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Case No. S189402

IN THE SUPREME COURT OF THE STATE OF CALIFORNIA

CALIFORNIA UNIONS FOR RELIABLE ENERGY
and WILLIAM PEREZ,

Petitioners,

v.

CALIFORNIA ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION,

Respondent,

TESSERA SOLAR, INC., CALICO SOLAR, LLC and
Does 1 through 100,

Real Parties in
Interest.

After a Decision of the Energy Resources Conservation and
Development Commission of the State of California
Docket No. 08-AFC-13, Order No. 10-1028-03

REAL PARTY IN INTEREST'S APPENDIX

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CALIFORNIA UNIONS FOR RELIABLE ENERGY AND WILLIAM PEREZ V. CALIFORNIA ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION

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08/09/2010	Calico Solar Power Project Supplemental Staff Assessment, Part II	3:742-1001

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SES Solar One

Application for Certification

Volume 1

December 2008

Submitted to:
California Energy Commission
1516 9th Street, MS 15
Sacramento, CA 95814-5504

Bureau of Land Management
1661 S. 4th Street
El Centro, CA 92243

Submitted by:
SES Solar Three, LLC
SES Solar Six, LLC

Stirling Energy Systems
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3.1 INTRODUCTION

This section describes Stirling Energy Systems (SES) Solar One (Solar One or Project) and its ancillary facilities and systems. The Project will be one of the world's largest solar power projects. It will be owned and operated by SES Solar Three, LLC and SES Solar Six, LLC (Solar One or Applicant). The Project will consist of approximately 34,000 solar dish Stirling systems (referred to as SunCatchers), their associated equipment and systems, and their support infrastructure. The nominal design electric capacity of the Project is approximately 850 megawatts (MW). The Project Site is approximately 8,230 acres and is located in San Bernardino County, California (see Figures 1-1, and 1-2, in Section 1).

For the Project, the Applicant will deploy SES's SunCatcher proprietary technology, which consists of solar concentrating dishes coupled with Solar Stirling Engine Power Conversion Units (PCUs). The SunCatcher technology has been developed, optimized, and matured during the past 20 years. It offers a number of distinct and unique benefits in the production of utility-scale electric power. These advantages include the items listed below.

Performance

- **High Peak Efficiency:** The SunCatcher technology is the world's most efficient solar power to grid-quality electricity system. The SES technology has had one of the world's records for efficiency since 1984 and in January 2008, SunCatcher broke its own record, achieving a conversion efficiency rating of 31.25 percent.
- **High Part-Load Efficiency:** The Solar Stirling Engine integrated into the SunCatcher delivers high part-load efficiency. Thus, little degradation of conversion efficiency occurs in suboptimal solar conditions, resulting in high annual performance.
- **Durability/Long Life:** This technology has been in operation since 1984 with no appreciable loss in any of the key performance criteria (reflectivity, electrical output, structural integrity, or efficiency). In fact, prototypes have been built and moved to various locations in the 24-year lifetime of the technology with no appreciable degradation in performance.

Modularity Design

Each SunCatcher is a highly efficient, modular, self-contained electricity generator. This leads to the advantages listed below.

- **Immediate Power Production:** This technology allows immediate power production from units or groups of units as they are installed. A key result of this is that the overall cost of the Project is reduced due to the combined impacts of higher efficiencies and earlier generation of electricity during the installation period.
- **High Availability:** The modularity of the Project facilities provides a high degree of redundancy which benefits overall availability. The failure of any specific unit or group of units will not have an adverse effect on the performance of the overall Project.
- **Terrain Tolerance:** The modularity allows the units to be installed on sloping land with up to a 10 percent grade. This significantly reduces the requirements for grading of sites, thereby minimizing the ground disturbance.

- **Mass Production:** Modularity allows high volume and low cost automotive-style mass production. This type of mass production also provides the opportunity for high-precision, highly consistent quality of manufacturing, which translates into higher reliability of system performance. Another advantage of mass production processing is the ability to work in controlled factory environments that are designed and operated based on lean manufacturing principles. The result is considerably lower levels of waste generation throughout the process, both in manufacturing and site deployment. Furthermore, modularity facilitates recycling and management of the waste generated. An additional benefit is that manufacturing at off-site factories will result in reduced disturbance of the Project Site during installation.

Environmental

- **Water Usage:** The SunCatcher[1] technology does not employ steam in its generation process. In fact, the only water consumption specific to the SunCatcher technology is that required for mirror washing.
- **Emissions:** SunCatchers do not consume fossil fuels; therefore, no combustion emissions are specifically associated with the operation of this technology.

3.1.1 Technology

The Solar One technology is the most efficient solar-powered electricity-generating technology currently deployed in the world. The SunCatcher electric power generation profile aligns well with utility peak demand requirements and has a predictable "time-of-day" output. Solar insolation, the amount of incoming solar radiation, varies annually from summer to winter, which causes a similar variation in the daily output power of the Project.

Each SunCatcher consists of a PCU and a mirrored-surface dish assembly operating as a solar concentrator that automatically tracks the sun. The dish assembly collects and focuses solar energy onto the PCU to generate electricity. Each PCU consists of a solar receiver heat exchanger and a closed-cycle, high-efficiency Solar Stirling Engine specifically designed to convert solar power to rotary power via a thermal conversion process. The engine drives an electrical generator to produce grid-quality electricity. Power generated by the 1.5MW groups of 60 SunCatchers per group will be collected through a 600-volt underground power collection system. This collection system will combine the output from the units and connect each 1.5MW group to a generator step-up unit (GSU) transformer with an output voltage of 34.5 kilovolt (kV). The output from the GSUs will be grouped into 3-, 6-, and 9MW groups, which will be connected via 34.5kV underground collection circuits to 48- or 51MW, 34.5kV overhead collection circuits, each of which will be connected directly to the on-site collection substation. The on-site collection substation will be connected via a 220kV, single-circuit overhead interconnection transmission line for delivery of generated electricity to the Southern California Edison (SCE) Pisgah Substation, where the interconnect to the California Independent System Operator (CAISO)-controlled grid will take place.

[1] These references are for the SunCatcher systems. Limited water and fuel consumption and vehicle emissions associated with operation and maintenance activities for a utility-scale power plant will still be required.

3.1.2 Project Summary

The Project will include the construction of a new 220kV substation approximately in the center of the Project Site. The Project design will minimize land disturbance, and the Project will operate with no fossil-fuel emissions from the electric generation process. Well water will be stored on-site for all operational needs. The drainage swales will be constructed to intercept and convey the surface low-flows from undisturbed natural areas to debris basins. Rainfall runoff will be collected and percolated into the ground. Main roads will be constructed with a combination of roadway dips and elevated sections across the drainage features. A stem pipe concept may be used at some of these crossings; the stem pipes will retain a small amount of water, which will be percolated into the ground. The sanitary system will consist of a buried septic tank system with a dual sanitary leach field.

The Project will be constructed in two phases. As shown on Figure 3-1, Solar One – Site Plan – Phase I – During Construction, Phase I of the Project will consist of up to 20,000 SunCatchers configured in 333 (1.5MW) solar groups of 60 SunCatchers per group that will have a net nominal generating capacity of 500MW. As shown on Figure 3-2, Solar One – Site Plan – Phase II – During Construction, and Figure 3-3, Solar One– Site Plan – Post-Construction, Phase II will expand the Project to 34,000 SunCatchers configured in 567 (1.5MW) solar groups with a total net generating capacity of 850MW. The Project will be connected to the SCE Pisgah Substation via an approximate 2-mile, single-circuit, 220kV transmission line. The Project will require the proposed SCE expansion and upgrade of the 220kV SCE Pisgah Substation, increasing the voltage to 500kV, looping the Eldorado-Lugo 500kV line into the SCE Pisgah Substation and removing 65 miles of the of the existing Lugo-Pisgah No 2 220kV Transmission Line and reinstalling a new 500kV transmission line from the SCE Pisgah Substation to the Lugo Substation. In addition, modifications within the SCE Eldorado and Lugo substations will be required. See Appendix EE, Lugo-Pisgah No. 2 500kV Transmission Line and Substation Siting Study, for more details regarding these upgrades.

Within the Project boundary, Phase I requires approximately 5,838 acres of BLM land and Phase II requires approximately 2,392 acres of BLM land. The total area of BLM land, within the Project boundary, required for both phases, including the area for the operation and administration building, the maintenance building, and the substation, is approximately 8,230 acres. A portion of the 220kV transmission line that will be built for the Project will parallel the Burlington Northern Santa Fe (BNSF) Railroad Right-of-Way (ROW) and the remaining portion will parallel the SCE transmission line within the Project boundary, as shown on Figure 3-5. The Applicant has applied for a ROW grant for the Project Site from the Bureau of Land Management (BLM) California Desert District (CDD). Although the Project is phased, it is being analyzed in this Application for Certification as if all phases will be operational at the same time.

The main entry for traffic to the Project Site during construction will be from Interstate 40 (I-40) via a proposed temporary half interchange approximately 3 miles east of the Project Site. The proposed interchange will accommodate west bound traffic and will be constructed on the north side of I-40. A proposed temporary two-lane off-site access road will be constructed from this interchange back to the Project Site.

During Project operation, the main access (entry and exit) to the site will be from Hector Road. The portion of the Project north of the BNSF Railroad will be accessed via a proposed overpass

over the railroad that will be constructed on the Project Site. During Project operation, the secondary and emergency access will be from the existing road network.

3.2 LOCATION OF THE PROJECT

The Project Site is located in San Bernardino County in an undeveloped area of the Mojave Desert located approximately 115 miles east of Los Angeles, California, and 37 miles east of Barstow, California along I-40. The following sections or portions of sections in Townships 8 and 9 of the San Bernardino Meridian identify the Project Site and the planned boundary for development of the Project.

Within Township 8 North, Range 5 East of the San Bernardino Meridian defined by:

- the eastern half of Section 2,
- the portion of the northeast and northwest quarter sections and the northeast and southeast quarter-quarter sections of the south east quarter section of Section 8 south of the railroad ROW and north of the I-40 ROW,
- the southwest, northeast, and southeast quarter of Section 10,
- the portion of Section 11 south of the railroad ROW and the portion of the northeast quarter section of Section 11 north of the railroad ROW,
- the portion of Section 12 north and south of the railroad ROW,
- the portion of Section 14 north of the I-40 ROW,
- the portion of Section 16 north of the I-40 ROW, and
- the portion of the northeast quarter-quarter section of the northeast quarter section of Section 17 north of the I-40 ROW.

Township 8 North, Range 6 East defined by:

- the portion of Section 4 west of the SCE Transmission ROW,
- all of Sections 5 and 6,
- the portions of Section 7 north and south of the railroad ROW,
- the portion of Section 8 west of the SCE Transmission ROW,
- the portion of Section 9 west of the SCE Transmission ROW,
- the portions of Section 17 west of the SCE Transmission ROW and north and south of the railroad ROW, and
- the portions of Section 18 west of the SCE Transmission ROW, south of the railroad ROW and north of the I-40 ROW.

Township 9 North, Range 5 East defined by:

- the eastern half of Section 35,

Township 9 North, Range 6 East defined by:

- all of Sections 31 and 32, and
- the northwest and southwest quarter sections and the northwest and southwest quarter-quarter sections of the northeast and southeast quarter sections of Section 33.

The area where the Project would be constructed is primarily open, undeveloped land within the Mojave Desert. The Cady Mountain Wilderness Study Area (WSA) is located north of the Solar One site. The Pisgah Crater, located within the BLM-designated Pisgah Area of Critical Environmental Concern (ACEC), is located south of the Project. Several underground and aboveground utilities traverse the area.

An off-site single-circuit generation interconnection transmission line will be constructed a distance of approximately 0.14 miles to connect the Project to the SCE Pisgah Substation as shown on the following figures:

- Figure 3-5, Solar One 220kV Transmission Line,
- Figure 3-6, Solar One and Solar Three Transmissions Lines,
- Figure 3-7, 500kV Transmission Line Under Crossing Detail, and
- Figure 3-8, 220kV Transmission Line Under Crossing Detail.

The single-circuit transmission line will be defined by a linear survey and will be routed through portions of Township 8 North, Range 6 East, Section 18.

Electric and communications utility services for the Main Services Complex will be constructed in Township 8 North, Range 5 East in Section 15 to the overhead utility lines located on the south side of National Trails Highway. These utility ROWs will be defined by linear surveys and are shown in the Figure 3-9, Utility Plan – On-Site Utility Service.

A temporary site access road will be constructed from I-40 to the eastern boundary of the Project Site, as shown on Figure 3-3, Solar One – Site Plan – Post Construction. The temporary site access road will generally follow an existing road and will include new off-and-on ramps to the westbound lanes of I-40. The temporary site access road will be defined by a linear survey, and will be routed through portions of Township 8 North, Range 6 East, Sections 17, 20 and 21.

3.3 PROJECT SITE DESCRIPTION

3.3.1 Existing Site Conditions

The Project is located in San Bernardino County, California. The Project will be located on approximately 8,230 acres of land requested to be authorized under a ROW permit from the BLM. There are approximately 2,246 acres of private land within the Project boundary.

Currently, the Project Site consists primarily of mostly undisturbed desert alluvial sands and desert flora and includes some parcels of private land.

In addition to the natural desert areas, the site also contains numerous improvements including:

- BNSF Railroad - the BNSF railroad bisects the site from west to east. The BNSF Hector siding is located adjacent to the Project and is within the BNSF ROW.

- Gas Pipelines - Several underground high pressure gas pipelines cross the site, generally parallel to the highway and the railroad. There are several valve and gasline control installations also located within the gasline easement on the Project Site.
- Electric Transmission - An existing SCE electrical overhead powerline forms part of the boundary of the site. In addition the SCE Pisgah Substation is located adjacent to the site.
- I-40 – the interstate highway forms the southern boundary of the Project Site
- Hector Road – enters the site from I-40 for approximately 0.5 mile.

Topography

The northern part of the site (Phase I) is flanked by the Cady Mountains which are rugged, weathered mountains sloping down to a moderately sloped plain, typical of the basin and range province. The ground surface at the site generally slopes from the northeast to the southwest from an approximate high point elevation of 2,860 feet above mean sea level (msl) to the southwestern side of the site with an elevation of approximately 1,800 feet. Slopes range from approximately 2 percent to 6 percent across the site. The southern boundary of the site is formed by I-40.

Hydrologic Setting

The Project Site lies within the Mojave Desert, which is part of the Great Basin. The topography is typical of the Basin and Range Province. The site lies at the foot of the Cady Mountains. As is typical with basin and range system, the basin is bounded by the Pisgah and Lavic Lake Faults. Weathering and erosion from the mountain ranges has created vast amounts of sediment which has collected in the valley, mostly burying the bedrock.

The site is located northwest of the Pisgah Crater, also known as Pisgah Volcano. The volcano is the youngest vent in the Lavic Lake volcanic field. It is speculated that there may have been activity at this site as recent as 2,000 years ago, though more likely 20,000 to 50,000 years ago. The lava flows extend over 10 miles from the cone and are visible at the ground surface at some locations within the Project boundary.

The Project Site is located generally on a gently sloping alluvial surface. On the north side of the railroad tracks, slopes vary from about 2 percent to 6 percent and exhibit the characteristics of an alluvial fan or plain. Slopes within the mountainous watershed north of the site are much steeper. These slopes promote rapid runoff of floodwater when the precipitation rate exceeds the infiltration rate of the soil.

Climate

The Mojave Desert is one of the hottest and most arid regions in North America. The Project Site lies approximately 80 miles south of Death Valley. This region is one of the more arid parts of the Mojave Desert with an average annual precipitation of approximately 5 inches (measured in Barstow). Maximum recorded 24-hour precipitation is 1.57 inches (measured in Barstow). February is the wettest month with a mean rainfall of 0.99 inch and a maximum of 4.22 inches. June is the driest month with a mean rainfall of 0.06 inch and maximum of 0.60 inch. Average annual maximum and minimum temperatures are 80º F and 50º Fahrenheit (F). Daily maximum and minimum temperatures are 115º F and 8º F. Average annual pan evaporation is over 140 inches.

Soils

Site soils are generally of four different types. Within wash areas, soils vary from silty to gravelly fine sands which are loose, un-compacted and exhibit little cohesion. Soils in these areas are deposited by fluvial action and are often uniformly graded (sorted). In higher areas, which are not subject to concentrated water flows, soils are more densely compacted and contain larger gravels, cobbles, and boulders. Soils in these areas exhibit relatively little desert varnish but do appear to be armored. In some areas, bedrock outcrops are observed which appear to be either exposed bedrock or lava flows. The entire area is littered with pyroclastic material presumably from the Pisgah Crater that is several miles southeast of the Project Site. The mountainous off-site watershed area includes massive outcrops of bedrock. The bedrock is highly fractured and weathered.

Surface Water

There are no perennial streams within the Project Site or in the area. The nearest major ephemeral stream is the Mojave River which is approximately 15 miles northwest of the site and does not pose a flooding hazard to the project. The site is traversed by a number of discontinuous ephemeral drainage features. No floodplains have been delineated by the Federal Emergency Management Agency (FEMA); however, additional delineation will be undertaken to identify flood paths within the Project Site that pose a hazard.

3.3.2 Site Surveys

USGS maps have been used to preliminary establish local benchmarks, Project Site boundaries, and topography. The USGS topographic maps were used to establish the site's grading and drainage plans and to determine preliminary placement of SunCatchers, roadways, and other Project features. A preliminary geotechnical report was performed for a portion of the Project to evaluate general surface conditions; basic subsurface conditions, seismicity, and the other geological information necessary to develop preliminary recommendations for the design and construction of foundations, aboveground structures, and equipment (see Section 5.3, Geologic Hazards and Resources, and Appendix E, Solar One Pilot Project Preliminary Geotechnical and Geologic Hazards Evaluation).

3.4 PROJECT DESCRIPTION

This section describes the Project Site arrangement, the Project conceptual design, Project processes, and the operation of the Project. Project facilities will be designed, constructed, and operated in accordance with applicable laws, ordinances, regulations, and standards (LORS). Computer-generated photo simulations of the Project are shown on Figures 3-10A through 3-10C. Figure 3-10A is a full-page color photographic reproduction depicting the visual appearance of the existing Project Site. Figure 3-10B is a color simulation depicting the Project Site and ancillary features after construction. Figure 3-10C provides a simulation of a portion of the Project Site.

3.4.1 Project Site Arrangement

The site plan for the Project is shown on Figure 3-3, Solar One – Site Plan – Post Construction. The basic building block for the Project is a 1.5MW solar group consisting of 60 SunCatchers, as shown on Figure 3-11, Solar One 1.5MW Solar Group Plan. The 1.5MW groups will be connected in series to create 3-, 6-, and 9MW solar groups. A typical 9MW group is shown on Figure 3-12, Solar One 9MW Solar Group Plan. The 3-, 6-, and 9MW groups will be connected to overhead collection lines rated at 48MW or 51MW. A typical 18MW solar group showing two 9MW groups connected to the overhead collection lines is shown on Figure 3-13, Solar One 18MW Solar Group Plan. Typical elevation views of a 6MW portion of the solar field are provided on Figure 3-14, Solar One Typical Elevation View. The typical solar groups will be arranged as necessary to fit the contours of the site. These figures illustrate the location, equipment arrangement, and size of the generation equipment for the Project.

The entire working Project will be fenced while still protecting sensitive ecological areas. The Project will have four laydown areas, two for each Phase. The southeast corner of Phase I will have a laydown area on approximately 26 acres and the other laydown area will be located on approximately 14 acres adjacent to the Main Services Complex. Phase II will have a laydown area on approximately 26 acres located just north of I-40 and immediately east of Hector Road and the other laydown area will be located on approximately 11 acres adjacent to the Satellite Services Complex.

The boundary of the Project will encompass approximately 8,230 acres of land, not including the private parcels of land designated as not a part of the Project. Access to the federal land managed by the BLM will be authorized under a ROW permit. Appendix C, Property Owners Within 1,000 Feet of Project Site, contains a list of the current assessor parcel numbers and the owners' names and addresses for all parcels within 1,000 feet of the Project and its ancillary facilities.

During Project construction, the main entry and exit to Phase I will be from the east, from the temporary access road. The main entry and exit to Phase II will be from Hector Road. During Project operation, main site access (entry and exit) will be from Hector Road. The temporary access road to be constructed from I-40 may be utilized as a permanent secondary emergency access route after construction.

The following roadways will be constructed on the Project Site: paved arterial roads, unpaved perimeter roads, and unpaved access routes. The paved arterial roads will reduce fugitive dust while allowing full access to dishes and infrastructure. Polymeric stabilizers may be used in lieu of traditional road construction materials for paved roads and/or to stabilize unpaved roads. Access to the Project Site will be through controlled gates. See Table 3-17 for more details on these roadways.

3.4.2 Major Equipment

Table 3-1, Major Equipment List, and Table 3-2, Significant Structures and Equipment, list the major equipment and significant structures required for the Project, respectively.

Table 3-1
Major Equipment List

Description	Quantity	Size/Capacity	Remarks
SunCatcher power generating system	34,000	2 kWe	Focuses solar energy onto a Power Conversion Unit to generate 25kWe of electricity
Generator collection junction box	2,834	400A, 600V	Collects the output from 12 Stirling dish assemblies.
Generator collection power center, distribution switchboard with six 400A circuit breakers	567	2,000A Bus, 600V	Collects five 1.5MW solar groups and connects one power factor correction capacitor group.
Collector group generator step-up unit (GSU) transformer, with taps	567	1,7kVA, 57V to 34.kV	Step up power from 1.5MW solar group (60 Stirling dishes assemblies).
Power factor correction capacitor, switched in five each 200kVAR steps	567	1,000kVAR, 6 V	Provides power factor correction at the 1.5MW solar group level.
Open bus switch rack, five 1,200A feeder breakers, 40kA INT, with switches, insulators, and bus work	6	34.5kV, 3,00A	Five of each switch rack lineup collects 150MW at 34.5kV, one lineup collects 100MW at 34.5kV.
Shunt capacitor bank, switched in six 15MVAR steps	6	34.5kV, 90 MVAR	Provides power factor correction at the 150MW solar group level.
Dynamic VAR (DVAR) compensation system in coordination with shunt capacitor banks; size to be determined by studies (Check with Tom, may be 6)	6	34.kV, size to be determined	Provides active VAR compensation to maintain required power factor profile and to aid in meeting low-voltage ride-through requirements.
Disconnect switch, 35kV, 200kVBIL, group-operated	6	35kV, 3,000A	Provides capability to isolate power transformer from the 34.5kV collection system.
Power transformer, three-phase, oil filled	6	100/133/166.7MVA, 220/127 to 34.5/19.9kV, 750kV BIL	Step up power from 34.5kV collection voltage to 220kV transmission voltage.
Power circuit breaker	7	242kV, 2,000A, 40kA interrupting capacity	Transformer and line protection.
Coupling capacitor voltage transformer	6	242kV, 90kV BIL, 60Hz, PT Ratio 1,200/2,000:1	Voltage source for protection and control.
Disconnect switch, 242kV, 900kV BIL, group operated	9	24kV, 2,000A	For isolation of the power transformers, breakers and for isolating the substation from the interconnect transmission lines.

Table 3-1
Major Equipment List

Description	Quantity	Size/Capacity	Remarks
Diesel power generator set	1	250kW, 480V	Installed at Main Services Complex
Fire water pump, diesel or electric	1	26HP	Installed at Main Services Complex
Water Treatment	1	64,000gpd	Automatic reverse osmosis and/or demineralized system(s)

Source: Stirling Energy Systems, 2008.

Notes:

A	=	ampere (amp)
BIL	=	basic impulse level
gpd	=	gallons per day
HP	=	horsepower
Hz	=	hertz
INT	=	international
kA	=	kilo amps
kV	=	kilovolt
kVA	=	kilovolt amps
kVAR	=	kilovolt amp reactive
kW	=	kilowatt
kWe	=	kilowatt-electric
MVA	=	mega volt amps
MVAR	=	mega volt amp reactive
MW	=	megawatts
V	=	volts
VAR	=	volt amp reactive
W	=	watts

Table 3-2
Significant Structures and Equipment

Description	Quantity	Length (feet)	Width (feet)	Height (feet)
SunCatcher power generating system	34,000	38	40	38
Main Services Complex administration building	1	200	150	14
Main Services Complex maintenance building	1	180	250	44
Main SunCatcher assembly building[2]	3	211	170	78
Satellite Services Complex maintenance building		120	250	44
Well water storage tank, 175,000 gallons	1	40 diameter		20
Demineralized water tank, 17,000 gallons	2	18 diameter		10
Potable/Fire Water Tank, 175,000 gallons	1	40 diameter		20
220kV transmission line towers, double-circuit with upswept arms	12 to 15	--	32	90 to 110

[2] Assembly building may be relocated from the Main Services Complex to the Satellite Services Complex during Phase II

Table 3-2
Significant Structures and Equipment

Description	Quantity	Length (feet)	Width (feet)	Height (feet)
Generator collection sub-panel; distribution panel, 42 circuit, 400A, 600V, with circuit breakers in a weatherproof enclosure	2,834	1	2.67	5
Generator collection power center, 2,000-A distribution panels with six 400-A circuit breakers	567	2	3.33	7.5
Collector group generator step-up unit transformer (GSU), 1,750kVA, 575 V to 34.5kV, with taps	567	6.67	7.5	6.67
Power factor correction capacitor, 600V, 1,000kVAR, switched in five, each 200kVAR steps	567	2.5	6.67	7.5
Open bus switch rack, 35kV, 7 bay with five 35kV, 1,200-A, 40kVA INT, circuit breakers, insulators, switches, and bus work	6	105	20	30
Shunt capacitor bank, 34.5kV, 90 MVAR switched in six each 15 MVAR steps	6	15	8	20**
Dynamic VAR (DVAR) compensation system in coordination with shunt capacitor banks – size to be determined by studies	1	60	12	16
Disconnect switch, 35kV, 3,000 A, 200kV BIL, group-operated	6	3	11	16**
Power transformer, three phase, 100/133/167 mega volt amp, 230/132.8-34.5/19.9kV, 750kV BIL, oil filled	6	15	35	23
Power circuit breaker, 242kV, 2000A, 40 kilo amp interrupting capacity	7	12	20	16
Coupling capacitor voltage transformer for metering, 242kV, 900kV BIL, 60 Hertz, Potential Transformer ratio 1,200/2,000:1	6	1	1	25**
Disconnect switch, 242kV, 2000A	9	10	25	25**

Source: Stirling Energy Systems, Inc., 2008.
Notes:
**Includes structure height to provide electrical safety clearances to ground.
-- = not applicable
A = ampere (amp)
BIL = basic impulse level
INT = international
kV = kilovolt
kVA = kilovolt amp
kVAR = kilovolt amp reactive
MVAR = mega volt amp reactive
v = volts

3.4.3 Power Process Description

The Project will consist of approximately 34,000 SunCatchers. Each SunCatcher will produce up to 25 kW net of grid-quality electricity at 575 volts alternating current. The Project will be electrically designed as 567 1.5MW, three-phase, 60-hertz, solar groups. Each complete solar group will consist of 60 SunCatchers, which correlates to a 1.5MW power block with a corresponding generator step-up unit (GSU) transformer (see Figure 3-15, 1.5MW Solar Group Electrical One-Line Diagram, Sheet 1, and Figure 3-16, 1.5MW Solar Group Electrical One-Line Diagram, Sheet 2). The GSU transformer will step the voltage up to 34.5kV.

The 1.5MW solar groups will be connected by underground electrical cables to create the 3-, 6-, and 9MW solar groups. Two typical 9MW groups are shown on Figure 3-17, Solar One – 18MW Feeder Group General Arrangement. Five 9MW groups and one 3MW group will be connected by underground electrical cables and a pole riser to an overhead collector line rated for 48MW. Five 9MW groups and one 6MW solar group will be connected by underground electrical cables and a pole riser to an overhead collector line rated for 51MW (Figure 3-18, Solar One – 51MW Feeder Group General Arrangement). The overhead collector groups will deliver the solar electric–generated power to the Solar One Substation.

The solar groups will operate daily from sunrise to sunset; they will come out of the stowed position after sunrise once the solar insolation reaches a minimum of 250 watts per square meter (W/m^2). Full power output is achieved when solar insolation reaches $1{,}000W/m^2$. The solar field will operate until dusk unless adverse weather events occur (e.g., storms, periods of sustained clouds, or sustained wind conditions greater than approximately 35 miles per hour).

At dusk or when clouds reduce solar insolation to below a minimum of $250W/m^2$, the SunCatchers will be moved into the night-stow position. During periods of sustained high winds (exceeding 35 miles per hour), the SunCatchers will be moved into the wind stow position.

Each SunCatcher has an on-board control system that utilizes proprietary control systems to control the PCU and the dish. The on-board controllers will be supervised by a Supervisory Control and Data Acquisition (SCADA) system. The SCADA system will include central processors and an operator interface located in the central control room, communications, and data logging servers and dish-group servers located throughout the solar field. The various components of the SCADA system and the on-board controllers on each SunCatcher will be interconnected with a system of underground and overhead fiber optic cables that will generally be routed together with the electrical collection system cables.

3.4.4 Description of Technology

The solar dish Stirling technology is well beyond the research and development phase, with more than 20 years of recorded operating history. The equipment is well characterized with over 45,000 hours of on-sun time. Since 1984, the solar dish Stirling equipment has held one of the world's efficiency record for converting solar energy into grid-quality electricity. This record was achieved when the technology was installed in Huntington Beach, California. Solar One coordinated with the U.S. Department of Energy and Sun-Labs (National Renewable Energy Laboratory and Sandia National Laboratories) to conduct an endurance test of the solar dish Stirling system and to bring the technology to market.

The history of the development of the Solar Stirling Engine is provided in Appendix B, Solar Stirling Engine.

3.4.4.1 SunCatcher Technology

The SunCatcher is a 25-kilowatt-electrical (kWe) solar dish Stirling system designed to automatically track the sun and collect and focus solar energy onto a PCU, which generates electricity. The system consists of a 38-foot-high by 40-foot-wide solar concentrator in a dish structure that supports an array of curved glass mirror facets. These mirrors collect and concentrate solar energy onto the solar receiver of the PCU.

The PCU converts the focused solar thermal energy into grid-quality electricity. The conversion process in the PCU involves a closed-cycle, high-efficiency four-cylinder, 35-horsepower reciprocating Solar Stirling Engine utilizing an internal working fluid of hydrogen gas that is recycled through the engine. The Solar Stirling Engine operates with heat input from the sun that is focused by the SunCatcher's dish assembly mirrors onto the PCU's solar receiver tubes, which contain hydrogen gas. The PCU solar receiver is an external heat exchanger that absorbs the incoming solar thermal energy. This heats and pressurizes the hydrogen gas in the heat exchanger tubing, and this gas in turn powers the Solar Stirling Engine.

A generator is connected to the Solar Stirling Engine; this generator produces the electrical output of the SunCatcher. Each generator is capable of producing 25kWe at 575 volts alternating current (VAC/60 hertz [Hz]) of grid-quality electricity when operating with rated solar input. Waste heat from the engine is transferred to the ambient air via a radiator system similar to those used in automobiles.

The hydrogen gas is cooled by a standard glycol-water radiator system and is continually recycled within the engine during the power cycle. The conversion process does not consume water, as is required by most thermal-powered generating systems. The only water consumed by the SunCatcher is for washing of the mirrors to remove accumulated dust and replenishing small losses to the cooling system radiator in a 50-50 glycol-water coolant.

Thousands of SunCatchers constitute a single power plant, making the Project modular and scalable. Installed units will produce power while the remainder of the Project is under construction. Maintenance will be done on individual units while the vast majority of the units remain online; the result is high overall availability.

The SunCatcher technology uses no fuel other than heat from the sun, is emissions free, and uses a tiny fraction of the water required by traditional power plants. For this reason, the Project will have less impact on the environment than traditional generation technologies while providing a clean, efficient, reliable source of energy to SCE customers.

3.4.4.2 SunCatcher Components

The SunCatcher has three major components: the foundation/pedestal, the dish assembly, and the PCU.

Foundation/Pedestal

The solar dish will typically be mounted on a foundation consisting of a metal fin-pipe that is hydraulically driven into the ground. This foundation is preferred because no concrete is required, no spoils are generated, and the foundations can be completely removed when the Project is decommissioned. The metal fin-pipe foundation creates minimal disturbance to the environment. When conditions are not conducive to the use of the metal fin-pipe foundation, the foundation will consist of rebar-reinforced concrete constructed below grade. Figure 3-19, Integrated Metal Fin Pipe Foundation/Pedestal, illustrates the metal fin-pipe foundation.

Both of these foundation designs meet applicable structural design requirements and applicable LORS.

The SunCatcher pedestal on which the SunCatcher Dish Assembly is secured is up to 18 feet 6 inches in height and will be an integrated part of the metal fin-pipe foundation or will be a separate structure fastened to the rebar-reinforced concrete foundation at ground level.

Dish Assembly

The SunCatcher Dish Assembly is fitted with a trunnion that attaches to the pedestal. Each Dish Assembly consists of a 38-foot by 40-foot steel structure that supports an array of curved glass mirror facets. These mirrors form a curved shape engineered to concentrate solar energy onto the solar receiver portion of the PCU. The Dish Assembly includes azimuth and elevation drives for tracking the sun and a PCU support boom.

The SunCatcher Dish Positioning Control System employs proprietary algorithms to track the sun. This system focuses the solar energy onto the solar receiver by controlling elevation and azimuth drives, and executes startup, shutdown, and de-track procedures. These procedures allow the dish to "wake up" from the night-stow position in the morning to focus the dish mirror facets on the solar receiver of the PCU, and then to track the sun during the daylight operating time of the Project. The dish control system also communicates with and receives instructions from the central control room via the SCADA system. The system is designed to place the dish into a "wind stow" position when sustained winds exceed 35 miles per hour to protect the system from wind damage. The system also places the dish into "wind stow" position on loss of communications with the central control room or on receipt of a fault signal from the PCU control system.

Power Conversion Unit

The SunCatcher PCU converts the solar energy into grid-quality electricity. Hydrogen gas is used in a closed-cycle heating/expansion – cooling/compression cycle to drive a high-efficiency, 380-cubic-centimeter displacement, four-cylinder reciprocating Solar Stirling Engine. The Solar Stirling Engine powers an electrical generator that produces 25kWe net output after accounting for on-board parasitic loads at 575V alternating current, 60Hz of grid-quality electricity. The PCU attaches to the end of the PCU boom.

The dimensions of the PCU are approximately 88 inches (7 feet) long by 63 inches (5 feet) wide by 37 inches (3 feet) high. The PCU weighs approximately 1,400 pounds.

The PCU consists of six subsystems: solar receiver, Solar Stirling Engine, generator; cooling system, gas management system, and the PCU control system. Each subsystem is described below.

- **Solar Receiver:** The SunCatcher solar receiver consists of an insulated cavity with an aperture that allows the solar energy to enter. Within the cavity are four heater heads. Each heater head forms a tube network for one quadrant of the engine. The solar flux, radio energy from the sun, heats the metal tubes and the heat is then transferred through the tubes to the working hydrogen gas. The heat absorbed at the solar receiver drives the Solar Stirling Engine.
- **Solar Stirling Engine:** The kinematic Solar Stirling Engine has evolved from the design used as a propulsion source for submarines to its present Solar One design to convert solar

energy into electricity. The engine is highly reliable, low maintenance, and highly efficient. SES has further developed and improved the engine design specifically for use in the SunCatcher.

- **Generator:** A generator is coupled to the Solar Stirling Engine to produce the electrical output of the SunCatcher. The PCU generator attached to each Solar Stirling Engine is capable of producing up to 25kWe at 575VAC, 60Hz of grid-quality electricity when operating with a solar input of 250W/m^2 and above. The generator output is connected to the power collection system.
- **Cooling System:** Waste heat from the hydrogen gas within the engine is transferred to the ambient air via a radiator system similar to the type used in automobiles. The system is used to cool the hydrogen gas before the compression phase of the cycle. The SunCatcher cooling system is made up of ethylene-glycol fluid, a cooler in the gas circuit, a radiator, a fluid circulation pump, and a cooling fan.

  The pump circulates the cooling fluid through the gas cooler and radiator. Waste heat from the hydrogen gas is transferred to the ethylene-glycol fluid in the cooler. The coolant flows through the radiator where the fan forces ambient air over the cooling fins to remove heat. The heat is transferred to the atmosphere via the airflow over the radiator.
- **Gas Management System:** The gas management system controls the working pressure to ensure high efficiencies of the Stirling engine. The hydrogen gas is contained within a closed and sealed cycle, yet a very small amount of the hydrogen working fluid does leak (less than 200 cubic feet per dish per year) by the rod seals and is lost to the atmosphere. This hydrogen will be replenished by means of a local and/or distributed hydrogen system.
- **Control System:** The SunCatcher PCU control system monitors, controls, and communicates PCU performance. Thermal detectors are monitored by the PCU control system and the data are used to control the thermal balancing of the PCU. Alarms and faults monitored by the PCU control system are communicated to the Dish Positioning Control System and the Project SCADA system.

3.4.5 Electrical System Description

This section describes the major electrical systems and equipment for the Project. A small amount (less than 3 percent) of the Project output will be lost to electrical losses in the collection system. A very small amount (less than 0.1 percent) will be used in the Project substation for instrumentation, controls, lighting and heating, ventilating, and air-conditioning. Most of the output will be delivered to the regional electric grid through the interconnection with the SCE transmission system. The 25kWe rated net output of the SunCatchers takes into account the on-board auxiliary loads such as the azimuth and elevation drives, the cooling fan, and the controls systems. The Project buildings and auxiliary structures may receive electrical power via separate electrical services from SCE.

3.4.5.1 Major Electrical Equipment and Systems

The Project includes construction of a substation, which will include transformers, circuit breakers, metering, and other protection required to connect the Project to the SCE Pisgah Substation. The Project interconnect transmission system will require construction of approximately 2 miles of single-circuit 220kV transmission line.

Up to 34,000 SunCatchers will produce electrical power at 575 volts (V). Power will be collected at the 575V level in groups of 60 SunCatchers by an underground collection system. The voltage will be stepped up to 34.5kV by a GSU transformer.

Power will be collected at the 34.5kV level by a combination of underground cables and overhead collection lines and will be delivered to the Project substation, where the voltage will be stepped up to 220kV for transmission to the SCE Pisgah Substation and connection to the grid.

3.4.5.2 Electrical Collection System

This section describes the electrical collections system that collects power from the distributed generators and delivers it to the on-site substation for transmission to the SCE Pisgah Substation.

The following single-line diagrams illustrate the overall generation and distribution system for the Project:

- Figure 3-15, 1.5MW Solar Group Electrical One-Line Diagram, Sheet 1,
- Figure 3-16, 1.5MW Solar Group Electrical One-Line Diagram, Sheet 2,
- Figure 3-17, Solar One – 18MW Feeder Group General Arrangement, and
- Figure 3-18, Solar One – 51MW Feeder Group General Arrangement.

Power will be produced at 575 V by the PCU generators. The output from 12 SunCatcher PCU generators will be collected at a local 600 VAC, terminal cabinet via underground cables. Five local terminal cabinets will be wired to a 600-VAC, 2,000-A collector switchboard via underground cables to constitute a complete 60-unit, 1.5MW solar group. Local capacitor banks may be connected at each 1.5MW, 2,000-A solar group collector switchboard for volts-amps reactive control and power factor correction.

Each local collector switchboard described above will be connected to the low-voltage side of a 1,750kVA GSU transformer that steps voltage up to 34.5kV. GSUs will be connected together at 34.5kV via underground cables in strings of two to create a 3MW group, strings of four to create a 6MW group, and strings of six to create a 9MW group. Two typical 9MW groups are shown in Figure 3-17, Solar One – 18MW Feeder Group General Arrangement. Five 9MW groups and one 3MW group will be wired via underground cables and a pole riser to a 34.5kV overhead collection line rated for 48MW. Five 9MW groups and one 6MW group will be wired via underground cables and a pole rise to a 34.5kV overhead collection line rated for 51MW.

A total of six 48MW collection lines and eleven 51MW collection lines will be constructed. Overhead pole lines will be configured with one to four circuits. These pole lines will be routed to the 34.5kV to 220kV collector substation. Power step-up transformers at the Solar One Substation convert the 34.5kV collection voltage to the 220kV interconnection voltage in 150MW groups.

The electrical equipment described above will be specified for operation in a 55 degree Celsius ambient temperature to ensure reliability and longevity.

An elevation view of a 6MW solar group is shown in the Figure 3-14, Solar One Typical Elevation View.

3.4.5.3 Direct Current Power Supply System

SunCatcher controls and drive motors will be powered at 48 volts direct current (VDC) from battery/battery charger systems. The localized DC systems will each support multiple SunCatchers. The backup direct current (DC) power supply will maintain control power and provide the ability to slew the SunCatcher to a safe stow position in the event of a grid outage.

Each 220kV substation will have 125-VDC systems to feed the 220kV breaker controls, the step-up transformer controls, and the substation metering and relay circuits. The substation DC systems will consist of one battery, one charger, and one DC panel-board in each of the 34.5kV switchgear prefabricated metal buildings.

The battery chargers will each receive 240 VAC, three-phase power from the substation station service 34.5kV bus. They will supply power to the DC loads while continuously charging the batteries. The 125-VDC systems will be ungrounded and each will include a ground detector to detect ground faults.

3.4.5.4 Uninterruptible Power Supply System

The SCADA, control rooms, and other critical and related technical equipment support areas will be powered from uninterruptible power supply (UPS) systems backed up by diesel-powered standby generating systems to provide reliable, continuous, and uninterrupted power to the control rooms. The UPS units will be 120-VAC, solid-state converter/inverter technology with gel-cell batteries that require minimal ventilation for the charging gases.

3.4.5.5 Standby

The diesel-powered standby power generator will be sized to provide continuous power for the UPS system for the Project control rooms and other critical process loads through three-pole automatic transfer switches and downstream power distribution equipment. The estimated size of the diesel generator for the Main Services Complex is 250 kW, 480 VAC, three-phase service. Assuming a fuel consumption rate of 19.1 gallons/hour at 100 percent load, a 24-hour run time capability is a 480-gallon belly tank. A monthly 15-minute generator exercise program would consume 57.3 gallons of fuel per year.

3.4.5.6 Electrical Service for Buildings and Auxiliary Structures

Electrical service for the Main Services Complex, the water treatment structure, the water pumping stations, and other auxiliary structures will be provided separately from the Project power generation system and will be provided from SCE electrical distribution by means of overhead service lines to be constructed by SCE.

3.5 PROJECT AUXILIARIES

3.5.1 Lighting

Project building lighting will be a minimum 50 foot-candle illumination from combined day lighting and high-intensity discharge, high-efficiency lighting in the assembly and maintenance facility. Day lighting will supplement energy-efficient fluorescent lighting in the operation and administration and water treatment buildings. Emergency egress identification and path lighting will be provided per building code requirements.

Parking and site parking lighting will be designed to minimum traffic flow safety standards for personnel safety. Roadway lighting utilizing luminaries powered by photovoltaic arrays and batteries will be provided at the intersections and corners of internal site maintenance roads to provide minimal safety illumination from sunset to sunrise. Full-cut-off lighting fixtures will be used to control night sky light pollution. Project building exterior and support area lighting design will incorporate minimum personnel safety and security lighting levels while utilizing full-cut-off lighting fixtures to control light pollution. Photometric studies will be completed for the Main Services Complex, Satellite Services Complex and a typical roadway intersection. Preliminary photometric studies have been completed for the Main Services Complex and are illustrated for each of these areas on the following figures:

- Figure 3-20, Main Services Complex Lighting Site Plan – Part A,
- Figure 3-21, Main Services Complex Lighting Site Plan – Part B,
- Figure 3-22, Main Services Complex Lighting Site Plan – Part C, and
- Figure 3-23, Typical Roadway Lighting and Photometric Details.

Aviation obstruction lighting will be provided as required by the Federal Aviation Administration (FAA).

Reflective warning signage will be included on perimeter fencing.

3.5.2 Electrical Grounding

The electrical system may experience unit ground potential rise due to ground fault, lightning strike, or switching surges. A grounding system will be installed to permit dissipation of ground fault currents and minimize ground potential rise.

The substation-grounding grid will consist of bare conductors installed below grade in a grid pattern. Each junction of the grid will be bonded together by an exothermic welding process or mechanical connectors.

The grounding grid will be designed with adequate capacity to dissipate heat produced by ground current under the most severe fault conditions. Grid spacing will be designed to maintain safe voltage gradients. Ground resistivity testing and calculations will be performed during detailed design to determine the number and type of grounding electrodes and the grid spacing necessary to ensure safe step and touch potentials under fault conditions.

Each SunCatcher within the solar field will be bonded to the foundation to provide localized grounding of each machine.

Within Project buildings, grounding conductors will bond building structural steel, metallic piping, and non-energized metallic parts of electrical equipment to the building grounding systems. Isolated grounding conductors will connect sensitive control systems to the building grounding systems.

3.5.3 Cathodic and Lightning Protection

The cathodic protection system will be designed and installed to control electrochemical corrosion of exterior surfaces of underground carbon steel, copper, aluminum, and stainless steel. Bottoms of soil- or sand-pad-mounted steel tanks and exterior surfaces of underground ductile or cast-iron pipe will be protected against corrosion. The type of cathodic protection system (galvanic or impressed current) will be based on soil characteristics, the amount of material to be protected, and the interference effects of any nearby cathodic protection systems.

Lightning protection will follow the National Fire Protection Association (NFPA) 780 guidelines and will be provided where required for Project structures and pumps. A lightning protection study will be conducted to determine the specific equipment to protect.

3.5.4 Heating, Ventilation, and Air-Conditioning

Heating, ventilation, and air-conditioning (HVAC) will consist of heat pump rooftop units with code-required fresh make-up air capabilities for the Main and Satellite Services Complex. Mechanical ventilation with evaporative cooling and/or heat pumps will be utilized for maintenance buildings. Mechanical ventilation will be provided for the assembly buildings. Design will be performed in accordance with the Uniform Building Code (UBC)/International Building Code (IBC), California Energy and Buildings Codes, American Society of Heating, Refrigerating, and Air-Conditioning Engineers, and Sheet Metal and Air-Conditioning Contractors National Association standards and guides, and applicable LORS. These are listed in Appendix F, Mechanical and Fire Protection Engineering Design Criteria.

Temperature control will be provided for both personnel and equipment areas, and humidity control will be provided in the control and communications equipment rooms. Electric and/or propane bottle radiant heaters will be provided at local workstations in the assembly buildings.

3.5.5 Buildings

Buildings will be constructed in accordance with the appropriate edition of the California Building Code (CBC) and other applicable LORS.

The site layout of the Main Services Complex is depicted on Figure 3-24, Main Services Complex Site Plan – Part A, and Figure 3-25, Main Services Complex Site Plan – Part B. The Main Services Complex elevation view is illustrated in Figure 3-26, Main Services Complex Elevation View.

The Main Services Complex will be located within the in a central location that provides for efficient access routes for maintenance vehicles servicing the SunCatcher solar field. The main control room, SCADA, and UPS will be located at the Main Services Complex.

Warehouse and shop spaces will provide work areas and storage for spare parts for Project maintenance. The Main Services Complex will contain meeting and training rooms, maintenance and engineering offices, and administrative offices.

The Project administration offices and personnel facilities will be located in a one-story operation and administration building. The operation and administration building will measure approximately 200 feet long by 150 feet wide by 14 feet high. This building will also contain meeting and training rooms, engineering offices, a visitor's room, and support services.

The Project maintenance facilities, shop, and warehouse storage will be located adjacent to the operation and administration building. The maintenance building will measure 180 feet wide by 250 feet long by 44 feet in height. This building will contain maintenance shops and offices, PCU rebuild areas, maintenance vehicle servicing bays, chemical storage rooms, the main electrical room, and warehouse storage for maintenance parts to service the SunCatchers.

A water treatment shade structure will be located within the Main Services Complex. The water treatment structure will house water treatment equipment and safe storage areas for water treatment chemicals. A motor control center for the water treatment equipment and pumps will be located within this structure. Two wastewater evaporative ponds designed for water treatment wastewater containment will be located adjacent to the water treatment structure.

The Satellite Services Complex will be located south of the Solar One Substation in Phase II of the Project. The Satellite Services Complex will include a shade structure for maintenance of equipment and parts. An 18 foot diameter by 10 foot high aboveground demineralized water tank will be located adjacent to this structure for SunCatcher mirror washing. Two of the three temporary assembly buildings located in Phase I will be relocated to this complex during Phase II construction. Temporary buildings will be removed from the Satellite Services Complex at the end of Phase II construction.

A control building will be located near the Solar One Substation. This building will contain relay and control systems for the substation in one room and the Project operations control room in another room or rooms.

A diesel-powered or electric fire water pump and a diesel operated standby power generator will be located adjacent to the operation and administration building

On-site electric service will be obtained from SCE. Communications service will be provided. See Figure 3-9, Utility Plan – On-Site Utility Service, illustrates the routing of the site electrical, communications and water utilities. See Figure 3-4, Utility Plan – Off-Site Utility Service,.

SunCatcher assembly will be performed on-site in temporary structures. The assembly buildings are shown on Figure 3-24, Main Services Complex Site Plan – Part A, with an elevation shown on Figure 3-26, Main Services Complex Elevation View. The three assembly buildings will be located beside the Main Services Complex. Two of three buildings may be relocated to the Satellite Services Complex during construction of Phase II. Assembly buildings will be decommissioned after the Project's SunCatchers are assembled and installed.

Each assembly building will be 170 feet wide by 211 feet long by 78 feet in height and will contain two assembly lines. Each assembly building will be located on a concrete pad for the storage of SunCatcher components and assembled SunCatcher staging before field installation.

The primary purpose of the SunCatcher assembly buildings will be the assembly of the SunCatcher superstructure, the main beam assembly and trusses, the pedestal trunnion, mirrors, wire harnesses, control systems, drive position motors, and the calibration of the mirrors and control systems before field installation. Each assembly bay will be equipped with an automated platform on locating rails to move the SunCatcher through the assembly process.

The exterior material for the assembly buildings will be a fire retardant vinyl fluoride film with ultraviolet blocking characteristics and will be chemical and weather resistant.

A concrete pad with the dimensions 50 feet by 510 feet will be located adjacent to the assembly buildings for staging the assembled SunCatchers before field installation.

Transport trailer storage will be located next to the assembly bays. This storage facility will accommodate approximately 75 to 100 trailers, maintaining a supply of 3 to 5 days of inventory of SunCatchers parts during the assembly phase of construction.

3.5.6 Yard Tanks

The Project yard tanks will be at-grade steel tank reservoirs and/or polyethylene tanks. Conceptually, it is envisioned that the water treatment system will consist of a well water tank with a permanent booster pump station, a potable water treatment system, ground-set steel or polyethylene potable water and a fire water storage tank, a booster pump station to accommodate potable water needs and fire-flow requirements, a disinfection system, a demineralized water treatment system for mirror washing water, a polyethylene storage tank for demineralized water storage, chemical storage, reject water and sludge disposal and evaporation ponds, and various support piping, valves, and miscellaneous equipment to support the system. Conceptual tank sizing for water and other uses is as follows:

- one approximately 175,000-gallon well water storage tank,
- two approximately 17,000-gallon demineralized polyethylene water storage tanks to contain SunCatcher mirror washing water,
- one approximately 175,000-gallon potable water storage tank, to contain both fire suppression water and domestic water,

- two approximately 5,000-gallon double-walled fuel storage tanks mounted horizontally within a containment pad , and
- one approximately 10,000-gallon underground septic holding tank for off-site sanitary sewer off-site disposal or a smaller septic tank with dual leach fields.

The steel water storage tanks, if selected, will be vertical, round, field-erected steel tanks with suitable stem wall foundations and interior reinforced-concrete mats with coatings and grounding corrosion control. Tanks, foundations, and piping connections will be designed and constructed to the appropriate standards for contents and seismic zone considerations. Anchor bolts will be used as required.

Chemical storage tanks will be of shop-fabricated, double-walled construction that meets all applicable LORS. These tanks, as well as any portable drums, will be provided with appropriate anchors or cradles and placed within spill containment basins.

3.5.7 Roads and Railroads

The Project Site is located north and south of the Burlington Northern Santa Fe (BNSF) railway and north of I-40 within San Bernardino County, approximately 37 miles east of Barstow. Currently, there are three interchanges within the vicinity of the Project, I-40/Hector Road Interchange, I-40/Crucero Road Interchange, and I-40/Fort Cady Road Interchange. Construction vehicles, delivery trucks with materials, SunCatcher transport vehicles, employees, and visitors need off road conveyance routes to the on-site Main Services Complex and to the SunCatcher field arrays. The proposed roadway circulation system includes a Main and Secondary Project Site Access Roadways, main arterials, perimeter roadways, service roadways, and SunCatcher local roadways. Transport of equipment and/or materials to the Project Site may be via the BNSF Railroad.

Railroad Delivery Option

In addition to the existing Hector Road interchange and the proposed I-40 temporary off-ramp and access road, a potential railroad delivery option is under consideration. The railroad option would require coordination with BNSF to construct a railroad siding specifically designed to off-load construction materials in a safe and efficient manner with minimal disruption to current BNSF rail traffic operations. When implemented, the rail delivery option will reduce project construction related truck traffic along I-40, at the proposed I-40 temporary off-ramp and at the Hector Road interchange. It is anticipated that the proposed the rail delivery option under consideration would significantly reduce the traffic loadings and further improve the forecast LOS C conditions at the study intersections during project construction.

Off-site Roadways

Site access during the construction phase will be provided by constructing a temporary off-ramp and on-ramp from I-40 freeway (westbound) with a two-way paved temporary construction access road east of the Lugo-Pisgah Transmission Line from I-40, traversing a BLM ACEC. This access roadway includes the construction of a deceleration and acceleration interchange (westbound) and two way roadway from I-40 to the Project Site along an existing unimproved road located north of the BNSF ROW, across a BLM ACEC approximately 3 miles in length. The proposed temporary construction access road will be 30 feet wide to allow for two lanes and

shoulders, one 12-foot lane in each direction and 3-foot shoulders, minimizing the disturbance to the BLM ACEC. This roadway will be the primary construction roadway for the Project Site.

A permanent Project Site access roadway will be provided upon Project built-out via construction of the Hector Road access with bridge over the BNSF railway, utilizing I-40/Hector Road interchange. The proposed permanent access roadway, as shown on Figure 3-3, Solar One – Site Plan – Post Construction, will connect to the existing county maintained paved portion of Hector Road. The proposed roadway will be located at an off-set between ¼ mile and ½ mile to the east of the existing Hector Road alignment, crossing the BNSF railway with the construction of a private overhead grade separation (bridge). With the permanent site access roadway, vehicles will utilize I-40/Hector Road interchange and travel north on Hector Road, crossing the BNSF railway over a proposed bridge into the northern side of the Project Site. The bridge approach is anticipated to be placed on BLM land where the BNSF ROW is reduced from 200-feet to 100-feet in width (approximately ¼ mile east of the existing Hector Road alignment). It is anticipated that the proposed bridge will consist of a 220-foot long, 125-foot clear span, and 36-foot wide PC/PS girder bridge carrying two 12-foot lanes of traffic and a 6-foot pedestrian/bicycle pathway per BNSF Clearances for Highway and Pedestrian Overpass. The permanent access roadway will be the primary operations and maintenance roadway for the Project Site.

On-site Roadways

The Project Site arrangement is illustrated in the following figures:

Figure 3-1, Solar One – Site Plan – Phase I – During Construction,

Figure 3-2, Solar One – Site Plan – Phase II – During Construction, and

Figure 3-3, Solar One – Site Plan – Post Construction.

The figures illustrate a network of four types of roadways proposed for servicing the Project:

- paved arterial roadways,
- unpaved solar field access routes,
- unpaved perimeter roadways, and
- paved Main Services Complex roadways and parking areas.

Polymeric stabilizers are proposed to be used in lieu of traditional road construction materials (e.g., asphalt) for paved roads or to stabilize unpaved roads. The paved arterial roadways may be designed with one 12-foot lane in each direction or as one-way roadways with one 12-foot lane, as illustrated on the above-referenced figures and Figure 3-27, Paved Arterial Roads. These paved arterial roadways will allow for a looped access to the Main Services Complex, unpaved solar field access routes, access to private properties within the site, and access to the electrical substation. Paving will be placed on arterial roadways to provide for improved solar field access and to minimize fugitive dust generation. The looped roadways will provide for redundancy in the event that a roadway is blocked because of local SunCatcher maintenance, construction traffic, or other local disruption.

Perimeter roadways are proposed along the perimeter fence. In some instances the paved arterial roadways will serve as the perimeter roadways. Where paved arterial roadways are not located

adjacent to the perimeter fence, 15-foot unpaved one-way roadways will be provided to allow for patrolling of the Project Site by the security personnel and for maintenance of the perimeter fence. Unpaved perimeter roadways will be constructed with polymeric stabilizers or with base material consisting of crushed aggregate over compacted natural ground. Fugitive dust control will be added to the perimeter roadways as needed to minimize dust generation.

The unpaved solar field access routes will be designed for minimum roadway blading to allow for individual SunCatcher access for installation and maintenance. The unpaved solar field access routes will allow for localized access for maintenance service vehicles, and will be constructed per the recommendations of the Soils Engineer based on the expected construction and maintenance traffic loads. To minimize site disturbance, the construction of unpaved north-south access routes will be located along the center of a 144-foot area along every other row of SunCatchers. Between rows, a 40-foot area will be left intact and generally undisturbed except for brush trimming as may be required to reduce fire hazard and shading of SunCatchers. Unpaved east-west access routes will be limited to the alignments, or projection thereof, where electrical cables have been installed in an east-west direction. Temporary site stabilization measures such as metal plates or soil reinforcement mats, and/or polymeric stabilizers may be used to access SunCatchers.

The Main Services Complex parking lot, trailer storage areas, and the roadways circling SunCatcher assembly bays will also be paved using asphalt or polymeric stabilizers. Concrete paving may be utilized in loading and storage areas.

3.5.8 Site Security

An on-site security system will be installed as part of the. Controlled access gates will be maintained at the entrances to the site, on the east side of the Project, north of the SCE Pisgah Substation and on the south side of the Project, at Hector Road. The Hector Road access will also serve as the main entry and exit gate during Project operations. Twenty-four hour site security monitoring will be provided in the control room via closed-circuit television and intercom system.

Perimeter security fencing and access gates will be provided for the Project Site, including additional fencing and gates around the main buildings, the electrical substation, and construction laydown areas. The security fencing will be provided with warning reflective signage. Site security monitoring will be able to be displayed on a real-time as well as a recorded basis. Security monitoring cameras and active detection systems will be provided for Project buildings, support areas, and the entire site perimeter. Regular site security vehicular patrols will be conducted to provide additional site security. Site access will be provided to off-site emergency response teams that respond in the event of an “after-hours emergency.” Entry into the Project Site by fire department or emergency units will be handled on a manual override basis by 24-hour security officers stationed at both entrances.

3.5.9 Site Grading and Drainage

The Project Site will be developed utilizing the existing land features without major grading operations. Off-site flows will be accepted and conveyed throughout the site, with discharge following the existing drainage patterns. The Project Site preparation is based on minimizing surface-disturbing activities. Areas of sensitive habitat and cultural resource will be avoided wherever possible.

Brush trimming will be conducted between alternating rows as illustrated in Figure 3-17, Solar One – 18MW Feeder Group General Arrangement. Brush trimming consists of cutting the top of the existing brush while leaving the existing native plant root system in place to minimize soil erosion. Brush trimming will minimize shading on SunCatchers and prevent potential brush fire hazards.

After brush has been trimmed, blading for roadways and foundations will be conducted between alternating rows, as illustrated on Figure 3-28, 1.5MW Solar One Construction Disturbance Plan, to provide access to individual SunCatchers. Blading will consist of limited removal of terrain undulations to maintain a 10% maximum slope grade. Localized rises or depressions within the individual 1.5MW solar groups will be removed to provide for proper alignment and operation of the individual SunCatchers. Ground disturbance will be minimized wherever possible. The blading operations will generally keep native soils within 100 feet of the pre-development location, with no hauling of soils across the site.

To minimize site disturbance, the construction for unpaved north-south access routes will be located along the center of a 144-foot area along every other north-south column of SunCatchers. To protect the bladed areas from surface erosion, drainage swales will be constructed to intercept and convey the surface low-flows from undisturbed natural areas to debris basins. The debris basins are generally located upstream of paved arterial roadways. This approach is consistent with the BMP to minimize site erosion.

Debris basins are also proposed along the northern Project Site boundary to intercept the off-site flows from the Cady Mountains. In addition to intercepting debris from the mountains, the proposed debris basins will also provide for peak runoff attenuation of the surface flows, thus protecting the Project Site from flooding, sediment deposition, and scour.

Paved roadways will be constructed as close to the existing topography as possible, with limited cut-and-fill operations to maintain roadway design slope to within a maximum of 10 percent. (Project Site slope and gradient are shown in Appendix G, USGS Project Maps.)

To minimize shading on SunCatchers and prevent potential brush fire hazards, natural vegetation trimmings will be cleared in the area of each SunCatcher as well as on either side of the paved arterial roadways.

Grading operations will also be required for building foundations and pads and parking areas in the Main Services Complex, Satellite Services Complex, and substation areas. The clearing, blading, and grading operations will be undertaken using standard contractor heavy equipment. The equipment consists of, but is not be limited to, motor graders, bulldozers, elevating scrapers, hydraulic excavators, rubber tire loaders, compacting rollers, and dump trucks.

The Project Site layout will maintain the local pre-development drainage patterns where feasible, and water discharge from the Project Site will remain at the western boundary. The paved

roadways will have a low-flow, unpaved swale or roadway dip as needed to convey nuisance runoff to existing and/or proposed drainage channels/swales, as shown on Figure 3-29, Arizona Crossing, and utilize low-flow culverts, as shown on Figure 3-30, Low Flow Culverts. It is expected that storm water runoff will flow over the crown of the paved roadways, which are typically less than 6 inches from swale flow line to crown at centerline of roadway, thus maintaining existing local drainage patterns during storms. No crown is anticipated if polymeric stabilizers are used, further reducing drainage conveyance impacts. Where needed, unpaved roads will utilize low-flow culverts, as shown on Figure 3-31, Low Flow Culverts Under Solar Field Access Routes. Debris basins will be added throughout the Project Site for low-flow surface runoff retention in lieu of culverts. The design of the drainage facilities will be based on BMP for erosion and sediment control.

Localized channel grading will take place on a limited basis to improve channel hydraulics in the vicinity of BNSF railway right-of-way to control the surface runoff. In addition, the Main Services Complex will be protected from a 100-year flood by berms and/or channels that will direct the flow around the perimeter of the building site, if required.

Arizona Crossings (roadway dips) will be placed along the roadways or low-flow culverts consisting of a small-diameter storm drain with a perforated stem pipe, as needed to cross the minor or major channels/swales.

The proposed east-west on-site paved arterial roadway section between the Main Services Complex and I-40 will be designed as a designated evacuation route. As such, the culverts for the temporary construction access and the permanent access roadways will be designed such that the roadway section shall have its driving surface constructed above the projected profile of a 25-year storm event. In addition, overflow from the 100-year storm event will be limited to an over-flow depth not to exceed 7 inches.

It is anticipated that roadway maintenance will be required after rainfall events. For minor storm events, it is anticipated that the unpaved roadway sections may need to be bladed to remove soil deposition, along with sediment removal from debris basins and stem pipe risers at the culvert locations. For major storm events, in addition to the aforementioned maintenance, roadway repairs may be required due to possible damage to pavement where the roadways cross the channels and where the flows exceed the culvert capacity.

Soft bottom storm water retention basins will be constructed to mitigate the increase in runoff from the proposed building sites. Rainfall from paved areas and building roofs will be collected and directed to the storm water retention basins. Retention basins will be sized based on storing the entire 100-year, 24-hours storm volume from the proposed building sites. A 3.8-inch precipitation covering the entire site with no C reduction (coefficient of runoff) factor will be used. The retention volume may be considered by a combination of basin size and additional volume provided within paving and/or landscaping areas.

The retention basin will be designed so that the retained flows will empty within 72 hours after the storm to provide mosquito abatement. This design can be accomplished by draining, evaporation, infiltration, or a combination thereof.

The post-development flow rates released from the Project Site are expected to be less than the pre-development flow rates, thus complying with BMP. The expected flow reduction is based on the following factors.

- Except for the building sites, the majority of the Project Site will remain pervious, as only a negligible portion of the site will be affected by pavement and SunCatchers foundations.
- The increased runoff expected from the building sites will be over-mitigated by capturing 100 percent of the runoff in a retention basin, where the storm runoff will be infiltrated and/or evaporated to the atmosphere.
- The proposed debris basins and perforated risers to be constructed upstream of the roadway culverts will provide for additional retention/detention.

3.5.10 Well Water Supply Line

As discussed in Section 3.7.1, Water Supply Source, a proposed primary water well will be located in a Water Treatment Facility within the Main Services Complex per Figure 3-3, Solar One – Site Plan – Post Construction. During the construction stages of the Project, additional water wells may need to be drilled to augment the primary water well, as the water requirements for the peak construction stages of the Project will increase to approximately 10 times the peak facility operations demand. SES may utilize, to the extent possible, the aforementioned primary well and any additional water wells during the construction stages and normal operation of the future adjacent SES Project Site adjoining the western boundaries of the Project Site.

Since the primary water well will be located at the Water Treatment Facility within the Main Services Complex, the well water pump will discharge the well water directly into a Well Water Storage Tank, also located within the Water Treatment Facility. Construction water augmentation from the secondary water well and/or from other on-site wells, will be conveyed via water trucks or via temporary above-ground conduits, e.g., aluminum pipes, fire hoses.

3.6 TRANSMISSION: INTERCONNECTION TO ELECTRIC GRID

This section describes the transmission interconnection between the Project and the existing electric grid.

The Project will produce a nominal net output of up to 850MW to supply to the SCE high-voltage system at the SCE Pisgah Substation, which is located adjacent to the Project.

The Applicant will build a 34.5kV to 220kV substation on the Project Site. The Project substation will consist of an open air bus with 17 35kV collection feeder circuit breakers. Each feeder breaker will be connected to one of the 48MW or 51MW overhead collection lines described in Section 3.4.3, Power Process Description. Additional 35kV circuit breakers will connect to power factor correction capacitor banks located in the substation yard.

For the 500MW Phase I of the Project, the first interconnection substation will initially consist of four power transformers rated at 100/133/167 mega volt amperes (MVA) each to convert the generation collection voltage from 34.5kV to the transmission tie voltage of 220kV. The substation will ultimately contain six 100/133/167MVA, 34.5kV to 220kV step-up power transformers. Each power transformer will 48MW and 51MW overhead collection lines, as illustrated on Figures 3-32 through 3-34.

The power transformers will be protected by 220kV power circuit breakers. Provisions will be made to expand the substation from 500 to 850MW with the addition of two power transformers

in Phase II of the Project. Figure 3-35, 850MW Solar One Substation General Arrangement Plan, illustrates the plan view of the substation. Figure 3-36, 850MW Solar One Substation Elevation, Sheet 1, and Figure 3-37, 850MW Solar One Substation Elevation, Sheet 2, show elevation views of the substation.

Each transformer will collect 150MW of generation via three overhead 34.5kV collection circuits, each protected by a 35kV power circuit breaker. The 34.5kV feeders will be terminated on outdoor circuit breakers.

Control, metering, and protection systems for the line, substation, and collection systems will be contained within a control building located adjacent to the substation. The control building will also contain the necessary communications equipment to meet owner, CAISO, and SCE requirements.

Additional substation equipment will include a 34.5kV power-factor correction capacitor control system designed to meet the power factor and zero and low-voltage ride-through requirements of the Interconnect Agreement.

One 220kV main circuit breakers will connect to the 220kV transmission circuit on a 220kV single-circuit transmission line to the SCE Pisgah Substation.

The transmission line to the SCE Pisgah Substation will be an approximately 2 mile-long, single-circuit line, as shown on Figures 3-5, 220kV Transmission Line, Part A, Phase I, and Figure 3-6, 220kV Transmission Line, Part A, Phase II.

The on-site portion of the interconnection transmission line will be installed in a 100-foot ROW from the Solar One Substation heading east and parallel to the BNSF Railroad ROW, and south crossing the BNSF railroad to a point where the line turns east leaving the site and undercrossing three SCE transmission lines before it finally enters the SCE Pisgah Substation from the south. The on-site portion of the 220kV interconnect transmission line is illustrated on Figure 3-5, 220kV Transmission Line, Part A, Phase I, and Figure 3-6, Solar One and Solar Three Transmission Lines. The routing was selected to minimize the distance required and to reduce the undercrossing of the line with assembled SunCatchers.

The off-site portion of the 220kV interconnect transmission line will be routed under existing SCE transmission lines.

SCE has proposed expanding and upgrading the the 220kV SCE Pisgah Substation, increasing the voltage to 500kV, looping the Eldorado-Lugo 500kV line into the SCE Pisgah Substation and upgrading 65 miles of the existing Lugo-Pisgah No 2 220kV transmission line to 500kV. In addition, modifications within the SCE Eldorado and Lugo substations will be required. The off-site 220kV interconnect transmission line is illustrated on Figure 3-7, 500kV Transmission Line Under Crossing Detail, and Figure 3-8, 220kV Transmission Line, Under Crossing Detail.

The SCE Pisgah Substation will be a 220kV to 500kV substation. Generation will enter the substation at 220kV and power will leave the substation at 220kV and 500kV.

The Gen-Tie transmission line towers will consist of H-Frame towers at the undercrossing of the existing SCE 500kV and 220kV transmission lines and single-circuit lattice steel towers and/or steel poles elsewhere. See Figure 3-38, Typical H-Frame Transmission Structure, and Figure 3-39, Typical Single-Circuit Transmission Structures.

The single circuit overhead 220kV transmission line will be constructed with aluminum steel-reinforced conductors, thermally rated to carry full Project output in emergency conditions and in normal conditions. One fiber optic cable and a microwave dish and tower will be provided for communication with SCE and the CAISO.

The overhead 220kV transmission conductors will be supported by a dead-end structure in the Solar One Substation and 12 to 15 single-circuit lattice steel transmission towers and/or steel poles, as illustrated on Figure 3-39, Typical Single-Circuit Transmission Structures.

An application was filed by the Applicant with SCE to perform a System Impact Study for the Project. This System Impact Study determined the effect on the Pisgah transmission system based on power flows on the existing transmission lines and transformers, short circuit duties of the existing substation facilities, and the electrical stability of the interconnected system considering various contingencies and fault conditions. CASIO issued the final System Impact Study on November 2008. This study is attached in Appendix H, System Impact Study.

SCE completed a facility study for the Project. The facility study outlines measures required for transmission facility overloads and the cost associated with the upgrading of the transmission and substation facilities. See plat maps (1 through 58) in Appendix EE, Summary Environmental Report for the Proposed Lugo-Pisgah 500kV Transmission Line and Substation Upgrades, for more details related to these upgrades.

3.6.1 Design, Construction, and Operation of Transmission Facilities

The Project will be connected to the power grid through the SCE Pisgah Substation by a single-circuit, three-phase, 220kV transmission line. It is expected that SCE will complete final design and construction of transmission facilities and reliability upgrades.

The Project transmission system will require construction of approximately 2 miles of single-circuit, 220kV transmission line. As depicted on Figure 3-5 through Figure 3-8, the Project transmission line extends from the Solar One Substation to a point inside the ROW of the SCE Pisgah Substation. The transmission line starts within the Project Site boundary but a 0.14 mile-long segment that connects to the SCE Pisgah Substation is outside the Project Site boundary.

Construction of the line will include dead-end structures at the substation and 12 to 15 lattice steel towers and/or tubular steel poles with concrete foundations and new double bundled 1,590-kilo circular miles aluminum steel-reinforced conductors for the circuit.

The power poles will be spaced approximately 650 feet to 800 feet apart (the final calculation will take into account the grading and other factors to determine the final spacing).

The construction of the Project transmission line will involve the following facilities and tasks listed below.

- **Staging Areas:** These yards are staging areas for trailers, office personnel, equipment, material staging, and employee parking and will be provided in a disturbed area (within a 26-acre laydown area) along the south and eastern boundaries of the .
- **Road Work:** As needed, dirt roads will be cleared for access along the on-site transmission line route to coincide with the southern perimeter road for the Project Site. These roads will

provide access to the tower locations. Where the off-site transmission line crosses the existing SCE ROW, the existing access road to the existing transmission line will be utilized.

- **Foundations:** Each structure will have a foundation installed that will require curing before the tower or pole installation. These pole foundations will be installed in locations that avoid sensitive environmental resources identified in Project environmental surveys.
- **Tower Erection:** Where used, steel tower structures will be shop-fabricated to the maximum extent possible and erected at the site. The cross arms, insulators, and other hardware will be installed on the towers to the maximum extent possible before erection.
- **Pole Erection:** Where used, each pole will be made up of two sections, which will be assembled on-site and welded together. Afterward, insulators and conductor hardware will be installed.
- **Conductors:** From pulling sites, the conductors will be installed, sagged, and permanently connected to the insulators.
- **Pulling Sites:** Approximately two pulling sites are required to install the conductors along the transmission line. The pulling sites will be located on existing access roads or access roads that will be constructed as part of the transmission line installation.
- **Communication System:** The overhead ground/fiber optic communications optical ground wire cable will be installed using the same pulling sites used for the conductor installation.
- **Cleanup:** Although cleanup will be ongoing as the work proceeds, once construction is completed, a final cleanup of the entire transmission construction site will be performed to clear the area of any remaining construction-related debris.

3.6.2 Transmission Line Safety and Nuisance

This section discusses safety and nuisance issues associated with the proposed electrical interconnection of the Project.

3.6.2.1 Transmission Line Description

A single-circuit, 220kV transmission line will be required to deliver the Project's electric output to the Western Electricity Coordinating Council transmission grid. Each circuit will be sized to carry approximately full Project output under normal conditions and emergency conditions in 55 degrees Celsius ambient temperature. The circuit will terminate at the Solar One Substation. The connection to the grid will be made at the SCE Pisgah Substation. The single-circuit transmission line will consist of approximately 2 miles of new construction. The transmission line is illustrated in Figure 3-5, 220kV Transmission Line.

3.6.2.2 Aviation Safety – Transmission Line

The Code of Federal Regulations Part 77 authorizes the FAA to establish the standard for determining obstruction in navigation space and sets forth requirements for notification of proposed construction. These regulations require notification for any construction that is over 200 feet in height aboveground level. Notification is also required if the obstruction is less than

specified heights and falls within the restricted airspace in the approach to airports. For airports with runways longer than 3,200 feet, the restricted space extends 20,000 feet (3.2 nautical miles) from the runway. For airports with runways of 3,200 feet or less, the restricted space extends 10,000 feet (1.6 nautical miles) from the runway.

Supporting structures for the proposed 220kV transmission line will be shorter than 110 feet and will not encroach into restricted air space. Therefore, no Notice of Construction or Alteration filing with the FAA is required.

3.6.2.3 Electrical Clearances

High-voltage overhead transmission lines are composed of bare conductors connected to supporting structures by means of porcelain, glass, or plastic insulators. The air surrounding the energized conductor acts as the insulating medium. Maintaining sufficient clearances, or air space, around the conductors to protect the public and utility workers is paramount to the safe operation of the line. The safety clearance required around the conductors is determined by normal operating voltages, conductor temperatures, short-term abnormal voltages, avoidance of wind-blown swinging conductors, contamination of the insulators, clearances for workers, and clearances for public safety. Minimum clearances are specified in CPUC General Order 95. In American National Standards Institute Z-133.1-2000, clearances were developed for safe and reliable operation of high-voltage lines. Typically, clearances are specified for the following:

- distances between energized conductors,
- distances between energized conductors and supporting structures,
- distances between energized conductors and other power or communication wires on the same supporting structure, or between other power or communication wires above or below the conductors,
- distances from energized conductors to the ground and other features, such as roadways, railroads, driveways, parking lots, navigable waterways, airports, etc.,
- distances from energized conductors and buildings and signs, and
- distances from energized conductors and other parallel power lines.

Table 3-3, LORS for Electrical Clearances, describes electrical clearances LORS.

Table 3-3
LORS for Electrical Clearances

Laws, Ordinances, Regulations, and Standards	Applicability
GO-128, CPUC, "Rules for Underground Electric Line Construction"	Covers required clearances, grounding techniques, maintenance, and inspection requirements.
GO-95, CPUC, "Rules for Overhead Electric Line Construction"	Covers required clearances, grounding techniques, maintenance, and inspection requirements.
Title 8 CCR Section 2700 *et seq.* "High Voltage Electric Safety Orders''	Establishes essential requirements and minimum standards for installation, operation, and maintenance of electrical installation and equipment to provide practical safety and freedom from danger.

Table 3-3
LORS for Electrical Clearances

Laws, Ordinances, Regulations, and Standards	Applicability
GO-52, CPUC, "Construction and Operation of Power and Communication Lines"	Applies to the design of facilities to provide or mitigate inductive interference.
ANSI/IEEE 593, "IEEE Recommended Practices for Seismic Design of Substations"	Recommends design and construction practices.
IEEE 1119, "IEEE Guide for Fence Safety Clearances in Electric - Supply Stations"	Recommends clearance practices to protect persons.
IEEE 998, "Direct Lightning Stroke Shielding of Substations"	Recommends protections for electric system from direct lightning strikes.
IEEE 980, "Containment of Oil Spills for Substations"	Recommends preventions for release of fluids into eco-system.

Source: Stirling Energy Systems, Inc., 2008.
Notes:
ANSI = American National Standards Institute
CCR = California Code of Regulations
CPUC = California Public Utilities Commission
GO = General Order
IEEE = Institute of Electrical and Electronics Engineers, Inc.

3.6.2.4 Noise and Radio Frequency

An electric field is generated in the air surrounding a transmission line conductor when the transmission line is in operation. A corona discharge occurs at the conductor surface when the intensity of the electric field at the conductor surface exceeds the breakdown strength of the surrounding air. The electrical energy released from the conductors during this process is known as corona loss and is manifested as audible noise and radio or television interference.

Energized electric transmission lines can generate audible noise from corona discharge, most often perceived as a buzz or hum. This condition is usually worse when the conductors are wet. The Electric Power Research Institute has conducted several transmission line tests and studies that measure sound levels for several power line sizes with wet conductors (EPRI 1975, 1982). The "Transmission Line Reference Book, 345kV and Above" also notes that the noise produced by a conductor attenuates (decreases) by 2 to 3 decibels for each doubling of the distance from the source.

Radio and television interference, known as gap-type noise, is caused by a film on the surface of two hardware pieces that are in contact. The film acts as an insulator between the surfaces. This insulator results in small electric arcs that produce noise and interference. This type of noise is not a problem in well-maintained transmission lines. Well-trained transmission line maintenance crews will maintain the Project transmission line. Therefore, any problems that might occur can be readily pinpointed and corrected. Further, the distance to the nearest residential development makes it unlikely that the Project transmission line would have an effect on radio or television reception.

Many factors contribute to the pre-project ambient noise levels in the area of the Project Site. The Project transmission line will be designed such that noise from the transmission line will

continue to be well below undesirable levels. Any noise or radio/television interference complaints will be logged, investigated, and, to the degree possible, mitigated.

3.6.2.5 Induced Currents and Hazardous/Nuisance Shocks

Introduction

Touching underground metallic objects near a transmission line can cause hazardous or nuisance shocks if the line is not properly constructed. Since the electric fields of the transmission line will be negligible aboveground, and the line will be built in conformance with California Public Utilities Commission (CPUC) General Order 95 requirements and the California Code of Regulations (CCR), Title 8, Section 2700 requirements, hazardous shocks are highly unlikely to occur as a result of the Project construction and operation.

Electric and Magnetic Fields

Electric and magnetic fields (EMFs) occur independently of one another at the 60Hz frequency used in transmission lines, and both are created by electric charges. Electric fields exist when these charges are not moving. Magnetic fields are created when these same electric charges are moving. The magnitude of both electric and magnetic fields from three-phase transmission lines falls off rapidly as the distance from the source increases (proportional to the inverse of the square of the distance).

Transmission lines, distribution lines, house wiring, and appliances generate electric fields in their vicinity because of unbalanced electrical charge on unshielded energized conductors. Electric fields are expressed in volts per meter or kilovolts (thousands of volts) per meter (kV/m).

Once electric currents are in motion, they create magnetic fields. The strength of the magnetic field is proportional to the magnitude of the current in the circuit. Magnetic fields can be characterized by the force they exert on a moving charge or on an electrical current. A magnetic field is a vector quantity that is characterized by both magnitude and direction. Electric currents are sources of magnetic fields. Magnetic fields are measured in milligauss.

At the ground under a transmission line, the electric field is nearly constant in magnitude and direction over distances of a few meters. However, in close proximity to the transmission or distribution line conductors, the field decreases rapidly as distance from the conductor increases. Similarly, near small sources, such as appliances, the field is not uniform and falls off even more rapidly with distance from the device. If an energized conductor is inside a grounded conducting enclosure, then the electric field outside the enclosure is zero and the source is said to be shielded.

In January 1991, the CPUC issued an Order Instituting Investigation (I.91-01-012 [CPUC 1991]) into the potential health effects from electric and magnetic fields emitted by electric power and cellular telephone facilities. In September 1991, the assigned CPUC administrative law judge issued a ruling that created the "California EMF Consensus Group." This group of representatives from utilities, industry, government, private and public research, and labor organizations submitted a document entitled "Issues and Recommendations for Interim Response

and Policy Regarding Power Frequency EMFs" on 20 March 1992 (California EMF Consensus Group 1992). Regarding the relevant policy consensus recommendation titled "Facility Siting," the group stated that the CPUC should recommend that utilities take public concern about electromagnetic fields into account when siting new electric facilities. Although this group could not conclude that there is a relationship between EMFs and human health effects, they also could not conclude that this relationship does not exist; therefore, they recommended that the CPUC authorize further research.

California does not presently have a regulatory level for magnetic fields. However, the values estimated for the Project are well below those established by states that do have limits. Other states have established regulations for magnetic field strengths that have limits ranging from 150 milligauss to 250 milligauss at the edge of the ROW, depending on voltage. The California Energy Commission (CEC) does not presently specify limits on magnetic fields for 220kV transmission lines.

Electric Fields: Project Effects

The line voltage and the distance of conductors from the point of measurement largely determine the electric fields of the Project. Conducting objects such as vegetation, the earth, or buildings perturb or distort the field. These can in some cases act as shields, which significantly reduce electric field levels. Increasing the distance from the conductors of the transmission line to potential receptors is the most effective way to reduce electric field effects in overhead transmission lines.

The electric field strengths from the proposed transmission line are calculated to be insignificant. Although California does not have any regulatory level for electric fields, it is anticipated that the Project's electric field strengths will be well below levels established by those states that do have regulatory limits. States with regulations have ranges from 1.0kV/m to 2.0kV/m at the edge of the ROW to 11kV/m within the ROW, depending on the line voltage.

Electric field strengths have been calculated for the Project and the results are shown in Appendix I, Electric and Magnetic Field Calculations.

Magnetic Fields: Project Effects

Unlike the electric fields, magnetic fields are not necessarily perturbed or shielded by most common objects. Effective ways to reduce magnetic field strengths in overhead transmission lines include increasing the distance from the conductors of the transmission line to potential receptors and arranging phases to increase cancellation of fields. The higher the overhead transmission lines are aboveground level, the lower the magnetic field strength is at ground level.

Magnetic field strengths have been calculated for the Project. The results are shown in Appendix I, Electric and Magnetic Field Calculations.

3.7 WATER SUPPLY AND TREATMENT

The following types of water will be required for the Project:

- SunCatcher equipment washing water,

- potable water,
- dust control water, and
- fire protection water.

When completed, the Project will require a total of approximately 36.2 acre-feet of well water per year. SunCatcher mirror washing and operations dust control under regular maintenance routines will require an average of approximately 25.8 gallons of well water per minute, with a daily maximum requirement of approximately 43.7 gallons of raw water per minute during the summer peak months each year, when each SunCatcher receives a single mechanical wash.

The Project water supply requirements are tabulated in Table 3-4, Water Usage Rates for Solar One Operations. The table provides both the expected maximum water usage rates and the annual average usage rates. The water balance for the Project is illustrated in Appendix J, Water Balance Flow Diagrams.

Table 3-4
Water Usage Rates for Solar One Operations

Water Use	Daily Average (gallons per minute)	Daily Maximum (gallons per minute)	Annual Usage (acre-feet)
Equipment Water Requirements			
SunCatcher mirror washing	11.8[1]	19.7[2]	16.1[3]
Water Treatment System Discharge			
Brine to evaporation ponds	6.0	11.4[4]	8.1
Potable Water Use			
For drinking and sanitary water requirements	3.8[5]	4.6[6]	5.2[7]
Dust Control			
Well water for dust control during operations	4.2[8]	8.3[9]	6.7[10]
Totals	**25.8**	**43.7**	**36.2**

Source: Stirling Energy Systems, Inc., 2008.
Notes:
[1]Based on 34,000 SunCatchers requiring a monthly wash with an average of 14 gallons of demineralized water per spray wash and a five-day work week (21 work days per month).
[2]During a 3 month period, all SunCatcher mirrors are given a scrub wash requiring up to three times the normal wash of 14 gallons per SunCatcher. Therefore, the Daily Maximum usage rate is based on two-thirds of the SunCatchers receiving a normal wash and one-third receiving a scrub wash.
[3]Based on every SunCatcher having approximately 8 normal washes per year with one additional scrub wash.
[4]Based on the maximum amount of demineralized water required for mirror washing and assumes a decrease in raw water quality requiring an additional 20 percent of system discharge.
[5]Assumes 30 gallons per person per day for 182 people.
[6]Maximum amount assumes a 20 percent contingency over the Daily Average.
[7]Assumes a six-day work week and average daily usage.
[8]Assumes 6,000 gallons per day based on utilizing soil binders on all roadways for dust control mitigation.
[9]Assumes up to 12,000 gallons per day based on utilizing soil binders on all roadways for dust control mitigation.
[10]Assumes daily average dust control operations.

SES Solar One

Application for Certification

Volume 2 Appendices

December 2008

Submitted to:
California Energy Commission
1516 9th Street, MS 15
Sacramento, CA 95814-5504

Bureau of Land Management
1661 S. 4th Street
El Centro, CA 92243

Submitted by:
SES Solar Three, LLC
SES Solar Six, LLC

Stirling Energy Systems
2910 East Camelback Road,
Suite 150
Phoenix, AZ 85016

Environmental Summary Report for the Proposed Lugo-Pisgah 500kV Transmission Line and Substation Upgrades

Prepared for:

STIRLING ENERGY SYSTEMS

Submitted to:
Stirling Energy Systems
Biltmore Lakes Corporate Center
2920 E. Camelback Road, Suite 150
Phoenix, AZ 85016

Prepared by:

ECOSPHERE
ENVIRONMENTAL SERVICES

2243 Main Avenue, Suite 4
Durango, CO 81301
(970)382-7256

November 21, 2008

Figure 1. Project Area Map

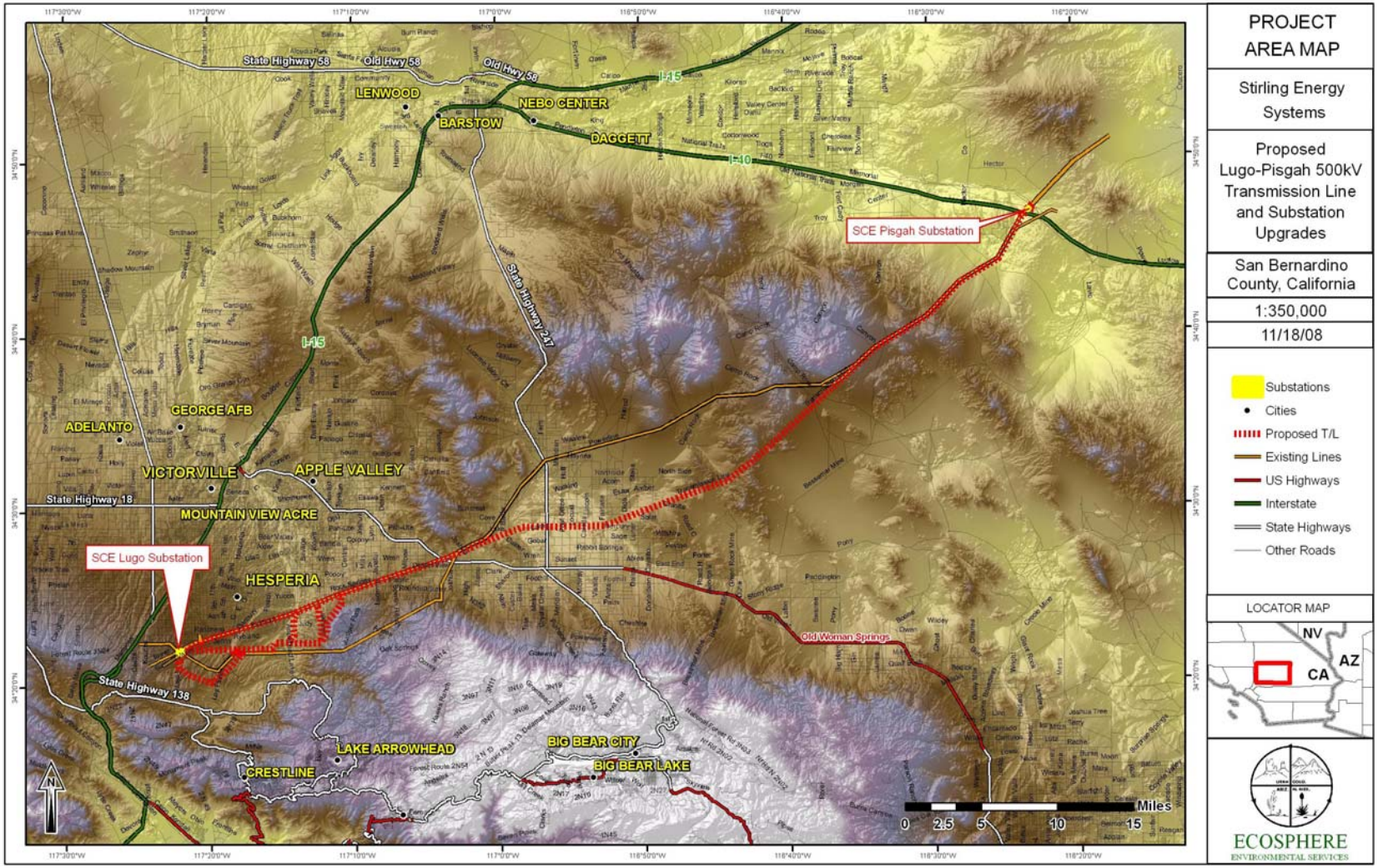

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Figure 2. Farmland in Project Area.

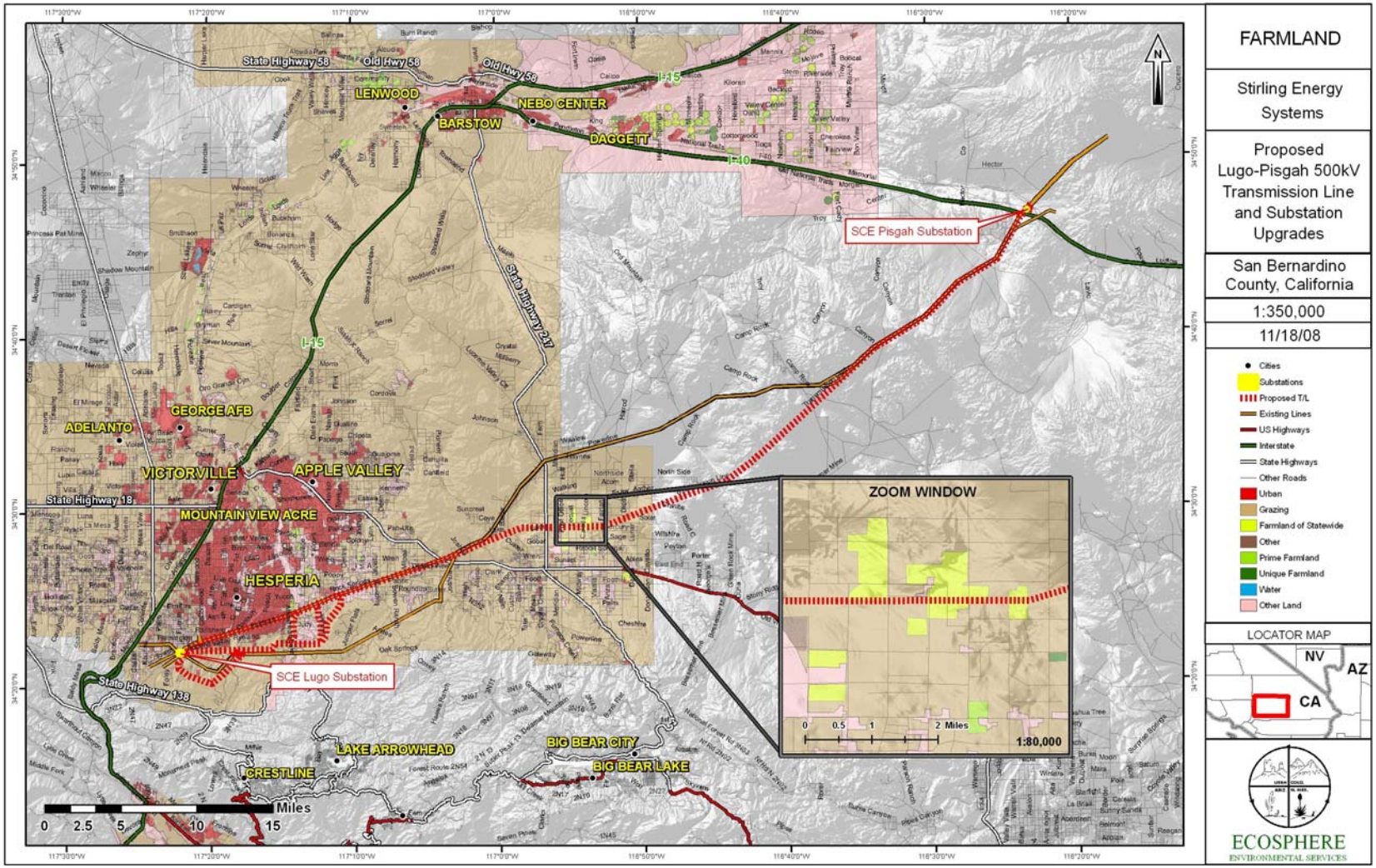

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Figure 3. Desert Tortoise Critical Habitat.

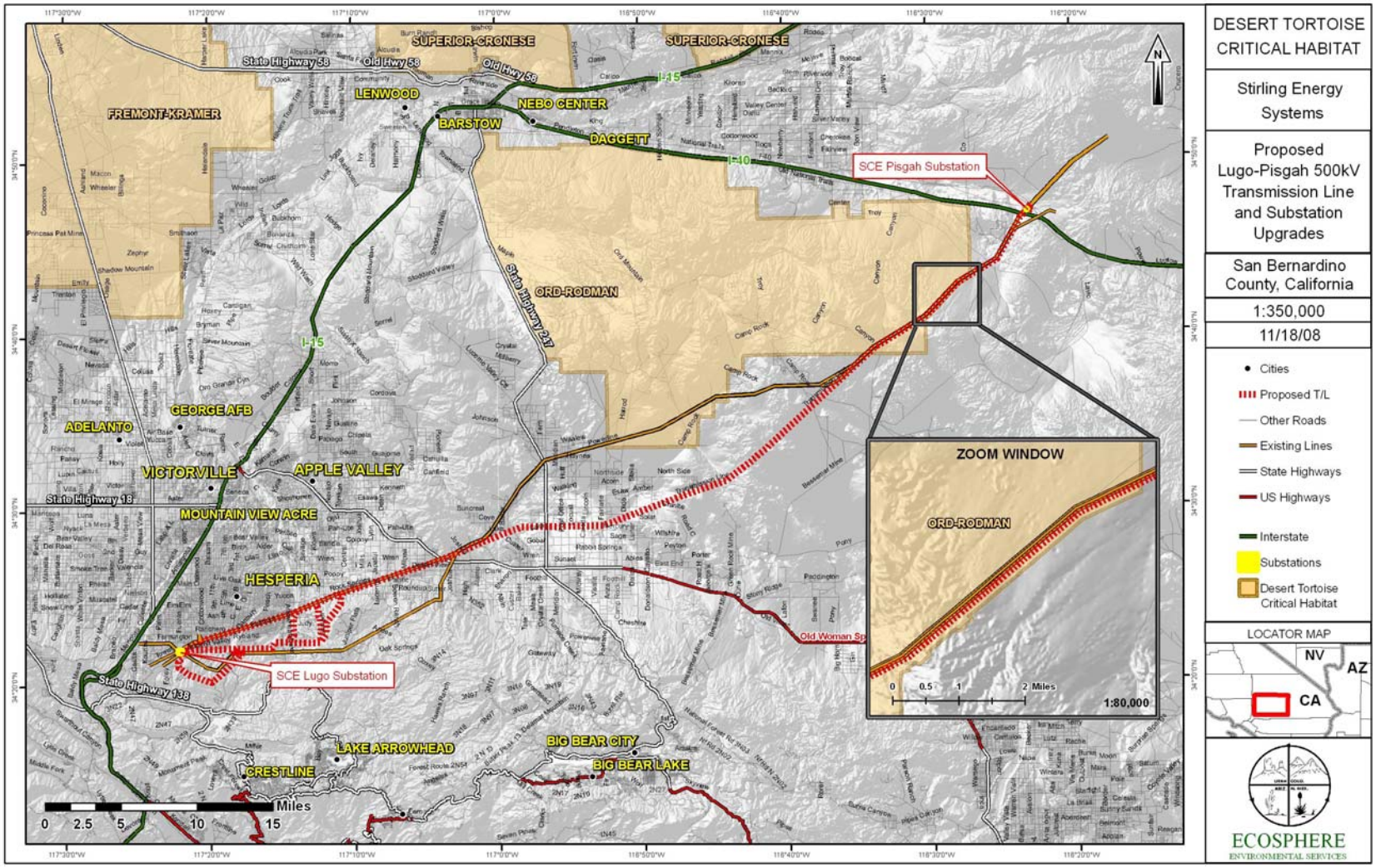

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Figure 4. Geology and Fault Zones

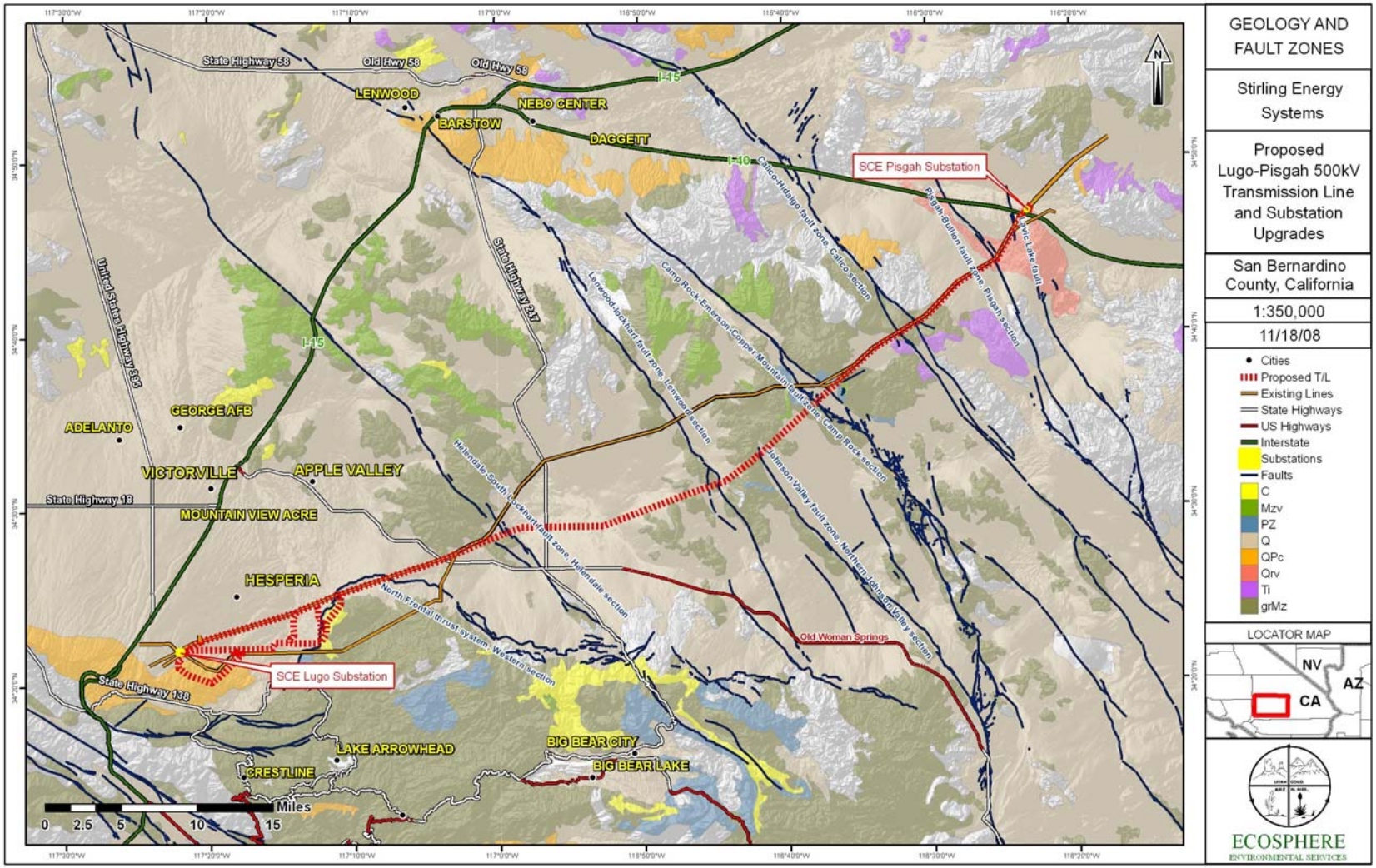

Figure 5. Transportation and Land Ownership – Map A

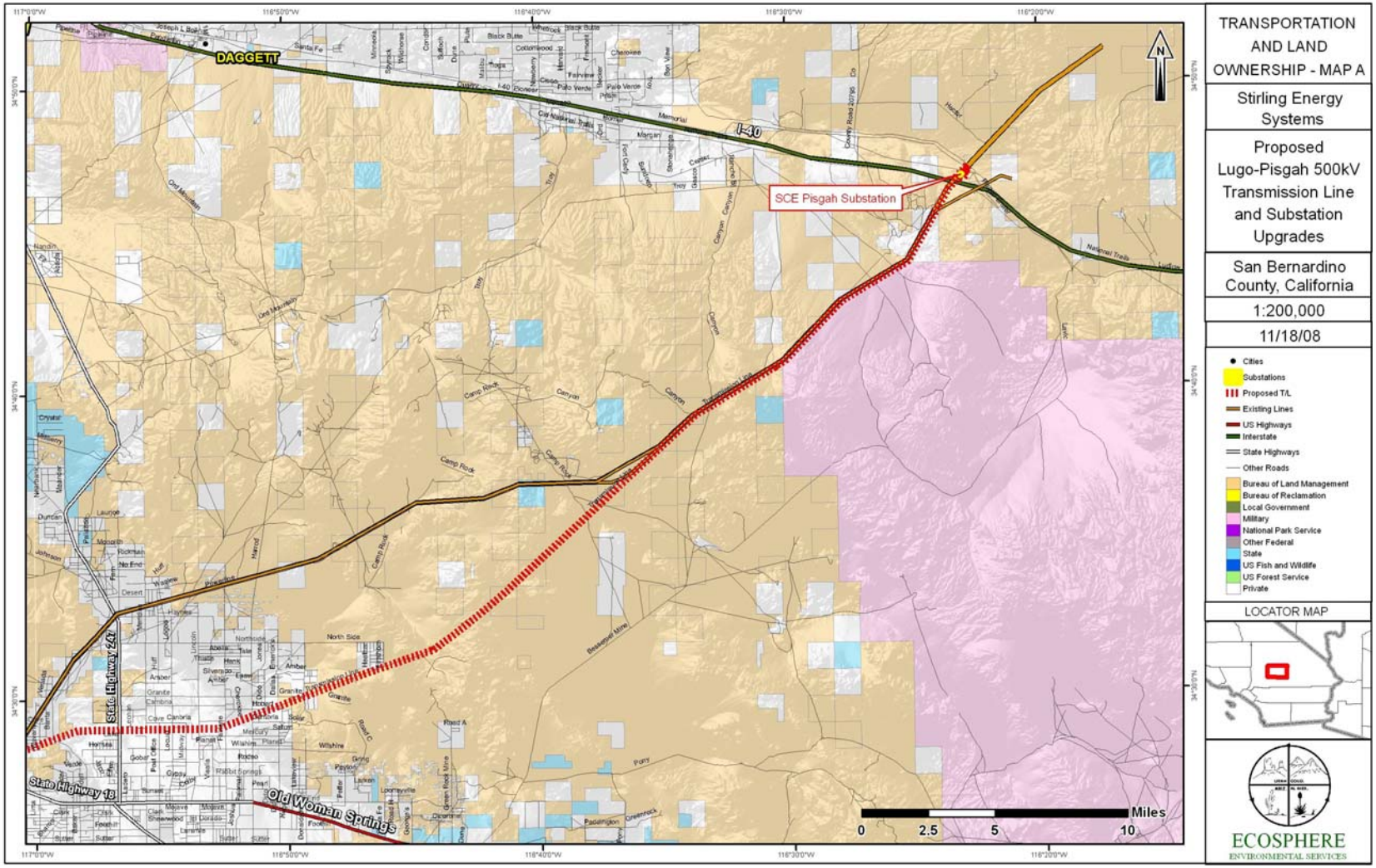

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Figure 6. Transportation and Land Ownership – Map B.

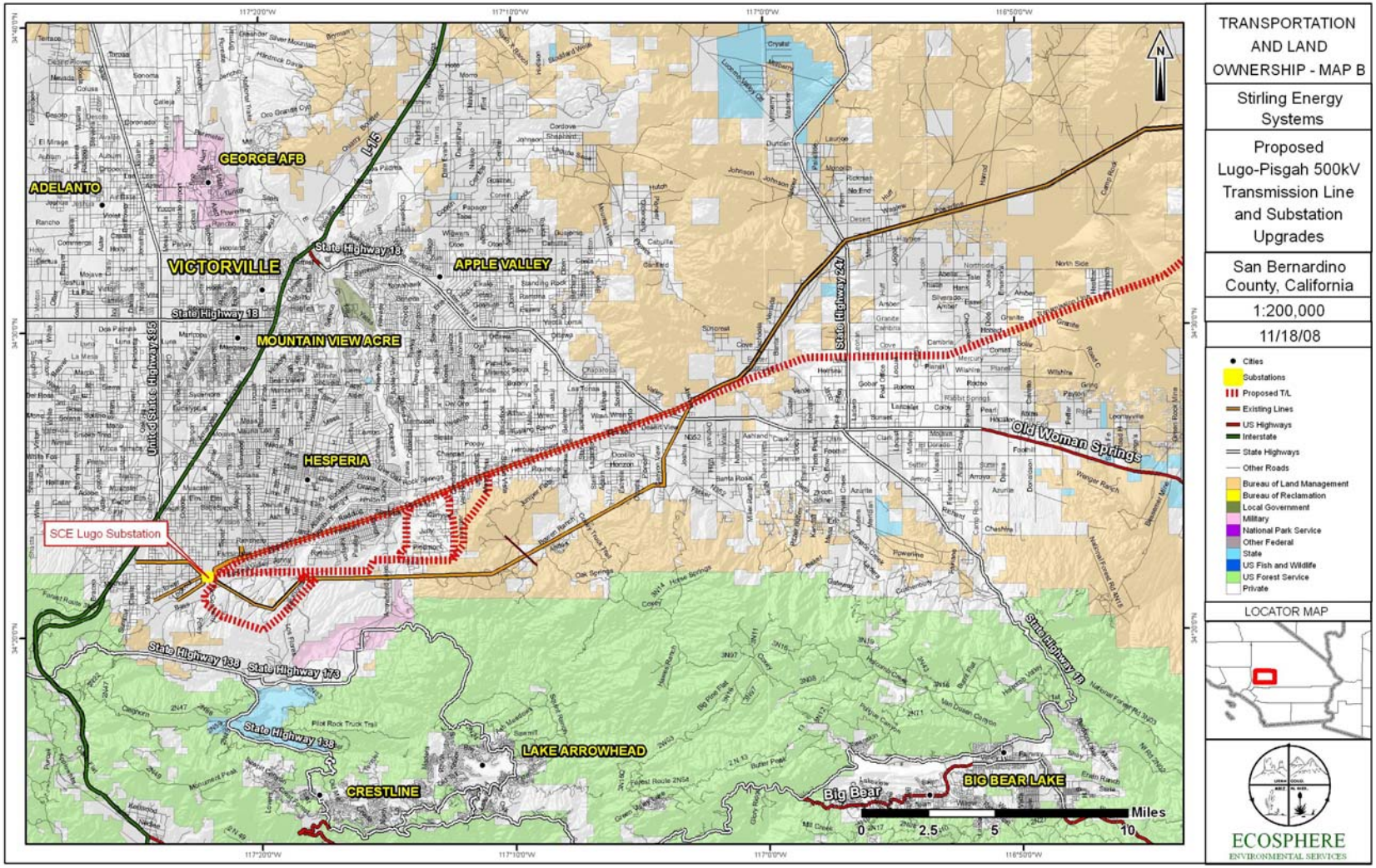

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Figure 7. Special Designations

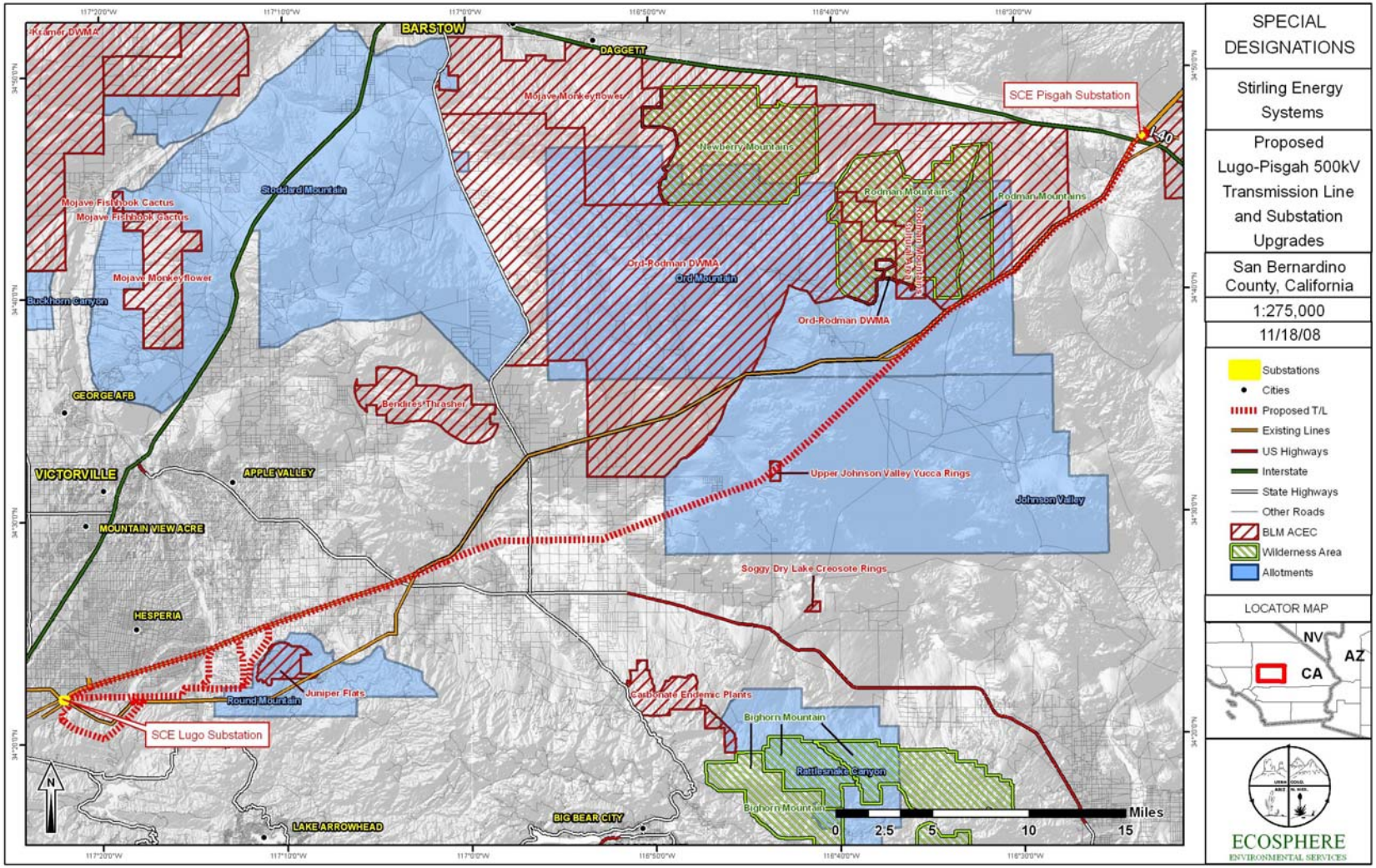

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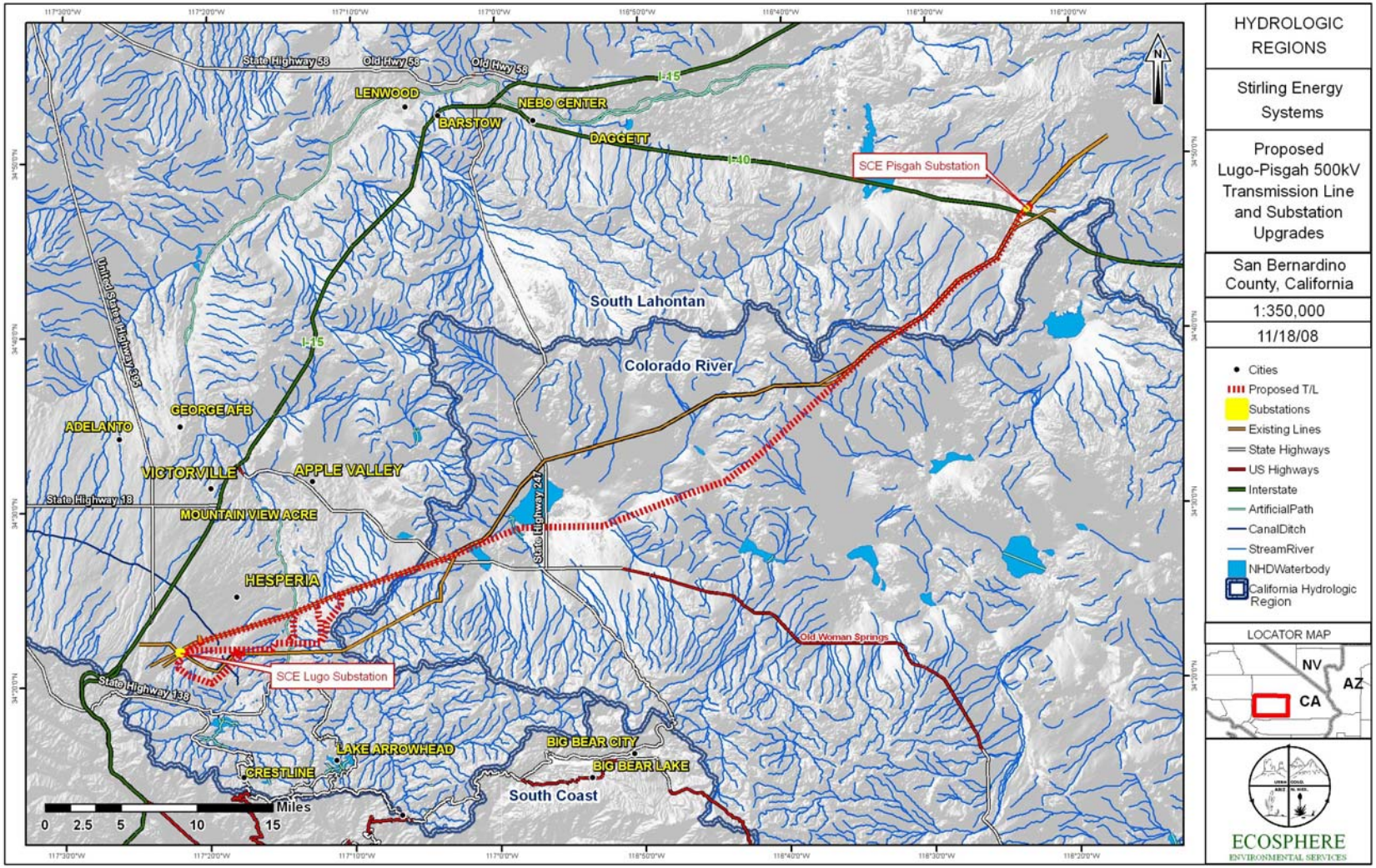
Figure 8. Hydrologic Regions



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Tessera Solar
power from stirling energy systems

January 8, 2009

DOCKET	
08-AFC-13	
DATE	JAN 08 2010
RECD.	JAN 08 2010

Mr. Christopher Meyer
CEC Project Manager
Attn: Docket No. 08-AFC-13
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Mr. Jim Stobaugh
BLM Project Manager
Attn: Docket No. 08-AFC-13
Bureau of Land Management
P.O. Box 12000
Reno, NV 89520

RE: SES Solar One Project
Applicant's Responses to the CEC Memo Regarding Transmission Line Upgrades

Dear Mr. Meyer and Mr. Stobaugh,

Tessera Solar hereby submits the Applicant's Responses to the CEC Memo Regarding Transmission Line Upgrades. Please use these responses in conjunction with other materials previously docketed related to the transmission line, which are:

1. Application for Certification, Appendix EE: Environmental Summary Report for the Proposed Lugo-Pisgah 500kV Transmission Line and Substation Upgrades (comparable to the example provided in the aforementioned CEC Memo)
2. Applicant's Responses to CURE Data Requests Set Two
3. Applicant's Responses to CURE Data Requests Set Three
4. Applicant's Responses to CURE Data Requests Set Four
5. Applicant's Submittal of the SCE Project Description for SES Solar One 275 MW Early Interconnection

I certify under penalty of perjury that the foregoing is true, correct, and complete to the best of my knowledge.

Sincerely,

Felicia L. Bellows
Vice President of Development

Tessera Solar | 4800 N. Scottsdale Road | Suite 5500 | Scottsdale, AZ 85251 | P +1 602 535 3576 | F +1 602 535 3617 | tesserasolar.com

TECHNICAL AREA: TRANSMISSION LINE UPGRADES

Item 1: For the areas affected by the transmission line upgrades, provide information related to special-status species surveys for both plants and animals done when the organisms are identifiable (multiple trips out, especially for plants)

Response: Maps of vegetation types and special-status species locations along the transmission line are provided as attachment TRANS-1 provided behind this response. The abundance and location of each special-status species that was detected during surveys are provided below as Table 1. The survey dates and personnel conducting each survey are provided in Table 2.

All of the special-status species with potential to occur within the transmission line corridor, based on the presence of appropriate habitat and known occurrences within a five-mile radius, are included below in Table 3. The list of species was compiled from official database queries of the CNDDB, CNPS, and BLM.

The potential transmission line impacts cannot be assessed at this time because a final Project design has not been engineered by SCE. While the majority of the alignment is proposed along existing transmission lines with existing access roads, portions of each alternative may require new access roads as part of the project. Impacts to natural communities, and mitigation to offset those impacts, will therefore depend on the transmission line alignment alternative that is ultimately chosen by SCE.

Table 1
Special-Status Species Detected

Common Name	Scientific Name	Field Notes	Easting	Northing
Plants				
short-joint beavertail cactus	*Opuntia basilaris* var. *brachyclada*	Individual	467574	3803055
short-joint beavertail cactus	*Opuntia basilaris* var. *brachyclada*	Individual	466880	3802477
short-joint beavertail cactus	*Opuntia basilaris* var. *brachyclada*	Individual	470835	3801472
short-joint beavertail cactus	*Opuntia basilaris* var. *brachyclada*	Individual	468821	3801084
short-joint beavertail cactus	*Opuntia basilaris* var. *brachyclada*	Individual	470835	3801472
short-joint beavertail cactus	*Opuntia basilaris* var. *brachyclada*	Individual	530927	3830431
White-margined beardtongue	*Penstemmon albomarginata*	Individual	Not Recorded	Not Recorded
Birds				
golden eagle	*Aquila chrysaetosi*	pair	530927	3830431
burrowing owl	*Athene cunicularia*	verified active nest	493960	3810278
loggerhead shrike	*Lanius ludovicianus*	Individual	469197	3801005
loggerhead shrike	*Lanius ludovicianus*	Individual	495303	3812962
Reptiles				
desert tortoise	*Gopherus agassizi*	Individual	520035	3827573
desert tortoise	*Gopherus agassizi*	Individual	539458	3833934
desert tortoise	*Gopherus agassizi*	Individual	540473	3834594
desert tortoise	*Gopherus agassizi*	Individual	531109	3830456
desert tortoise	*Gopherus agassizi*	Individual	552743	3843611
desert tortoise	*Gopherus agassizi*	Individual	539458	3833934
desert tortoise	*Gopherus agassizi*	Individual	547964	3840192
desert tortoise	*Gopherus agassizi*	Individual	548795	3841026

*Coordinates are in NAD 1983 UTM Zone 11 meters

Table 2
Survey Dates and Field Personnel

Date	Field Personnel	Survey Type
3/15/2007	Glen Kinoshita, Paul Brenner	General Survey, site assessment
3/16/2007	Glen Kinoshita, Paul Brenner	General Survey, site assessment
3/19/2007	Glen Kinoshita, Brooke McDonald, Wayne Vogler, David Silverman	General Survey, site assessment
3/20/2007	Glen Kinoshita, Brooke McDonald, Wayne Vogler, David Silverman	General Survey, site assessment
3/21/2007	Glen Kinoshita, Brooke McDonald, Wayne Vogler, David Silverman	General Survey, site assessment
3/22/2007	Brooke McDonald, Wayne Vogler, David Silverman, Cindy Hopkins	General Survey, site assessment
3/23/2007	Brooke McDonald, Wayne Vogler, David Silverman, Cindy Hopkins	General Survey, site assessment
3/26/2007	Ellen Howard, Brooke McDonald, Greg Hoisington, Sage Jensen, Bridget Canty	General Survey, site assessment
3/27/2007	Ellen Howard, Brooke McDonald, Greg Hoisington, Sage Jensen, Bridget Canty	General Survey, site assessment
3/28/2007	Ellen Howard, Brooke McDonald, Greg Hoisington, Sage Jensen, Bridget Canty, David Silverman, Cindy Hopkins	General Survey, site assessment
3/29/2007	Ellen Howard, Brooke McDonald, Greg Hoisington, Sage Jensen, Bridget Canty, David Silverman, Cindy Hopkins	General Survey, site assessment
3/30/2007	Ellen Howard, Brooke McDonald, Greg Hoisington, Sage Jensen, Bridget Canty, David Silverman, Cindy Hopkins	General Survey, site assessment
4/2/2007	Theresa Miller, Ken McDonald, Greg Hoisington, Dallas Pugh, David Silverman, Michael Honer, Cheryl Rustin	General Survey, site assessment, Desert tortoise protocol survey
4/3/2007	Theresa Miller, Ken McDonald, Greg Hoisington, Dallas Pugh, Michael Honer, Cheryl Rustin	General Survey, site assessment, Desert tortoise protocol survey
4/4/2007	Theresa Miller, Ken McDonald, Dallas Pugh, Cheryl Rustin	General Survey, site assessment. Desert tortoise protocol survey

Table 2
Survey Dates and Field Personnel
(Continued)

Date	Field Personnel	Survey Type
3/15/2007	Glen Kinoshita, Paul Brenner	General Survey, site assessment
4/5/2007	Ken McDonald, Greg Hoisington, Dallas Pugh, Michael Honer	Desert tortoise protocol survey
4/6/2007	Ken McDonald, Dallas Pugh	Desert tortoise protocol survey
4/11/2007	Glen Kinoshita, Dallas Pugh, Sage Jensen	Desert tortoise protocol survey
4/12/2007	Dallas Pugh, Sage Jensen	Desert tortoise protocol survey
6/11/2007	Glen Kinoshita, Dallas Pugh	Mojave ground squirrel presence/absence survey
6/12/2007	Glen Kinoshita, Dallas Pugh	Mojave ground squirrel presence/absence survey
3/21/2008	Glen Kinoshita, Kristen Marsh, Michael Honer, Marc Baker	Focused rare plant surveys
3/22/2008	Kristen Marsh, Michael Honer, Marc Baker, Dave Erikson, Eric Klein, Rich Kleinleder, Mike Wood, Yancey Bissonnette, Lech Naumovich, Neal Kramer	Focused rare plant surveys
3/23/2008	Kristen Marsh, Michael Honer, Marc Baker, Dave Erikson, Eric Klein, Rich Kleinleder, Mike Wood, Yancey Bissonnette, Lech Naumovich, Neal Kramer	Focused rare plant surveys
5/12/2008	Glen Kinoshita, Yancey Bissonnette	Focused rare plant surveys
5/13/2008	Glen Kinoshita, Yancey Bissonnette	Focused rare plant surveys
5/14/2008	Glen Kinoshita, Yancey Bissonnette	Focused rare plant surveys
5/15/2008	Glen Kinoshita, Yancey Bissonnette	Focused rare plant surveys
12/14/2008	Dallas Pugh, Shanti Santulli, Rick Bailey, Sundeep Amin	Jurisdictional Waters of the US Surveys
12/15/2008	Dallas Pugh, Shanti Santulli, Rick Bailey, Sundeep Amin	Jurisdictional Waters of the US Surveys

Table 2
Survey Dates and Field Personnel
(Continued)

Date	Field Personnel	Survey Type
3/15/2007	Glen Kinoshita, Paul Brenner	General Survey, site assessment
12/16/2008	Dallas Pugh, Shanti Santulli, Rick Bailey, Sundeep Amin	Jurisdictional Waters of the US Surveys
1/5/2009	Dallas Pugh, Shanti Santulli, Brittany Benson, Sundeep Amin	Jurisdictional Waters of the US Surveys
1/6/2009	Dallas Pugh, Shanti Santulli, Brittany Benson, Sundeep Amin	Jurisdictional Waters of the US Surveys
1/7/2009	Dallas Pugh, Shanti Santulli, Brittany Benson, Sundeep Amin	Jurisdictional Waters of the US Surveys

Table 3
Special-Status Species

SPECIES		STATUS			HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR	STATUS ONSITE
Common Name	*Scientific Name*	Federal	State	CNPS			
Plants							
Small-flowered androstephium	*Androstephium breviflorum*	None	None	2	Mojave desert scrub (bajadas), blooms March-April.	Moderate potential. Habitat in north-eastern portion of study area.	Not observed in Project area in 2007 or 2008
White bearpoppy	*Arctomecon merriamii*	None	None	2	Chenopod scrub, Mojave desert scrub, blooms April-May.	Moderate potential. Habitat in north-eastern portion of study area.	Not observed in Project area in 2007 or 2008
Plummer's mariposa lily	*Calochortus plummerae*	None	None	1B	Chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, valley and foothill grassland, blooms May-July.	Moderate potential. Habitat in south-western portion of study area.	Not observed in Project area in 2007 or 2008
Alkalai mariposa lily	*Calochortus striatus*	None	None	1B	Chaparral, chenopod scrub, Mojave desert scrub, meadows and seeps at north base of San Bernardino Mts., blooms April-June.	Moderate potential. Habitat in south-western portion of study area.	Not observed in Project area in 2007 or 2008
Booth's evening primrose	*Camissonia boothii* var. *boothii*	None	None	2	Joshua tree woodland, pinion and juniper woodland, blooms April-September.	High potential. Habitat in south-western portion of study area in Joshua tree woodland areas. Historical observation in Mojave River near Antelope Valley.	Observed in 2008 in Project area.
Crucifixion thorn	*Castela emoryi*	SC	None	2	Dry, rocky desert washes, slopes and plains, blooms June-July.	High potential in north-eastern portion of Project area, historical location near Pisgah Crater.	Observed in 2008 in Project area.

Table 3
Special-Status Species
(Continued)

SPECIES		STATUS			HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR	STATUS ONSITE
Common Name	*Scientific Name*	Federal	State	CNPS			
White-bracted spineflower	*Chorizanthe xanti* var. *leucotheca*	None	None	1B	Mojave desert scrub, pinion and juniper woodland, blooms April-June.	Moderate potential. Habitat in woodlands in south-western portion of Project area.	Not observed in Project area in 2007 or 2008
Mojave Tarplant	*Deinandra mojavensis*	None	SE	1B	Chaparral, coastal scrub, riparian scrub, blooms June-October.	Moderate potential. Scrub habitat in south-western portion of Project area.	Not observed in Project area in 2007 or 2008
Slender-horned spineflower	*Dodecahema leptoceras*	CE	None	1B	Chaparral, cismontane woodland, coastal scrub (alluvial fan), blooms April-June.	Low potential. Most scrub habitat too dry for species.	Not observed in Project area in 2007 or 2008
Barstow wooly sunflower	*Eriophyllum mojavense*	None	None	1B	Chenopod scrub, Mojave desert scrub, playas, bloom April-May.	Moderate potential. Desert scrub habitat found throughout survey area.	Not observed in Project area in 2007 or 2008
Viviparous foxtail cactus	*Escobaria vivipara* var. *rosea*	None	None	2	Mojave desert scrub, pinyon and juniper woodland, blooms May-June.	Moderate potential. Desert scrub and juniper woodland found in south-western and throughout Project area.	Not observed in Project area in 2007 or 2008
Sagebrush loeflingia	*Loeflingia squarrosa* var. *artemisiarum*	None	None	2	Desert dunes, Great Basin scrub, Sonoran desert scrub, blooms April-May.	Moderate potential. Dune habitat in north-eastern portion of Project area.	Not observed in Project area in 2007 or 2008
Creamy blazing star	*Mentzelia tridentata*	None	None	1B	Mojave desert scrub, bloom March-May.	Moderate potential. Desert scrub habitat found throughout survey area.	Not observed in Project area in 2007 or 2008

Table 3
Special-Status Species
(Continued)

SPECIES		STATUS			HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR	STATUS ONSITE
Common Name	*Scientific Name*	Federal	State	CNPS			
Mojave monkey flower	*Mimulus mojavensis*	None	None	1B	Joshua tree woodland, Mojave desert scrub, blooms April-June.	Moderate potential. Joshua tree woodland areas found in south-western portion of Project area.	Not observed in Project area in 2007 or 2008
Short-joint beavertail cactus	*Opuntia basilaris var. brachyclada*	None	None	1B	Chaparral, Joshua tree woodland, Mojave desert scrub, pinion and juniper woodland, blooms April-June.	High Potential. Suitable habitat found throughout Project area. Historical observations in south-western and north-eastern portions of study area.	Observed in 2007 and 2008 in Project area.
White-margined beardtongue	*Penstemon albomarginatus*	None	None	1B	Mojave desert scrub, blooms March-May.	High potential. Scrub habitat found throughout survey area. Historical observations near Project area in the Antelope Valley and near Pisgah Crater.	Observed in Project area in 2008.
Sky-blue phacelia	*Phacelia coerulea*	None	None	2	Mojave desert scrub, pinyon and juniper woodland, blooms April-May.	Moderate potential. Scrub habitat found throughout Project area.	Not observed in 2007 Project area.
Parish's phacelia	*Phacelia parishii*	None	None	1B	Mojave desert scrub, blooms April-May.	High potential. Scrub habitat found throughout Project area. Historical observation near Lucerne Lake.	Not observed in Project area in 2007 or 2008

Table 3
Special-Status Species
(Continued)

SPECIES		STATUS			HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR	STATUS ONSITE
Common Name	*Scientific Name*	Federal	State	CNPS			
Parish's popcornflower	*Plagiobothrys parishii*	None	None	1B	Desert scrub, Joshua tree woodland, blooms March-June.	High potential. Desert scrub found throughout Project area and Joshua tree woodland found in south-western portion. Historical observation near Rabbit Springs.	Not observed in Project area in 2007 or 2008
Thorny milkwort	*Polygala acanthoclada*	None	None	2	Chenopod scrub, Joshua tree woodland, pinyon and juniper woodland, blooms May-August.	Moderate potential. Juniper and pinyon-juniper woodland habitat in south-western portion of study area.	Not observed in Project area in 2007 or 2008
Parish's alkali grass	*Puccinellia parishii*	None	None	1B	Desert seeps, springs, wet meadows, blooms April-May.	High potential. Desert seeps are scattered along Project area. Historical observation near Rabbit Springs.	Not observed in Project area in 2007 or 2008
Black sedge	*Schoenus nigricans*	None	None	2	Marshes, swamps, springs, generally alkaline soils, blooms August-September.	Moderate potential. Areas of alkaline soils in Project area such as in the Lucerne Valley.	Not observed in Project area in 2007 or 2008
Salt spring checkerbloom	*Sidalcea neomexicana*	None	None	1B	Alkaline springs and marshes, blooms March-April.	High potential. Springs and seeps are located along survey corridor. Historical observation located at Rabbit Springs.	Not observed in Project area in 2007 or 2008
Rusby's desert mallow	*Sphaeralcea rusbyi* var. *eremicola*	None	None	1B	Joshua tree woodland, Mojave desert scrub, blooms May-June.	Moderate potential. Joshua tree habitat in south-western portion of Project area.	Not observed in Project area in 2007 or 2008.

Table 3
Special-Status Species
(Continued)

SPECIES		STATUS			HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR	STATUS ONSITE
Common Name	*Scientific Name*	Federal	State	CNPS			
Golden violet	*Viola aurea*	None	None	2	Sandy slopes, blooms April-June.	Moderate potential. Sandy areas located throughout Project area.	Not observed in Project area in 2007 or 2008
Amphibians							
California red-legged frog	*Rana aurora draytonii*	T	None	N/A	Dense, shrubby or emergent riparian vegetation associated with deep still or slow moving water.	Moderate potential. Riparian habitat in south-western portion of Project area. Historical observation in Mojave River Forks Reservoir.	Not observed in Project area in 2007 or 2008
Reptiles							
Desert tortoise	*Gopherus agassizii*	T	T	N/A	river washes, rocky hillsides, and flat desert having sandy or gravelly soil with creosote bush, burro bush, saltbush, Joshua tree, Mojave yucca, cacti, other shrubs, grasses, and wildflowers	High potential. Habitat in north-eastern portion of Project area in and around the desert tortoise conservation area.	Observed in 2007 and 2008 in Project area.
Rosy boa	*Lichanura trivirgata*	None	None	N/A	Arid scrublands, semi-arid shrublands, rocky deserts, desert oases, canyons, and rocky areas.	Moderate potential. Arid scrubland habitat in south-western portion of Project area.	Not observed in Project area in 2007 or 2008
Coast horned lizard	*Phrynosoma coronatum*	SC	SC	N/A	Chaparral and coastal sage scrub with open spaces in abundant vegetation	Moderate potential. Scrub habitat in south-western portion of Project area. Historic observations along the Mojave River and Mojave River West Fork.	Not observed in Project area in 2007 or 2008

Table 3
Special-Status Species
(Continued)

SPECIES		STATUS			HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR	STATUS ONSITE
Common Name	*Scientific Name*	Federal	State	CNPS			
Chuckwalla	*Sauromalus obesus*	SC	None	N/A	Desert rock outcrops surrounded by creosote brush scrub.	High potential. Numerous rocky outcrops in north-eastern portion of Project area.	Not observed in 2007 Project area.
Mojave fringe-toed lizard	*Uma scoparia*	SC	SC	N/A	Areas of Aeolian sands including dunes, flats with sandy hummocks, washes and banks of rivers.	High potential. Dune habitat in north-eastern portion of Project area. Historical observation in Pisgah Crater.	Not observed on t-line in 2007 or 2008.Observed on Solar One project site in 2008.
Birds							
Cooper's hawk	*Accipiter cooperii*	None	SC	N/A	Woodlands, suburban landscapes.	High potential. Pinyon-juniper woodlands and suburban areas in south-western portion of Project area. Historical observation near Hesperia.	Not observed in Project area in 2007 or 2008
Golden eagle	*Aquila chrysaetos*	None	SC	N/A	Desert scrub near cliff nest sites.	Moderate potential. Suitable habitat in south-western portion of Project area.	Observed in 2007 in Project area.
Long-eared owl	*Asio otus*	None	None	N/A	Woodlands, forest edges, riparian strips along rivers.	High potential. Suitable habitat in south-western portion of Project area. Historical observation in Antelope Valley near Hesperia.	Not observed in 2007 Project area.

Table 3
Special-Status Species
(Continued)

SPECIES		STATUS			HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR	STATUS ONSITE
Common Name	*Scientific Name*	Federal	State	CNPS			
Western burrowing owl	*Athene cunicularia*	SC	SC	N/A	Found in open grasslands and agricultural areas with suitable fossorial mammal burrows for nesting.	High potential. Suitable habitat and burrows observed along survey corridor.	Observed in 2007 and 2008 in Project area.
Yellow warbler	*Dendroica petechia*	None	None	N/A	Farmlands, forest edges, suburban yards and gardens, areas of scattered trees and shrubbery.	High potential. Suitable suburban habitat in south-western portion of Project area. Historical observation near Hesperia.	Observed in 2007 and 2008 in Project area.
Southwestern willow flycatcher	*Empidonax traillii extimus*	E	E	N/A	Riparian woodland/forest; Mojave River.	Moderate potential. Suitable habitat around Mojave River in south-western portion of Project area.	Not observed in Project area in 2007 or 2008
Prairie falcon	*Falco mexicanus*	None	SC	N/A	Desert scrub near cliff nest sites.	Moderate potential. Suitable scrub habitat along survey route.	Not observed in Project area in 2007 or 2008
Loggerhead shrike	*Lanius ludovicianus*	SC	None	N/A	Desert, farmland; nests in cholla and thorny bushes.	Moderate potential. Suitable habitat in south-western portion of Project area.	Observed in 2007 and 2008 in Project area.
Black-tailed gnatcatcher	*Polioptila melanura*	None	SC	N/A	Occurs in dry washes in low desert and arid country.	Moderate potential. Suitable habitat in south-western portion of Project area.	Not observed in Project area in 2007 or 2008
Vermillion flycatcher	*Pyrocephalus rubinus*	SC	SC	N/A	Riparian drainages adjacent to open habitats.	Low potential. Little potential habitat in Project area, mostly in south-western area near Hesperia.	Not observed in Project area in 2007 or 2008.

Table 3
Special-Status Species
(Continued)

SPECIES		STATUS			HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR	STATUS ONSITE
Common Name	*Scientific Name*	Federal	State	CNPS			
Bendire's thrasher	*Toxostoma bendirei*	None	SC	N/A	Desert wash vegetation	Moderate potential. Suitable habitat throughout Project area, such as the Mojave River and other washes along survey corridor.	Not observed in Project area in 2007 or 2008
Le Conte's thrasher	*Toxostoma lecontei*	None	SC	N/A	Desert washes where large shrubs occur for nesting.	High potential. Suitable habitat throughout Project area. Historical observations in Hesperia, Apple Valley, Lucerne Valley.	Not observed in Project area in 2007 or 2008
Gray vireo	*Vireo vaccinator*	None	None	N/A	Chaparral, pinyon-juniper woodland, oak-juniper woodland.	Moderate potential. Suitable habitat in south-western portion of Project area.	Not observed in Project area in 2007 or 2008
Mammals							
Pallid San Diego pocket mouse	*Chaetodipus fallax pallidus*	None	SC	N/A	Chaparral, sage scrub communities with sandy open spaces.	High potential. Scrub habitat in the south-western portion of Project area. Historical observation in Arrastre Canyon near Apple Valley.	Not observed in Project area in 2007 or 2008
Spotted bat	*Euderma maculatum*	SC	None	N/A	Associated with patchy vegetation with prominent rocky features, pinyon juniper and riparian forests.	High potential. Pinyon-juniper habitat in south-western portion of survey area.	Not observed in Project area in 2007 or 2008

Table 3
Special-Status Species
(Continued)

SPECIES		STATUS			HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR	STATUS ONSITE
Common Name	*Scientific Name*	Federal	State	CNPS			
Western mastiff bat	Eumops perotis	None	None	N/A	Rocky areas and cliff faces, roosts in cliff crevices, buildings.	High potential. Numerous exposed, rocky slopes and hills along survey route. Historical observation in Lucerne Lake.	Not observed in Project area in 2007 or 2008
Townsend's big-eared bat	*Plecotus townsendii*	None	None	N/A	Desert scrub and coniferous forests, roosts in caves, abandoned mines, and buildings.	High potential. Desert scrub habitat in south-western portion of Project area. Historical observation in Apple Valley.	Not observed in Project area in 2007 or 2008
Mohave ground squirrel	*Spermophilus mohavensis*	SC	ST	N/A	Mojave desert scrub west of Barstow.	High potential. Desert scrub habitat in south-western portion of Project area. Historical observations in Hesperia, Apple Valley, and Rabbit Springs.	Not observed in Project area in 2007 or 2008
American badger	*Taxidea taxus*	None	SC	N/A	Grasslands, savannas, and mountain meadows near timberline are preferred, but also occur in desert scrub areas.	High potential. Desert scrub habitat in south-western portion of Project area.	Not observed on t-line in 2007 or 2008.Observed on Solar One project site in 2007.

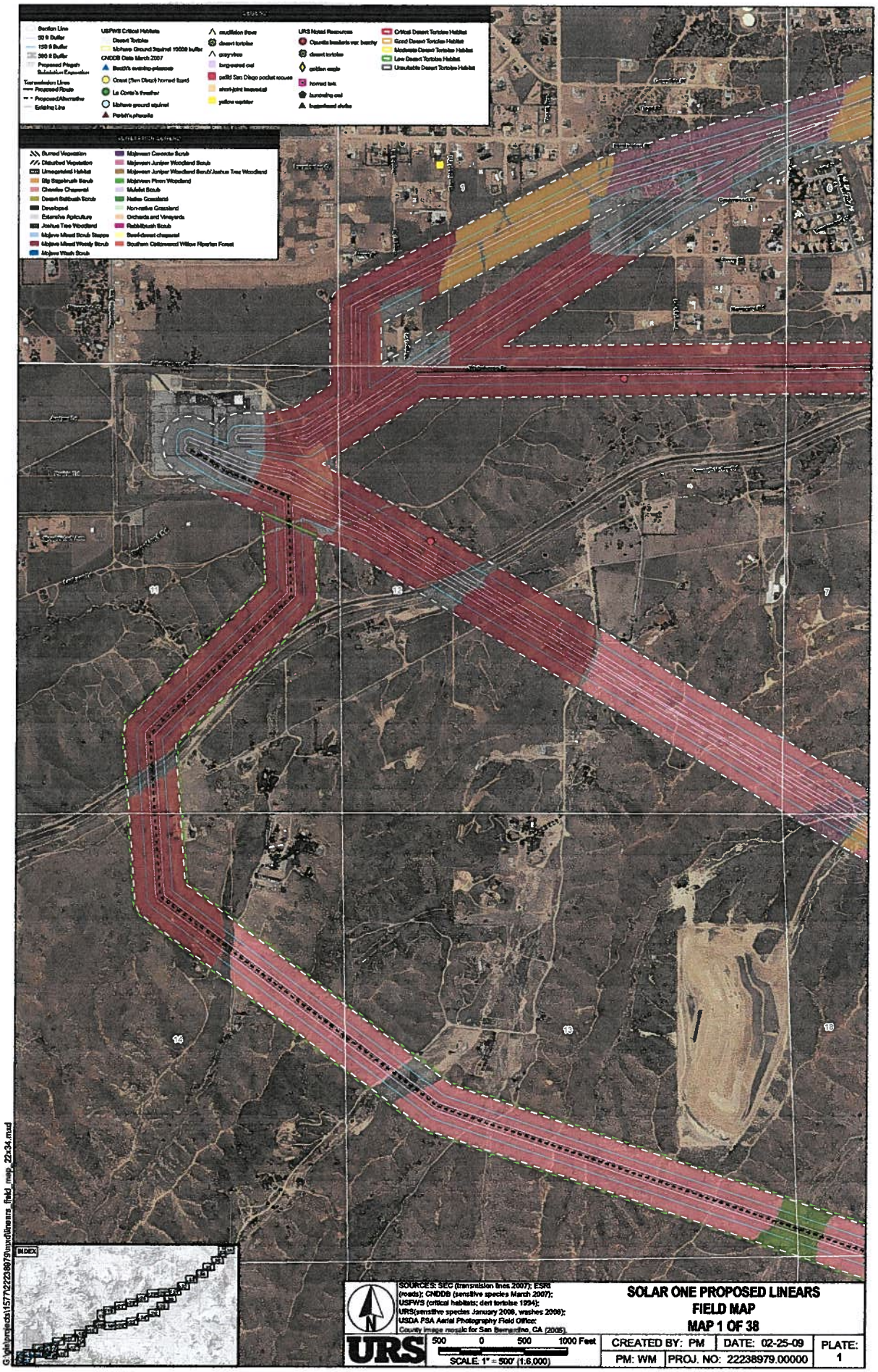
REFERENCES

California Native Plant Society (CNPS). 2008. Inventory of Rare and Endangered Plants (online edition, v7-08c-interim). California Native Plant Society. Sacramento, CA. Accessed from http://www.cnps.org/inventory.

(CNDDB) California Department of Fish and Game (CDFG). 2008. California Natural Diversity Data Base. Sacramento, CA.

PLATES 1-38

Vegetation and Special-Status Species Maps of Proposed Transmission Line Corridor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150 ft Buffer
300 ft Buffer
Proposed Project Substation Expansion
Transmission Lines
Proposed Route
Proposed/Alternative
Existing Line
USFWS Critical Habitats
Desert Tortoise
Mohave Ground Squirrel 10000 buffer
CNDDB Data March 2007
Beath's evening-primrose
Coast (San Diego) horned lizard
La Conte's thrasher
Mohave ground squirrel
Parish's phacelia
mudfoldon fever
desert tortoise
gray vireo
long-eared owl
pallid San Diego pocket mouse
short-joint beavertail
yellow warbler
URS Noted Resources
Opuntia basilaris var. beaviy
desert tortoise
golden eagle
horned lark
burrowing owl
loggerhead shrike
Critical Desert Tortoise Habitat
Good Desert Tortoise Habitat
Moderate Desert Tortoise Habitat
Low Desert Tortoise Habitat
Unsuitable Desert Tortoise Habitat
Burned Vegetation
Disturbed Vegetation
Unmapped Habitat
Big Sagebrush Scrub
Chamise Chaparral
Desert Saltbush Scrub
Developed
Extensive Agriculture
Joshua Tree Woodland
Mojave Mixed Scrub Steppe
Mojave Mixed Woody Scrub
Mojave Wash Scrub
Mojavean Cercocarpus Scrub
Mojavean Juniper Woodland Scrub
Mojavean Juniper Woodland Scrub/Joshua Tree Woodland
Mojavean Pinon Woodland
Mulefat Scrub
Native Grassland
Non-native Grassland
Orchards and Vineyards
Rabbitbush Scrub
Semi-desert chaparral
Southern Cottonwood Willow Riparian Forest
INDEX
SOURCES: SEC (transmission lines 2007); ESRI (roads); CNDDB (sensitive species March 2007); USFWS (critical habitats; dert tortoise 1994); URS(sensitive species January 2008, washes 2008); USDA FSA Aerial Photography Field Office: County image mosaic for San Bernardino, CA (2005).
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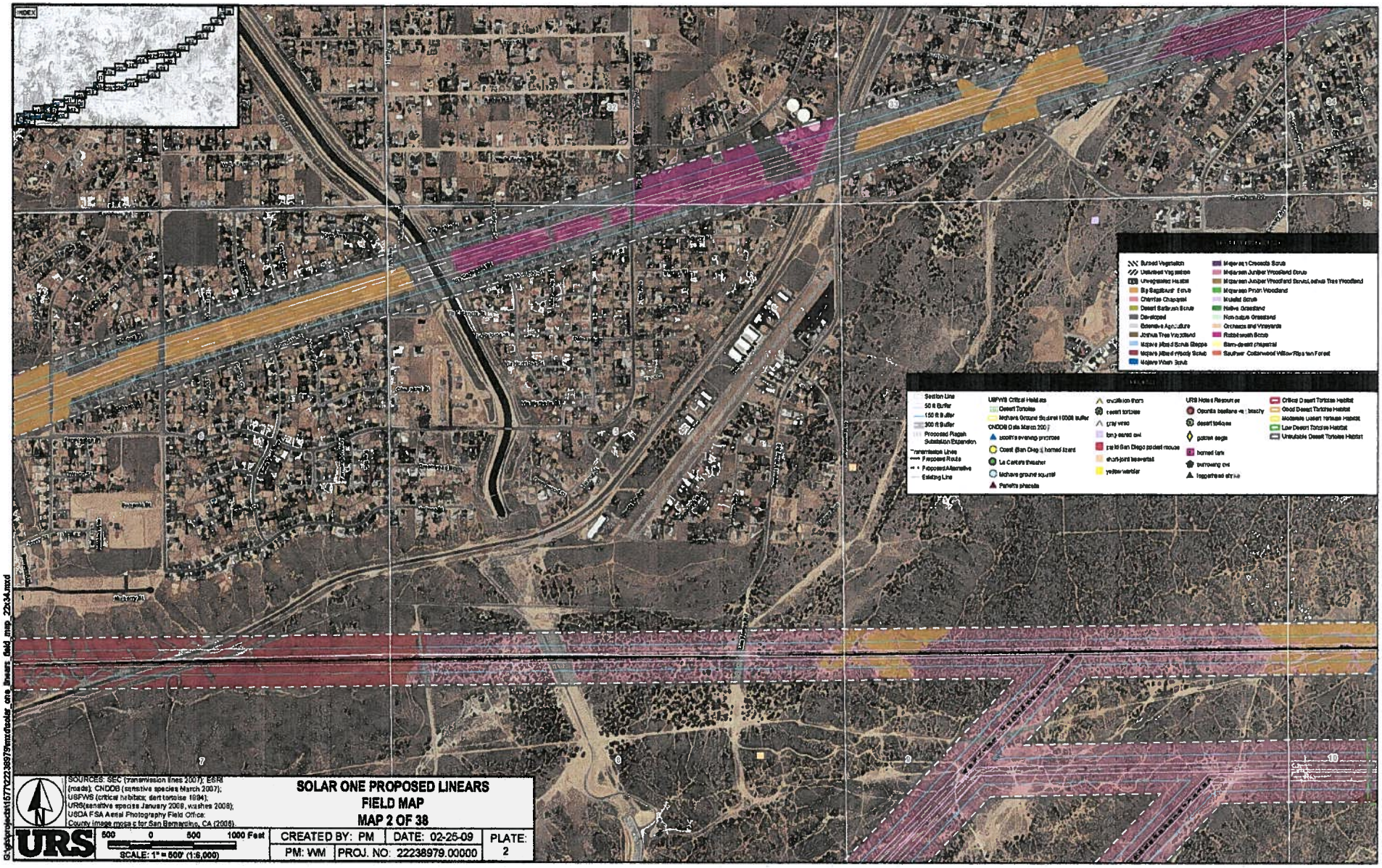
INDEX
Section Line
50 ft Buffer
150 ft Buffer
300 ft Buffer
Proposed Pisgah Substation Expansion
Transmission Lines
Proposed Route
Proposed Alternative
Existing Line
USFWS Critical Habitats
Desert Tortoise
Mohave Ground Squirrel (1000ft buffer
CNDDB Data March 2007
Coast (San Diego) horned lizard
La Cantera thistle
Mohave ground squirrel
Panamint chaparral
crucifixion thorn
desert tortoise
gray vireo
long-eared owl
pocket mouse
short-joint beavertail
yellow warbler
URS Notes Resources
desert tortoise
golden eagle
horned lark
burrowing owl
loggerhead shrike
Critical Desert Tortoise Habitat
Good Desert Tortoise Habitat
Moderate Desert Tortoise Habitat
Low Desert Tortoise Habitat
Unsuitable Desert Tortoise Habitat
Burned Vegetation
Undisturbed Vegetation
Unvegetated Habitat
Big Sagebrush Scrub
Chamise Chaparral
Desert Saltbush Scrub
Developed
Extensive Agriculture
Joshua Tree Woodland
Mojave Mixed Scrub (Sage)
Mojave Mixed Woody Scrub
Mojave Wash Scrub
Mojave Creosote Scrub
Mojavean Juniper Woodland Scrub
Mojavean Juniper Woodland Scrub/Joshua Tree Woodland
Mojavean Pinon Woodland
Musteld Scrub
Native Grassland
Non native Grassland
Orchards and Vineyards
Rabbitbrush Scrub
Semi-desert chaparral
Southern Cottonwood Willow Riparian Forest
Mountain Ave
Hickory St
7
8
9
10
SOURCES: SEC (transmission lines 2007); ESRI (roads); CNDDB (sensitive species March 2007); USFWS (critical habitats; dert tortoise 1994); URS(sensitive species January 2008, washes 2008); USDA FSA Aerial Photography Field Office: County image mosaic for San Bernardino, CA (2006).
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URS
SOLAR ONE PROPOSED LINEARS
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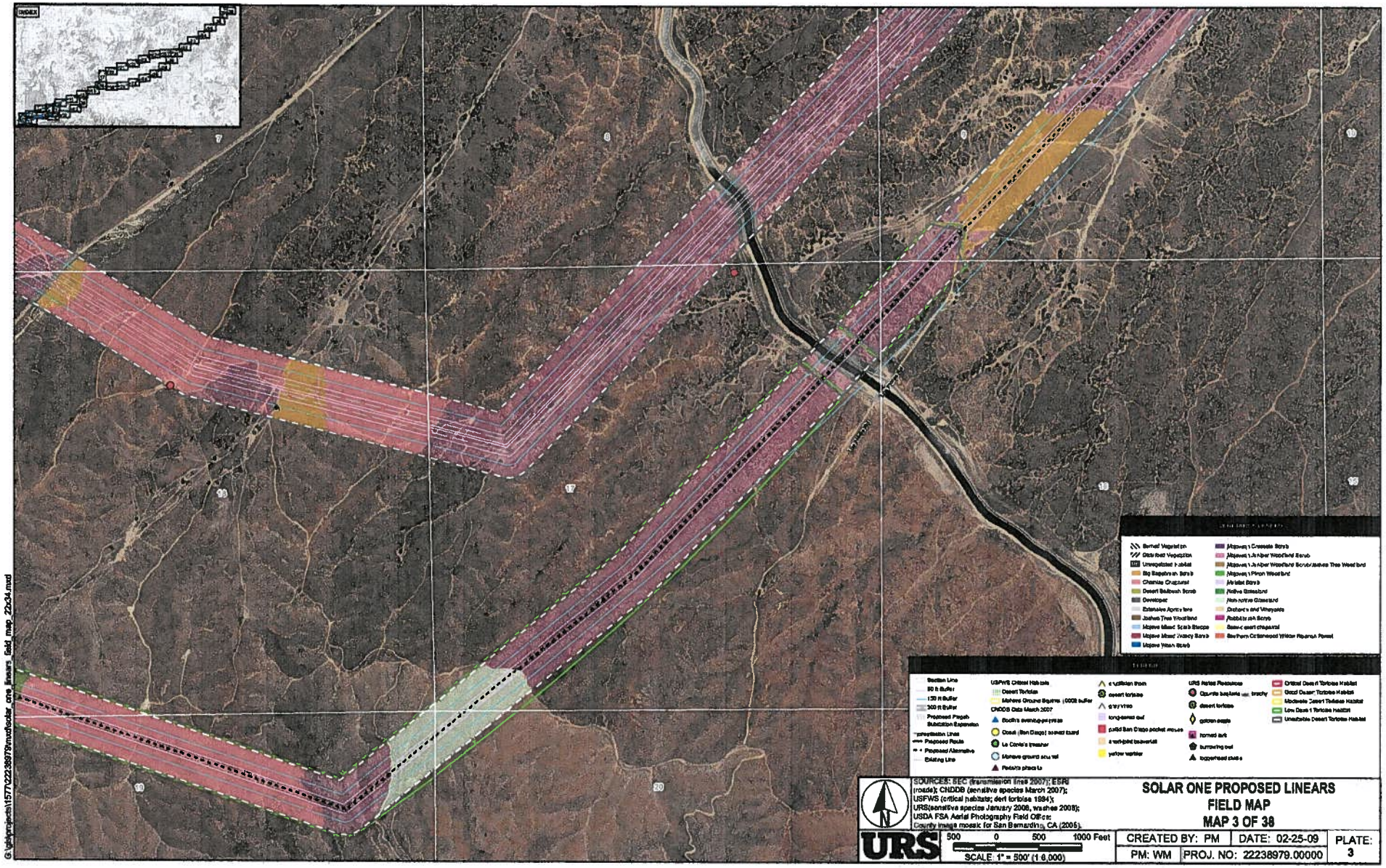

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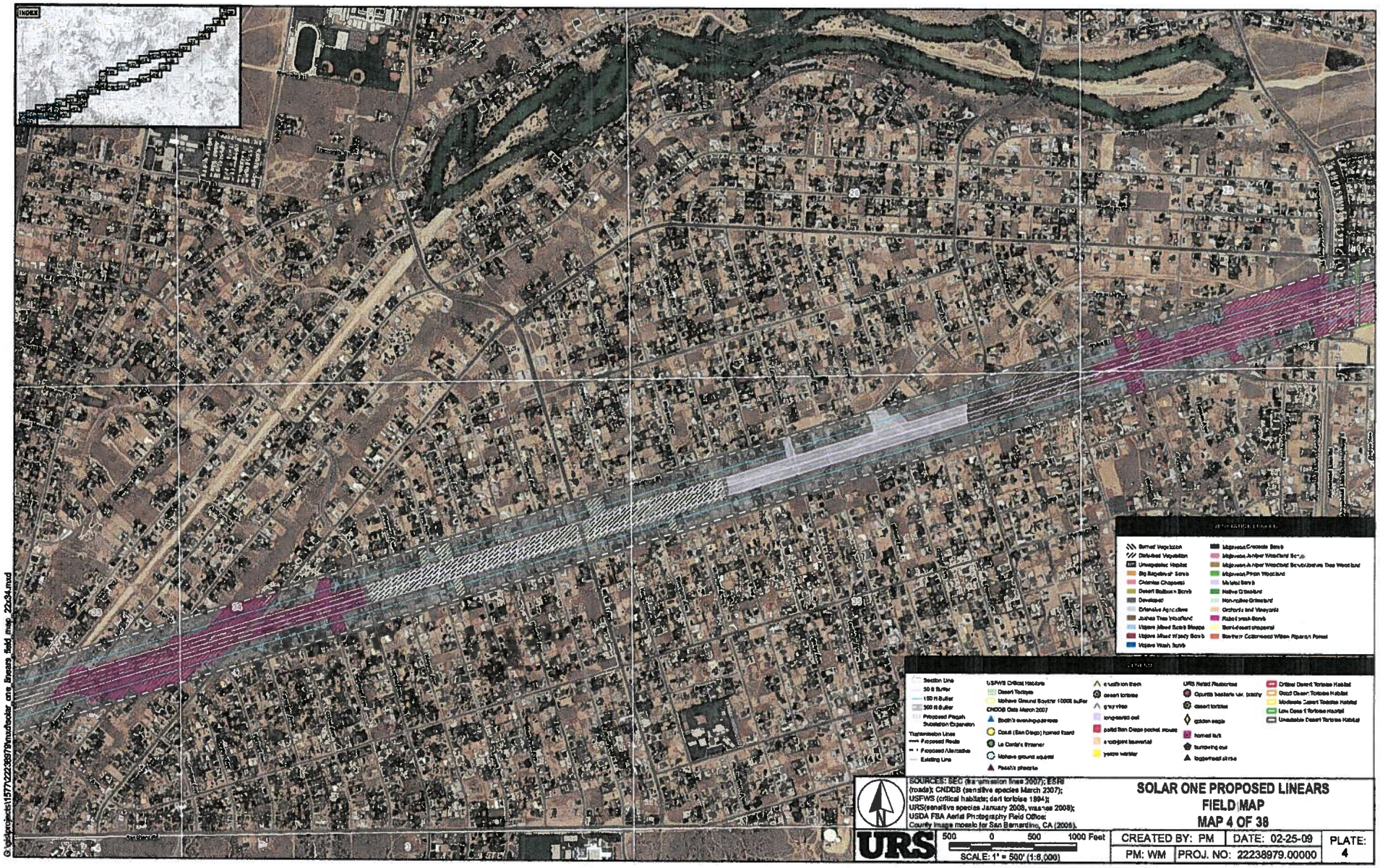

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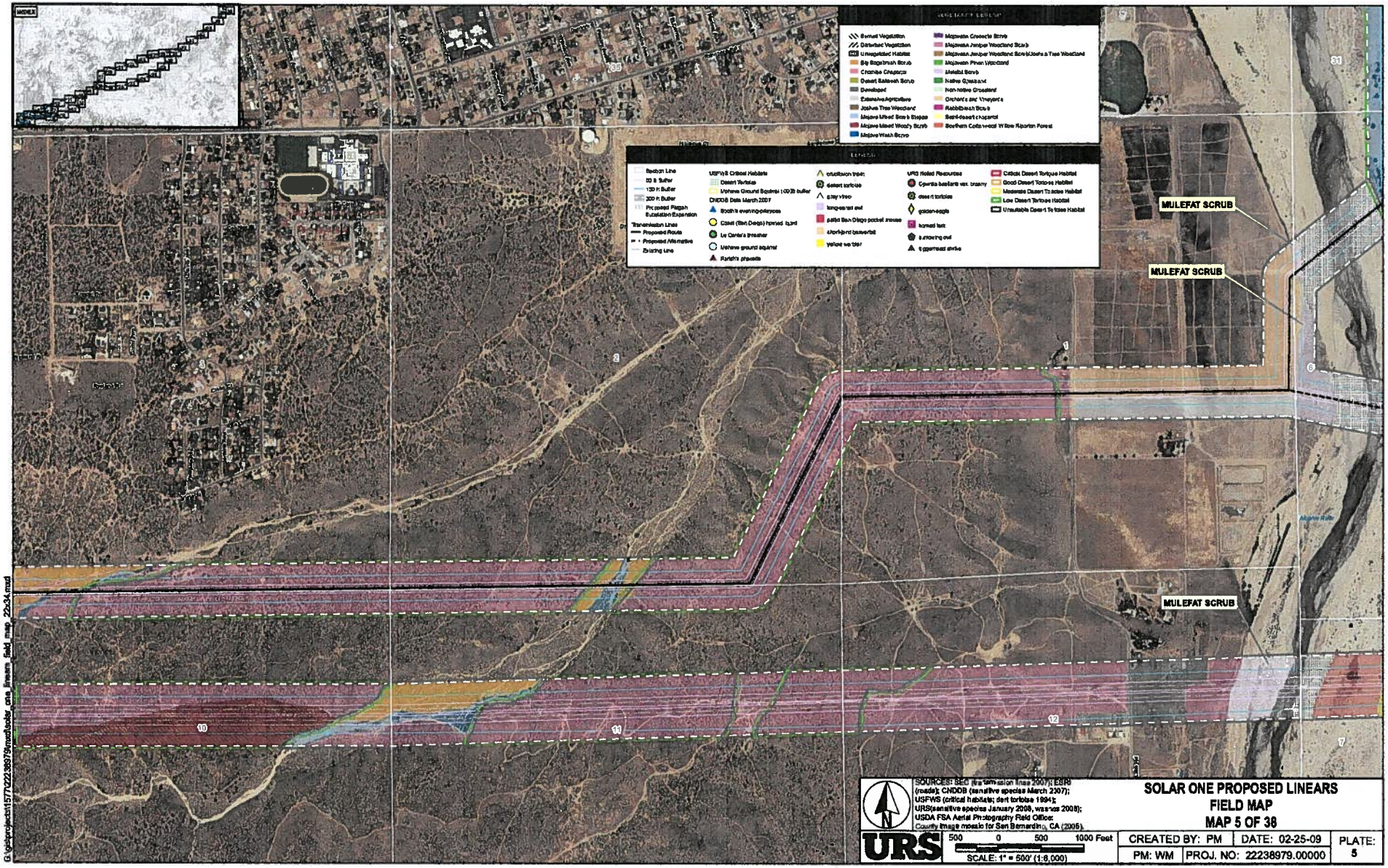

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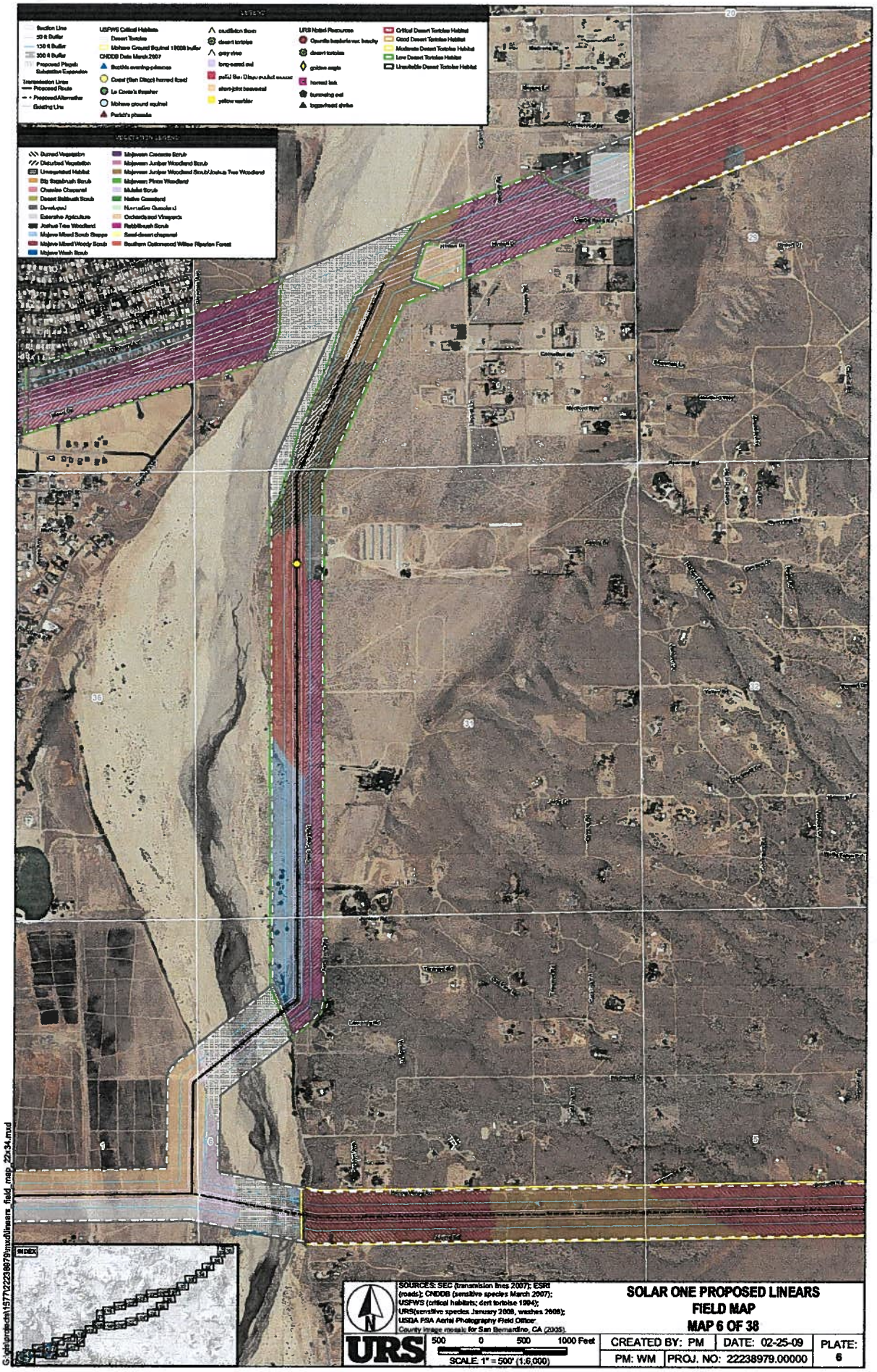
LEGEND
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50 ft Buffer
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300 ft Buffer
Proposed Pilegah Substation Expansion
Transmission Lines
Proposed Route
Proposed Alternative
Existing Line
USFWS Critical Habitats
Desert Tortoise
Mohave Ground Squirrel 1500ft buffer
CNDDB Data March 2007
Bushtits overing-pilaenus
Coast (San Diego) horned lizard
Le Conte's thrasher
Mohave ground squirrel
Parish's phacelia
ruddiblush thorn
desert tortoise
gray vireo
long-eared owl
palid San Diego pocket mouse
short-joint beavertail
yellow warbler
URS Noted Resources
Opuntia basilaris var. brachy
desert tortoise
golden eagle
horned lark
burrowing owl
loggerhead shrike
Critical Desert Tortoise Habitat
Good Desert Tortoise Habitat
Moderate Desert Tortoise Habitat
Low Desert Tortoise Habitat
Unsuitable Desert Tortoise Habitat
VEGETATION LEGEND
Burned Vegetation
Disturbed Vegetation
Unvegetated Habitat
Big Sagebrush Scrub
Chamise Chaparral
Desert Saltbush Scrub
Developed
Extensive Agriculture
Joshua Tree Woodland
Mojave Mixed Scrub Steppe
Mojave Mixed Woody Scrub
Mojave Wash Scrub
Mojavean Creosote Scrub
Mojavean Juniper Woodland Scrub
Mojavean Juniper Woodland Scrub/Joshua Tree Woodland
Mojavean Pinon Woodland
Mulefat Scrub
Native Grassland
Nonnative Grassland
Orchards and Vineyards
Rabbitbrush Scrub
Semi-desert chaparral
Southern Cottonwood Willow Riparian Forest
INDEX
SOURCES: SEC (transmission lines 2007); ESRI (roads); CNDDB (sensitive species March 2007); USFWS (critical habitats; dert tortoise 1994); URS(sensitive species January 2008, washes 2008); USDA FSA Aerial Photography Field Office County image mosaic for San Bernardino, CA (2005).
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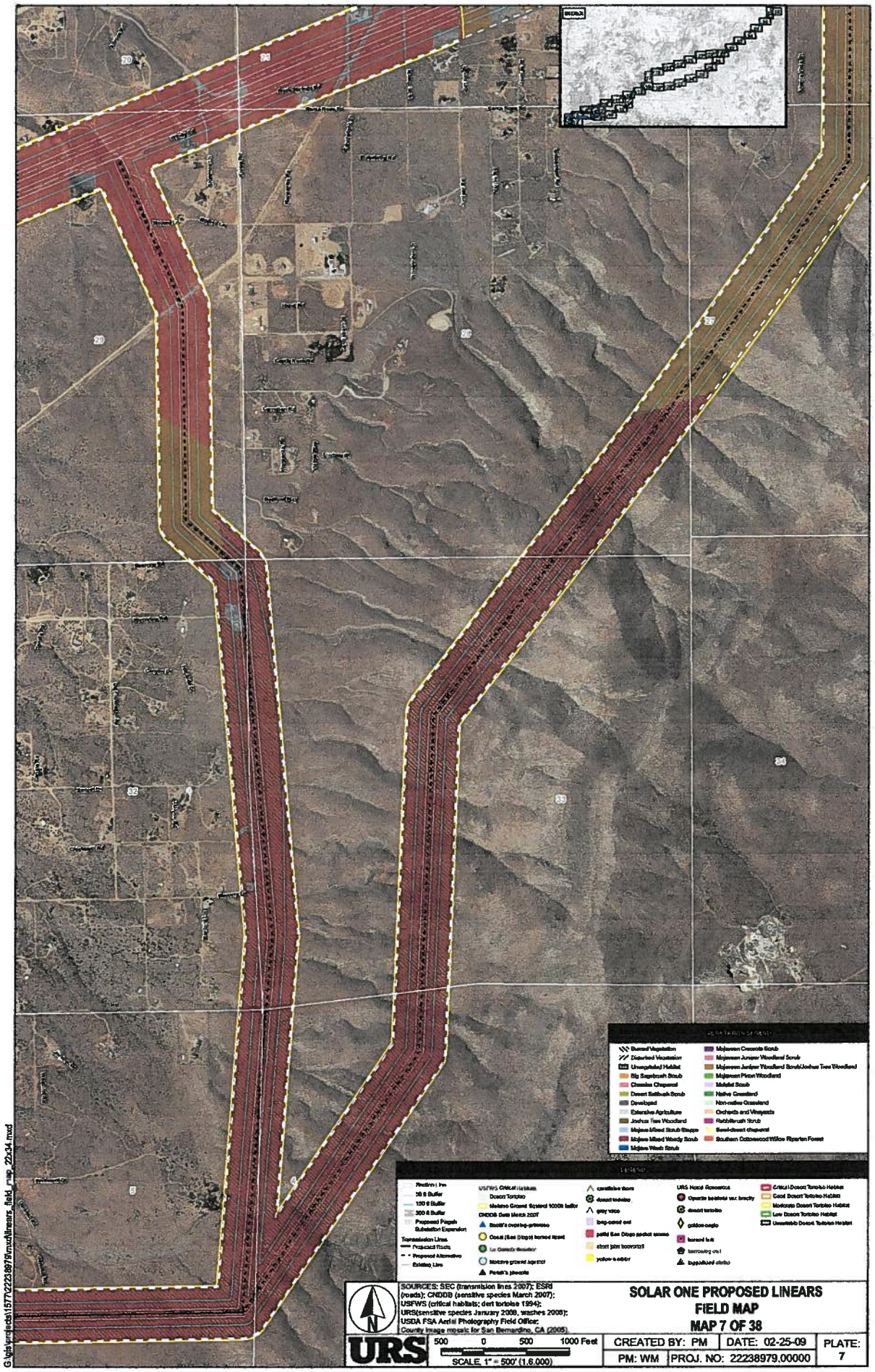
Burned Vegetation
Disturbed Vegetation
Undeveloped Habitat
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Chamise Chaparral
Desert Saltbush Scrub
Developed
Extensive Agriculture
Joshua Tree Woodland
Mojave Mixed Scrub Steppe
Mojave Mixed Woody Scrub
Mojave Wash Scrub
Mojavean Creosote Scrub
Mojavean Juniper Woodland Scrub
Mojavean Juniper Woodland Scrub/Joshua Tree Woodland
Mojavean Pinon Woodland
Mulefat Scrub
Native Grassland
Non-native Grassland
Orchards and Vineyards
Rabbitbrush Scrub
Semi-desert chaparral
Southern Cottonwood Willow Riparian Forest
USFWS Critical Habitat
Desert Tortoise
Mojave Ground Squirrel 1000ft buffer
CNDDB Data March 2007
Beetle's owning-grasses
Coast (San Diego) horned lizard
Le Conte's thrasher
Mojave ground squirrel
Parish's phacelia
cactus wren
desert tortoise
gray vireo
long-eared owl
pallid San Diego pocket mouse
short jaw leopard
yellow warbler
URS Hazel Screenings
Operator located var. bradly
desert tortoise
golden eagle
horned lark
burrowing owl
loggerhead shrike
Critical Desert Tortoise Habitat
Good Desert Tortoise Habitat
Moderate Desert Tortoise Habitat
Low Desert Tortoise Habitat
Unsuitable Desert Tortoise Habitat
Restrict Inc
50 ft Buffer
100 ft Buffer
300 ft Buffer
Proposed Pisgah Substation Expansion
Transmission Lines
Proposed Route
Proposed Alternative
Existing Line
SOURCES: SEC (transmission lines 2007); ESRI (roads); CNDDB (sensitive species March 2007); USFWS (critical habitats; dert tortoise 1994); URS(sensitive species January 2008, washes 2008); USDA FSA Aerial Photography Field Office; County Image mosaic for San Bernardino, CA (2005).
SOLAR ONE PROPOSED LINEARS
FIELD MAP
MAP 7 OF 38
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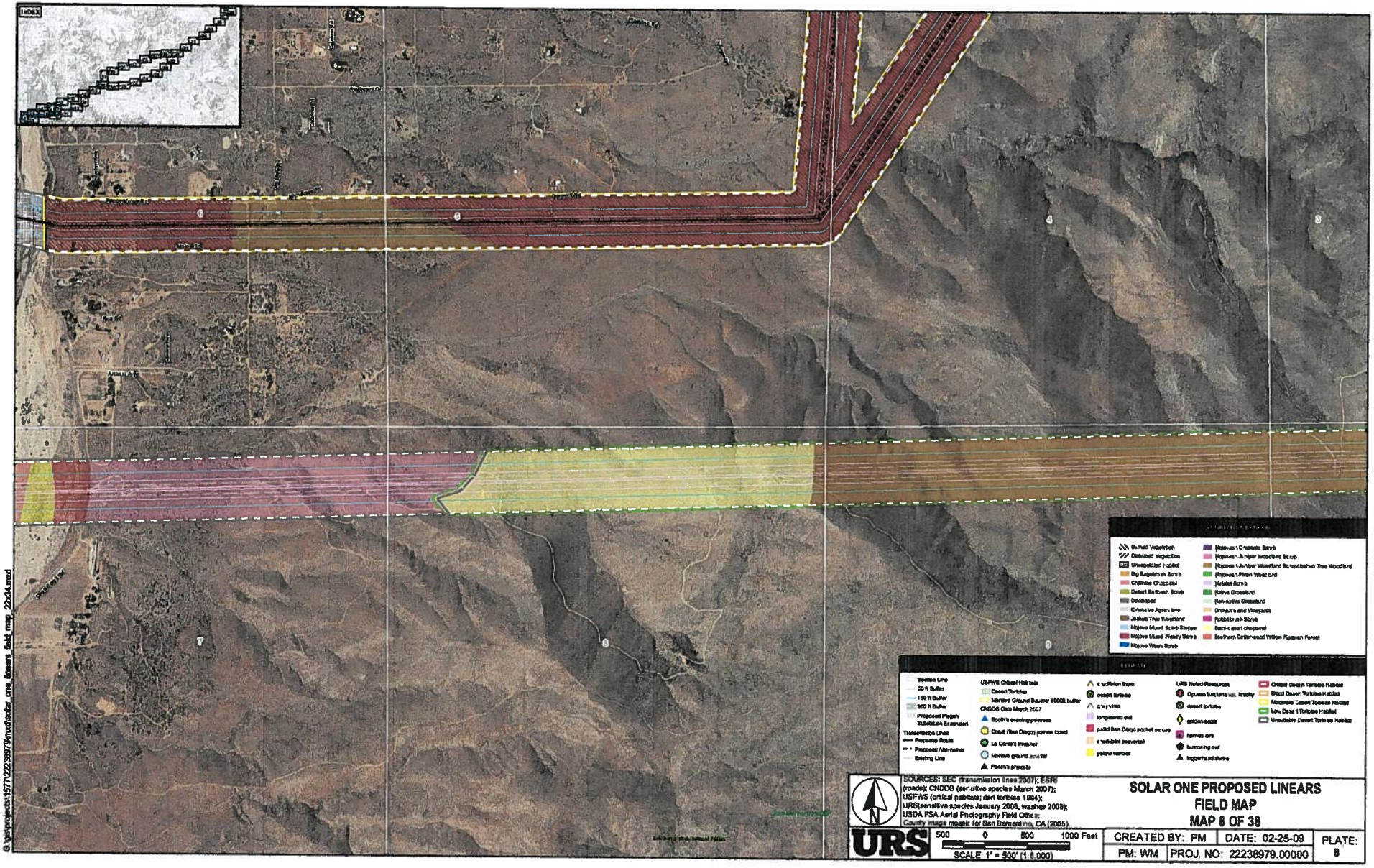

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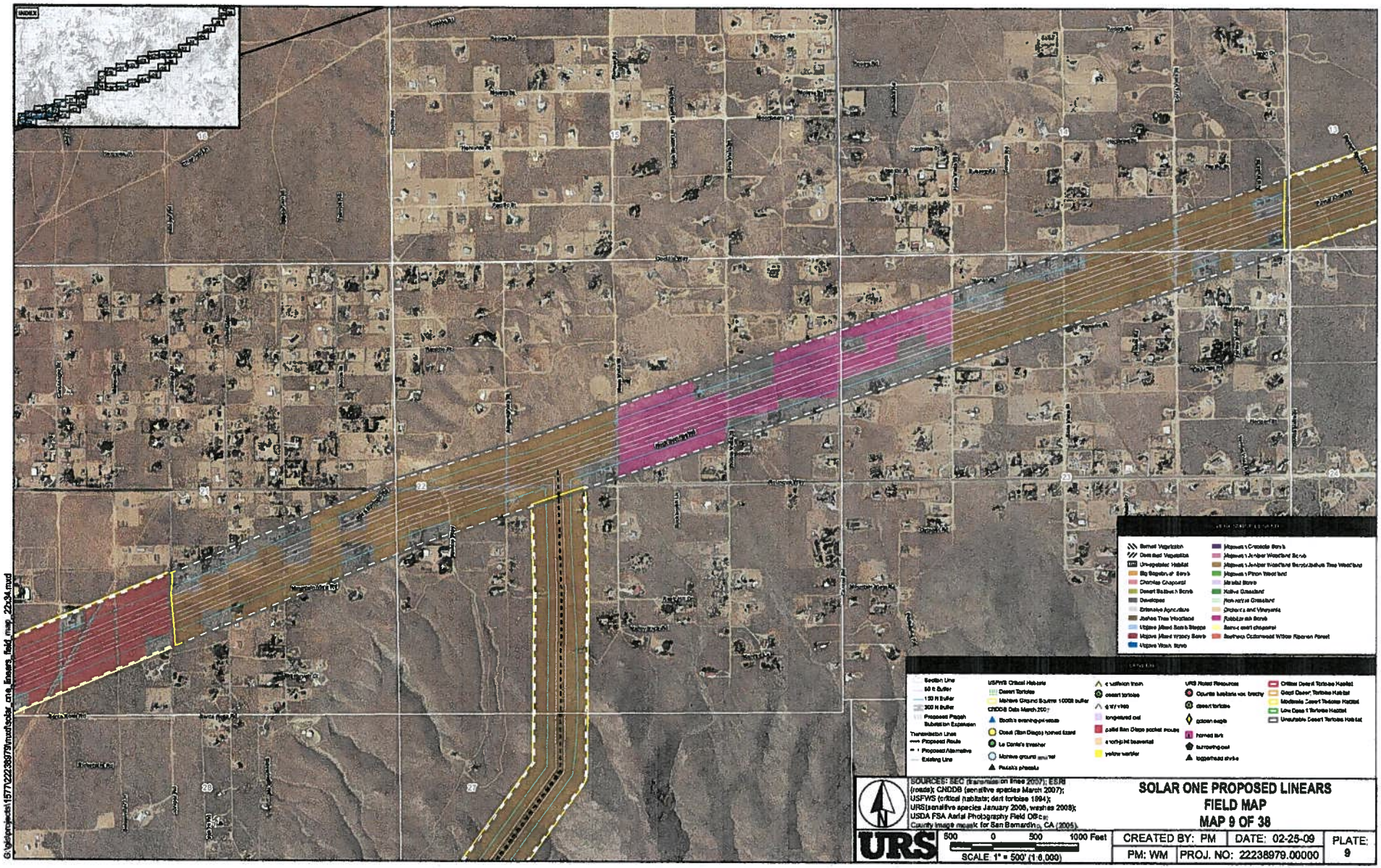

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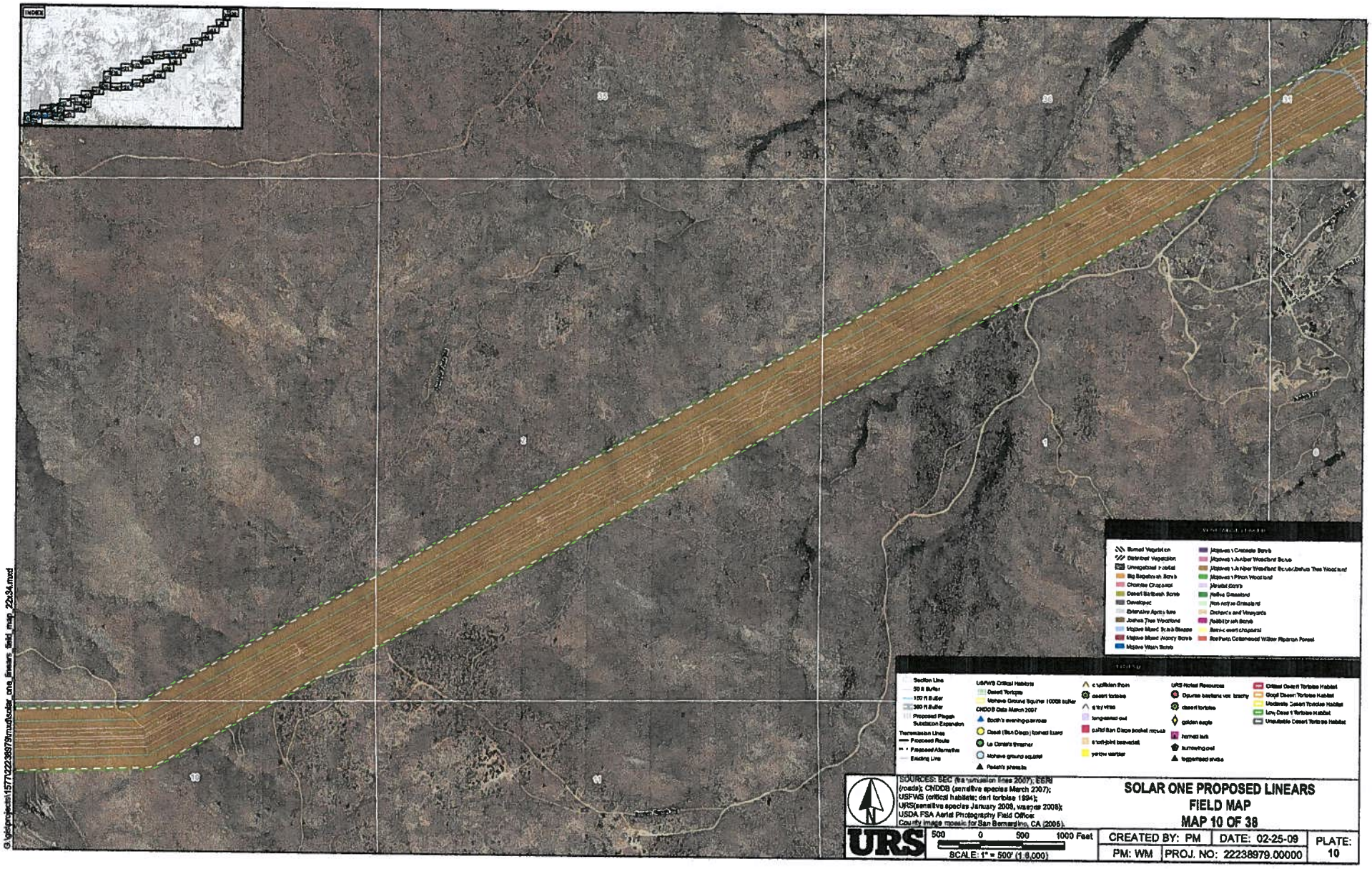

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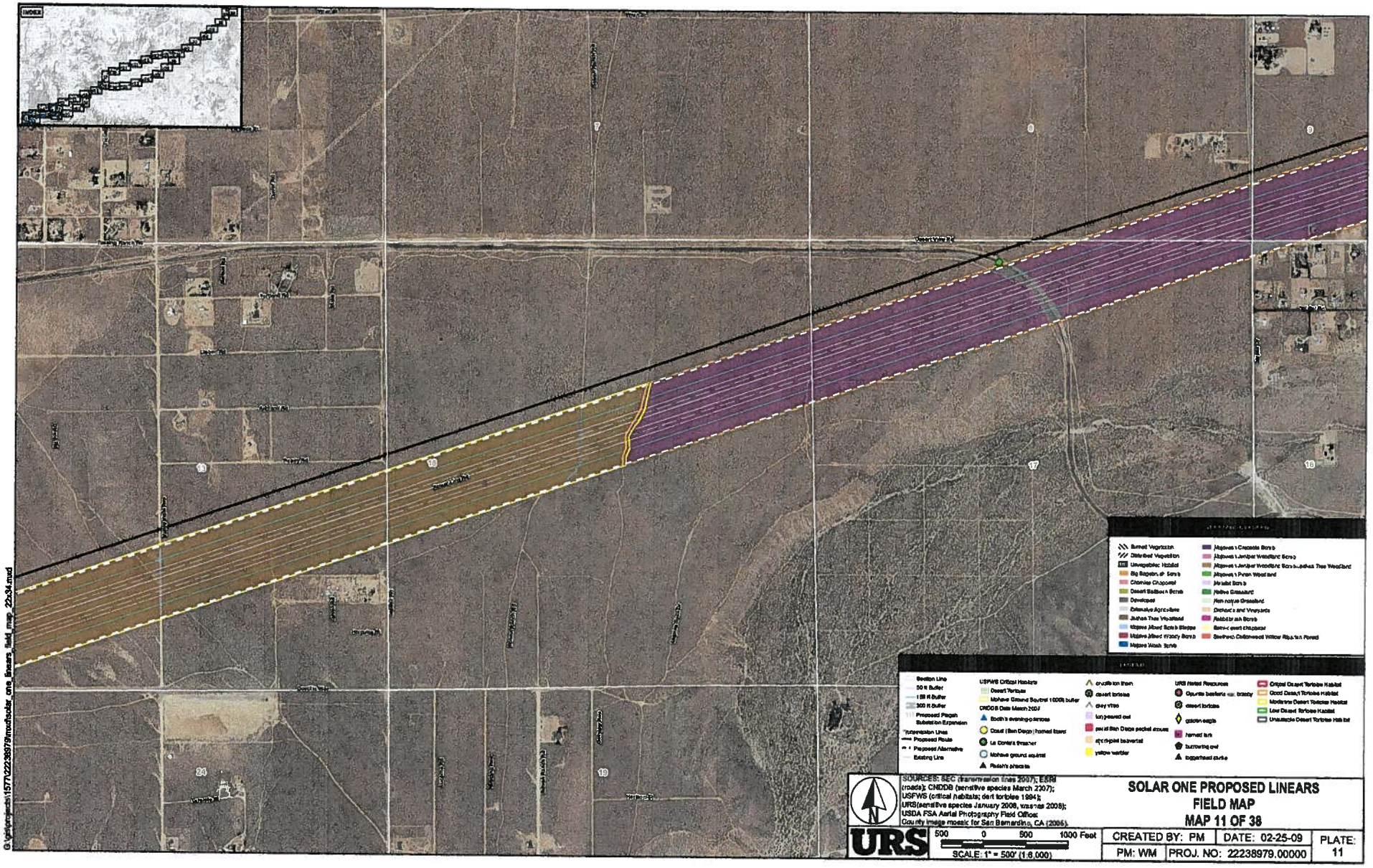

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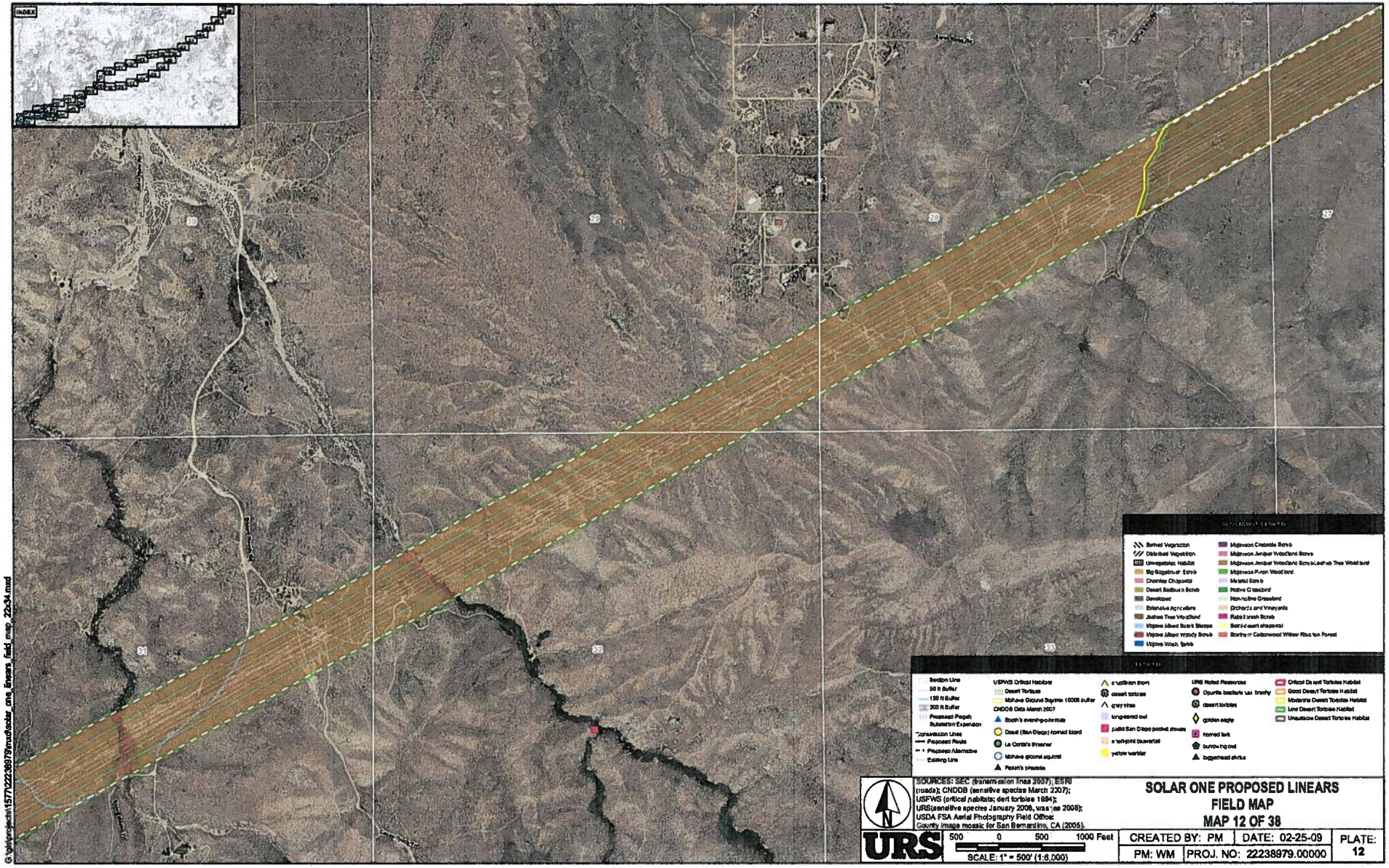

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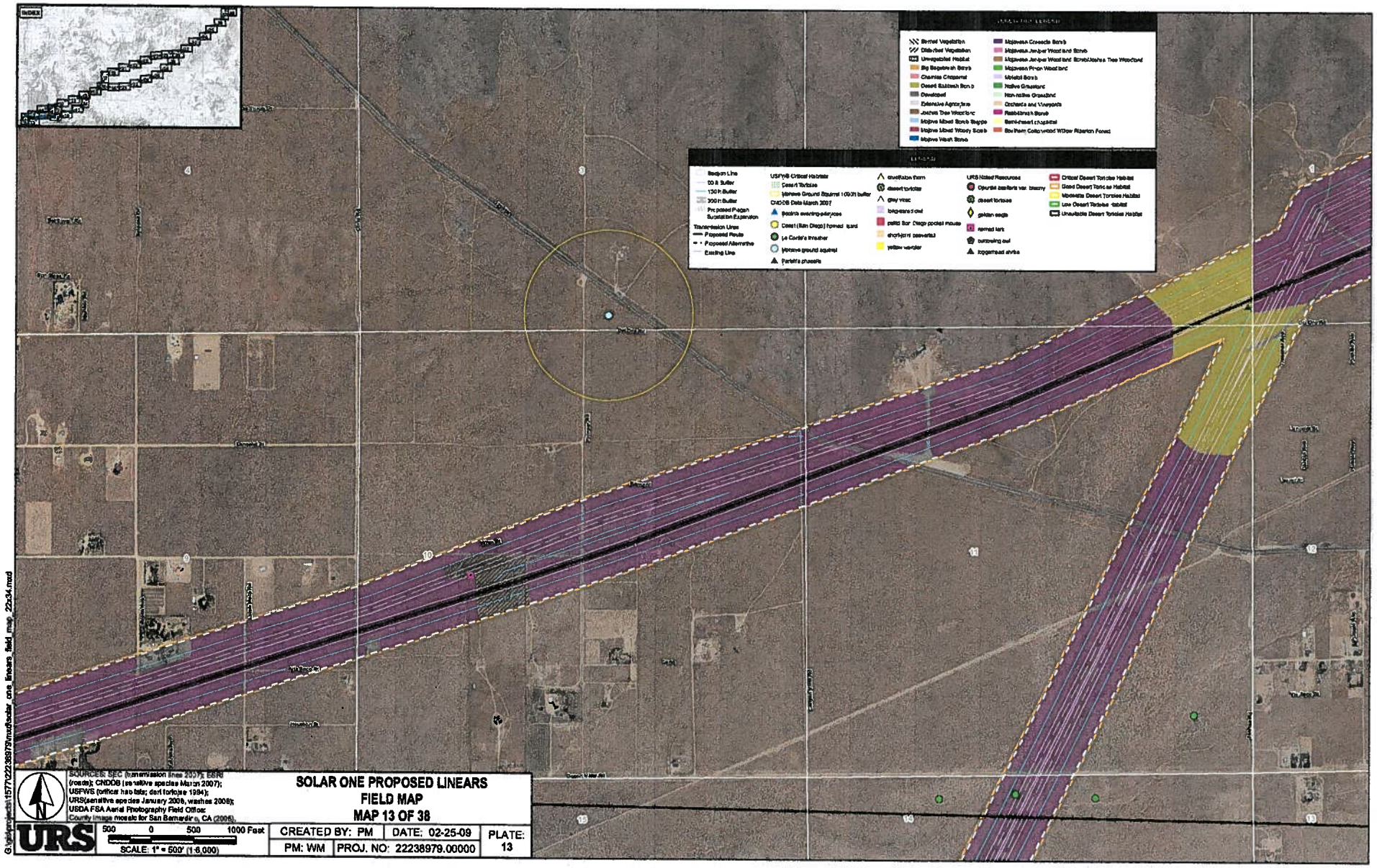
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Barren Vegetation
Disturbed Vegetation
Unvegetated Habitat
Big Sagebrush Scrub
Chamise Chaparral
Desert Saltbush Scrub
Developed
Extensive Agriculture
Joshua Tree Woodland
Mojave Mixed Scrub Steppe
Mojave Mixed Woody Scrub
Mojave Wash Scrub
Mojavean Cressote Scrub
Mojavean Juniper Woodland Scrub
Mojavean Juniper Woodland Scrub/Joshua Tree Woodland
Mojavean Pinon Woodland
Mixed Scrub
Native Grassland
Non-native Grassland
Orchards and Vineyards
Rabbitbrush Scrub
Semi-Desert Chaparral
Southern Cottonwood Willow Riparian Forest
Section Line
50 ft Buffer
150 ft Buffer
300 ft Buffer
Proposed Pegasus Substation Expansion
Transmission Lines
Proposed Route
Proposed Alternative
Existing Line
USFWS Critical Habitats
Desert Tortoise
Mojave Ground Squirrel 100 ft buffer
CNDDB Data March 2007
Western evening-primrose
Coast (San Diego) horned lizard
Le Conte's thrasher
Mojave ground squirrel
Parish's phacelia
cuvierian tern
desert tortoise
gray vireo
long-eared owl
mesa Bar Diego pocket mouse
short-joint beavertail
yellow warbler
URS Noted Resources
Opuntia basilaris var. treleasy
desert tortoise
golden eagle
horned lark
burrowing owl
loggerhead shrike
Critical Desert Tortoise Habitat
Good Desert Tortoise Habitat
Moderate Desert Tortoise Habitat
Low Desert Tortoise Habitat
Unsuitable Desert Tortoise Habitat
SOURCES: SEC (transmission lines 2007); ESRI (roads); CNDDB (sensitive species March 2007); USFWS (critical habitats; desert tortoise 1994); URS(sensitive species January 2008, washes 2008); USDA FSA Aerial Photography Field Office: County Image mosaic for San Bernardino, CA (2006).
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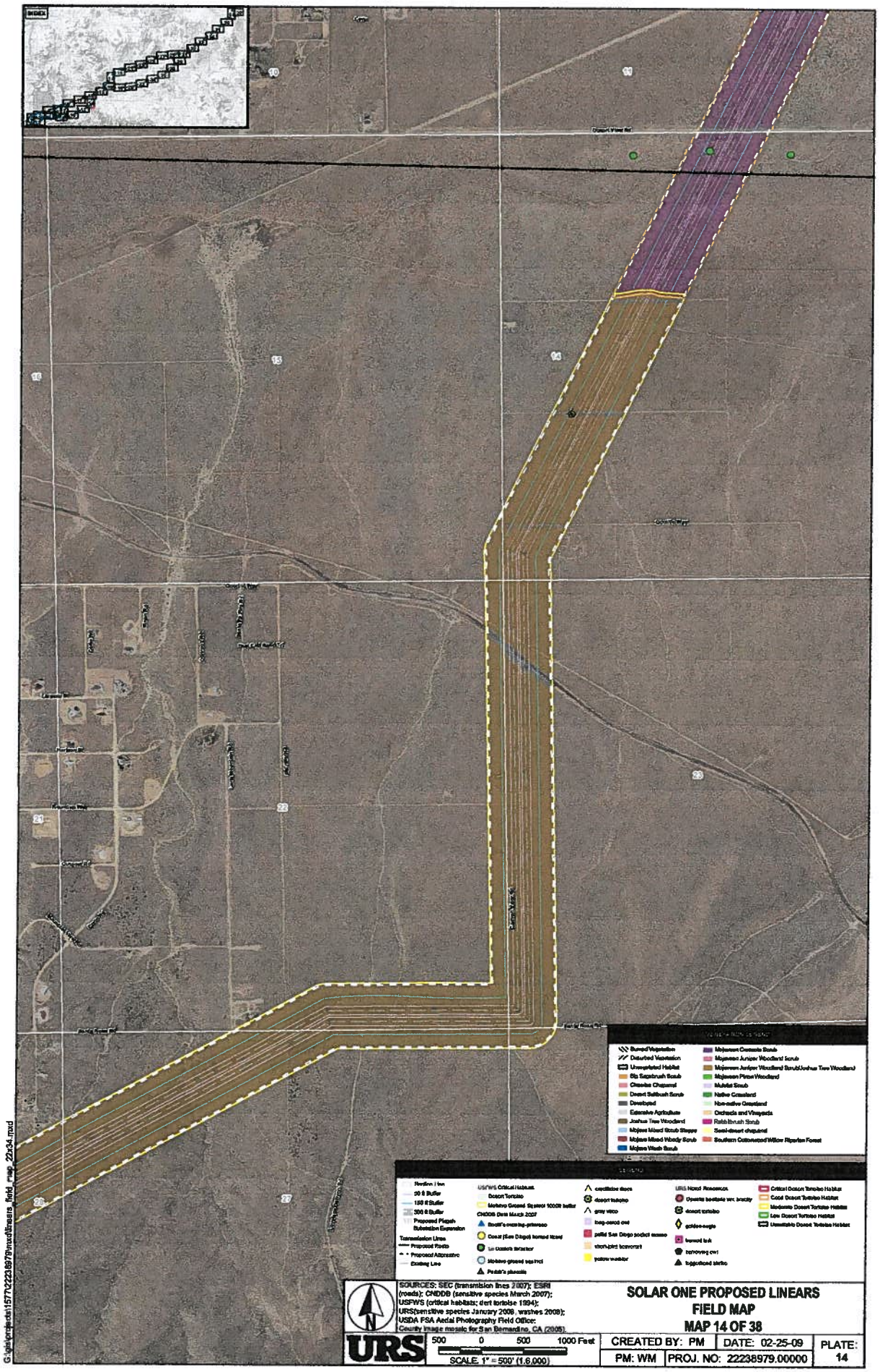
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Disturbed Vegetation
Unvegetated Habitat
Big Sagebrush Scrub
Creosote Chaparral
Desert Saltbush Scrub
Developed
Extensive Agriculture
Joshua Tree Woodland
Mojave Mixed Scrub Steppe
Mojave Mixed Woody Scrub
Mojave Wash Scrub
Mojaveen Creosote Scrub
Mojaveen Juniper Woodland Scrub
Mojaveen Juniper Woodland Scrub/Joshua Tree Woodland
Mojaveen Pinon Woodland
Mulefat Scrub
Native Grassland
Non-native Grassland
Orchards and Vineyards
Rabbitbrush Scrub
Semi-desert chaparral
Southern Cottonwood Willow Riparian Forest
Northern 1 km
30 ft Buffer
150 ft Buffer
300 ft Buffer
Proposed Pisgah Substation Expansion
Transmission Lines
Proposed Route
Proposed Alternative
Existing Line
USFWS Critical Habitat
Desert Tortoise
Mohave Ground Squirrel 1000ft buffer
CNDDB Data March 2007
Swainson's hawk-primary
Coast (San Diego) horned lizard
Le Conte's thrasher
Mohave ground squirrel
Pallid's pocosin
ceciliation days
desert tortoise
gray vireo
long-eared owl
pallid San Diego pocket mouse
short-eared owl
yellow warbler
URS Noted Resources
Opuntia basilaris var. brachy
desert tortoise
golden-eagle
burrowing owl
loggerhead shrike
Critical Desert Tortoise Habitat
Good Desert Tortoise Habitat
Moderate Desert Tortoise Habitat
Low Desert Tortoise Habitat
Unsuitable Desert Tortoise Habitat
SOURCES: SEC (transmission lines 2007); ESRI (roads); CNDDB (sensitive species March 2007); USFWS (critical habitats; dert tortoise 1994); URS(sensitive species January 2008, washes 2008); USDA FSA Aerial Photography Field Office; County image mosaic for San Bernardino, CA (2005).
SOLAR ONE PROPOSED LINEARS
FIELD MAP
MAP 14 OF 38
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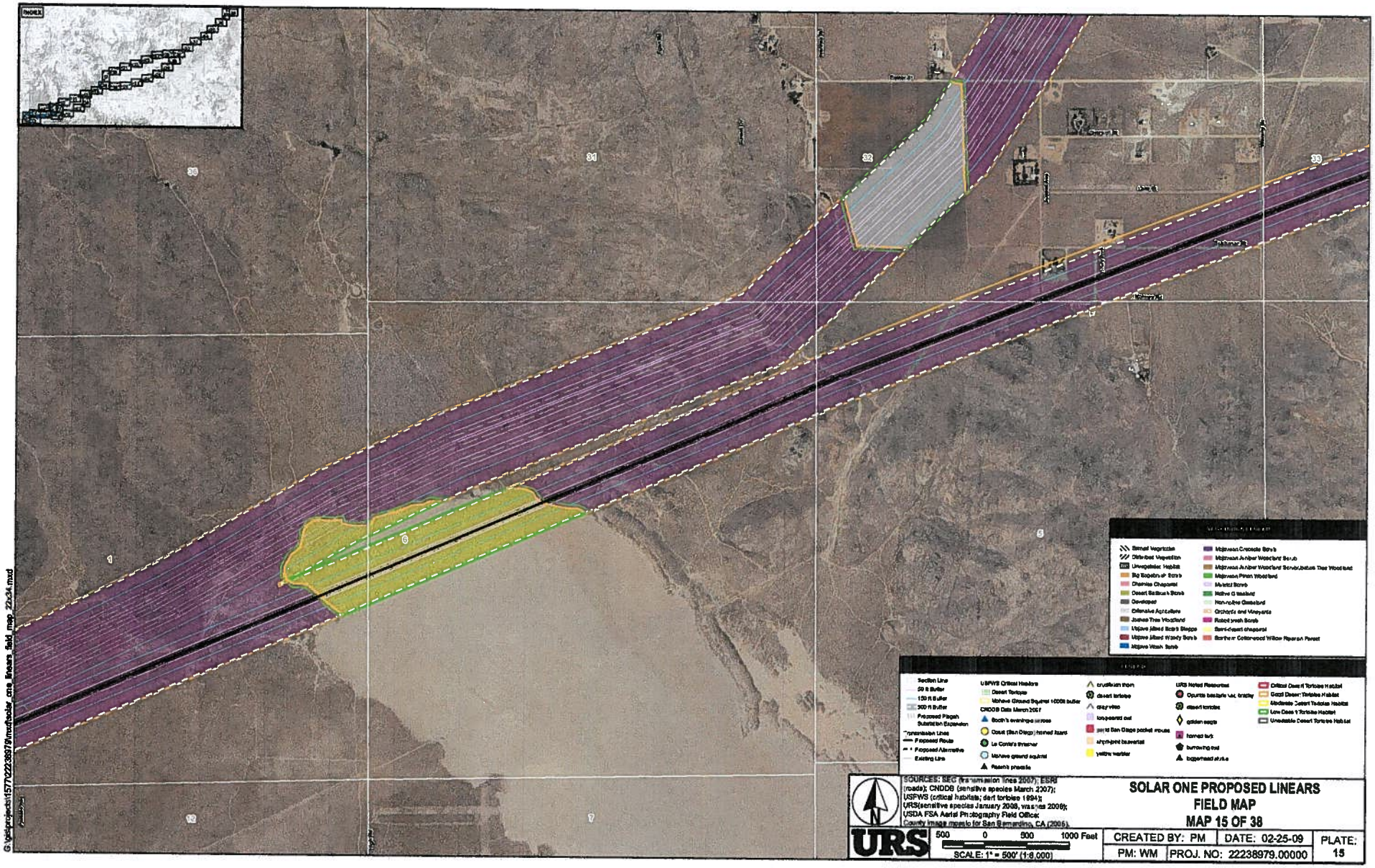
INDEX
31
32
33
6
1
12
7
Section Line
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150 ft Buffer
300 ft Buffer
Proposed Pisgah Substation Expansion
Transmission Lines
Proposed Route
Proposed Alternative
Existing Line
USFWS Critical Habitat
Desert Tortoise
Mohave Ground Squirrel 14000 buffer
CNDDB Data March 2007
Beck's evening primrose
Coast (San Diego) horned lizard
Le Conte's thrasher
Mohave ground squirrel
Parish's phacelia
crucifixion thorn
desert tortoise
gray vireo
long-eared owl
San Diego pocket mouse
shoshonean sagebrush
yellow warbler
URS Noted Resources
Opuntia basilaris var. brachy
desert tortoise
golden eagle
horned lark
burrowing owl
loggerhead shrike
Critical Desert Tortoise Habitat
Good Desert Tortoise Habitat
Moderate Desert Tortoise Habitat
Low Desert Tortoise Habitat
Unsuitable Desert Tortoise Habitat
Mojavean Creosote Scrub
Mojavean Juniper Woodland Scrub
Mojavean Juniper Woodland Scrub/Joshua Tree Woodland
Mojavean Pinon Woodland
Ruderal Scrub
Native Grassland
Non-native Grassland
Orchards and Vineyards
Ruderal Scrub
Semi-desert chaparral
Southern Cottonwood Willow Riparian Forest
Ruderal Vegetation
Disturbed Vegetation
Unvegetated Habitat
Big Sagebrush Scrub
Chamise Chaparral
Desert Saltbush Scrub
Developed
Extensive Agriculture
Joshua Tree Woodland
Mojave Mixed Scrub Steppe
Mojave Mixed Woody Scrub
Mojave Wash Scrub
SOURCES: SEC (transmission lines 2007); ESRI (roads); CNDDB (sensitive species March 2007); USFWS (critical habitat; desert tortoise 1994); URS(sensitive species January 2008, wash 2008); USDA FSA Aerial Photography Field Office; County Image mosaic for San Bernardino, CA (2006).
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SCALE: 1" = 500' (1:6,000)
URS
SOLAR ONE PROPOSED LINEARS
FIELD MAP
MAP 15 OF 38
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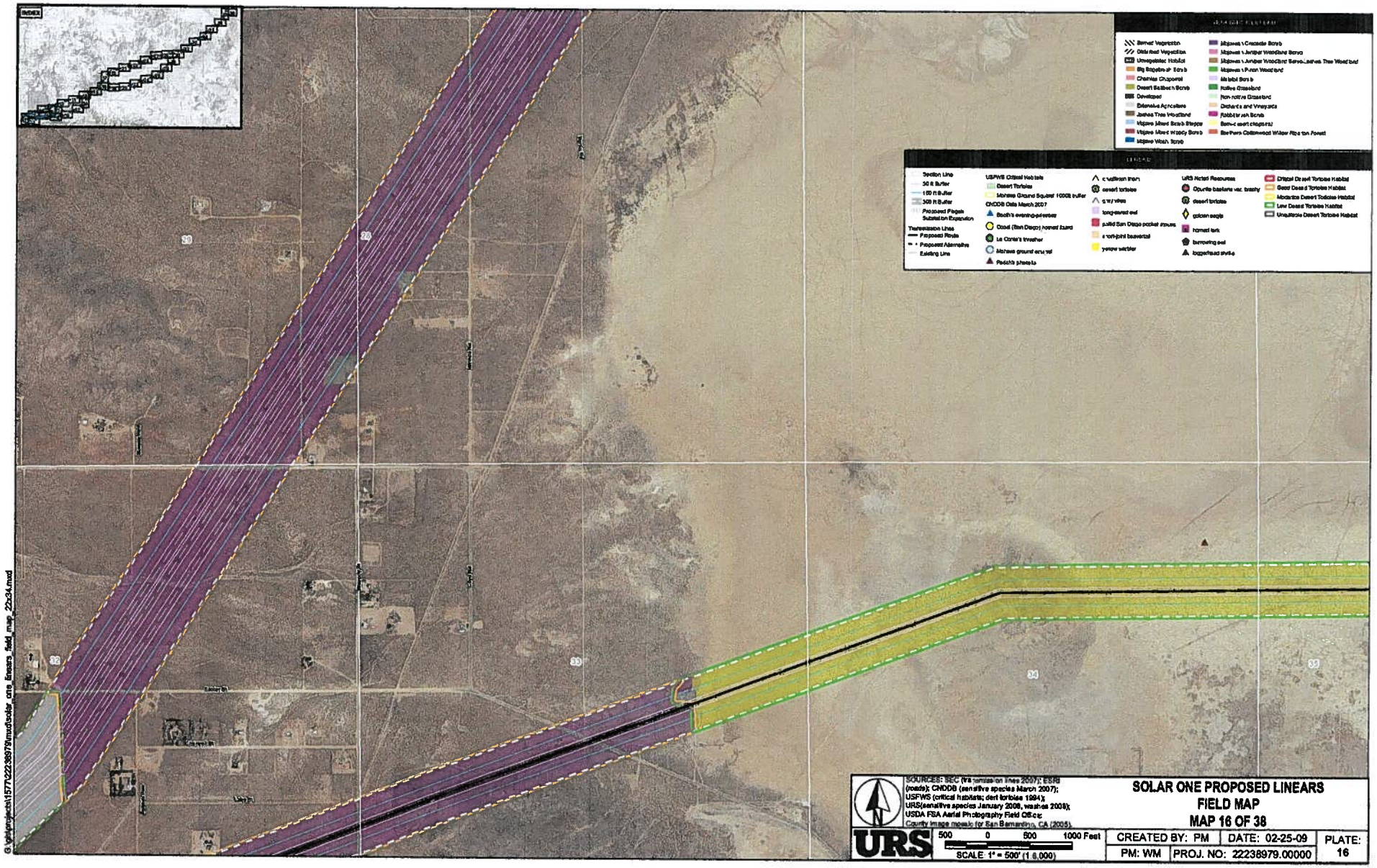
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Mohave ground squirrel
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crucifixion thorn
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gray vireo
long-eared owl
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short-joint beavertail
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SOURCES: SEC (transmission lines 2007); ESRI (roads); CNDDB (sensitive species March 2007); USFWS (critical habitats; dert tortoise 1994); URS(sensitive species January 2008, washes 2008); USDA FSA Aerial Photography Field Office County image mosaic for San Bernardino, CA (2005).
URS
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SCALE 1" = 500' (1:6,000)
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CREATED BY: PM
DATE: 02-25-09
PLATE: 16
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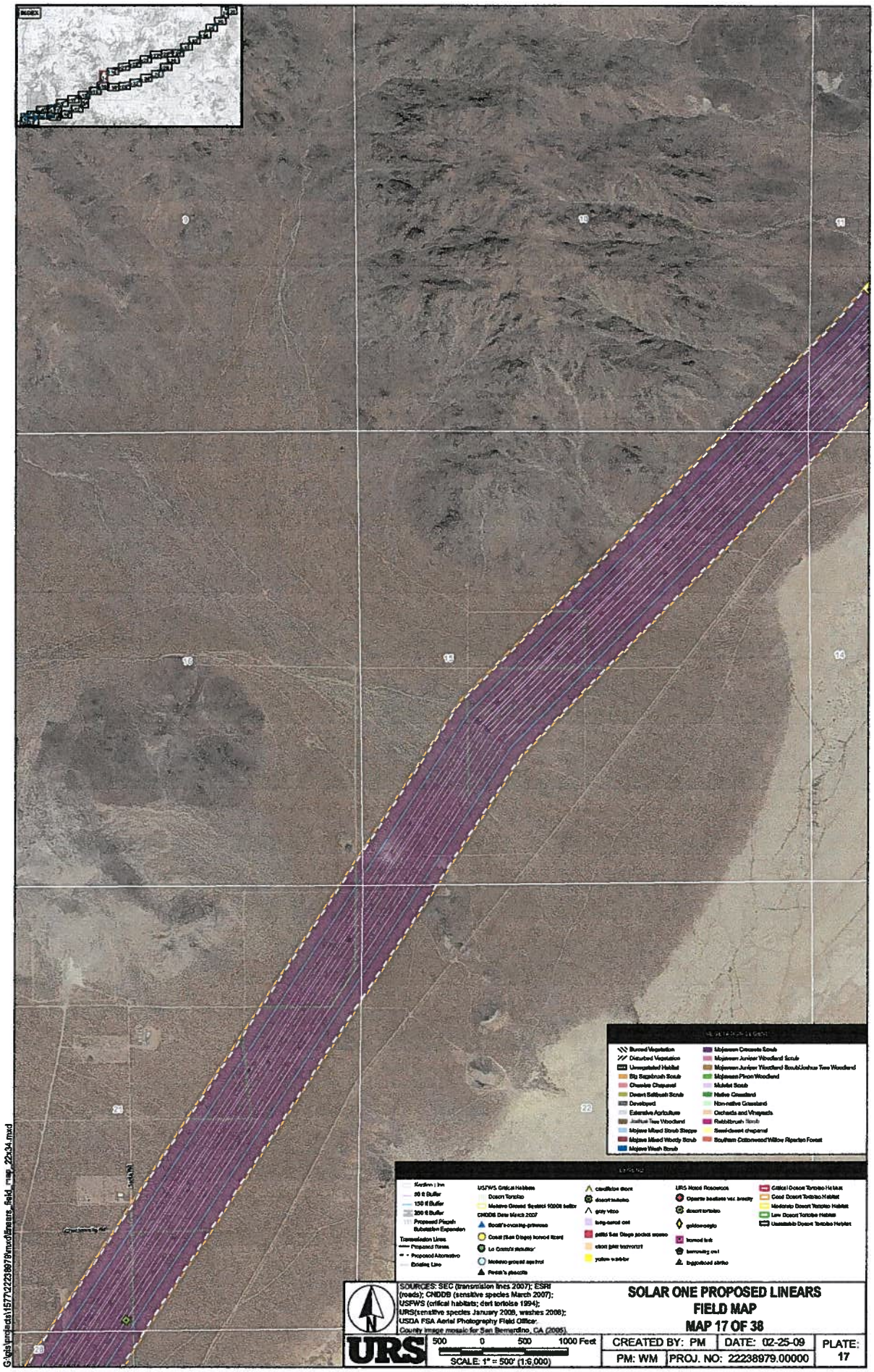
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Mohave ground squirrel
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desert tortoise
gray vireo
long-eared owl
pallid San Diego pocket mouse
short jaint harvestmt
yellow-breasted
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desert tortoise
goldenwaggle
horned lark
burrowing owl
haggedhead shrike
Critical Desert Tortoise Habitat
Good Desert Tortoise Habitat
Moderate Desert Tortoise Habitat
Low Desert Tortoise Habitat
Unsuitable Desert Tortoise Habitat
SOURCES: SEC (transmission lines 2007); ESRI (roads); CNDDB (sensitive species March 2007); USFWS (critical habitats; dart tortoise 1994); URS(sensitive species January 2008, washes 2008); USDA FSA Aerial Photography Field Office. County image mosaic for San Bernardino, CA (2005).
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SCALE: 1" = 500' (1:6,000)
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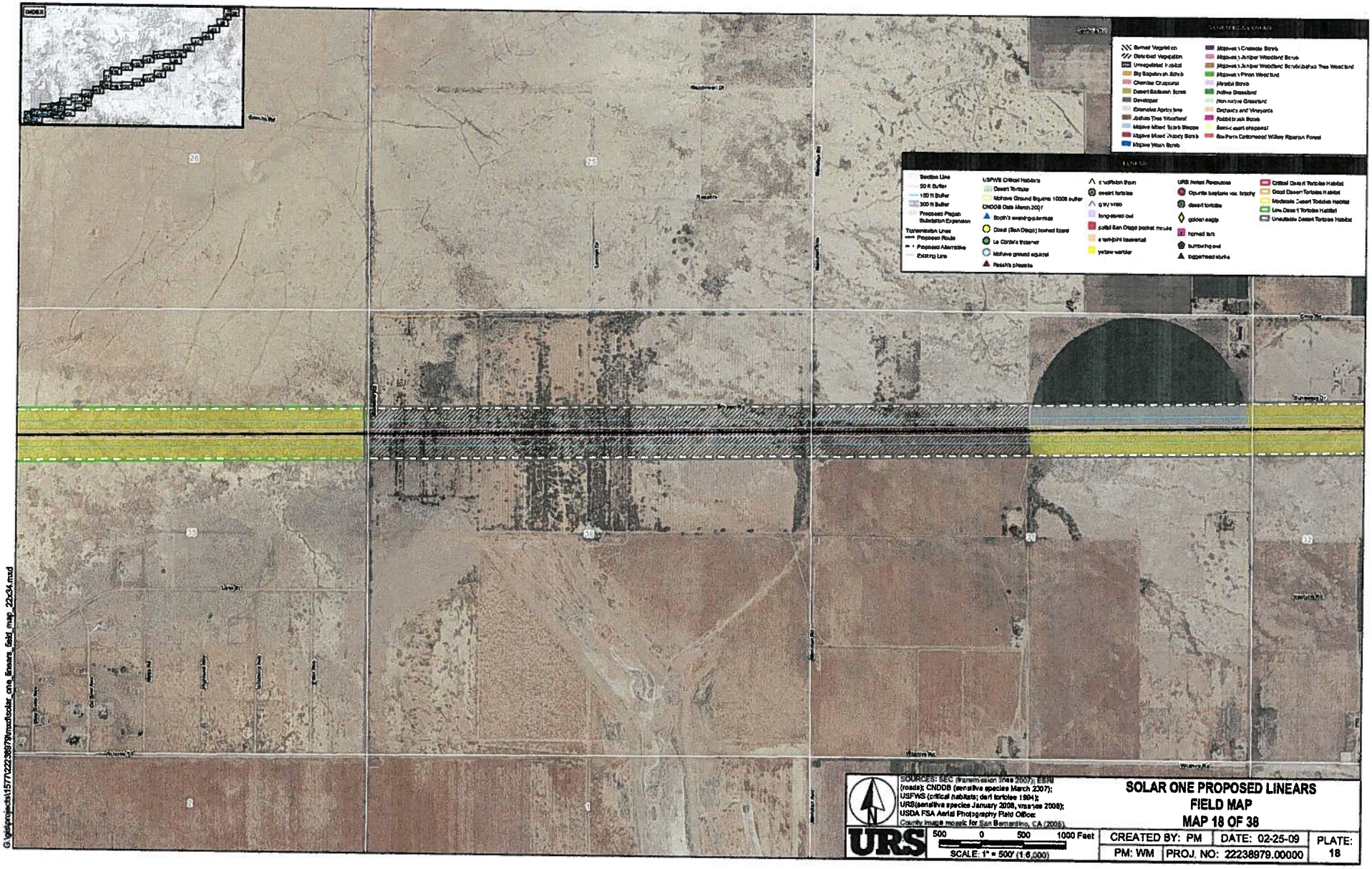
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Opuntia basilaris var. brachy
desert tortoise
golden eagle
horned lark
burrowing owl
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Moderate Desert Tortoise Habitat
Low Desert Tortoise Habitat
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Avenue E
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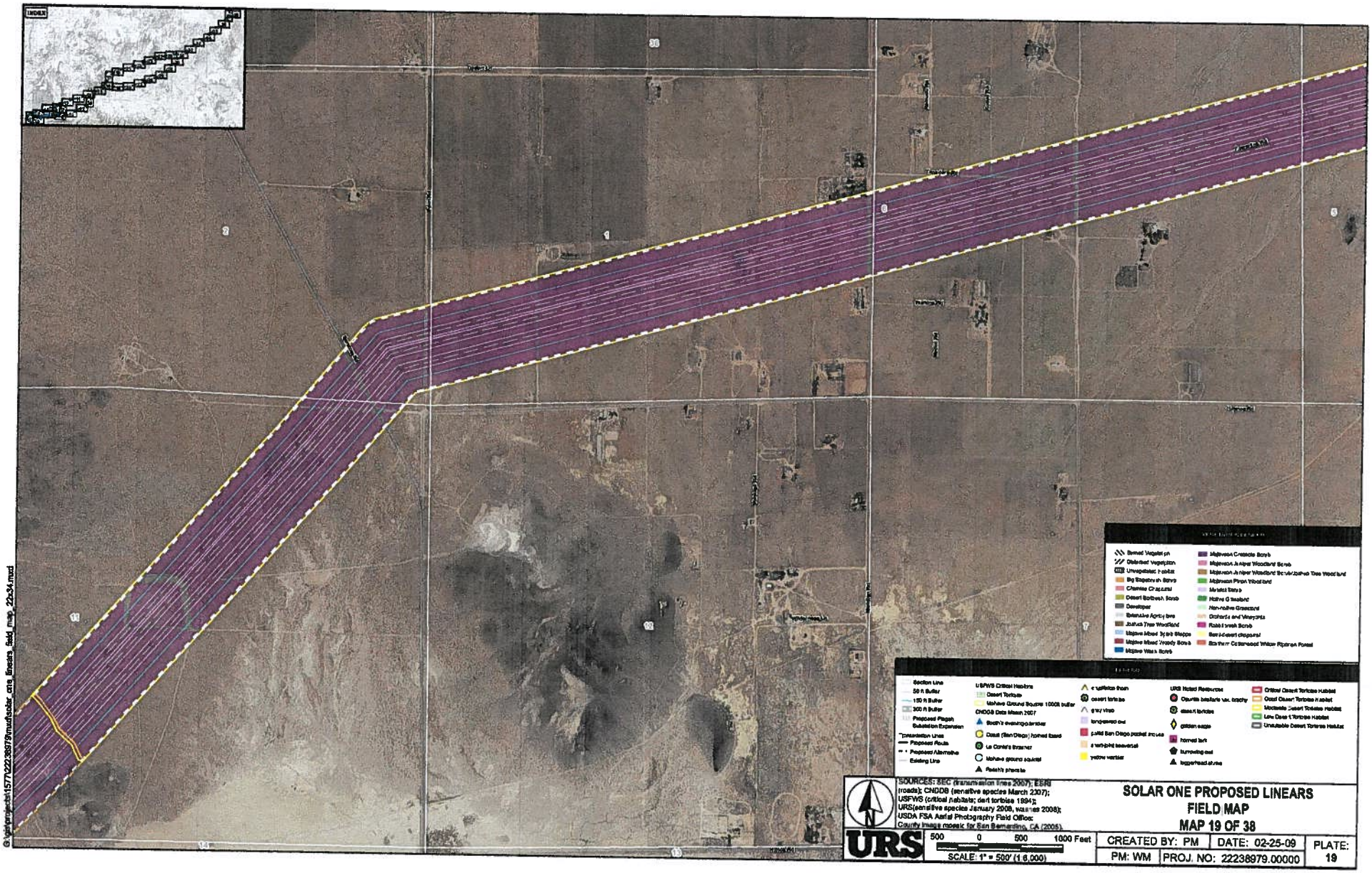
Avenue



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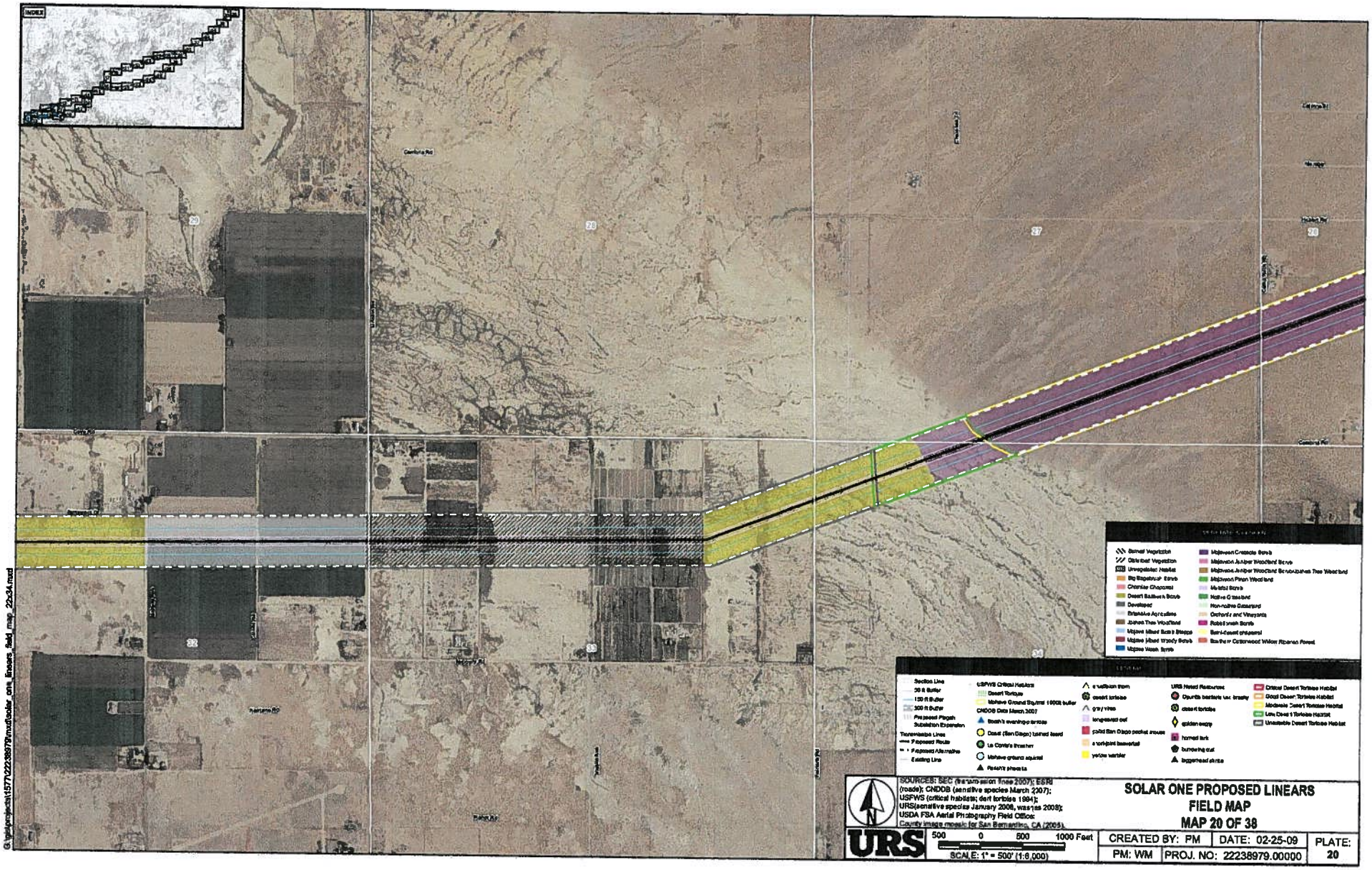
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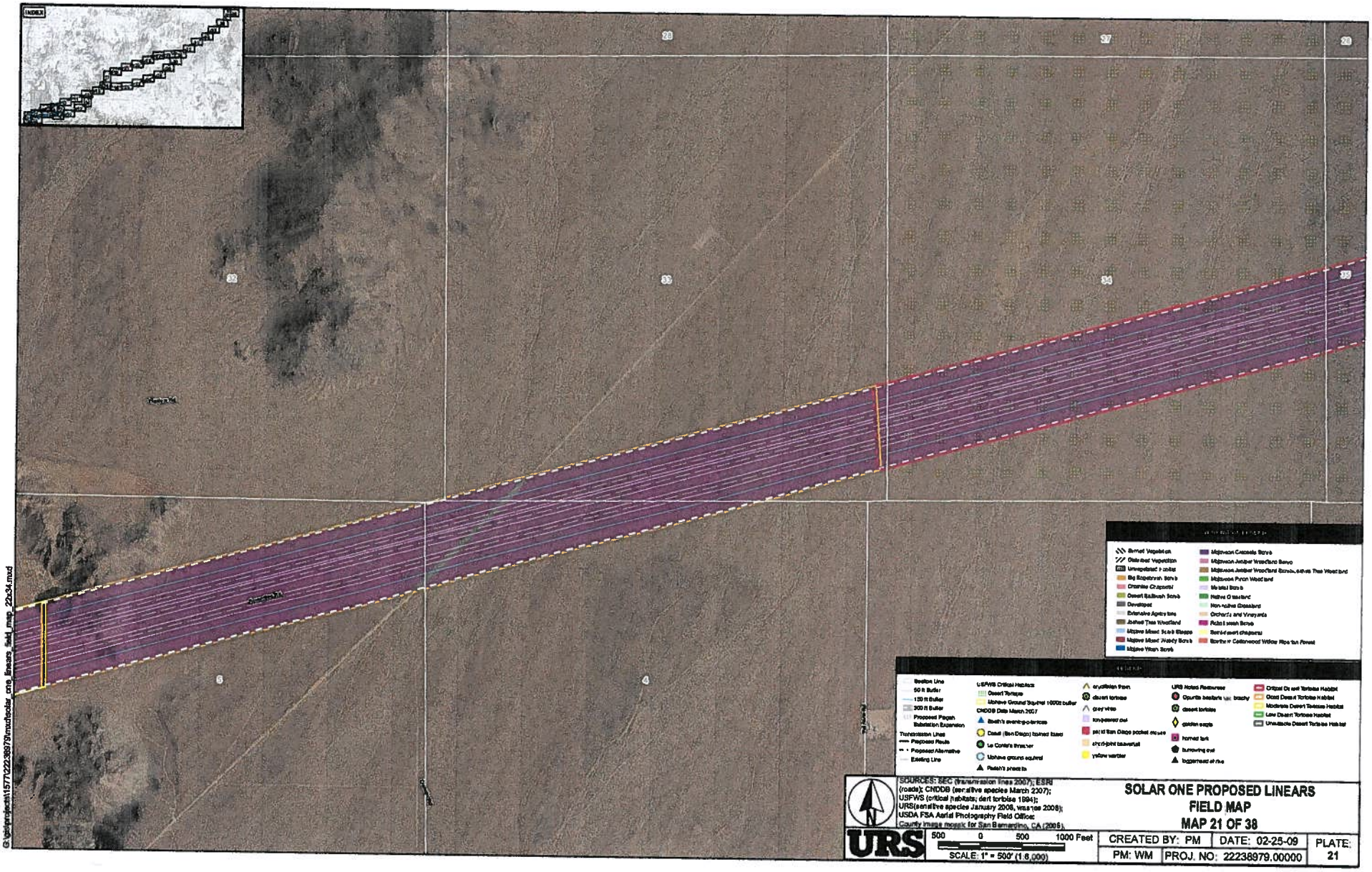
Camino Rd
Hidden Rd
Hidden Rd
Hidden



SOURCES: SEC (transmission lines 2007); ESRI (roads); CNDDB (sensitive species March 2007); USFWS (critical habitats; desert tortoise 1994); URS(sensitive species January 2008, visa rpe 2008); USDA FSA Aerial Photography Field Office; County image mosaic for San Bernardino, CA (2006).

URS

500 0 500 1000 Feet

SCALE: 1" = 500' (1:6,000)

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PM: WM	PROJ. NO: 22238979.00000	

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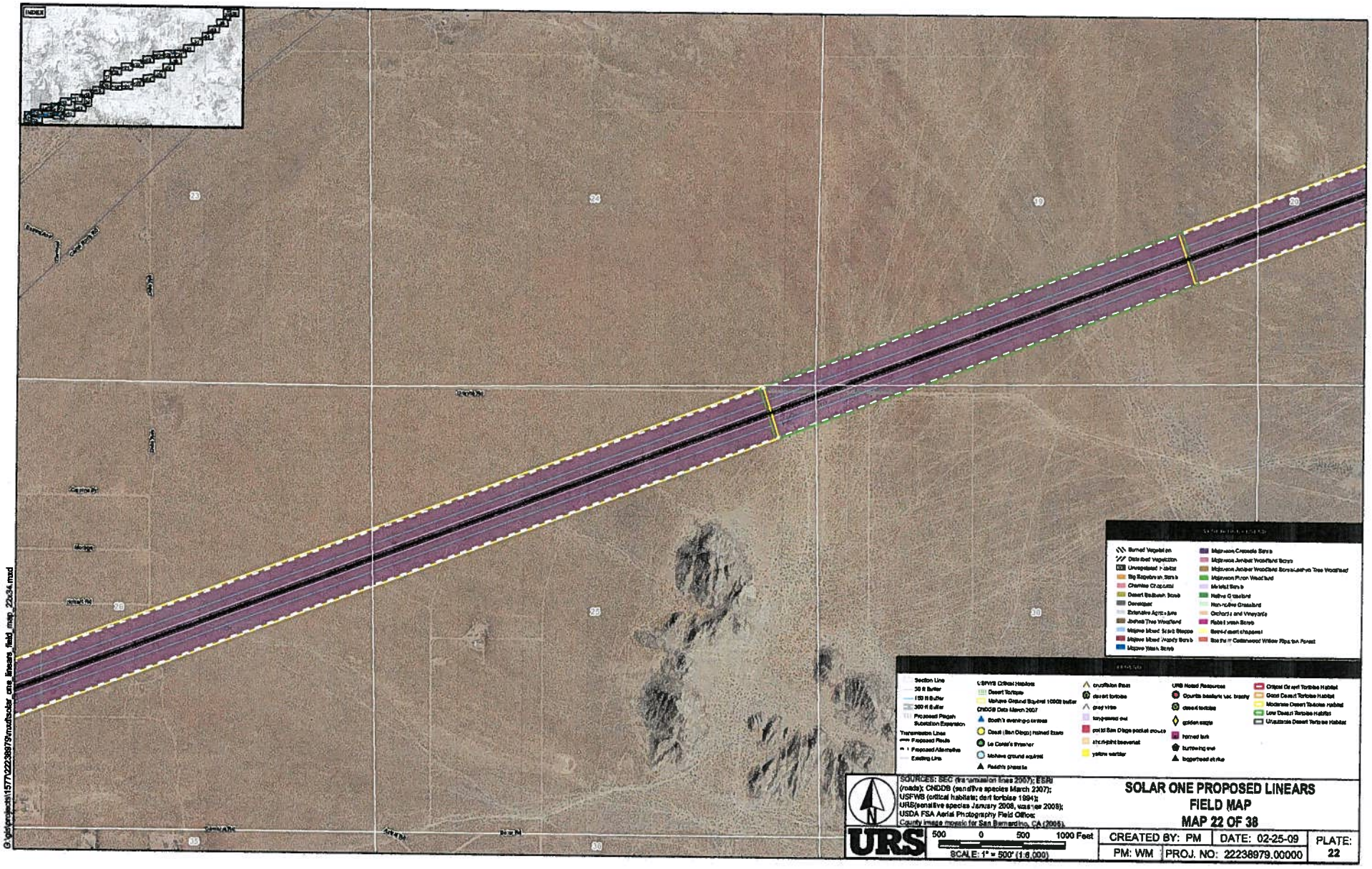

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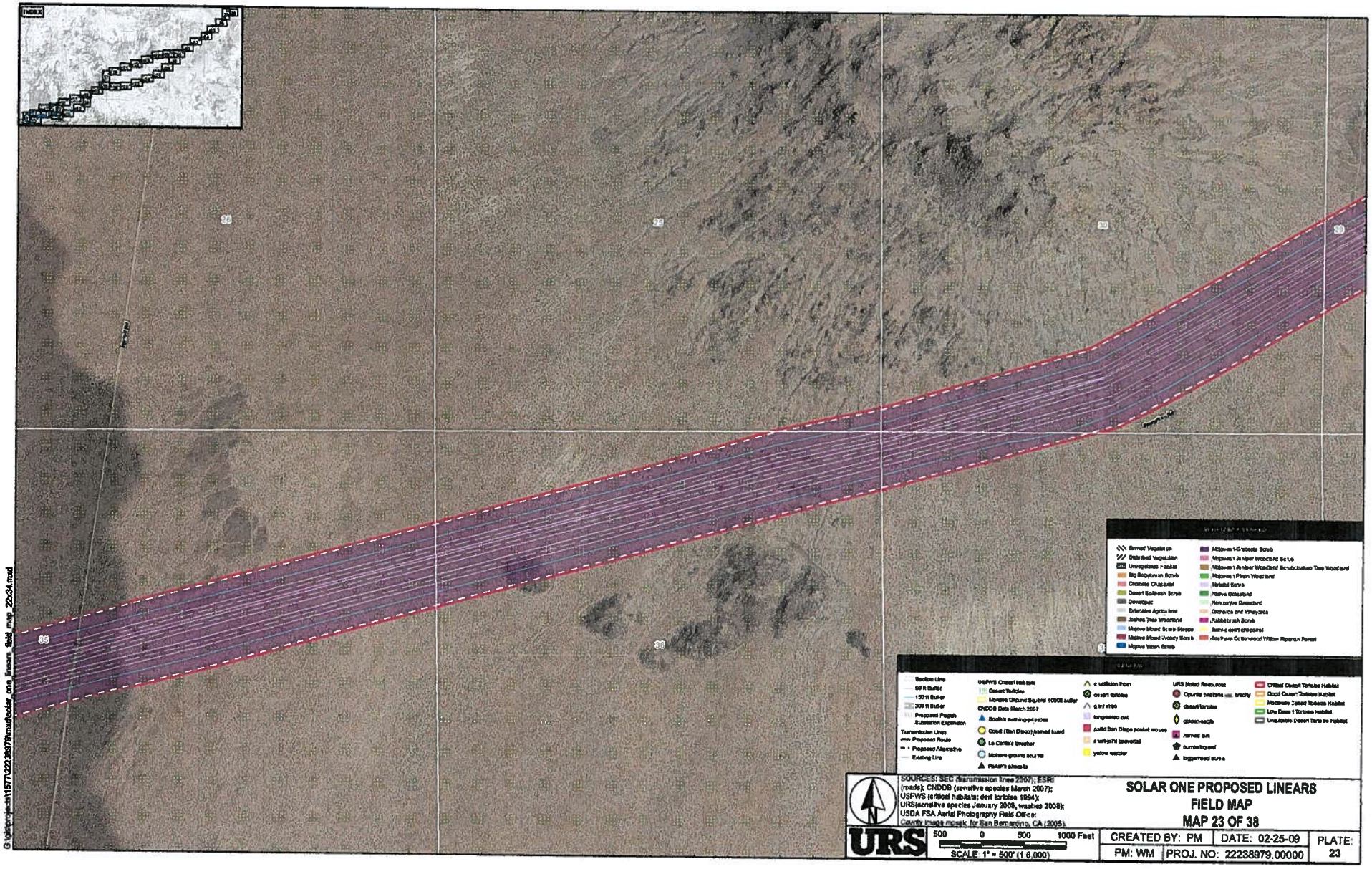

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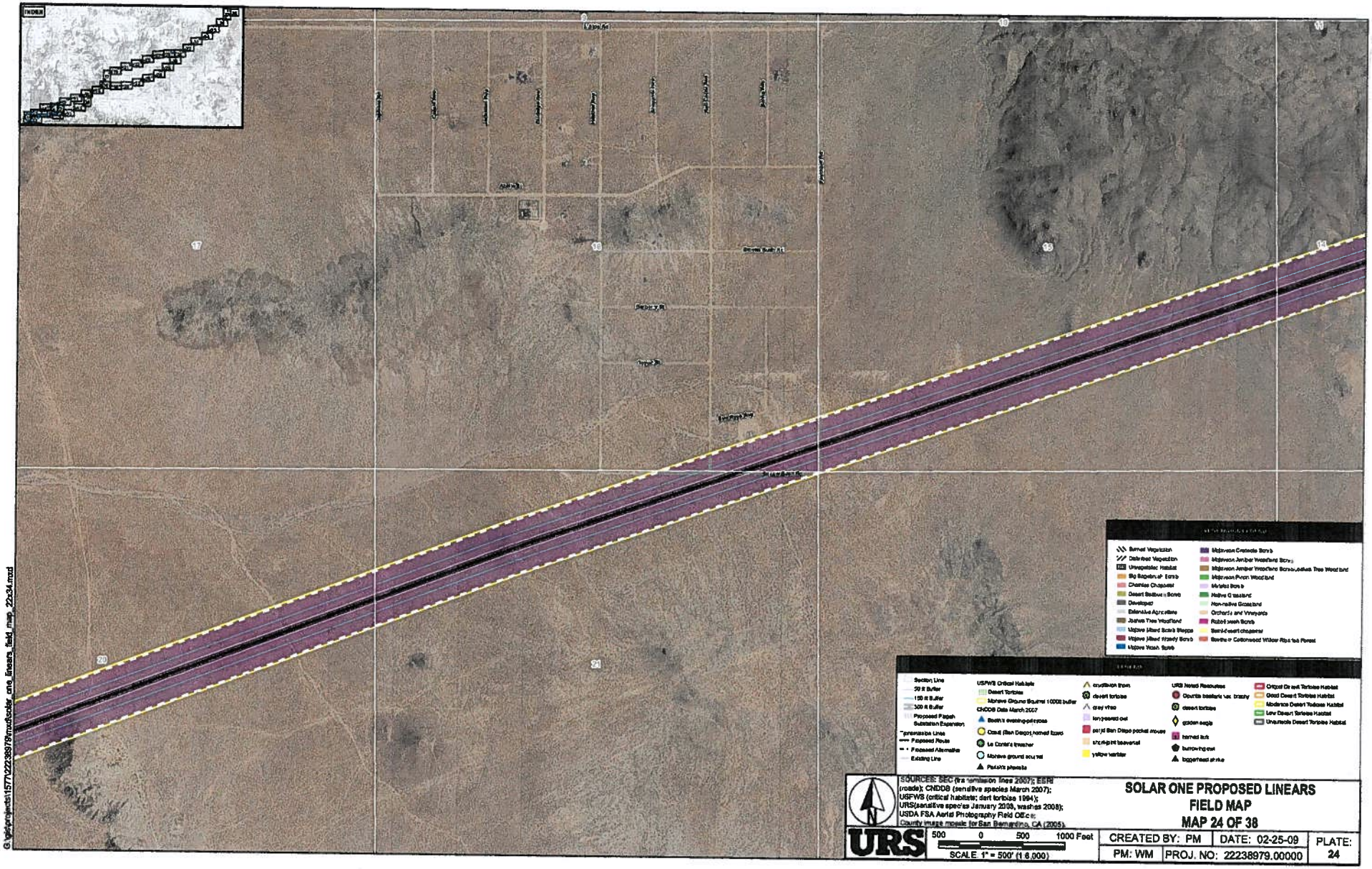
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crucifixion thorn
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long-eared owl
pocket San Diego pocket mouse
short-eared owl
yellow warbler
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golden eagle
horned lark
burrowing owl
loggerhead shrike
Critical Desert Tortoise Habitat
Good Desert Tortoise Habitat
Moderate Desert Tortoise Habitat
Low Desert Tortoise Habitat
Unsuitable Desert Tortoise Habitat
SOURCES: SEC (transmission lines 2007); ESRI (roads); CNDDB (sensitive species March 2007); USFWS (critical habitats; dert tortoise 1994); URS(sensitive species January 2008, washes 2008); USDA FSA Aerial Photography Field Office; County image mosaic for San Bernardino, CA (2005).
URS
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SCALE 1" = 500' (1:6,000)
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FIELD MAP
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CREATED BY: PM
DATE: 02-25-09
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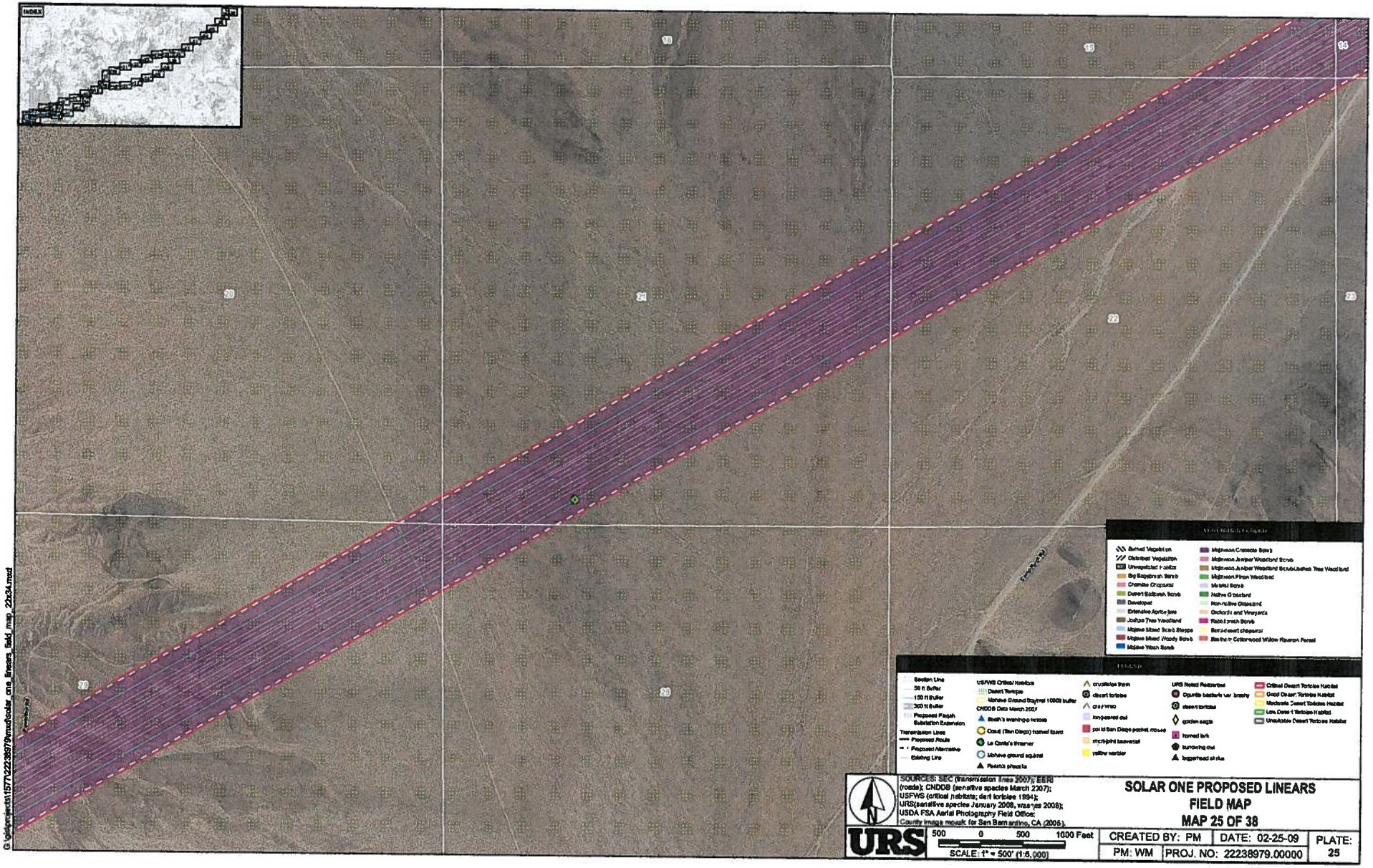
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Le Conte's thrasher
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Pacific pocket mouse
crotalidae family
desert tortoise
gray vireo
longspurred owl
San Diego pocket mouse
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URS Noted Resources
Opuntia basilaris var. brachy
desert tortoise
golden eagle
horned lark
burrowing owl
leggeriead shrub
Critical Desert Tortoise Habitat
Good Desert Tortoise Habitat
Moderate Desert Tortoise Habitat
Low Desert Tortoise Habitat
Unsuitable Desert Tortoise Habitat
SOURCES: SEC (transmission lines 2007); ESRI (roads); CNDDB (sensitive species March 2007); USFWS (critical habitats; desert tortoise 1994); URS(sensitive species January 2008, wasp 2008); USDA FSA Aerial Photography Field Office: County image mosaic for San Bernardino, CA (2005).
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SCALE: 1" = 500' (1:6,000)
SOLAR ONE PROPOSED LINEARS
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CREATED BY: PM
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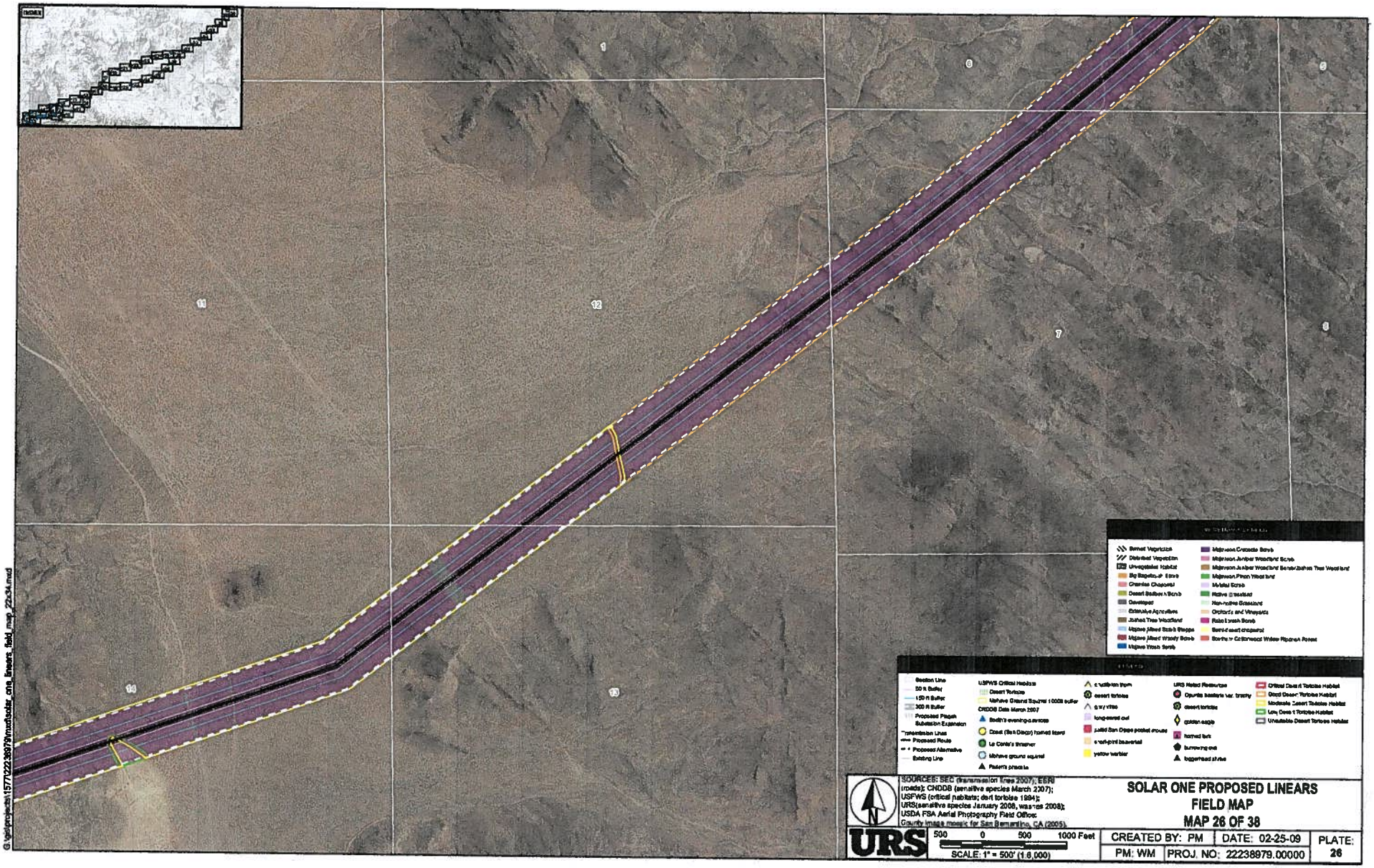
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150 ft Buffer
300 ft Buffer
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long-eared owl
pallid San Diego pocket mouse
western burrowing owl
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Opuntia basilaris var. treleasii
desert tortoise
golden eagle
horned lark
burrowing owl
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Good Desert Tortoise Habitat
Moderate Desert Tortoise Habitat
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Mojave Juniper Woodland Scrub/Joshua Tree Woodland
Mojave Pinon Woodland
Mulefat Scrub
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Orchards and Vineyards
Rabbitbrush Scrub
Semi-desert chaparral
Southern Cottonwood Willow Riparian Forest
SOURCES: SEC (transmission lines 2007); ESRI (roads); CNDDB (sensitive species March 2007); USFWS (critical habitats; desert tortoise 1994); URS(sensitive species January 2008, was-nos 2008); USDA FSA Aerial Photography Field Office; County image mosaic for San Bernardino, CA (2005).
URS
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SCALE: 1" = 500' (1:6,000)
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DATE: 02-25-09
PLATE: 26
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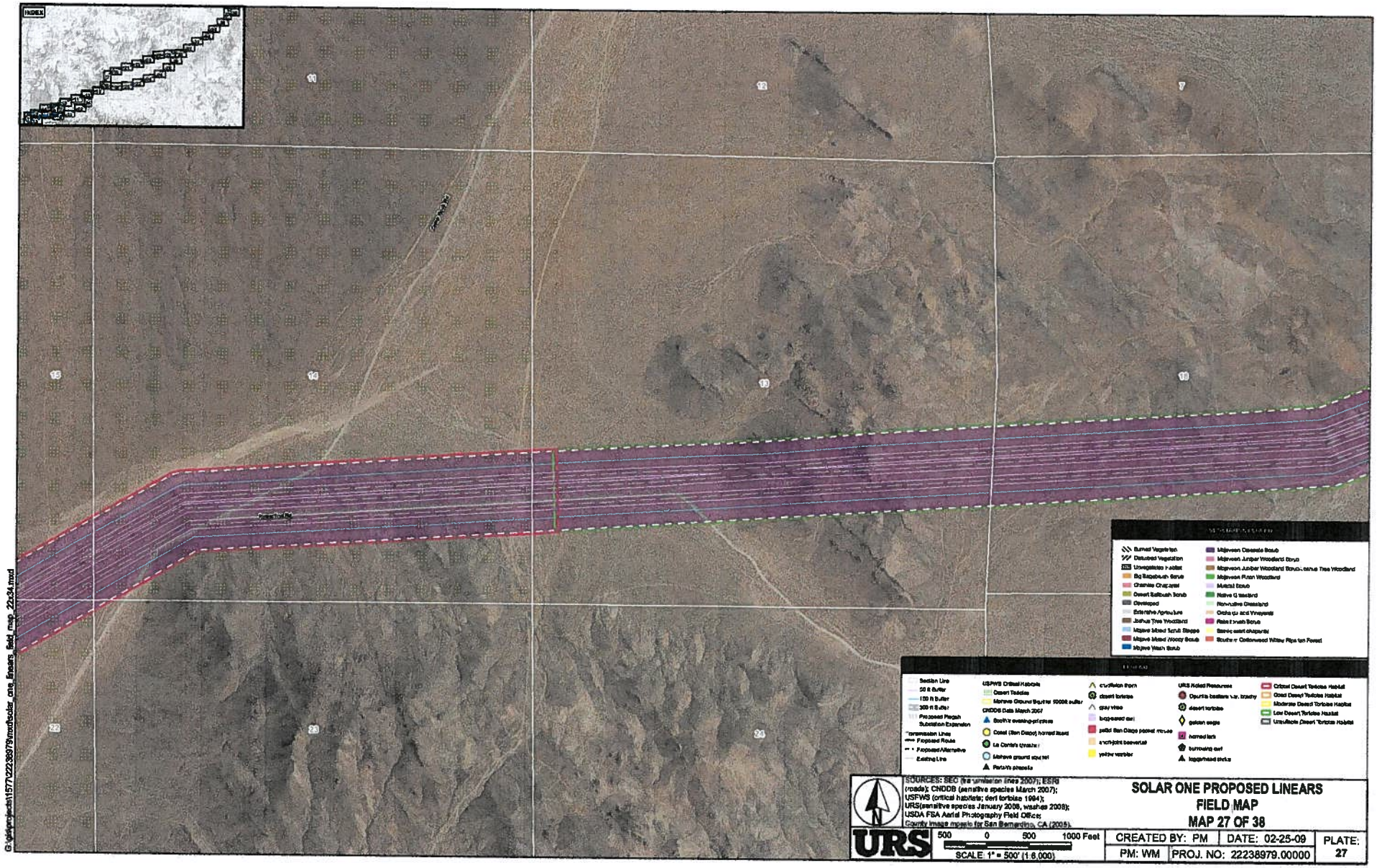
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Mohave ground squirrel
Parish's phacelia
crucifixion thorn
desert tortoise
gray vireo
big-eared bat
pallid San Diego pocket mouse
arch-joint beavertail
yellow warbler
URS Noted Resources
Opuntia basilaris var. brachy
desert tortoise
golden eagle
horned lark
burrowing owl
loggerhead shrike
Critical Desert Tortoise Habitat
Good Desert Tortoise Habitat
Moderate Desert Tortoise Habitat
Low Desert Tortoise Habitat
Unsuitable Desert Tortoise Habitat
SOURCES: SEC (transmission lines 2007); ESRI (roads); CNDDB (sensitive species March 2007); USFWS (critical habitats; desert tortoise 1994); URS(sensitive species January 2008, washes 2008); USDA FSA Aerial Photography Field Office; County image mosaic for San Bernardino, CA (2005).
URS
500 0 500 1000 Feet
SCALE: 1" = 500' (1:6,000)
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DATE: 02-25-09
PLATE: 27
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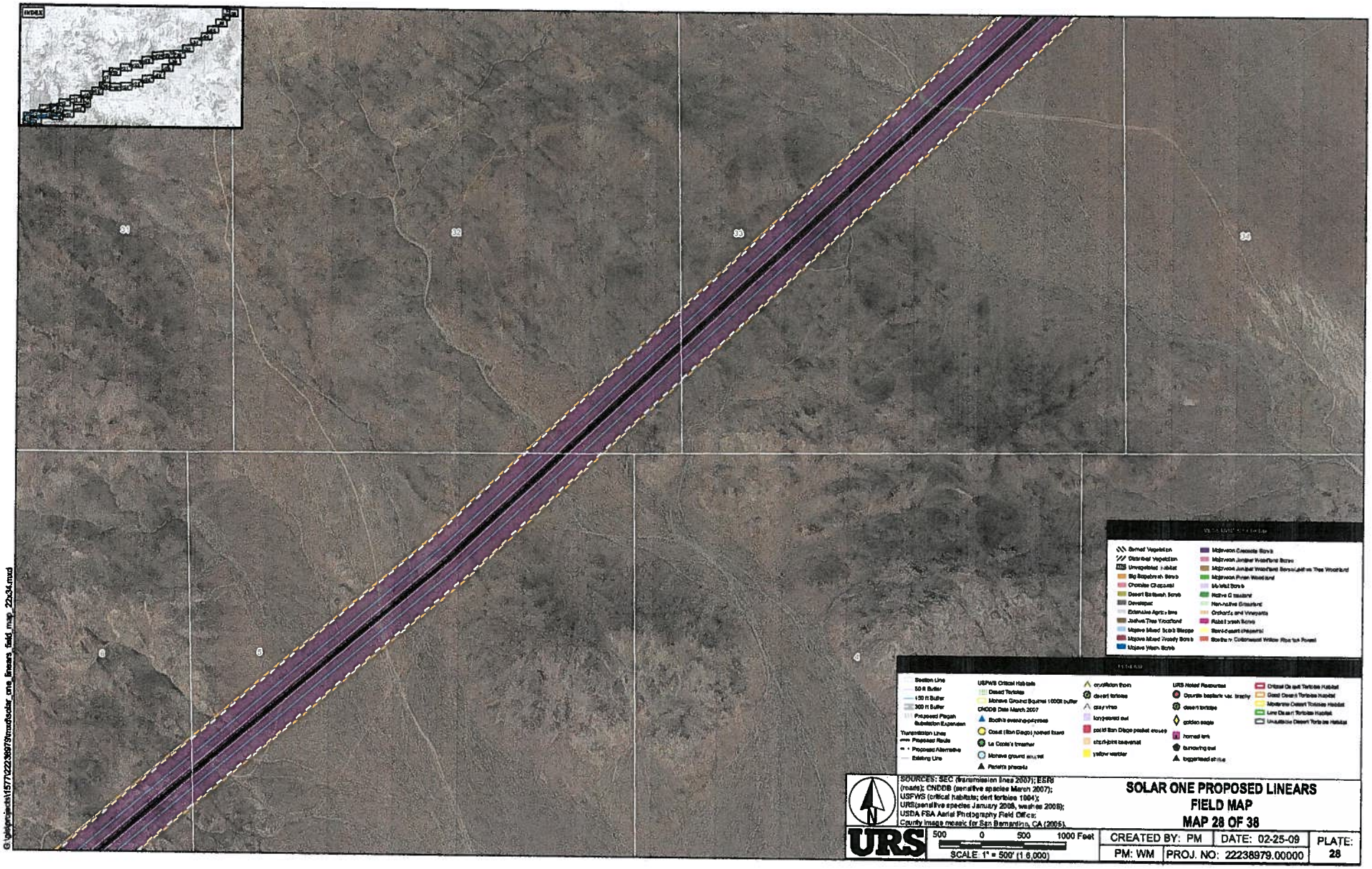

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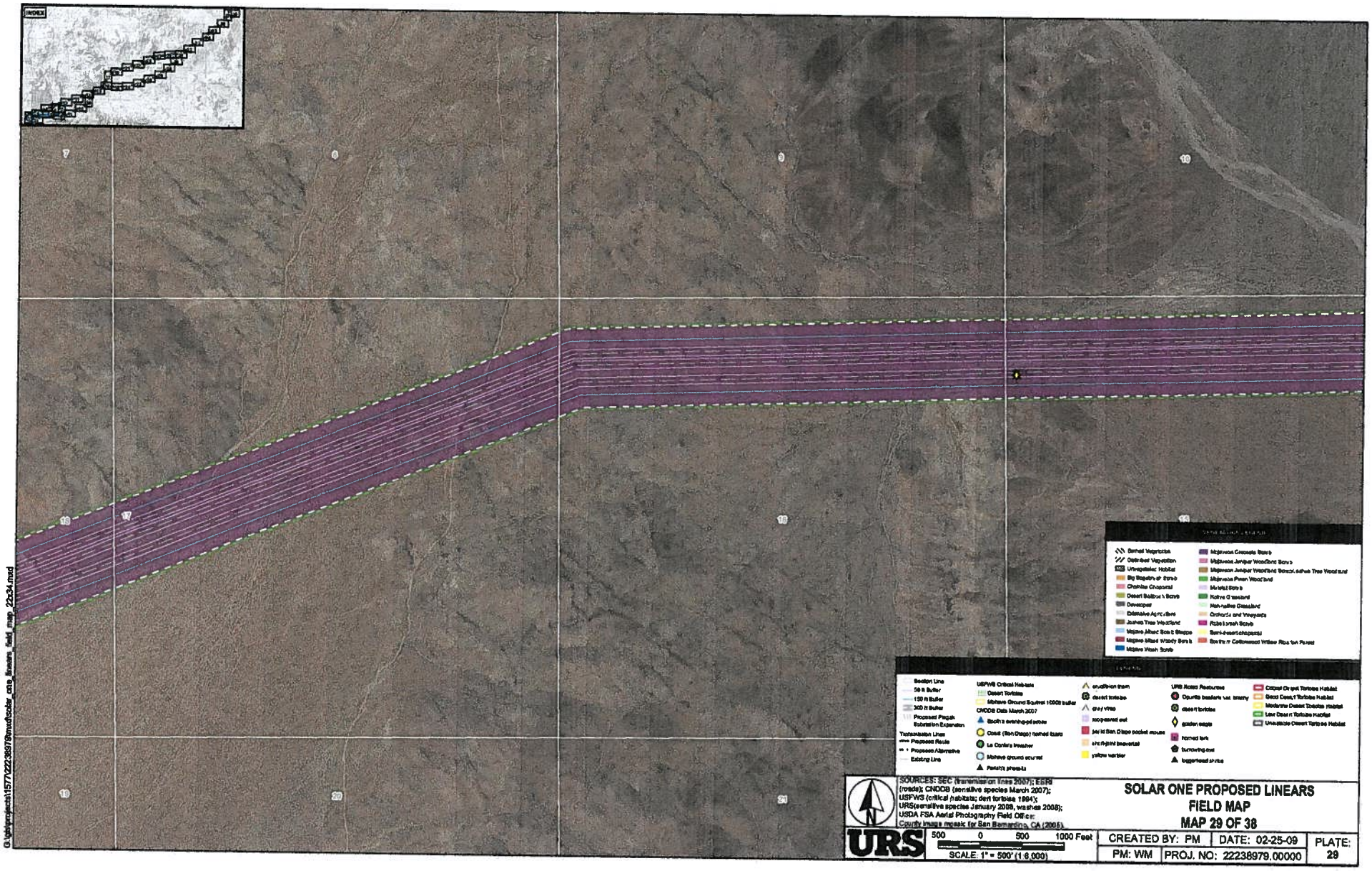
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Mojavean Juniper Woodland Scrub, Native Tree Woodland
Mojavean Pinon Wood land
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300 ft Buffer
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Coast (San Diego) horned lizard
Le Conte's thrasher
Mohave ground squirrel
Parish's phacelia
crucifixion thorn
desert tortoise
gray vireo
loggerhead shrike
pallid San Diego pocket mouse
short-footed beavertail
yellow warbler
URS Rosso Resources
Opuntia basilaris var. brachy
desert tortoise
golden eagle
horned lark
burrowing owl
loggerhead shrike
Critical Desert Tortoise Habitat
Good Desert Tortoise Habitat
Moderate Desert Tortoise Habitat
Low Desert Tortoise Habitat
Unsuitable Desert Tortoise Habitat
SOURCES: SEC (transmission lines 2007); ESRI (roads); CNDDB (sensitive species March 2007); USFWS (critical habitats; desert tortoise 1994); URS(sensitive species January 2008, washes 2008); USDA FSA Aerial Photography Field Office: County image mosaic for San Bernardino, CA (2005).
URS
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SCALE: 1" = 500' (1:6,000)
SOLAR ONE PROPOSED LINEARS
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CREATED BY: PM
DATE: 02-25-09
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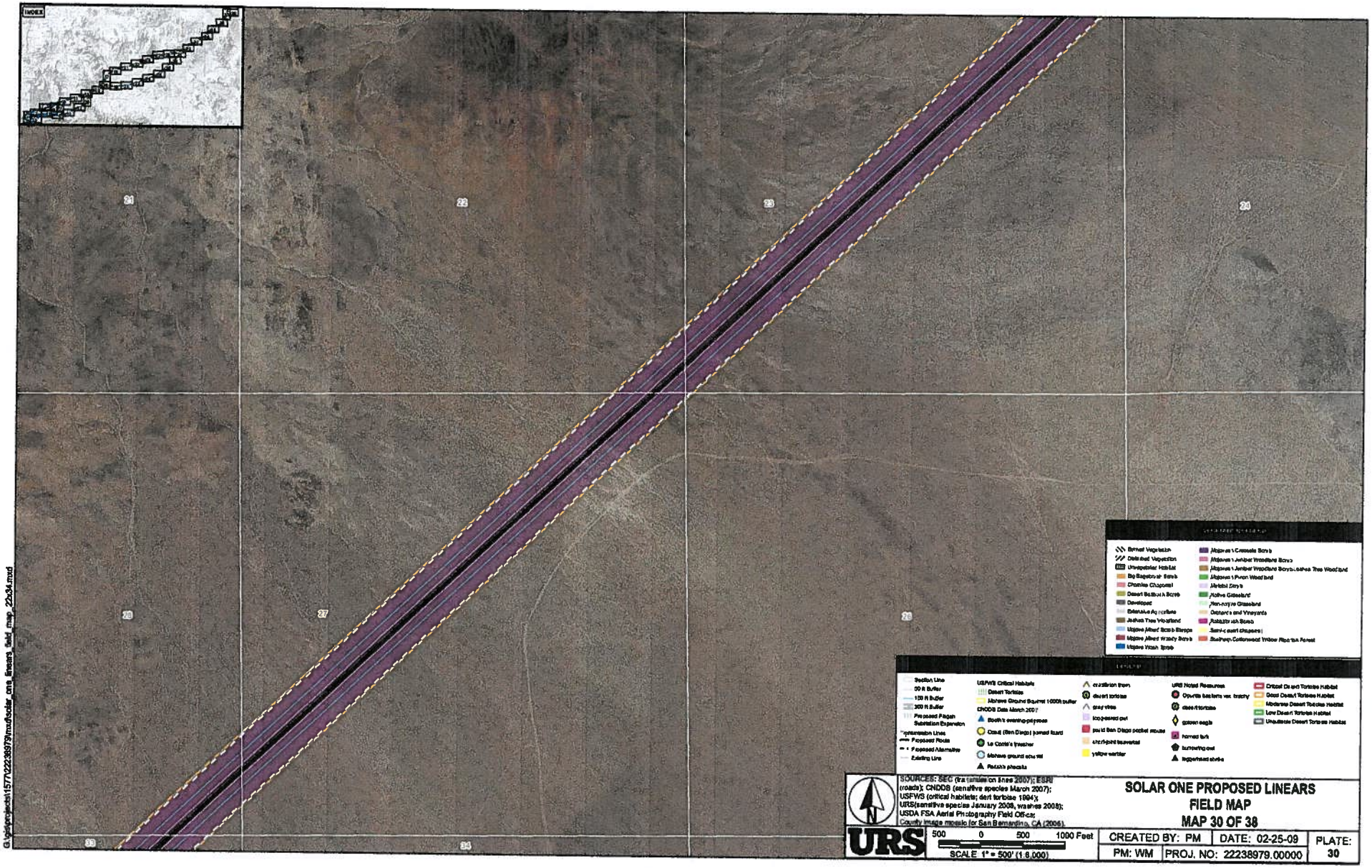
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Mojave Juniper Woodland Scrub-Native Tree Woodland
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CNDDB Data March 2007
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Coast (San Diego) horned lizard
Le Conte's thrasher
Mohave ground squirrel
Parish's phacelia
crucifixion thorn
desert tortoise
easy vireo
long-eared owl
pallid San Diego pocket mouse
short-joint beavertail
yellow warbler
URS Noted Resources
Opuntia basilaris var. treleasei
desert tortoise
golden eagle
horned lark
burrowing owl
loggerhead shrike
Critical Desert Tortoise Habitat
Good Desert Tortoise Habitat
Moderate Desert Tortoise Habitat
Low Desert Tortoise Habitat
Unsuitable Desert Tortoise Habitat
SOURCES: SEC (transmission lines 2007); ESRI (roads); CNDDB (sensitive species March 2007); USFWS (critical habitats; desert tortoise 1994); URS(sensitive species January 2008, washes 2008); USDA FSA Aerial Photography Field Office; County image mosaic for San Bernardino, CA (2006).
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SOLAR ONE PROPOSED LINEARS
FIELD MAP
MAP 30 OF 38
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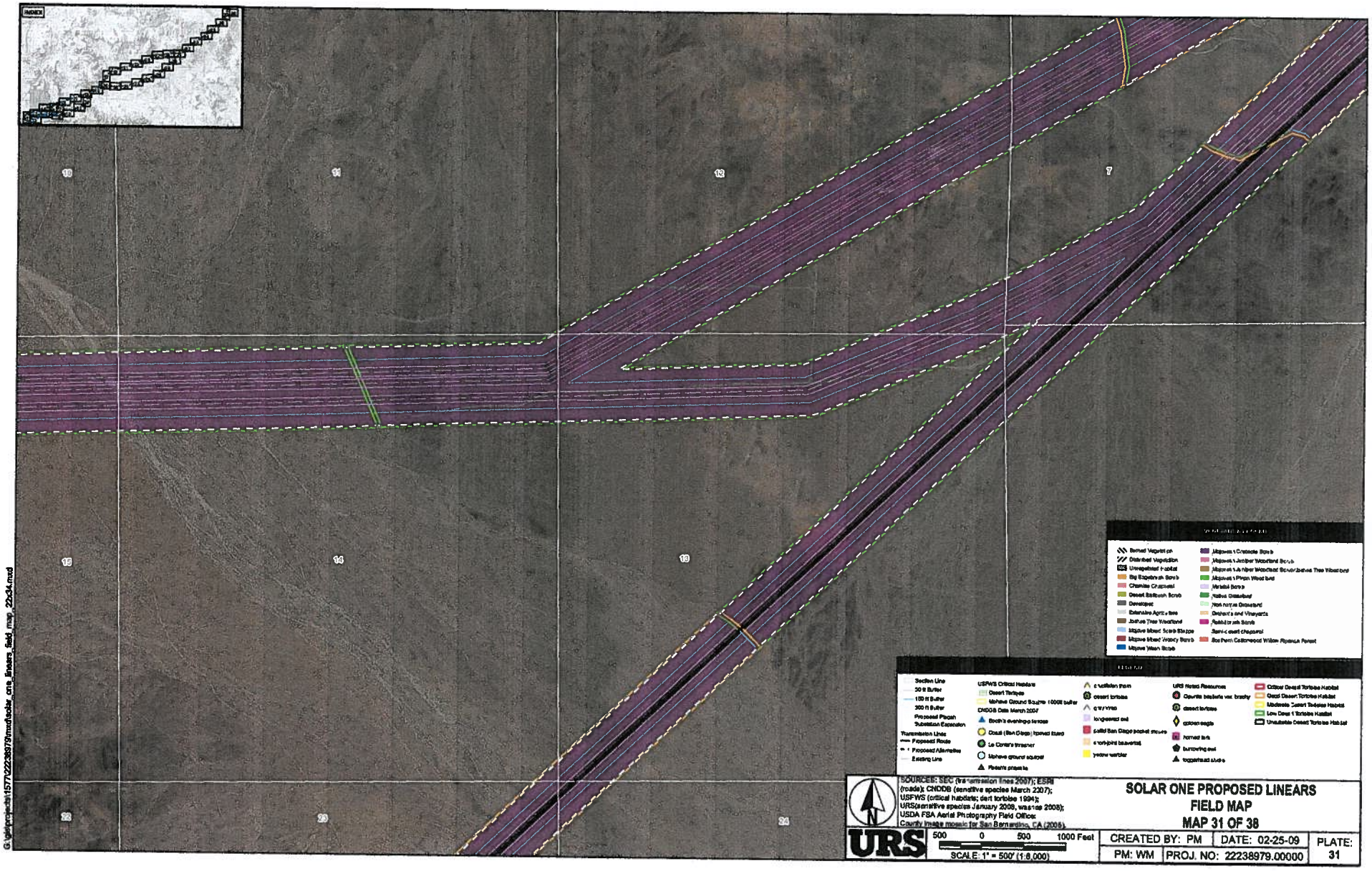

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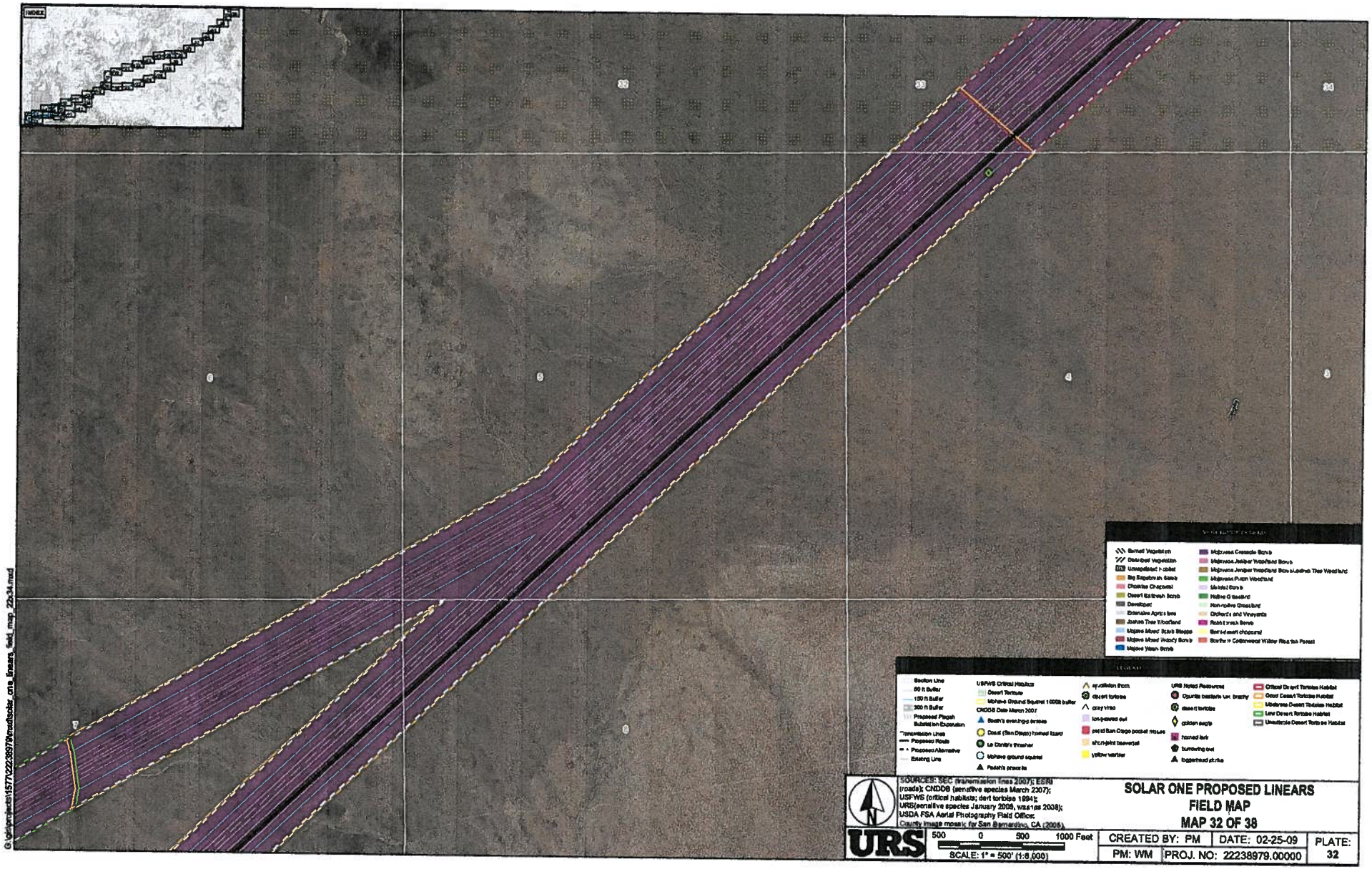
INDEX
Section Line
90 ft Buffer
150 ft Buffer
300 ft Buffer
Proposed Pisgah Substation Expansion
Transmission Lines
Proposed Route
Proposed Alternative
Existing Line
USFWS Critical Habitat
Desert Tortoise
Mohave Ground Squirrel 1000ft buffer
CNDDB Data March 2007
Smith's evening primrose
Coast (San Diego) horned lizard
Le Conte's thrasher
Mohave ground squirrel
Parish's phacelia
aquatic frog
desert tortoise
crazy vireo
long-eared owl
pocket mouse
short-eared owl
yellow warbler
URS Noted Resources
Opuntia basilaris var. brachy
desert tortoise
golden eagle
horned lark
burrowing owl
loggerhead shrike
Critical Desert Tortoise Habitat
Good Desert Tortoise Habitat
Moderate Desert Tortoise Habitat
Low Desert Tortoise Habitat
Unsuitable Desert Tortoise Habitat
Barren Vegetation
Disturbed Vegetation
Unvegetated Habitat
Big Sagebrush Scrub
Chamise Chaparral
Desert Saltbush Scrub
Developed
Extensive Agriculture
Joshua Tree Woodland
Mojave Mixed Scrub Steppe
Mojave Mixed Woody Scrub
Mojave Wash Scrub
Mojavean Creosote Scrub
Mojavean Juniper Woodland Scrub
Mojavean Juniper Woodland Scrub-Leafless Tree Woodland
Mojavean Pinon Woodland
Mulkey Scrub
Native Grassland
Non-native Grassland
Orchards and Vineyards
Rabbitbrush Scrub
Semi-desert chaparral
Southern Cottonwood Willow Riparian Forest
SOURCES: SEC (transmission lines 2007); ESRI (roads); CNDDB (sensitive species March 2007); USFWS (critical habitats; desert tortoise 1994); URS(sensitive species January 2008, wasp survey 2008); USDA FSA Aerial Photography Field Office; County image mosaic for San Bernardino, CA (2006).
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SOLAR ONE PROPOSED LINEARS
FIELD MAP
MAP 32 OF 38
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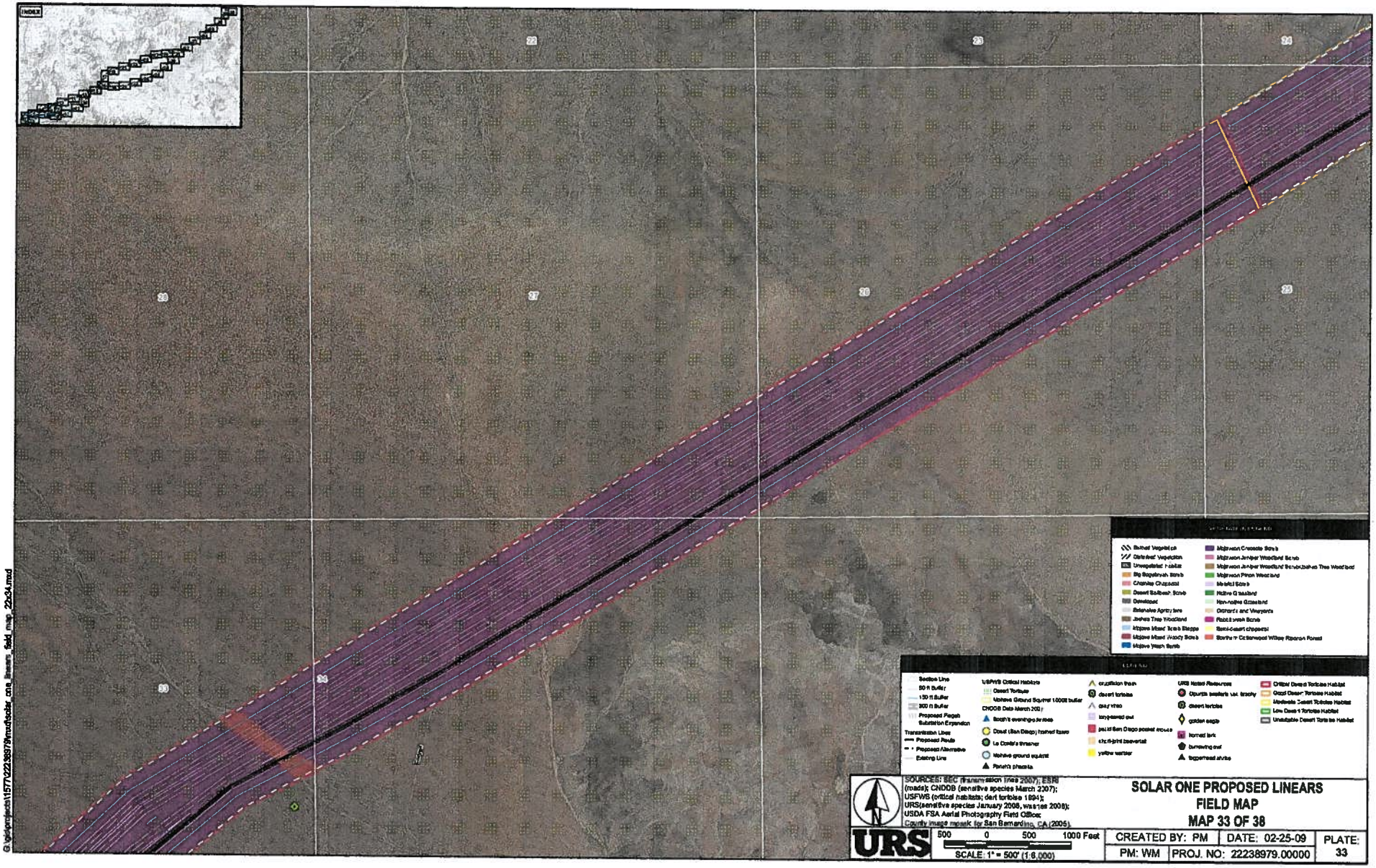
INDEX
22
23
24
30
37
28
29
36
31
32
33
Sections Line
50 ft Buffer
150 ft Buffer
300 ft Buffer
Proposed Pisgah Substation Expansion
Transmission Lines
Proposed Route
Proposed Alternative
Existing Line
USFWS Critical Habitats
Desert Tortoise
Mohave Ground Squirrel 1000ft buffer
CNDDB Data March 2007
Booth's evening primrose
Coast (San Diego) horned lizard
Le Conte's thrasher
Mohave ground squirrel
Parish's phacelia
crucifixion thorn
desert tortoise
gray vireo
long-eared owl
pallid San Diego pocket mouse
short-joint beavertail
yellow warbler
URS Noted Resources
Opuntia basilaris var. brachy
desert tortoise
golden eagle
horned lark
burrowing owl
loggerhead shrike
Critical Desert Tortoise Habitat
Good Desert Tortoise Habitat
Moderate Desert Tortoise Habitat
Low Desert Tortoise Habitat
Unsuitable Desert Tortoise Habitat
Bulrush Vegetation
Disturbed Vegetation
Unvegetated Habitat
Big Sagebrush Scrub
Chamise Chaparral
Desert Saltbush Scrub
Developed
Extensive Agriculture
Joshua Tree Woodland
Mojave Mixed Xeric Steppe
Mojave Mixed Woody Scrub
Mojave Wash Scrub
Mojave Creosote Scrub
Mojave Juniper Woodland Scrub
Mojave Juniper Woodland Scrub/Joshua Tree Woodland
Mojave Pinon Woodland
Mixed Scrub
Native Grassland
Non-native Grassland
Orchards and Vineyards
Rabbitbrush Scrub
Semi-desert chaparral
Southern Cottonwood Willow Riparian Forest
SOURCES: SEC (transmission lines 2007); ESRI (roads); CNDDB (sensitive species March 2007); USFWS (critical habitats; desert tortoise 1994); URS(sensitive species January 2008, wasries 2008); USDA FSA Aerial Photography Field Office; County image mosaic for San Bernardino, CA (2005).
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SOLAR ONE PROPOSED LINEARS
FIELD MAP
MAP 33 OF 38
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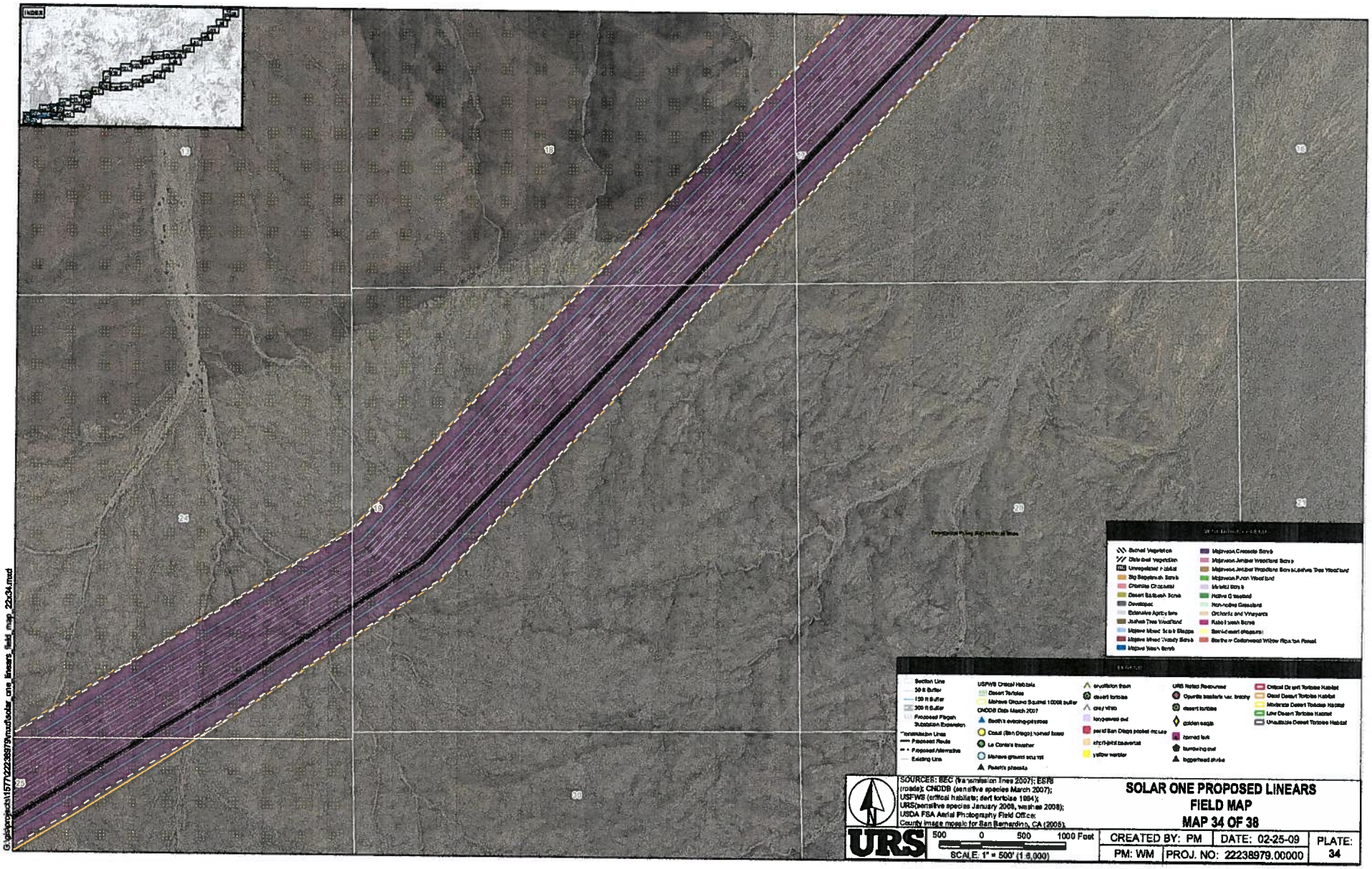
INDEX
Section Line
50 ft Buffer
150 ft Buffer
300 ft Buffer
Proposed Pisgah Substation Expansion
Transmission Lines
Proposed Route
Proposed Alternative
Existing Line
USFWS Critical Habitats
Desert Tortoise
Mohave Ground Squirrel 10000 buffer
CNDDB Data March 2007
Beetle's evening primrose
Coast (San Diego) horned lizard
Le Conte's thrasher
Mohave ground squirrel
Pierson's pheasta
crucifixion thorn
desert tortoise
gray vireo
long-eared owl
pallid San Diego pocket mouse
short-eared owl
yellow warbler
URS Noted Resources
Opuntia basilaris var. brachy
desert tortoise
golden eagle
horned lark
burrowing owl
loggerhead shrike
Critical Desert Tortoise Habitat
Good Desert Tortoise Habitat
Moderate Desert Tortoise Habitat
Low Desert Tortoise Habitat
Unsuitable Desert Tortoise Habitat
Burned Vegetation
Disturbed Vegetation
Unvegetated Habitat
Big Sagebrush Scrub
Chamise Chaparral
Desert Saltbush Scrub
Developed
Extensive Agriculture
Joshua Tree Woodland
Mojave Mixed Scrub Steppe
Mojave Mixed Woody Scrub
Mojave Yucca Scrub
Mojave Creosote Scrub
Mojave Juniper Woodland Scrub
Mojave Juniper Woodland Scrub w/Native Tree Woodland
Mojave Pinon Woodland
Mulefat Scrub
Native Grassland
Non-native Grassland
Orchards and Vineyards
Rabbitbush Scrub
Semi-desert chaparral
Southern Cottonwood Willow Riparian Forest
SOURCES: SEC (transmission lines 2007); ESRI (roads); CNDDB (sensitive species March 2007); USFWS (critical habitats; desert tortoise 1994); URS(sensitive species January 2008, washes 2008); USDA FSA Aerial Photography Field Office; County image mosaic for San Bernardino, CA (2005).
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SCALE: 1" = 500' (1:6,000)
SOLAR ONE PROPOSED LINEARS
FIELD MAP
MAP 34 OF 38
CREATED BY: PM
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PLATE: 34
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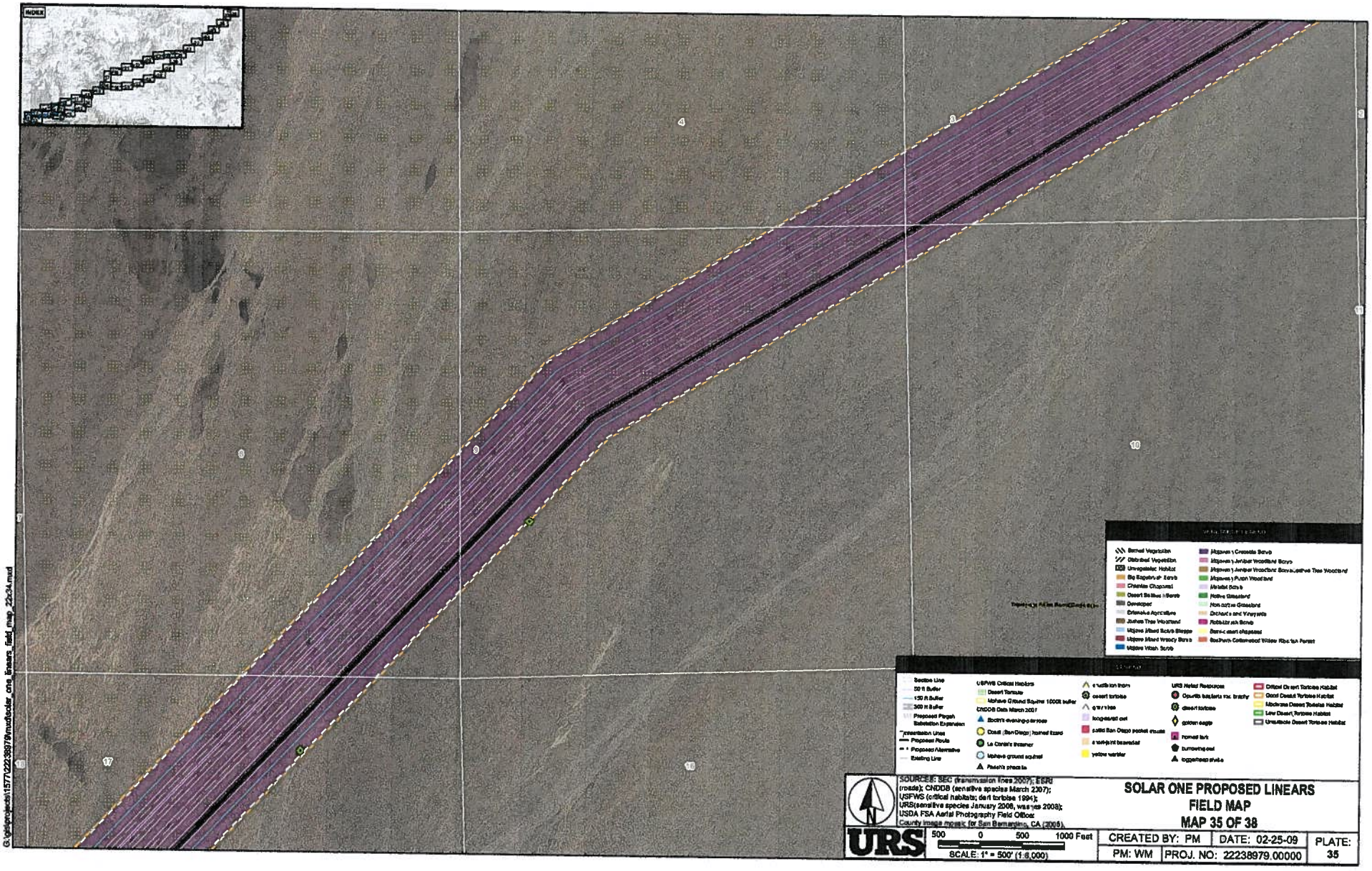
INDEX
Barren Vegetation
Disturbed Vegetation
Unvegetated Habitat
Big Saltbush Scrub
Chamise Chaparral
Desert Sagebrush Scrub
Developed
Extensive Agriculture
Joshua Tree Woodland
Mojave Mixed Scrub Steppe
Mojave Mixed Woody Scrub
Mojave Wash Scrub
Mojave Creosote Scrub
Mojave Juniper Woodland Scrub
Mojave Juniper Woodland Scrub Jeffrey Pine Woodland
Mojave Pinon Woodland
Mixed Scrub
Native Grassland
Non native Grassland
Orchards and Vineyards
Rabbitbrush Scrub
Semi-desert chaparral
Southern Cottonwood Willow Riparian Forest
Section Line
50 ft Buffer
150 ft Buffer
300 ft Buffer
Proposed Pisgah Substation Expansion
Transmission Lines
Proposed Route
Proposed Alternative
Existing Line
USFWS Critical Habitats
Desert Tortoise
Mohave Ground Squirrel 100DB buffer
CNDDB Data March 2007
Short's evening primrose
Coast (San Diego) horned lizard
Le Conte's thrasher
Mohave ground squirrel
Parish's phacelia
excellent habitat
desert tortoise
good habitat
logger-head shrike
pallid San Diego pocket mouse
southern grasshopper mouse
yellow warbler
URS Noted Resources
Opuntia basilaris var. brachy
desert tortoise
golden eagle
horned lark
burrowing owl
loggerhead shrike
Critical Desert Tortoise Habitat
Good Desert Tortoise Habitat
Moderate Desert Tortoise Habitat
Low Desert Tortoise Habitat
Unsuitable Desert Tortoise Habitat
SOURCES: SEC (transmission lines 2007); ESRI (roads); CNDDB (sensitive species March 2007); USFWS (critical habitats; desert tortoise 1994); URS(sensitive species January 2008, wetlands 2008); USDA FSA Aerial Photography Field Office; County image mosaic for San Bernardino, CA (2006).
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SCALE: 1" = 500' (1:6,000)
SOLAR ONE PROPOSED LINEARS
FIELD MAP
MAP 35 OF 38
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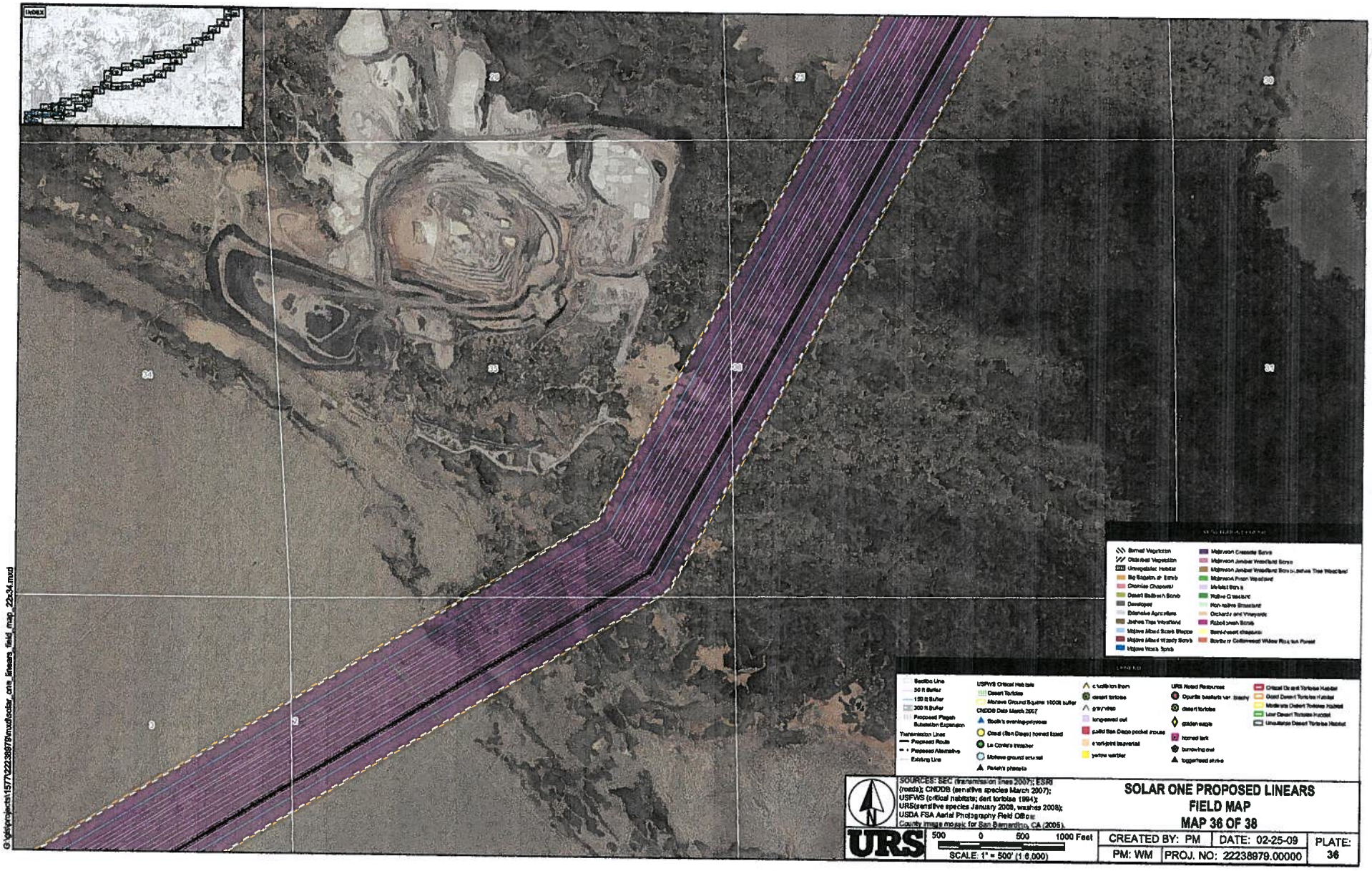

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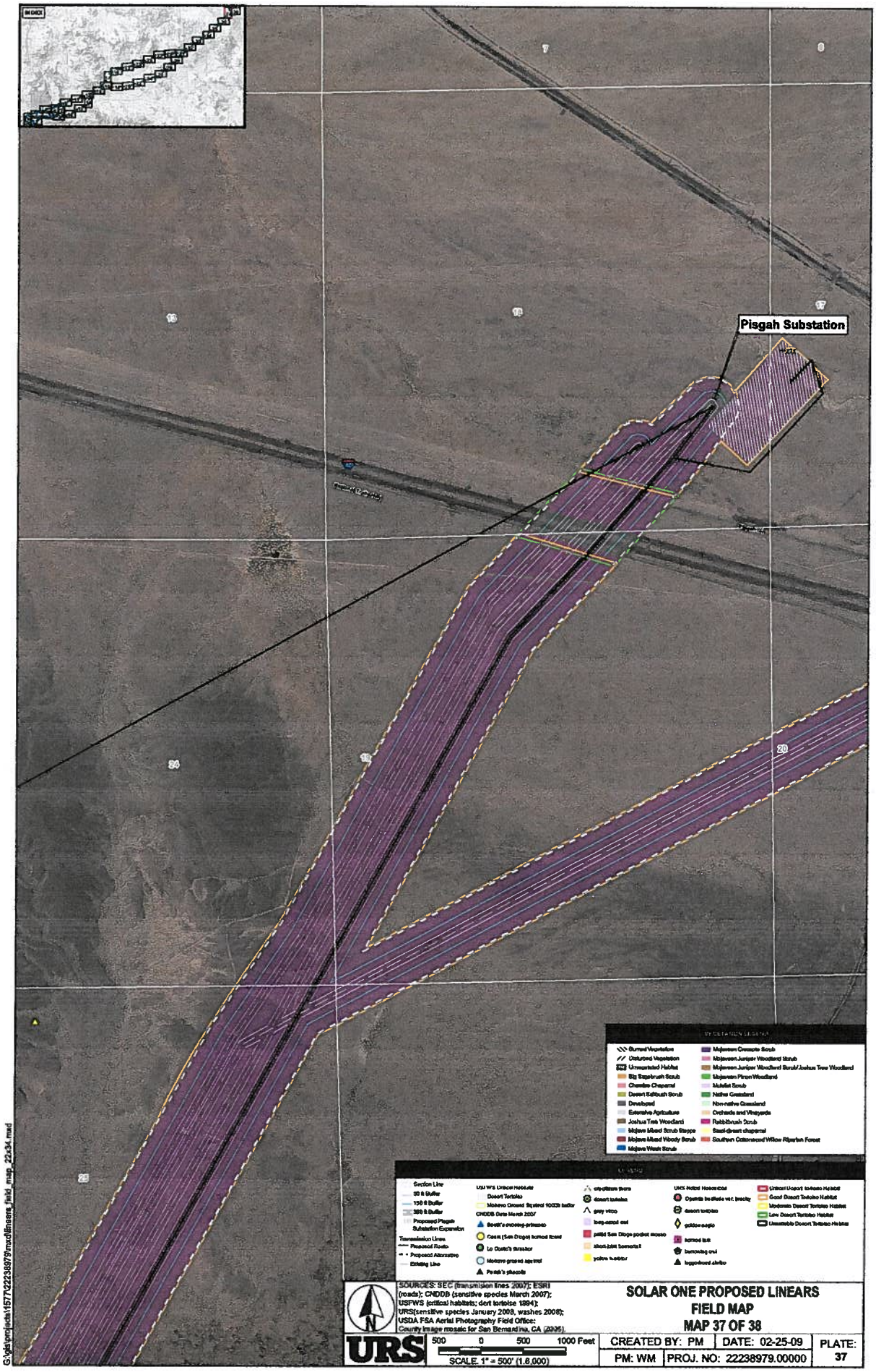
Pisgah Substation
Burned Vegetation
Disturbed Vegetation
Unvegetated Habitat
Big Sagebrush Scrub
Chamise Chaparral
Desert Saltbush Scrub
Developed
Extensive Agriculture
Joshua Tree Woodland
Mojave Mixed Scrub Steppe
Mojave Mixed Woody Scrub
Mojave Wash Scrub
Mojavean Creosote Scrub
Mojavean Juniper Woodland Scrub
Mojavean Juniper Woodland Scrub/Joshua Tree Woodland
Mojavean Pinon Woodland
Mulefat Scrub
Native Grassland
Non-native Grassland
Orchards and Vineyards
Rabbitbrush Scrub
Semi-desert chaparral
Southern Cottonwood Willow Riparian Forest
Section Line
50 ft Buffer
150 ft Buffer
300 ft Buffer
Proposed Pisgah Substation Expansion
Transmission Lines
Proposed Route
Proposed Alternative
Existing Line
USFWS Critical Habitat
Desert Tortoise
Mojave Ground Squirrel 10KM buffer
CNDDB Data March 2007
Smith's crocking-primrose
Cacti (San Diego) horned lizard
Le Conte's thrasher
Mojave ground squirrel
Parish's phacelia
chaparral sparrow
desert tortoise
gray vireo
long-eared owl
pallid San Diego pocket mouse
short-joint beavertail
yellow warbler
USFS Natural Resources
Opuntia basilaris var. brachy
desert tortoise
golden eagle
horned lark
burrowing owl
loggerhead shrike
Critical Desert Tortoise Habitat
Good Desert Tortoise Habitat
Moderate Desert Tortoise Habitat
Low Desert Tortoise Habitat
Unsuitable Desert Tortoise Habitat
SOURCES: SEC (transmission lines 2007); ESRI (roads); CNDDB (sensitive species March 2007); USFWS (critical habitats; dert tortoise 1994); URS(sensitive species January 2008, washes 2008); USDA FSA Aerial Photography Field Office: County image mosaic for San Bernardino, CA (2005).
SOLAR ONE PROPOSED LINEARS
FIELD MAP
MAP 37 OF 38
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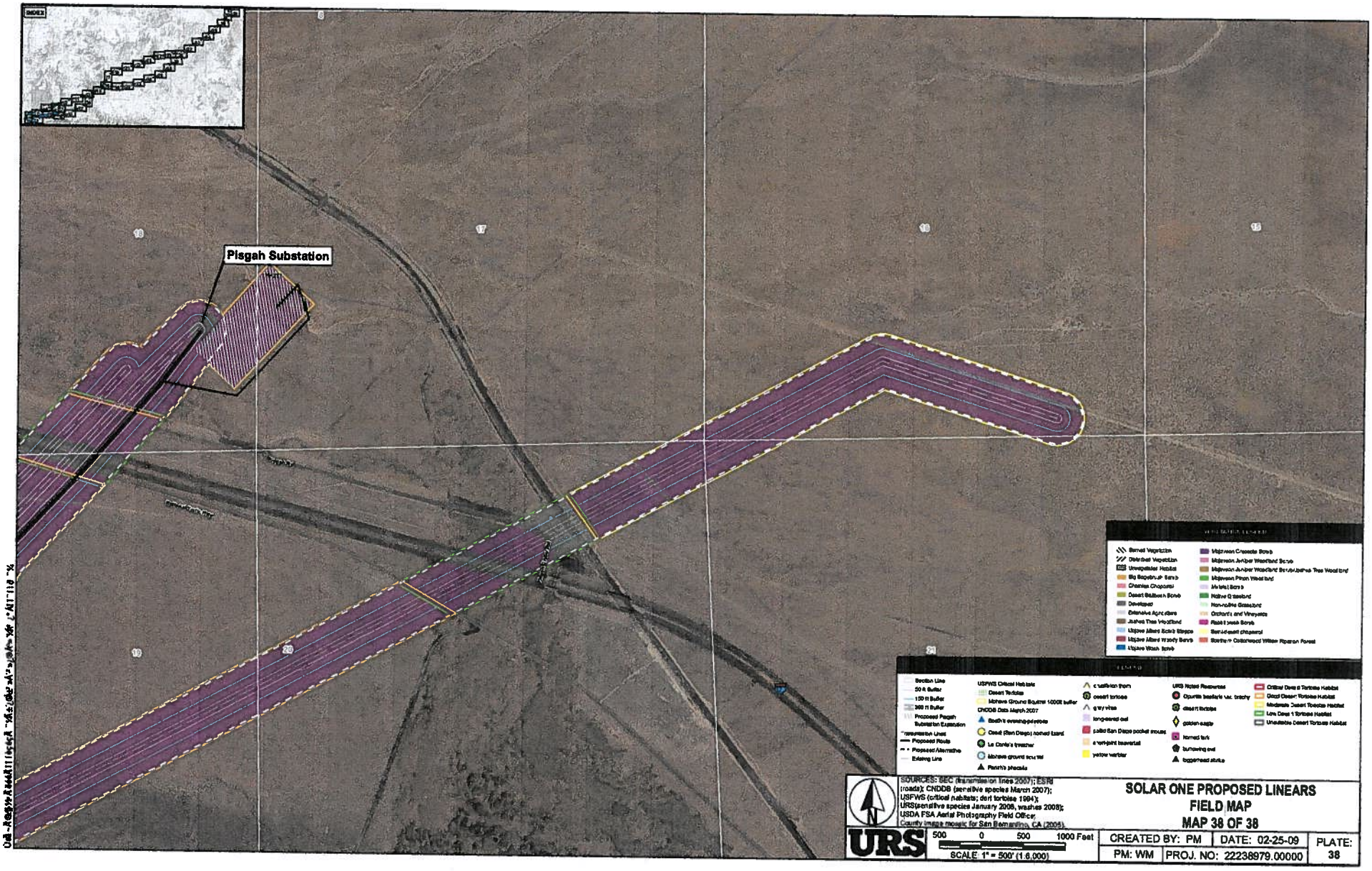
INDEX
Pisgah Substation
Section Line
50 ft Buffer
150 ft Buffer
300 ft Buffer
Proposed Pisgah Substation Expansion
Transmission Line
Proposed Route
Proposed Alternative
Existing Line
USFWS Critical Habitats
Desert Tortoise
Mohave Ground Squirrel 10000 buffer
CNDDB Data March 2007
Beath's evening primrose
Ocelot (San Diego) horned lizard
La Cima's treader
Mohave ground squirrel
Parish's phacelia
California thorn
desert tortoise
gray vireo
long-eared owl
pallid San Diego pocket mouse
short-joint beavertail
yellow warbler
URS Noted Resources
Opuntia basilaris var. brachy
desert tortoise
golden eagle
horned lark
burrowing owl
loggerhead shrike
Critical Desert Tortoise Habitat
Good Desert Tortoise Habitat
Moderate Desert Tortoise Habitat
Low Desert Tortoise Habitat
Unsuitable Desert Tortoise Habitat
Barren Vegetation
Disturbed Vegetation
Unvegetated Habitat
Big Sagebrush Scrub
Chamise Chaparral
Desert Saltbush Scrub
Developed
Extensive Agriculture
Joshua Tree Woodland
Mojave Mixed Scrub Steppe
Mojave Mixed Woody Scrub
Mojave Wash Scrub
Mojave Creosote Scrub
Mojave Juniper Woodland Scrub
Mojave Juniper Woodland Scrub/Joshua Tree Woodland
Mojave Pinon Woodland
Mixed Scrub
Native Grassland
Non-native Grassland
Orchards and Vineyards
Rabbitbush Scrub
Semi-desert chaparral
Southern Cottonwood Willow Riparian Forest
SOURCES: SEC (transmission lines 2007); ESRI (roads); CNDDB (sensitive species March 2007); USFWS (critical habitats; desert tortoise 1994); URS(sensitive species January 2008, weather 2008); USDA FSA Aerial Photography Field Office, County image mosaic for San Bernardino, CA (2005).
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SCALE: 1" = 500' (1:6,000)
SOLAR ONE PROPOSED LINEARS
FIELD MAP
MAP 38 OF 38
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PLATE: 38

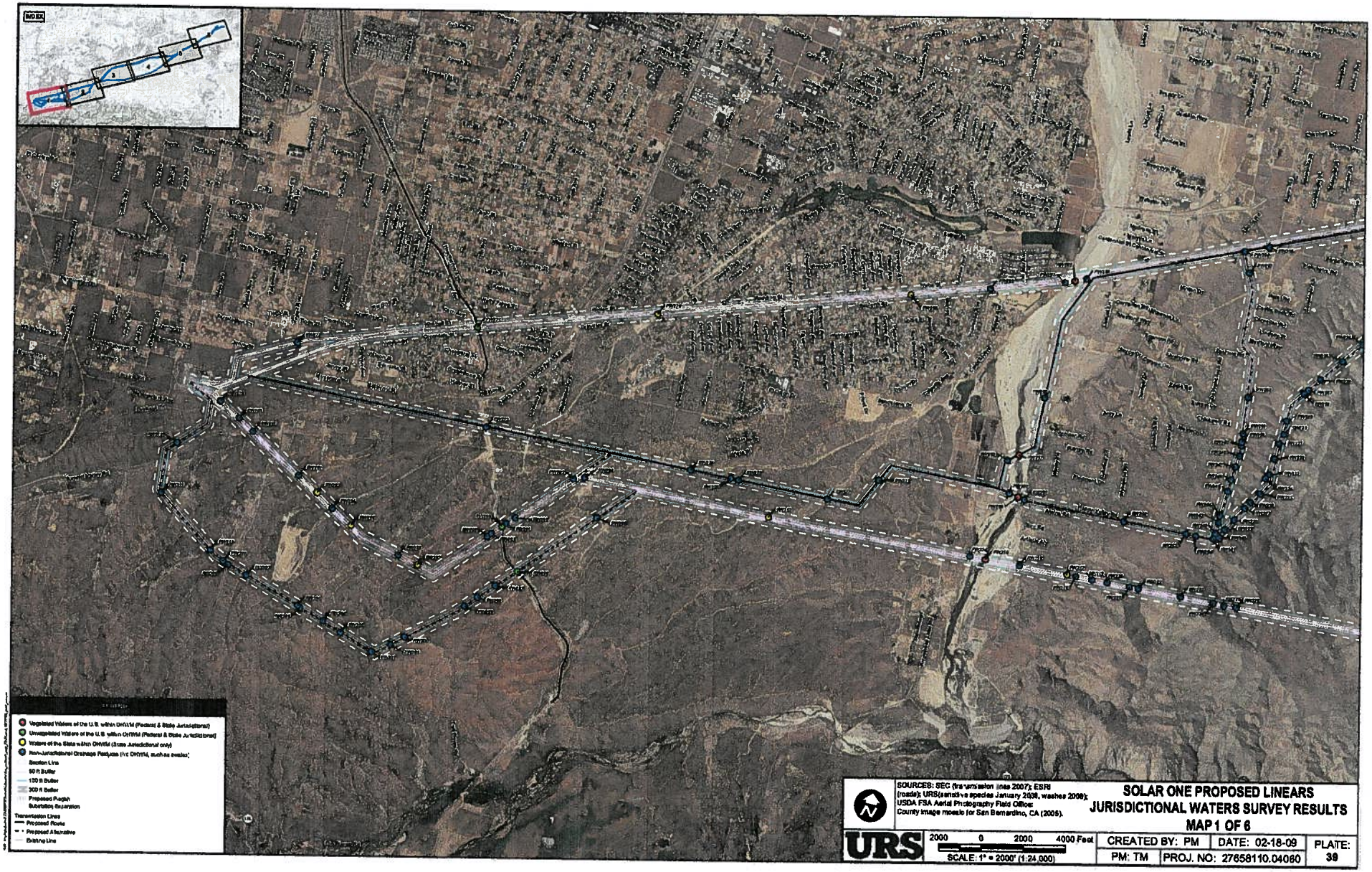
INDEX
Vegetated Waters of the U.S. within OHWM (Federal & State Jurisdictional)
Unvegetated Waters of the U.S. within OHWM (Federal & State Jurisdictional)
Waters of the State within OHWM (State Jurisdictional only)
Non-Jurisdictional Drainage Features (no OHWM, such as swales)
Section Line
50 ft Buffer
100 ft Buffer
300 ft Buffer
Proposed Pedestal
Substation Expansion
Transmission Lines
Proposed Route
Proposed Alternative
Existing Line
SOURCES: SEC (transmission lines 2007); ESRI (roads); URS(sensitive species January 2008, washes 2008); USDA FSA Aerial Photography Field Office: County image mosaic for San Bernardino, CA (2005).
URS
2000 0 2000 4000 Feet
SCALE: 1" = 2000' (1:24,000)
SOLAR ONE PROPOSED LINEARS
JURISDICTIONAL WATERS SURVEY RESULTS
MAP 1 OF 6
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PLATE: 39

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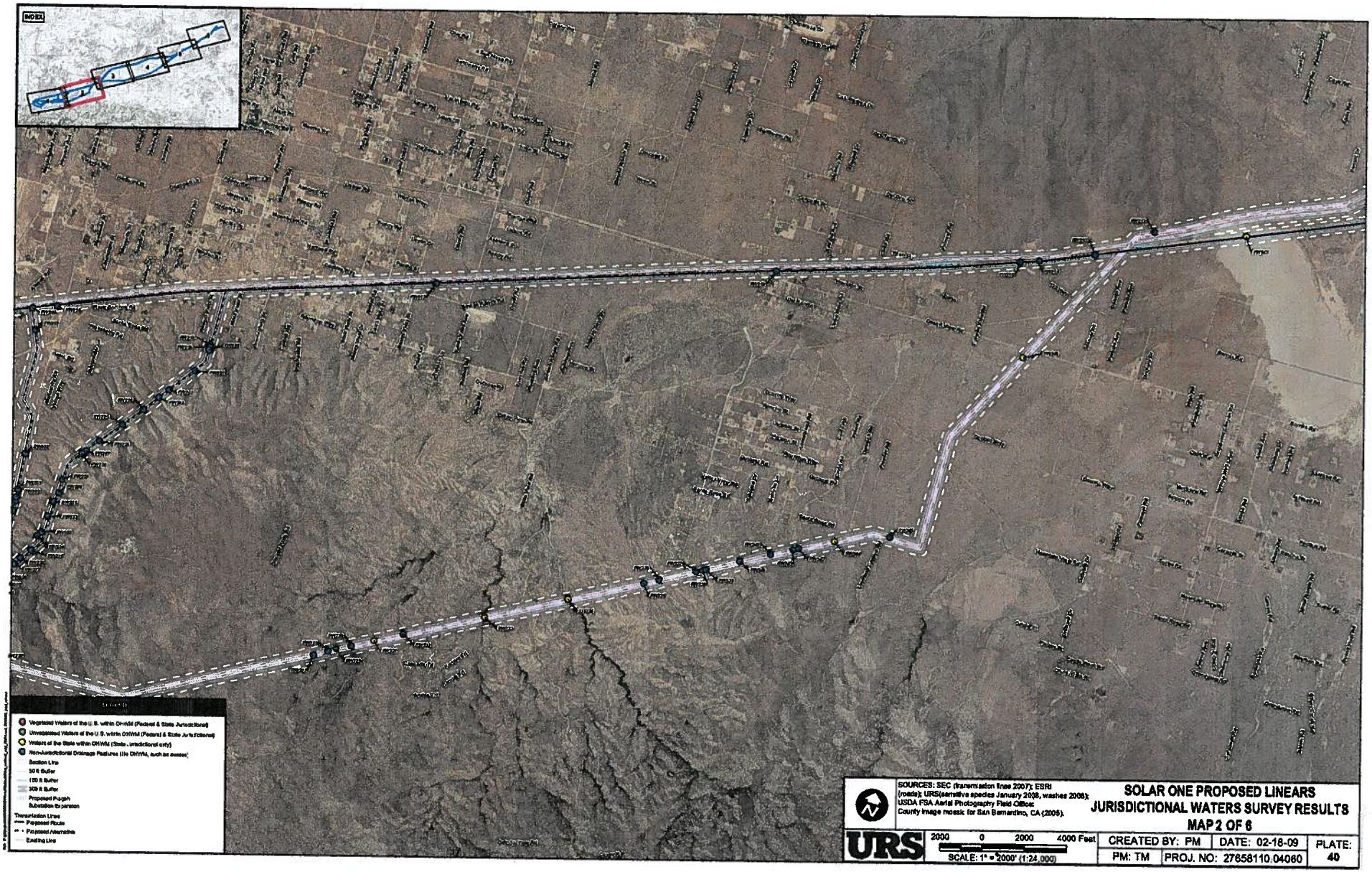

SOURCES: SEC (transmission lines 2007); ESRI (roads); URS(sensitive species January 2008, washes 2008); USDA FSA Aerial Photography Field Office: County Image mosaic for San Bernardino, CA (2005).

SOLAR ONE PROPOSED LINEARS
JURISDICTIONAL WATERS SURVEY RESULTS
MAP 2 OF 6

URS

2000 0 2000 4000 Feet
SCALE: 1" = 2000' (1:24,000)

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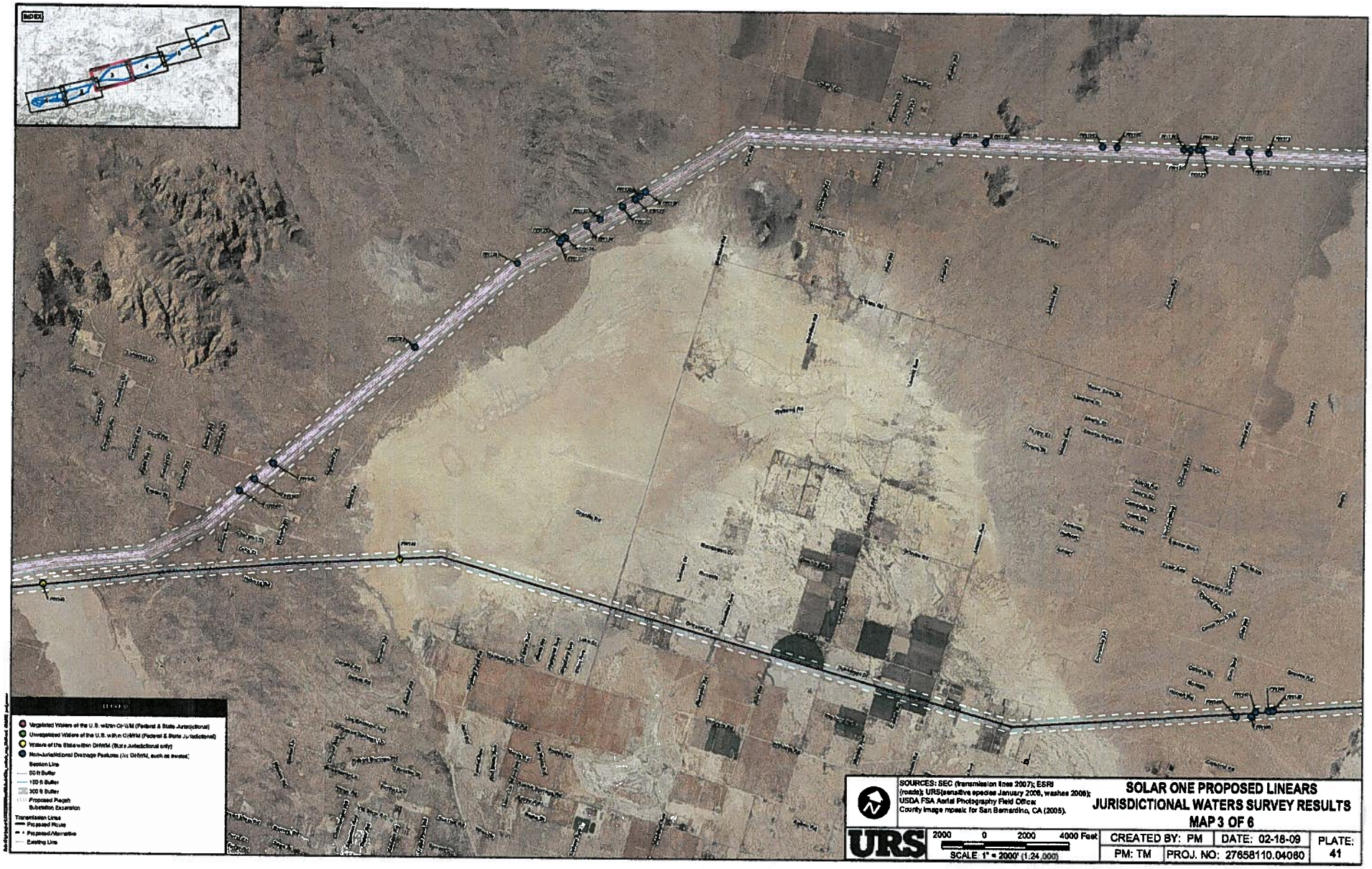
INDEX
Vegetated Waters of the U.S. within OHWM (Federal & State Jurisdictional)
Unvegetated Waters of the U.S. within OHWM (Federal & State Jurisdictional)
Waters of the State within OHWM (State Jurisdictional only)
Non-Jurisdictional Drainage Features (no OHWM, such as swales)
Section Line
50 ft Buffer
150 ft Buffer
300 ft Buffer
Proposed Pagoh Substation Expansion
Transmission Lines
Proposed Route
Proposed Alternative
Existing Line
SOURCES: SEC (transmission lines 2007); ESRI (roads); URS(sensitive species January 2006, washes 2006); USDA FSA Aerial Photography Field Office County image mosaic for San Bernardino, CA (2005).
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SCALE 1" = 2000' (1:24,000)
SOLAR ONE PROPOSED LINEARS
JURISDICTIONAL WATERS SURVEY RESULTS
MAP 3 OF 6
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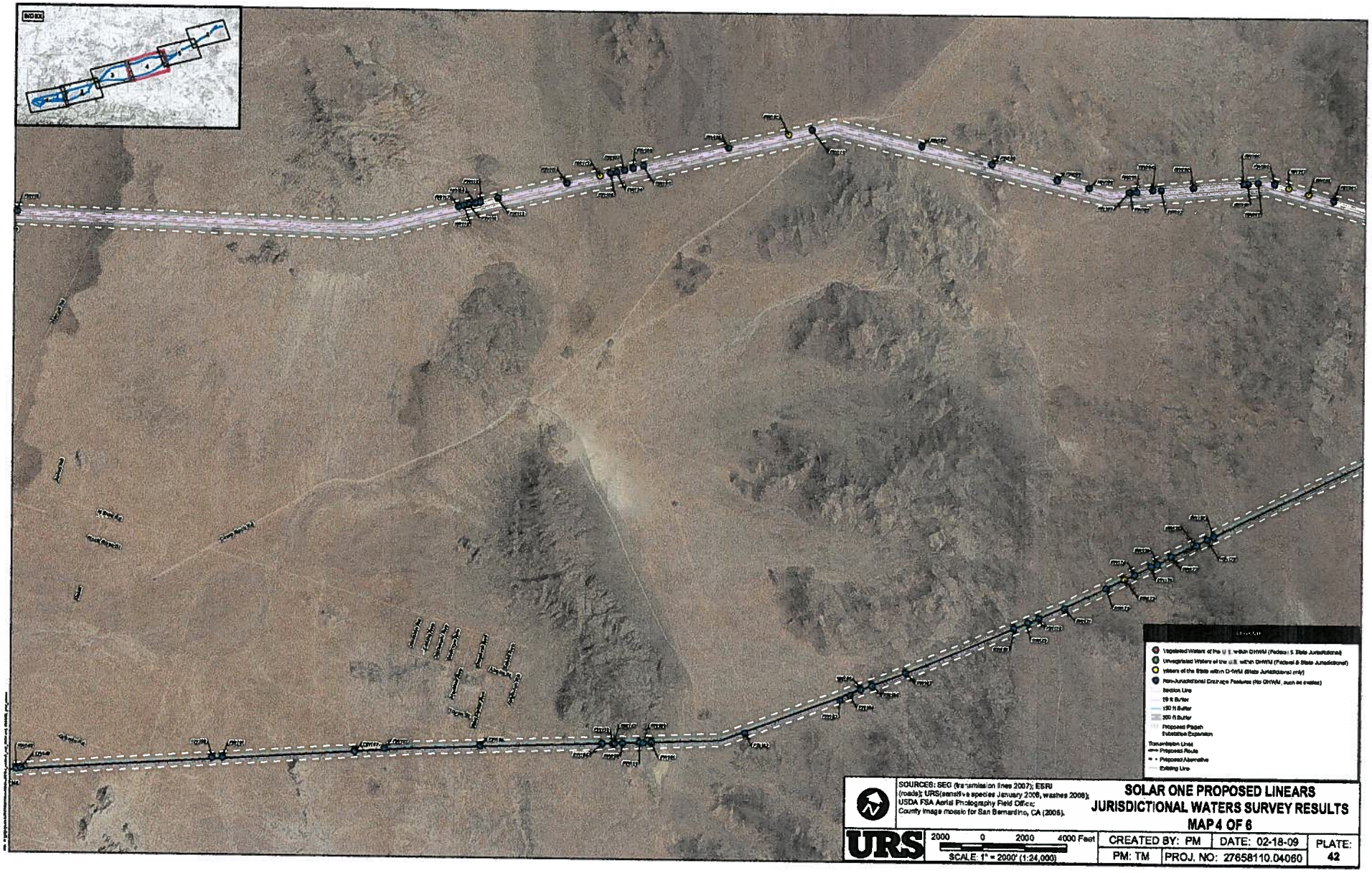
INDEX
Vegetated Waters of the U.S. within OHWM (Federal & State Jurisdictional)
Unvegetated Waters of the U.S. within OHWM (Federal & State Jurisdictional)
Waters of the State within O-HWM (State Jurisdictional only)
Non-Jurisdictional Drainage Features (No OHWM, such as swales)
Section Line
19 ft Buffer
130 ft Buffer
300 ft Buffer
Proposed Pisgah Substation Expansion
Transmission Lines
Proposed Route
Proposed Alternative
Existing Line
SOURCES: SEC (transmission lines 2007); ESRI (roads); URS(sensitive species January 2008, washes 2008); USDA FSA Aerial Photography Field Office; County image mosaic for San Bernardino, CA (2005).
URS
2000 0 2000 4000 Feet
SCALE: 1" = 2000' (1:24,000)
SOLAR ONE PROPOSED LINEARS
JURISDICTIONAL WATERS SURVEY RESULTS
MAP 4 OF 6
CREATED BY: PM
DATE: 02-18-09
PLATE: 42
PM: TM
PROJ. NO: 27658110.04060

000105

SOURCES: SEC (transmission lines 2007); ESRI (roads); URS(sensitive species January 2008, washes 2006); USDA FSA Aerial Photography Field Office: County image mosaic for San Bernardino, CA (2005).

URS

2000 0 2000 4000 Feet

SCALE: 1" = 2000' (1:24,000)

SOLAR ONE PROPOSED LINEARS
JURISDICTIONAL WATERS SURVEY RESULTS
MAP 5 OF 6

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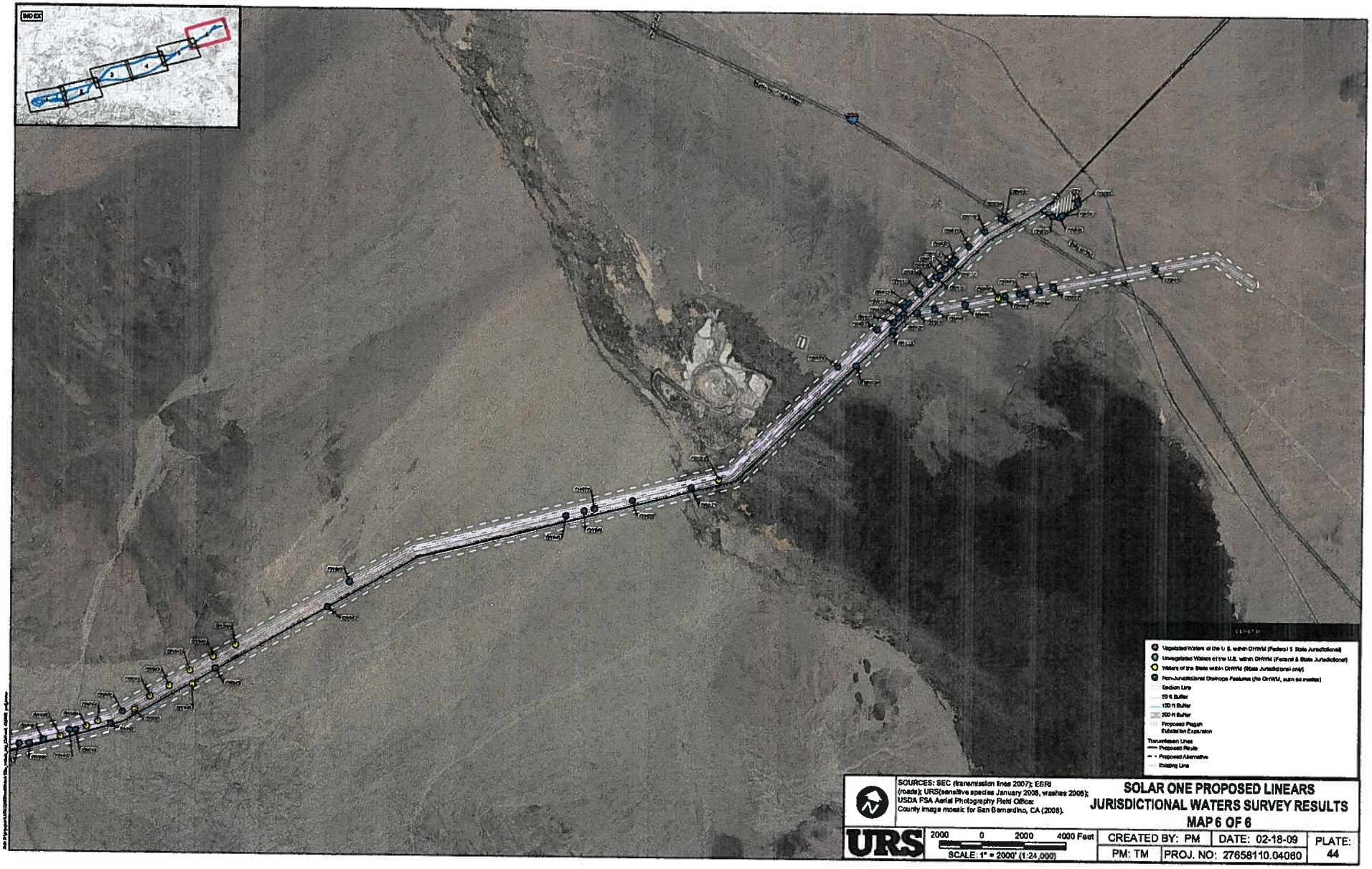
000106



SOURCES: SEC (transmission lines 2007); ESRI (roads); URS(sensitive species January 2008, washes 2008); USDA FSA Aerial Photography Field Office: County image mosaic for San Bernardino, CA (2008).

SOLAR ONE PROPOSED LINEARS
JURISDICTIONAL WATERS SURVEY RESULTS
MAP 6 OF 6

URS

2000 0 2000 4000 Feet
SCALE: 1" = 2000' (1:24,000)

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PM: TM	PROJ. NO: 27658110.04060	

TECHNICAL AREA: TRANSMISSION LINE UPGRADES

Item 2: Provide delineation of waters of the U.S. and state in the areas affected by the transmission line upgrades.

Response: Maps of waters of the U.S. and waters of the state along the transmission line proposed alignment are provided in Attachment TRANS-1, located behind the response to Item 1. Additionally, a table denoting the delineations is provided as TRANS-2, located behind this response.

Waters of the United States and State Jurisdictional Waters
The Project area encompasses four regional watershed hydrologic units: Bessemer, Johnson, Lucerne Lake, and Mojave (Table 4). During the site survey and habitat assessment, 346 drainage features were identified that cross the existing and/or proposed transmission lines using Google Earth aerial images. Further examination of the drainage features on the ground yielded the following results:.

Table 4
Regional Watershed Hydrologic Units of Proposed Transmission Line Corridor

Regional Hydrologic Unit	Acreage
Bessemer	1546
Johnson	491
Lucerne Lake	5385
Mojave	6057
Total Acreage:	13479

Waters of the U.S.
The Mojave River is an intrastate water that may be considered jurisdictional by the Corps. Four crossings of the Mojave River are vegetated waters that may be federal jurisdictional waters of the U.S. within an OHWM as defined by 33 CFR 328.3(e). These four areas are sparsely vegetated (<1%) along the fringe of the river with willow (Salix sp.) and other riparian vegetation. These locations include PW257, PW260, PW266, and PW315 on Plate 39 of the Solar One Proposed Linears Jurisdictional Waters Survey Results maps (indicated in red). Each of these four crossings is described in TRANS-2. While final jurisdiction over the Mojave River has not yet been determined by the Corps, a preliminary jurisdictional determination was implemented and it is assumed that the Corps will take jurisdiction over this feature.

The Corps may also want to assert jurisdiction over three locations at crossings of the California Aqueduct. These locations include PW271, PW290, and PW296 on Plate 39 and are indicated in green.

A total of 339 other drainage features were determined to be federally non-jurisdictional because they are isolated waters and there is no apparent or likely significant nexus to foreign or interstate commerce. Many of these drainage features also lack an OHWM. Each of these drainage features is described in TRANS-2 and can be found on Plates 39-44 of the Solar One Proposed Linears Jurisdictional Waters Survey Results maps.

Waters of the State

A total of 41 drainage features were determined to be waters of the state pursuant to Section 1600 of the California Fish and Game Code and the Porter Cologne Water Quality Act. These include the four aforementioned locations that cross sparsely vegetated (<1%) areas of the Mojave River (indicated in red on Plate 39), the three (3) aforementioned locations that traverse sections of the California Aqueduct (indicated in green on Plate 39), and 34 isolated, intrastate waters that fall under CDFG and Regional Water Quality Control Board (RWQCB) jurisdiction because of the presence of riparian vegetation (e.g., willows) and/or an OHWM. Each of the 34 isolated drainage features can be found on Plates 39-44 indicated in yellow. Descriptions of all 41 state-jurisdictional drainage features can be found in attachment TRANS-2.

Other Drainage Features

A total of 305 other drainage features (e.g., swales) were determined to be non-jurisdictional under federal and state regulations because they lacked an OHWM and/or bed, bank, and channel. These 305 drainage features are indicated in blue on Plates 1-6.

Potential Jurisdictional Waters of US Locations along Solar I Proposed Transmission Corridor

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW001	557988	3848483	No	No	Drainage feature running east to west across transmission line road ending at access road turn-off	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW002	556664	3847798	No	No	Drainage feature running southeast to northwest across transmission line road	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW003	556475	3847702	No	No	Drainage feature running southeast to northwest across transmission line road	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW004	556299	3847608	No	No	Drainage feature running southeast to northwest across transmission line road then continuing parallel to the transmission line access road	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW005	556217	3847565	No	No	Tributary to PW004 running southeast to northwest across transmission line road	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW006	556030	3847470	No	No	Tributary to PW004 running southeast to northwest	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW007	555942	3847421	No	Yes	Drainage feature running southeast to northwest	Width at OHWM = 16 feet; Depth = 4 inches. No wetland vegetation.
PW008	555514	3847195	No	No	Drainage feature running east to west across transmission line road	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW009	555114	3846993	No	No	Drainage feature and alluvial deposit area running south to north	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW010	554884	3846874	No	No	Alluvial tributary to PW009 running northwest to southeast	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW011	554679	3846898	No	No	Drainage feature/tributary to PW009 running northwest to southeast	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW012	554726	3846977	No	No	Drainage feature/tributary to PW009 running west to east	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW013	554840	3847158	No	No	Drainage feature/tributary to PW009 running west to east	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW014	554937	3847322	No	No	Tributary to PW015 running west to east	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW015	555003	3847443	No	No	Drainage feature/northern portion of PW009 running south to north across transmission line	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW016	555047	3847495	No	No	Tributary to PW015 running east to west across transmission line	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW017	555086	3847604	No	No	Tributary to PW015 running east to west across transmission line	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW018	555143	3847699	No	No	Braided drainage feature / northern portion of PW007 running east to west across transmission line	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW019	555158	3847724	No	No	Braided drainage feature / northern portion of PW007 running east to west across the transmission line	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW020	555183	3847768	No	No	Braided drainage feature / northern portion of PW007 running east to west across transmission line	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW021	555320	3848007	No	No	Sandy drainage feature running east to west across transmission line	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW022	555477	3848282	No	No	Braided drainage features running southeast to northwest across transmission line. Appear to be shallow braids.	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW023	555709	3848519	No	No	Drainage feature running off onto National Trails Hwy Runs southeast to northwest	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW024	555652	3848536	No	No	Drainage feature running off onto National Trails Hwy from transmission tower. Runs southeast to northwest	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW025	556343	3848776	No	No	Shallow braided drainage features running southeast to northwest	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW026	556457	3848797	No	No	Drainage feature running east to west across transmission line	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW027	556485	3848830	No	No	Drainage feature running east to west across transmission line	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW028	556651	3849062	No	No	Prominent sandy drainage feature running southeast to northwest crossing the transmission line two times	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW029	554706	3846814	No	No	Drainage feature and tributary to PW009 running west to east	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW030	554655	3846732	No	No	Drainage feature / tributary to PW009 running northwest to southeast	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW031	554601	3846651	No	No	Alluvial drainage feature / tributary to PW009 running northwest to southeast	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW032	554623	3846528	No	No	Drainage feature running west to east across the southern transmission line	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW033	554406	3846475	No	No	Alluvial drainage feature area running east to west across northern transmission line	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW034	554267	3845892	No	No	Braided drainage feature running east to west across southern transmission line	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW035	554023	3845803	No	No	Braided drainage feature running north to south	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW036	552851	3843735	No	Yes	Braided drainage feature running south to north	Width at OHWM = 1 foot; Depth = 3 inches. No wetland vegetation.
PW037	552503	3843515	No	No	Braided drainage features running south to north	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW038	551743	3843088	No	No	Braided drainage feature running southwest to northeast	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW039	551252	3842814	No	No	Braided drainage feature running southwest to northeast	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW040	551117	3842739	No	No	Braided drainage feature running southwest to northeast	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW041	550888	3842602	No	No	Braided drainage feature running southwest to northeast	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW042	548180	3840773	No	No	Braided drainage feature running south to north	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW043	547978	3840339	No	No	Braided drainage feature running south to north	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Jurisdictional Waters of US Locations along Solar I Proposed Transmission Corridor

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW044	546869	3839419	No	Yes	Sandy drainage feature running south to north	Width at OHWM = 1 - 3 feet; Depth = 6 inches. No wetland vegetation.
PW045	546613	3839161	No	Yes	Sandy drainage feature running southwest to northeast	Continuation of PW044: Same OHWM and Depth data. No wetland vegetation.
PW046	546690	3839012	No	No	Drainage feature running south to north	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW047	546345	3838875	No	Yes	Drainage feature running south to north	Braided drainage feature. OHWM = 4 feet; Depth = 4 inches. No wetland vegetation.
PW048	546434	3838693	No	Yes	Drainage feature running south to north	Erosional drainage feature. Width at OHWM = 8 - 10 feet; Depth = 2 inches. No wetland vegetation.
PW049	546123	3838576	No	Yes	Drainage feature running south to north	Width at OHWM = 2 feet; Depth = 2 inches. No wetland vegetation.
PW050	545902	3838353	No	Yes	Drainage feature running southeast to northwest	Gully. Width at OHWM = 2 feet; Depth = 2 inches. No wetland vegetation.
PW051	545748	3838103	No	Yes	Drainage feature running southeast to northwest	Width at OHWM = 1.5 feet; Depth = 2-3 inches. No wetland vegetation.
PW052	545584	3838027	No	No	Off-shoot of PW051 running south to north	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW053	545473	3837806	No	No	Drainage feature running east to west	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW054	545285	3837788	No	Yes	Drainage feature running southeast to northwest	Width at OHWM = 3 feet; Depth = 2-4 inches. No wetland vegetation.
PW055	545151	3837671	No	Yes	Drainage feature running southeast to northwest	Width at OHWM = 4 feet; Depth = 6 inches. No wetland vegetation.
PW056	545018	3837570	No	No	Drainage feature running south to north	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW057	544931	3837545	No	No	Drainage feature running south to north connecting with PW058	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW058	544833	3837420	No	Yes	Drainage feature running south to north through the mountains eventually emptying out onto a large alluvial fan	Sandy with little to no vegetation. Width at OHWM = 3 feet; Depth = 4 inches
PW059	544609	3837303	No	No	Drainage feature running south to north	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW060	544431	3837190	No	No	Drainage feature running south to north eventually connecting to PW061	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW061	544292	3837144	No	No	Drainage feature running south to north through the mountains eventually emptying out into a large alluvial fan	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW062	541361	3835385	No	No	Drainage feature running north to south connecting to larger drainage feature and eventually emptying out into a large alluvial fan	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW063	540363	3834838	No	No	Braided drainage feature running northwest to southeast connecting with PW062 in the south and then eventually emptying out into a large alluvial fan.	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW064	540009	3834575	No	No	Braided drainage feature running north to south eventually dissipating into the adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW065	539915	3834478	No	No	Drainage feature running north to south connecting with PW064 and eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW066	539843	3834445	No	No	Drainage feature running northwest to southeast eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW067	539764	3834369	No	No	Drainage feature running northwest to southeast connecting with PW066 and eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW068	538432	3833192	No	No	Braided drainage feature running northwest to southeast eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW069	538348	3833161	No	No	Braided drainage feature and alluvial outflow from a larger drainage feature running northwest to southeast	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW070	538285	3833055	No	No	Drainage feature running northwest to southeast	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW071	537853	3832747	No	No	Braided drainage feature and alluvial outflow from larger drainage feature running northwest to southeast eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW072	537695	3832653	No	No	Braided drainage feature running northwest to southeast eventually dissipating into adjacent habitat further south	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW073	537212	3832390	No	No	Braided drainage feature running north to south eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW074	537073	3832317	No	No	Canyon with drainage feature along the bottom running northwest to southeast connecting with PW073 and eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW075	536496	3831997	No	No	Drainage feature running northwest to southeast connecting with PW073 and PW074 eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW076	536318	3831893	No	No	Drainage feature running northwest to southeast along the bottom of a small valley connecting with PW075 and eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW077	536136	3831784	No	No	Braided drainage feature with some vegetation scouring running north to south from the mountains down to a large alluvial fan	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW078	536057	3831766	No	No	Drainage feature running north to south along the bottom of a small valley connecting with PW077	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW079	535699	3831543	No	No	Drainage feature running west to east across the transmission line into an alluvial drainage feature area with evidence of vegetation scouring and watermarks. Connects with PW077 and eventually empties out into a large alluvial fan.	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW080	535060	3831180	No	No	Alluvial drainage feature running north to south from the mountains eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW081	532739	3830579	No	No	Braided drainage feature associated with larger drainage feature (PW082). Runs northwest to southeast eventually dissipating into a large alluvial fan	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW082	532467	3830570	No	Yes	Sandy drainage feature running northwest to southeast eventually emptying into a large alluvial fan	Some cut banks, unvegtetated with evidence of sheetflow. Width at OHWM = 40 feet; Depth = 10 inches
PW083	532367	3830571	No	No	Braided drainage feature associated with larger drainage feature (PW082). Run northwest to southeast eventually dissipating into a large alluvial fan	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW084	530984	3830542	No	Yes	Numerous braided drainage feature running southwest to northeast eventually connecting with PW82	Width at OHWM = 3 feet; Depth = 6 inches. No wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW085	530320	3830524	No	No	Shallow braided drainage feature running northwest to southeast eventually dissipating into adjacent habitat with the exception of smaller capillary-like drainage features connecting to the southwestern portion of PW084	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW086	529951	3830508	No	Yes	Tributary to PW084 running west to east off of the mountains	Width at OHWM = 5 inches; Depth = 2 inches. No wetland vegetation.
PW087	529649	3830509	No	Yes	Drainage feature running northwest to southeast eventually connecting to PW084	Width at OHWM = 1-3 feet; Depth = 4 inches. No wetland vegetation.
PW088	529439	3830506	No	No	Drainage feature running north to south eventually connecting with PW087 to feed into PW084	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW089	529202	3830455	No	No	Drainage feature running northeast to southwest to eventually connect to PW091 which dissipates out into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW090	529063	3830401	No	No	Braided tributary to PW091 running northeast to southwest which eventually dissipates into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW091	529008	3830380	No	No	Sandy drainage feature running north to south across the transmission line before heading southwest where it eventually dissipates into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW092	528332	3830117	No	No	Series of braided drainage features running northeast to southwest eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW093	527896	3829953	No	No	Series of braided drainage features running northeast to southwest eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW094	527782	3829918	No	No	Drainage feature running northeast to southwest eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW095	527567	3829822	No	No	Drainage feature running northeast to southwest eventually dissipating into an alluvial fan	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW096	527484	3829790	No	No	Drainage feature running north to south eventually dissipating into an alluvial fan	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW097	527463	3829782	No	No	Drainage feature running northwest to southeast across the transmission line eventually dissipating into an alluvial fan	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW098	526890	3829669	No	No	Drainage feature running north to south across the transmission line before heading west then dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW099	526422	3829643	No	No	Drainage feature running north to south across the transmission line before winding southwest then dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW100	525449	3829585	No	No	Drainage feature at the bottom of a valley running north to south eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW101	524409	3829537	No	No	Braided drainage feature most likely a result of runoff from the Powerline Road however it does seem to connect to a larger drainage feature in the northwest	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW102	522822	3829300	No	No	Series of braided drainage features associated with larger drainage feature (PW103) begin here. Running northeast to southwest eventually dissipating into adjacent habitat.	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW103	522521	3829135	No	Yes	Sandy drainage feature running northeast to southwest eventually dissipating into adjacent habitat.	Width at OHWM = 4 feet; Depth = 4 inches. No wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW104	521747	3828695	No	No	Series of braided drainage features associated with PW103 end here. Running northeast to southwest eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW105	520649	3828088	No	No	Series of braided drainage features running northwest to southeast eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW106	520514	3828011	No	No	Series of braided drainage features running northwest to southeast eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW107	520404	3827947	No	No	Series of braided drainage features running northwest to southeast eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW108	520304	3827892	No	No	Series of braided drainage features running northwest to southeast eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW109	520226	3827850	No	No	Series of braided drainage features running northwest to southeast eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW110	520091	3827767	No	Yes	Sandy drainage feature running northwest to southeast eventually dissipating into adjacent habitat	Width at OHWM = 8 inches; Depth = 1-2 inches. No wetland vegetation.
PW111	519663	3827530	No	No	Series of braided drainage features running northwest to southeast eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW112	518773	3827032	No	No	Drainage feature running northwest to southeast along the bottom of a small valley eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW113	518549	3826906	No	No	Drainage feature running northwest to southeast along the bottom of a small valley eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW114	518479	3826868	No	No	Drainage feature running northwest to southeast along the bottom of a small valley eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW115	518401	3826825	No	No	Drainage feature running northwest to southeast along the bottom of a small valley eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW116	518332	3826786	No	No	Braided drainage features running northwest to southeast along the bottom of a small valley eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW117	518266	3826744	No	No	Braided drainage features running northwest to southeast eventually dissipating into adjacent habitat via a large alluvial fan	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW118	512198	3824810	No	No	Braided drainage features running northeast to southwest eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW119	511926	3824741	No	No	Braided drainage features running northeast to southwest eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW120	511680	3824675	No	No	Braided drainage features running northeast to southwest eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW121	511275	3824569	No	No	Braided drainage features running northeast to southwest eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW122	511207	3824556	No	No	Braided drainage features running northeast to southwest eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW123	511111	3824525	No	No	Braided drainage features running northeast to southwest eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW124	511013	3824501	No	No	Braided drainage features running northeast to southwest eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW125	510079	3824254	No	No	Braided drainage features running northeast to southwest eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW126	509872	3824198	No	No	Braided drainage features running northeast to southwest eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW127	508238	3823769	No	No	Drainage feature running north to south eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW128	507802	3823654	No	No	Braided drainage features running northeast to southwest eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW129	503755	3821665	No	No	Drainage feature / alluvial outflow running northwest to southeast eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW130	503696	3821580	No	No	Drainage feature / alluvial outflow running northwest to southeast eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW131	503648	3821515	No	No	Drainage feature running northwest to southeast eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW132	503501	3821357	No	No	Drainage feature running northwest to southeast with evidence of vegetation scouring and watermarks	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW133	503244	3821099	No	No	Drainage feature runs north to south within a small valley and eventually dissipates into the habitat below	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW134	503088	3820950	No	No	Drainage feature runs northwest to southeast within a small valley and eventually dissipates into the habitat below	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW135	502841	3820693	No	No	Drainage feature runs northwest to southeast within a small valley and eventually dissipates into the habitat below	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW136	502800	3820663	No	No	Drainage feature runs northwest to southeast and eventually dissipates into the habitat below	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW137	502784	3820601	No	No	Sandy/alluvial drainage feature running north to south eventually dissipating into the habitat below	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW138	502283	3820139	No	No	Sandy braided drainage feature running west to east eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW139	501220	3818554	No	No	Series of braided alluvial drainage features and alluvial washout running northwest to southeast eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW140	499759	3816356	No	No	Braided drainage feature running west to east eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW141	499562	3816060	No	No	Drainage feature running west to east emptying into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW142	499405	3815836	No	No	Drainage feature running west to east eventually dissipating out into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW143	497080	3813735	No	Yes	Dry lake bed	Dry lake bed
PW144	501898	3815574	No	Yes	Dry lake bed	Dry lake bed
PW145	514101	3816926	No	No	Drainage feature running southeast to northwest ending at Dido Road	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW146	514308	3816988	No	No	Drainage feature running southeast to northwest ending just past Powerline Road	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW147	514349	3817071	No	No	Drainage feature running southeast to northwest eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW148	514519	3817135	No	No	Drainage feature running southeast to northwest eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW149	514585	3817159	No	No	Drainage feature running southeast to northwest eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW150	517177	3818117	No	No	Shallow braided drainage features running southeast to northwest eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW151	517321	3818163	No	No	Shallow braided drainage features running southeast to northwest eventually dissipating out into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW152	519118	3818809	No	No	Sandy drainage feature running south to north before connecting with another large drainage feature running east to west. Drainage feature then dissipates out into adjacent habitat.	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW153	519516	3818972	No	No	Braided drainage feature running southeast to northwest before connecting to another large drainage feature running east to west. Drainage feature then dissipates out into adjacent habitat.	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW154	520828	3819413	No	No	Braided drainage features running southeast to northwest before connecting to a larger drainage feature running east to west. Drainage feature then dissipates out into adjacent habitat.	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW155	522509	3819962	No	No	Drainage feature running from the mountains in the north south out into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW156	522650	3820009	No	No	Drainage feature running from the mountains in the north south into adjacent habitat below	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW157	522677	3820018	No	No	Drainage feature running from the mountains in the north south into adjacent habitat below	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW158	522786	3820054	No	No	Drainage feature running from the mountains in the north south into adjacent habitat below	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW159	523015	3820133	No	No	Drainage feature running from the mountains in the north south into adjacent habitat below	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW160	523073	3820150	No	No	Drainage feature running from the mountains in the north south into adjacent habitat below	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW161	523178	3820186	No	No	Drainage feature running from the mountains in the west east into adjacent habitat below	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW162	524432	3820712	No	No	Drainage feature running southeast to northwest eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW163	525600	3821570	No	No	Braided drainage feature running southeast to northwest dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW164	525727	3821676	No	No	Braided drainage feature running southeast to northwest dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW165	525849	3821804	No	No	Braided drainage feature running southeast to northwest dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW166	525987	3821899	No	No	Drainage feature running southeast to northwest eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW167	526395	3822215	No	No	Braided drainage feature running south to north before heading west and emptying out into adjacent habitat off of the mountains	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW168	527705	3823293	No	No	Wide braided alluvial drainage feature running off the mountains in the northwest southeast into the habitat below where it dissipates	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW169	527869	3823428	No	No	Braided drainage feature running north to south dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW170	528002	3823534	No	No	Series of braided alluvial drainage features running north to south before dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW171	528320	3823779	No	No	Drainage feature running north to south before dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW172	528808	3824232	No	No	Drainage feature running north to south before connecting with larger drainage features that empty out into a large alluvial fan.	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW173	529026	3824436	No	Yes	Drainage feature running north to south before connecting with larger drainage features that empty out into a large alluvial fan.	Drainage feature has OHWM, but no connection. Alluvial with high OHV impacts. Width at OHWM = 3 feet; Depth = 5 inches. No wetland vegetation.
PW174	529144	3824543	No	No	Drainage feature running north to south before connecting with larger drainage features that empty out into a large alluvial fan.	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW175	529339	3824723	No	No	Drainage feature running north to south before connecting with larger drainage features that empty out into a large alluvial fan.	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW176	529414	3824789	No	No	Drainage feature running north to south before connecting with larger drainage features that empty out into a large alluvial fan.	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW177	529583	3824947	No	No	Drainage feature running north to south before connecting with larger drainage features that empty out into a large alluvial fan.	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW178	529874	3825205	No	No	Drainage feature running west to east from the mountains down into habitat below where it dissipates out	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW179	530001	3825326	No	No	Braided drainage feature running northwest to southeast before dissipating out into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW180	530075	3825401	No	No	Braided drainage feature running northwest to southeast before dissipating out into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW181	532407	3827533	No	No	Sandy drainage feature running northwest to southeast before dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW182	532479	3827595	No	No	Drainage feature running northwest to southeast before dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW183	532615	3827718	No	No	Drainage feature running northwest to southeast before dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW184	532712	3827808	No	No	Braided drainage features running northwest to southeast before dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW185	532998	3828076	No	No	Drainage feature running northwest to southeast before dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW186	533208	3828264	No	No	Braided sandy drainage feature running west to east before dissipating out into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW187	533273	3828324	No	No	Braided drainage feature running west to east before connecting with PW186 and dissipating out into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW188	533390	3828427	No	No	Braided drainage feature running west to east before dissipating out into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW189	533488	3828518	No	No	Braided drainage feature running west to east before dissipating out into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW190	533616	3828641	No	No	Braided drainage feature running west to east before dissipating out into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW191	533945	3828933	No	No	Sandy drainage feature running northwest to southeast before dissipating out into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW192	534004	3829006	No	No	Braided sandy drainage feature running northwest to southeast before dissipating out into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW193	534072	3829064	No	No	Braided sandy drainage feature running northwest to southeast before dissipating out into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW194	534130	3829102	No	No	Series of braided drainage features running northwest to southeast before dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW195	534181	3829157	No	No	Series of braided drainage features running northwest to southeast before dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW196	534252	3829222	No	No	Braided drainage feature running northwest to southeast before dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW197	534338	3829299	No	No	Braided drainage feature running northwest to southeast before dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW198	534406	3829364	No	No	Drainage feature running northwest to southeast before dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW199	534446	3829401	No	No	Drainage feature running northwest to southeast before dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW200	534514	3829463	No	No	Drainage feature running northwest to southeast before dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW201	534637	3829575	No	No	Drainage feature running northwest to southeast before dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW202	534694	3829626	No	No	Drainage feature running northwest to southeast before dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW203	534902	3829811	No	No	Drainage feature running north to south through the hills before emptying out into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW204	535145	3830058	No	No	Braided drainage features running north to south before dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW205	535803	3830636	No	No	Wide braided drainage feature running northeast to southwest then dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW206	536418	3831202	No	No	Drainage feature running north to south through the mountains before dissipating out into the habitat below	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW207	536788	3831538	No	No	Braided drainage feature running west to east before connecting with PW208 and heading south to dissipate into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW208	536918	3831654	No	No	Sandy drainage feature running northwest to southeast before heading south and dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW209	537030	3831758	No	No	Drainage feature running northwest to southeast before connecting to larger drainage features in the south that empty into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW210	537166	3831883	No	Yes	Drainage feature running northwest to southeast before connecting to larger drainage features in the south that empty into adjacent habitat	Width at OHWM = 1.5 feet; Depth = 2 inches. No wetland vegetation.
PW211	537298	3831993	No	No	Drainage feature running north to south before connecting to larger drainage features that empty into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW212	495788	3813424	No	No	Drainage feature running west to east toward the dry lake bed to the east. No connectivity. Drainage feature dissipates into adjacent habitat.	Erosional with no OHWM or wetland vegetation
PW213	495054	3812879	No	No	Drainage running south to north eventually connecting to PW212, heading toward the dry lake bed to the east. No connectivity. Drainage feature dissipates into adjacent habitat.	Erosional with no OHWM or wetland vegetation
PW214	494301	3812574	No	No	Drainage running off the mountains in the northwest southeast where it eventually connects with PW213	Erosional with no OHWM or wetland vegetation
PW215	494043	3812479	No	No	Drainage dissipates into adjacent habitat	Erosional with no OHWM or wetland vegetation
PW216	490693	3811383	No	No	Drainage feature running south to north	Erosional with no OHWM or wetland vegetation
PW217	486026	3809844	No	No	Drainage running southeast to northwest	Erosional with no OHWM or wetland vegetation
PW218	483138	3808082	No	No	Drainage running southeast to northwest eventually dissipating into residencies and habitat below but ultimately dissipates into adjacent habitat	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW219	483140	3808052	No	No	Drainage running southeast to northwest eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW220	483139	3808006	No	No	Drainage running southeast to northwest eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW221	483020	3807666	No	No	Drainage running southeast to northwest eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present
PW222	482745	3807295	No	No	Drainage running southeast to northwest eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW223	482635	3807145	No	No	Drainage running southeast to northwest eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW224	482468	3806917	No	No	Drainage running southeast to northwest eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW225	482235	3806622	No	No	Drainage running southeast to northwest eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW226	481980	3806301	No	No	Drainage running southeast to northwest eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW227	481838	3806112	No	No	Drainage running east to west eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW228	481791	3806054	No	No	Drainage running east to west eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW229	481623	3805618	No	No	Drainage running east to west eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW230	481622	3805423	No	No	Drainage running east to west eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW231	481586	3805273	No	No	Drainage running east to west eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW232	481565	3805046	No	No	Drainage running east to west eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW233	481543	3804809	No	No	Drainage running east to west eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW234	481498	3804741	No	No	Drainage running east to west eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW235	481470	3804513	No	No	Drainage running east to west eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW236	481356	3804360	No	No	Drainage running east to west eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW237	481297	3804259	No	No	Drainage running east to west eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW238	481178	3804067	No	No	Drainage running east to west ultimately dissipating into adjacent habitat	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW239	481073	3803903	No	No	Drainage running east to west eventually connecting to PW238 then ultimately dissipating into adjacent habitat	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW240	481025	3803770	No	No	Drainage running east to west eventually connecting to PW238 then ultimately dissipating into adjacent habitat	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW241	480942	3803737	No	No	Drainage running east to west eventually connecting to PW238 then ultimately dissipating into adjacent habitat	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW242	480951	3803821	No	No	Drainage running east to west eventually connecting to PW238 then ultimately dissipating into adjacent habitat	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW243	480966	3803983	No	No	Drainage running east to west eventually connecting to PW238 then ultimately dissipating into adjacent habitat	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW244	480966	3804084	No	No	Drainage running east to west ultimately dissipating into adjacent habitat	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW245	480999	3804451	No	No	Drainage running east to west ultimately dissipating into adjacent habitat	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW246	481012	3804623	No	No	Drainage running east to west ultimately dissipating into adjacent habitat	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW247	481033	3804811	No	No	Drainage running east to west eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW248	481060	3804986	No	No	Drainage running east to west eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW249	481058	3805136	No	No	Drainage running east to west eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW250	481052	3805189	No	No	Drainage running east to west eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW251	481041	3805305	No	No	Drainage running east to west eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW252	481006	3805829	No	No	Drainage running east to west eventually dissipating into residencies and habitat below	Headwaters running off of mountains, dissipating quickly into small alluvial fans behind residencies. No culverts or other connectivity present. No wetland vegetation present.
PW253	480650	3807581	No	No	Drainage running south to north eventually dissipating into adjacent residencies and habitat	Erosional, no OHWM or wetland vegetation.
PW254	480525	3807875	No	No	Drainage running south to north eventually dissipating into adjacent residencies and habitat. Downstream section of PW253	Erosional, no OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW255	480855	3808005	No	No	Drainage running south to north eventually dissipating into adjacent habitat	Erosional, no OHWM or wetland vegetation.
PW256	478137	3805212	No	No	Eastern edge of the Mojave River	Eastern edge of the greater Mojave River floodplain
PW257	477940	3804326	Yes	Yes	Here the transmission line crosses the Mojave River	Width at OHWM = 214 feet; Depth = 1-3 feet. Vegetation is present and covers less than 1% of the area where the transmission line crosses.
PW258	477797	3804215	No	No	Western edge of the Mojave River	Western edge of the greater Mojave River floodplain.
PW259	477923	3803756	No	No	Western edge of the Mojave River	Western edge of the greater Mojave River floodplain
PW260	478055	3803729	Yes	Yes	Here the transmission line crosses the Mojave River	Width at OHWM = 155 feet; Depth = 1-3 feet. Vegetation is present and covers less than 1% of the area where the transmission line crosses the river.
PW261	478156	3803711	No	No	Eastern edge of the Mojave River	Eastern edge of the greater Mojave River floodplain.
PW262	479623	3803711	No	No	Drainage feature running east to west quickly dissipating into adjacent habitat.	Erosional drainages that dissipate quickly into adjacent habitat. No OHWM or wetland vegetation.
PW263	480538	3803718	No	No	Drainage running south to north into larger drainage (PW244) which ultimately dissipates into adjacent habitat	Erosional drainages that dissipate quickly into adjacent habitat. No OHWM or wetland vegetation

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW264	480684	3803722	No	No	Drainage running south to north into larger drainage (PW244) which ultimately dissipates into adjacent habitat	Erosional drainages that dissipate quickly into adjacent habitat. No OHWM or wetland vegetation
PW265	478367	3807004	No	No	Eastern edge of the Mojave River	Eastern edge of the greater Mojave River floodplain.
PW266	478213	3806941	Yes	Yes	Here the transmission line crosses the Mojave River	Width at OHWM = 213 feet; Depth = 1-3 feet. Vegetation is present and covers less than 1% of the area where the transmission line crosses the river.
PW267	478079	3806890	No	No	Western edge of the Mojave River	Western edge of the greater Mojave River floodplain.
PW268	477044	3806578	No	No	Believed to be a drainage feature from Google Earth aerials	Not a wash - access road.
PW269	475939	3806248	No	Yes	Drainage/culvert running south to north connecting with PW268 which drains toward the Mojave River	Sandy wash with distinct OHWM with well defined bed and banks. Debris present. Width at OHWM = 3 feet; Depth = 5 feet. No wetland vegetation present.
PW270	472418	3805207	No	Yes	Drainage/culvert draining from the southwest to the northeast through a golf course toward the Mojave River.	Man-made, distinct banks and clear OHWM. Width at OHWM = 10 feet; Depth = 1 foot
PW271	469914	3804468	Yes	Yes	California Aqueduct	California Aqueduct

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW272	467415	3803703	No	No	Drainage feature running southwest to northeast eventually dissipating out into adjacent habitat	Erosional with no OHWM or wetland vegetation
PW273	470330	3803094	No	No	From Google Earth aerials, it appears that the California Aqueduct is underground	Above-ground it is erosional with no OHWM or wetland vegetation
PW274	473350	3803110	No	No	Drainage feature running west to east eventually emptying around the Mojave River in what appears to be a reservoir	Erosional with no OHWM or wetland vegetation
PW275	473941	3803116	No	No	Drainage feature running south to north eventually draining into larger drainage feature (PW274) which eventually dissipates into adjacent habitat	Erosional with no OHWM or wetland vegetation
PW276	474058	3803117	No	No	Drainage feature running south to north eventually draining into larger drainage feature (PW274) which eventually dissipates into adjacent habitat	Erosional with no OHWM or wetland vegetation
PW277	475371	3803120	No	No	Braided drainage feature running southwest to northeast eventually dissipating into adjacent habitat	Erosional with no OHWM or wetland vegetation

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW278	476038	3803538	No	No	Drainage feature running east to west eventually draining into larger drainage feature (PW277) which eventually dissipates into adjacent habitat	Erosional with no OHWM or wetland vegetation
PW279	466505	3802647	No	No	Flood water detention basin associated with power substation	Large flood water detention basin associated with power substation.
PW280	466818	3802461	No	No	From Google Earth aerials, it appears to be a drainage feature due to road runoff. Runs northwest to southeast and dissipates into habitat below	Not a drainage feature - access road.
PW281	467049	3802318	No	No	From Google Earth aerials, it appears to be a drainage feature due to road runoff. Runs northwest to southeast and dissipates into habitat below	Not a drainage feature - access road.
PW282	467828	3801840	No	No	Drainage running southwest to northeast eventually draining into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW283	468139	3801655	No	Yes	Drainage feature running southwest to northeast along the bottom of a valley eventually connecting to other small drainage features in the northeast which dissipate into adjacent habitat	Sandy with evidence of sheet flow and shelving. Drains all water off of 2 hillsides. Width at OHWM = 2-3 feet; Depth = 1 foot

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW284	468402	3801478	No	No	Braided drainage feature running southwest to northeast eventually connecting to smaller drainage features in the northeast which dissipate into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW285	468719	3801297	No	Yes	Drainage feature running southwest to northeast along the bottom of a small valley eventually connecting to other small drainage features in the northeast which dissipate into adjacent habitat	Rocky drainage feature, grass in drainage feature is water stained and wet at the OHWM. Width at OHWM = 2 feet; Depth = 6 inches
PW286	469473	3801021	No	No	Drainage feature running southeast to northwest along the bottom of a small valley eventually dissipating into adjacent habitat	Erosional runoff from adjacent hillsides. Dissipates into adjacent habitat. No OHWM or wetland vegetation.
PW287	469777	3800943	No	Yes	Drainage feature running southwest to northeast along the bottom of a small valley eventually connecting to other small drainage features in the northeast which dissipate into adjacent habitat	Drainage feature with very steeply cut banks. Water is present within the channel. Width at OHWM = 2-4 feet; Depth = 1-20 feet
PW288	470677	3801558	No	No	Drainage running west to east eventually dissipating in adjacent habitat near California Aqueduct	Erosional runoff from adjacent hillsides and access roads. Dissipates into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW289	470726	3801612	No	No	Drainage running west to east eventually dissipating in adjacent habitat near California Aqueduct	Erosional runoff from adjacent hillsides and access roads. Dissipates into adjacent habitat. No OHWM or wetland vegetation.
PW290	470854	3801743	Yes	Yes	California Aqueduct	California Aqueduct
PW291	470908	3801798	No	No	Drainage running west to east along the bottom of a small valley eventually dissipating into adjacent habitat	Erosional runoff from the aqueduct/transmission line access road. No OHWM or wetland vegetation
PW292	471012	3801905	No	No	Drainage running northwest to southeast along the bottom of a small valley eventually connecting with PW291 which dissipates into adjacent habitat in the northeast	Erosional runoff from adjacent hillsides. Dissipates into adjacent habitat. No OHWM or wetland vegetation.
PW293	471723	3802629	No	No	From Google Earth aerials, it appears to be a drainage feature running west to east eventually connecting with PW274 which eventually empties around the Mojave River into what appears to be a reservoir	Not a drainage feature - access road.
PW294	471876	3802685	No	No	Drainage feature running west to east eventually connecting with PW274 which eventually empties around the Mojave River in what appears to be a reservoir	Not a drainage feature - access road.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW295	472171	3802153	No	No	Sandy braided drainage feature running west to east eventually connecting with smaller drainage features which dissipate into adjacent habitat in the northeast.	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW296	471205	3801155	Yes	Yes	California Aqueduct	California Aqueduct
PW297	470936	3800889	No	No	Drainage running southwest to northeast eventually dissipating in adjacent habitat near California Aqueduct	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW298	470721	3800668	No	No	Drainage running southwest to northeast eventually dissipating in adjacent habitat near California Aqueduct	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW299	470565	3800502	No	No	Drainage running southwest to northeast eventually dissipating in adjacent habitat near California Aqueduct	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW300	469813	3799887	No	No	Drainage running north to south off of the mountain eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW301	469636	3799735	No	No	Drainage running north to south off of the mountain eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW302	469388	3799581	No	No	Drainage running north to south off of the mountain eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW303	468893	3799756	No	No	Drainage running northwest to southeast off of the mountain eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW304	468604	3799867	No	No	Drainage running south to north off of the mountains eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW305	468242	3799977	No	No	Drainage running south to north off of the mountains eventually connecting with a larger drainage feature which dissipates in adjacent habitat in the northeast	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW306	468205	3800000	No	No	Braided drainage feature running southwest to northeast eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW307	467390	3800278	No	No	Drainage running south to north eventually connecting with a larger drainage feature (PW284) which dissipates in adjacent habitat in the northeast	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW308	467097	3800366	No	No	Drainage running south to north off of the mountains eventually dissipating into adjacent habitat in the northeast	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW309	467015	3800402	No	No	Drainage running southwest to northeast off of the mountains eventually dissipating into adjacent habitat in the northeast	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW310	466806	3800525	No	No	Small sandy drainage feature running southwest to northeast dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW311	465941	3801179	No	No	Drainage feature running south to north eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW312	466011	3801927	No	No	Sandy braided drainage feature running north to south ending at the railroads and Summit Valley Road	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW313	474589	3802685	No	Yes	Braided sandy drainage feature running southwest to northeast dissipating into adjacent habitat	Very large floodplain within flat sandy canyon. No consistent OHWM; Bank to Bank = 400 ± 100 feet; Depth = 1 foot
PW314	477554	3802748	No	No	Western edge of the Mojave River	Western edge of the greater Mojave River floodplain
PW315	477784	3802751	Yes	Yes	Here the transmission line crosses the Mojave River	Width at OHWM = 84 feet; Depth = 1-3 feet. Vegetation is present and covers less than 1% of the area where the transmission line crosses the river.
PW316	478283	3802766	No	No	Eastern edge of the Mojave River	Eastern edge of the greater Mojave River floodplain

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW317	478985	3802783	No	Yes	Drainage running from east to west into a larger drainage feature which drains into adjacent habitat	Sandy drainage feature with evidence of shelving and recent flow. Dissipates into adjacent habitat. Width at OHWM = 1-4 feet; Depth = 7 inches
PW318	479117	3802785	No	No	Drainage running from south to north before heading west into a larger drainage feature which drains into adjacent habitat	Erosional, drains access roads. No OHWM or wetland vegetation
PW319	479352	3802787	No	No	Drainage running from south to north before heading west into a larger drainage feature which drains into adjacent habitat	Erosional, drains access roads. No OHWM or wetland vegetation
PW320	479574	3802793	No	No	Drainage running from east to west into a larger drainage feature which drains into adjacent habitat	Erosional, drains access roads. No OHWM or wetland vegetation
PW321	479908	3802798	No	No	Drainage running south to north before heading west into a larger drainage feature which drains into adjacent habitat	Erosional, drains access roads. No OHWM or wetland vegetation
PW322	480033	3802802	No	No	Drainage running south to north before heading west into a larger drainage feature which drains into adjacent habitat	Erosional, drains access roads at the bottom of a very steep incline. No OHWM or wetland vegetation
PW323	480655	3802818	No	No	Drainage running south to north off mountains into a drainage feature which drains into adjacent habitat	Erosional, drains access roads. No OHWM or wetland vegetation

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW324	481139	3802826	No	No	Drainage running south to north before heading west into a larger drainage feature which drains into adjacent habitat	Erosional, drains access roads. No OHWM or wetland vegetation
PW325	481295	3802820	No	No	Drainage running south to north before heading west into a larger drainage feature which drains toward the Mojave River	Erosional, drains access roads. No OHWM or wetland vegetation
PW326	481479	3802828	No	No	Drainage running southeast to northwest before heading west into a larger drainage feature which drains into adjacent habitat	Erosional, drains access roads. No OHWM or wetland vegetation
PW327	485801	3804204	No	No	Drainage running west to east before heading northeast into a larger drainage feature which dissipates out into habitat	Erosional, drains access roads. No OHWM or wetland vegetation
PW328	485989	3804315	No	No	Drainage running northwest to southeast before heading northeast into a larger drainage feature which dissipates out into habitat	Erosional, drains access roads. No OHWM or wetland vegetation
PW329	486094	3804374	No	No	Drainage running west to east before heading northeast into a larger drainage feature which dissipates out into habitat	Erosional, drains access roads. No OHWM or wetland vegetation

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW330	486290	3804478	No	No	Drainage running northwest to southeast before heading northeast into a larger drainage feature which dissipates out into adjacent habitat	Erosional, drains access roads. No OHWM or wetland vegetation
PW331	486586	3804642	No	Yes	Braided drainage feature running northeast into a larger drainage feature which dissipates out into adjacent habitat	Willows present in small seep-like area under power line. Width at OHWM = 2 feet; Bank to Bank = 15 feet; Depth = 1 inch
PW332	486963	3804853	No	No	Drainage running south to north before heading northeast into a larger drainage feature (PW331) which dissipates out into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW333	488024	3805411	No	Yes	Drainage feature running south to north through the mountains before connecting with PW331 which dissipates into adjacent habitat in the northeast	Willows present and other riparian vegetation. Width at OHWM = 14 feet; Depth = 1 inch
PW334	489112	3805997	No	Yes	Drainage feature running southeast to northwest through the mountains before connecting with PW331 which dissipates into adjacent habitat in the northeast	Running water, riparian area supporting willows and other riparian vegetation. Upland vegetation just outside narrow stream banks. Width at OHWM = 3 feet; Depth = 1 foot
PW335	490096	3806522	No	No	Drainage running south to north before dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW336	490296	3806626	No	No	Drainage running southeast to northwest before dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW337	490776	3806888	No	No	Drainage running south to north before dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW338	490863	3806934	No	No	Drainage feature area running south to north before dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW339	490909	3806960	No	No	Drainage feature area running south to north before dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW340	491342	3807206	No	No	Drainage feature area running southeast to northwest before connecting to a larger drainage feature which dissipates into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW341	491741	3807428	No	No	Drainage feature running south to north along the bottom of a steep valley eventually dissipating into adjacent habitat	Not a drainage feature - OHV trail along the bottom of a canyon
PW342	492033	3807580	No	No	Drainage feature running south to north before connecting to a larger drainage feature eventually dissipating into adjacent habitat	Erosional sheetflow dissipating into adjacent habitat. No OHWM or wetland vegetation.

Potential Wash #	Location (WGS84 UTM Zone 11S)		Federally Jurisdictional	State Jurisdictional	General Description	Reasoning for Jurisdictional Determinations
	Easting	Northing				
PW343	492108	3807622	No	No	Drainage feature running south to north before connecting to a larger drainage feature eventually dissipating into adjacent habitat	Erosional sheetflow from the surrounding hills, dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW344	492575	3807867	No	Yes	Drainage feature running south to north before connecting to a larger drainage feature eventually dissipating into adjacent habitat	Drainage feature within a large canyon. Width at OHWM = 20 feet; Depth = 6 inches
PW345	493327	3808140	No	No	Drainage feature running south to north before dissipating into adjacent habitat	Erosional runoff from Santa Rosa Road, dissipating into adjacent habitat. No OHWM or wetland vegetation.
PW346	494459	3811166	No	Yes	Drainage feature running west to east before dissipating into adjacent habitat	Evidence of sheet flow, damp soils, and recent flow. Width at OHWM = 1-2 feet; Depth = 1 inch.

TECHNICAL AREA: TRANSMISSION LINE UPGRADES

Item 3: Provide a breakdown of the temporary vs. permanent impact acreage in the various habitat types, with acreage for each habitat type as it pertains to the transmission line upgrades.

Response: All of the special-status species with potential to occur within the transmission line corridor, based on the presence of appropriate habitat and known occurrences within a five-mile radius, are included above in Table 3. The list of species was compiled from official database queries of the CNDDB, CNPS, and BLM. Additionally, attachment TRANS-1 depicts habitat types and survey results for the entirety of the proposed alignment.

The temporary vs. permanent potential transmission line impacts to habitat types cannot be assessed at this time because a final transmission line design has not been engineered and construction methods have not been described. The specific locations of transmission towers to be replaced, locations of pull towers and the alignments of necessary access roads are unknown at this time.

While the majority of the alignment is proposed along existing transmission lines with existing access roads, portions of each alternative may require new access roads as part of the project depending on the final engineering design being prepared by SCE. Existing roads will be utilized to the maximum extent practicable. Impacts to natural communities, and mitigation to offset those impacts, will therefore depend on the transmission line alignment alternative that is ultimately chosen.

TECHNICAL AREA: TRANSMISSION LINE UPGRADES

Item 4: Provide a complete description of the upgrade and construction methods involved.

Response: Please see attachment TRANS-3 located behind this response, provided by SCE for a complete description of the upgrade and the cosntruction methods involved.

Southern California Edison Project Description for Full Interconnection of SES Solar One Submitted by SCE on January 7, 2010

Background

The following project description is provided in relation to the interconnection request made by Stirling Energy Systems (SES) to Southern California Edison (SCE). In order to deliver the full 850 MW of capacity from the SES Solar One Project, it was determined that the Pisgah substation should be either expanded or relocated to accommodate the upgrades to allow for necessary 500 kV facilities, and that the Lugo-Pisgah No. 2 220 kV transmission line should be replaced with a 500 kV transmission line. Once this was determined, SES requested SCE to review how much latent transmission system capacity is available for use on SCE's existing transmission system prior to completion of the system facilities proposed for interconnection of the 850 MW for the SES Solar One Project. Therefore, an early interconnection of up to 275 MW was identified. Details for this early interconnection were provided by SCE to SES on December 16, 2009, and docketed by SES at the California Energy Commission (CEC) on December 23, 2009.

The intent of the early interconnection of up to 275 MW is that it would be a temporary interconnection until the 500kV upgrades identified in the Interconnection Facilities Study are in service, and the full requested generation output of 850 MW could be connected to the upgraded SCE transmission system. When completed, the 500 kV upgrades will allow the export of approximately 1,400 MW of additional generating capacity between the Lugo and Pisgah Substations. This will accommodate not only all of the power produced by SES Solar One but other proposed generating facilities.

Please note, detailed engineering has not yet been performed by SCE for the full 850 MW system upgrades, and is pending the execution of a Large Generator Interconnection Agreement ("LGIA") for the proposed SES Solar One Project. Negotiations for the LGIA are nearing completion and execution of the LGIA is expected in January 2010. The following project description and associated construction activities are therefore based on conceptual information only at this time and are subject to change upon further engineering.

The California Public Utilities Commission (CPUC) has jurisdiction over the SCE transmission system upgrades beyond the first point of interconnection. Thus, SCE will be filing a Certificate of Public Convenience & Necessity (CPCN) application with the CPUC upon completion of SCE's siting process and development of what is anticipated to be a comprehensive and extensive Proponent's Environmental Assessment (PEA), which is a required component of such CPCN application. In that application, SCE will further define any proposed changes to the Lugo-Pisgah 500 kV line, Pisgah Substation (either the expansion or relocation of the substation) and other related project elements to accommodate the full 850 MW SES project, while making accommodations for additional generators wishing to interconnect at Pisgah Substation.

Due to the CEC's concerns that it must analyze all available information about the upgrades associated with the full 850 MW buildout as they are part of the "whole of the project" which the CEC, as lead agency, must review, SCE is cooperating with SES to supplement the information presented in the SES Application for Certification (AFC). Accordingly, SCE anticipates the 850 MW early interconnection project description, which is based only at this time on typical design and construction techniques, to be as follows:

Proposed 500/220 kV Substation for Full 850 MW Plan of Service

Engineering Plan, Description and Location:
SCE's Facility Study and pending LGIA assume the Pisgah Substation will be expanded to accommodate the upgrades to allow for 500 kV capacity. However, upon completion of the LGIA SCE will perform a siting analysis to determine if the substation can be expanded in its current location, or if it will require an alternate location. If the substation requires relocation, SCE anticipates the likely location would be approximately within 6 miles southwest of the current location in the vicinity of the existing SCE right-of-way (ROW). The substation would be designed for up to four AA-Banks; initially two AA-Banks would be installed for SES Solar One. Additionally, it would include new 500 kV and 220 kV switchracks.

Construction Activities**:**
The expansion or relocation of Pisgah Substation would require grading of an area adjacent to the existing location, or grading a new area, so that the upgraded area would total approximately 100 acres. After the area has been graded, it is anticipated that the new substation would be enclosed with a wall approximately 8 feet in height.

After the substation site is graded, below grade facilities would be installed. Below grade facilities include a ground grid, cable trenches, power cable trench, equipment foundations, conduits, duct banks, utilities, and the footing of the substation wall. The design of the ground grid would be based on soil resistivity measurements collected during a geotechnical investigation that would be conducted prior to construction.

Above grade construction would include the erection of steel structures for the new switchracks and transformer banks; installation of associated circuit breakers, disconnecting switches, current and potential transformers, capacitor banks, and reactors; installation of primary conductors and secondary cables; installation of a new mechanical electrical equipment room (MEER) and associated relays and metering devices.

Once the installation of the substation equipment has been completed, asphalt concrete driveways and access roads would be installed, and a four-inch thick layer of crushed rock would be placed on the surface of the enclosed substation area.
Upon completion of these activities, extensive testing would be required to insure safe and reliable operation prior to the energization of the new substation.

Replace Lugo-Pisgah No. 2 220 kV with a 500 kV Transmission Line

Engineering Plan, Description and Location:
SCE will remove the existing Lugo-Pisgah No. 2 220 kV transmission line between Pisgah Substation and the Mojave River. SCE anticipates the new 500 kV transmission line will be primarily constructed in the existing 220 kV transmission corridor that will be vacated with the removal of the 220 kV transmission line. Due to constraints in and adjacent to the corridor south of the Mojave River continuing into SCE's Lugo Substation, SCE will be initiating, upon completion of the LGIA, a siting study to determine how to route the 500 kV line on new ROW between these two points. Note, line configurations, including potential reconfigurations of existing transmission lines, have not yet been confirmed. In addition, SCE has not yet determined if the ingress into Lugo Substation will require use of double-circuit transmission towers in the vicinity of the substation. Further, Lugo Substation may require reconfiguration and/or relocation of existing facilities and expansion of the existing 500 kV switchrack on existing SCE-owned property. Finally, the Eldorado-Lugo 500 kV transmission line will be looped into the new/expanded Pisgah Substation and may require the removal and/or reconfiguration of existing structures and the construction of additional structures to provide for the loop-in.

Transmission Line Construction Activities:
The information provided regarding construction activities for the installation of a new 500kV transmission line is general in nature and is subject to modification during detailed engineering.

Marshalling Yards and Secondary Equipment & Material Staging Areas
Construction of the proposed transmission line would begin with the establishment of temporary marshalling yards located at strategic points along the route. Each yard would be used as a reporting location for workers, and for vehicle and equipment parking and material storage. The yards would have offices for supervisory and clerical personnel. Each yard would be approximately 5 to 20 acres in size, depending on land availability and intended use. Preparation of the marshalling yards would include the application of road base, depending on existing ground conditions at the yard site, and the installation of perimeter fencing. Crews would load materials onto work trucks and drive to the line position being worked. At the end of the day, they would return to the yard in their work vehicles and depart in their private vehicles

Equipment and materials to be stored at the temporary marshalling yards may include:

- Construction trailer
- Construction equipment
- Conductor / wire reels
- Transmission structure components
- Overhead ground wire/Optical ground wire cable
- Hardware
- Insulators
- Consumables, such as fuel and joint compound
- Storm Water Pollution Prevention Plan (SWPPP) materials; such as straw wattles, gravel, and silt fences
- Portable sanitation facilities
- Waste materials for salvaging, recycling, and/or disposal

In addition to the primary marshalling yards, temporary secondary equipment and material staging yards would be established for short-term utilization near construction sites. Where possible, the secondary staging yards would be sited in areas of previous disturbance along the construction corridors. Typically, an area approximately 1 to 3 acres would be required. Once sites for secondary yards are proposed, biological and cultural resource reviews would be conducted before final site selection. Preparation of the secondary staging yards would include installation of perimeter fencing, the application of road base may also occur, depending on existing ground conditions at the yard site.

Equipment and materials to be stored at the temporary secondary equipment and material staging may include:

- Construction equipment
- Conductor / wire reels
- Transmission structure components
- Overhead ground wire/Optical ground wire cable
- Hardware
- Insulators
- Portable sanitation facilities
- Waste materials for salvaging, recycling, and/or disposal

Land disturbed at the temporary marshalling yards and the temporary secondary equipment and material staging areas would be restored to preconstruction conditions or to the landowner's requirements following the completion of construction for the Proposed Project.

Transmission Line Access and Spur Roads

This portion of the project involves construction within existing and new ROW. It is assumed that existing public roads as well as existing transmission line roads would be used during construction of this project. This project will also require new transmission line roads to access the new transmission line segments and structure locations. Transmission line roads are classified into two groups: access roads and spur roads; access roads are through roads that run between tower sites along a ROW and serve as the main transportation route along line ROWs; spur roads are roads that lead from access roads and terminate at one or more structure sites.

Rehabilitation work may be necessary in some locations along the existing transmission line roads to accommodate construction activities. This work may include the re-grading and repair of existing access and spur roads. These roads would be cleared of vegetation, blade-graded to remove potholes, ruts, and other surface irregularities, and re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The graded road would have a minimum drivable width of 14 feet (preferably with 2 feet of shoulder on each side).

Similar to rehabilitation of existing roads, all new road alignments would first be cleared and grubbed of vegetation. Roads would be blade-graded to remove potholes, ruts, and other surface irregularities, fill material would be deposited where necessary, and roads would be re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The graded road would have a minimum drivable width of 14 feet (preferably with 2 feet of shoulder on

each side) but may be wider depending on final engineering requirements and field conditions. New road gradients would be leveled so that any sustained grade does not exceed 12 percent. All curves would have a radius of curvature of not less than 50 feet, measured at the center line of the usable road surface. The new roads would typically have turnaround areas near the structure locations.

Guard Structures

Guard structures may be installed at transportation, flood control, and utility crossings. Guard structures are temporary facilities designed to stop the movement of a conductor should it momentarily drop below a conventional stringing height. Temporary netting could be installed to protect some types of under-built infrastructure. Typical guard structures are standard wood poles, 60 to 80 feet tall, and depending on the width of the conductor being constructed, the number of guard poles installed on either side of a crossing would be between two and four. The guard structures are removed after the conductor is secured into place. In some cases, the wood poles could be substituted with the use of specifically equipped boom-type trucks with heavy outriggers staged to prevent the conductor from dropping.

Dismantle and Removal of Existing Transmission Facilities

The construction of a portion of the Proposed Project would require the removal of the existing Lugo-Pisgah #2 220kV transmission line. Transmission line equipment to be removed includes transmission line conductor, transmission structures, and associated hardware (i.e., insulators, vibration dampeners, suspension clamps, ground wire clamps, shackles, links, nuts, bolts, washers, cotters pins, insulator weights, and bond wires.

SCE proposes to remove the existing 220kV conductor through the following activities:

- Wire Pulling Locations: Wire-pulling locations would be sited no more than every 15,000 feet along the utility corridor, and would include locations at dead-end structures and turning points. Wire-pulling equipment would be placed at these locations. It is anticipated that many of the same locations that would be used for the removal of existing 220kV lines would also be used for the installation of the new 500kV lines.
- Pulling Cable: A 3/8-inch pulling cable would replace the old conductor as it is being removed; this allows complete control of the conductor during its removal. The 3/8-inch line would then be removed under controlled conditions to minimize ground disturbance, and all wire-pulling equipment would be removed.
- Breakaway Reels: The old conductor wire would be wound onto “breakaway” reels as it is removed. The old conductor would be transported to a marshalling yard where it would be prepared for recycling.

SCE proposes to remove the existing kV structures through the following activities:

- Set Up: Existing access routes would be used to reach structure sites, but some rehabilitation work on these routes may be necessary before removal activities begin. In addition, grading may be necessary to establish temporary crane pads for structure removal.
- Structure Removal: For each type of structure, a crane truck or rough terrain crane will be used to support structure during removal; a crane pad of approximately 50 feet by 50 feet may be required to allow a removal crane to be set up at a distance of 60 feet from the structure center line.

- Footing Removal: The existing structure footings would be removed to a depth of approximately 2 feet below ground level. Holes would be filled, compacted, and then the area would be smoothed to match surrounding grade.

Transmission Structures

The new structure locations would first be graded and/or cleared of vegetation as required to provide a reasonably level and vegetation-free surface for footing and structure construction. Site preparation for the temporary laydown area required for the assembly of the structure would first be cleared of vegetation and graded as required to provide a reasonably level and vegetation-free surface for footing and structure construction. The area needed for the laydown and the assembly of the structure is approximately 200 feet by 200 feet (0.92 acre). Erection of the structure will require an erection crane to be set up adjacent to and 60 feet from the centerline of the structure. The crane pad would be located within the laydown area used for structure assembly. If the existing terrain is not suitable to support crane activities, a temporary 50 feet by 50 feet (0.06 acre) crane pad will be constructed.

The structure would require drilled, poured-in-place, concrete footings that would form the structure foundation. Actual footing diameters and depths for each of the structure foundations would depend on the soil conditions and topography at the site and would be determined during detailed engineering.

The foundation process starts with the drilling of the hole for the structure. The hole would be drilled using truck or track-mounted excavators with various diameter augers to match the diameter requirements of the structure. The excavated material will be distributed at the structure site, used as fill for the new roads or substation site, or used in the rehabilitation of existing access roads. Alternatively, the excavated soil may be disposed of at an off-site disposal facility in accordance with all applicable laws.

Following excavation of the foundation footing for each structure, steel reinforced rebar cage(s) would be set, survey positioning of the anchor bolts and/or stub angles would be verified, and concrete would then be placed. The steel reinforced rebar cage(s) would be assembled off site and delivered to the structure location by flatbed truck. A typical transmission structure would require approximately 50 to 80 cubic yards of concrete delivered to the structure location depending upon the type of structure being constructed, soil conditions, and topography at each site. The transmission structure footings will project approximately 1-3 feet above the ground level.

Foundations in soft or loose soil and that extend below the groundwater level may be stabilized with drilling mud slurry. Mud slurry will be placed in the hole after drilling to prevent the sidewalls from sloughing. The concrete for the foundation is then pumped to the bottom of the hole, displacing the mud slurry. The mud slurry brought to the surface is typically collected in a pit adjacent to the foundation, and then pumped out of the pit to be reused or discarded at an off-site disposal facility in accordance with all applicable laws.

Concrete samples would be drawn at time of pour and tested to ensure engineered strengths were achieved. A normally specified SCE concrete mix typically takes approximately 28 days to cure to

an engineered strength. This strength is verified by controlled testing of sampled concrete. Once this strength has been achieved, crews would be permitted to begin the erection of the structure.

During construction, existing concrete supply facilities would be used where feasible. If concrete supply facilities do not exist in certain areas, a temporary concrete batch plant would be set up. If necessary, approximately 2 acres of property would be sub-partitioned from the temporary equipment and material staging area for a temporary concrete batch plant. Equipment would include a central mixer unit (drum type); three silos for injecting concrete additives, fly ash, and cement; a water tank; portable pumps; a pneumatic injector; and a loader for handling concrete additives not in the silos. Dust emissions would be controlled by watering the area and by sealing the silos and transferring the fine particulates pneumatically between the silos and the mixers.

The assembly would consist of hauling the structure components from the staging yard to their designated laydown site using semi-trucks with 40-foot trailers. Crews would then assemble portions of each structure on the ground at the structure location, while on the ground, the top section may be pre-configured with the necessary insulators and wire-stringing hardware before being set in place. An 80-ton all-terrain or rough terrain crane would be used to position the base section on top of previously prepared foundation. When the base section is secured, the remaining portions of the structure would then be placed upon the base section and bolted together.

After construction is completed, the transmission structure site would be graded such that water would run toward the direction of the natural drainage. In addition, drainage would be designed to prevent ponding and erosive water flows that could cause damage to the structure footing. The graded area would be compacted and would be capable of supporting heavy vehicular traffic.

Wire Stringing

Wire-stringing includes all activities associated with the installation of conductors. This activity includes the installation of primary conductor and overhead ground wire (OHGW), vibration dampeners, weights, spacers, and suspension and dead-end hardware assemblies. Insulators and stringing sheaves (rollers or travelers) are typically attached during the steel erection process.

A standard wire-stringing plan includes a sequenced program of events starting with determination of wire pulls and wire pull equipment set-up positions. Advanced planning by supervision determines circuit outages, pulling times, and safety protocols needed for ensuring that safe and quick installation of wire is accomplished.

Wire-stringing activities would be conducted in accordance with SCE specifications, which is similar to process methods detailed in Institute of Electrical and Electronics Engineers Standard 524-2003, Guide to the Installation of Overhead Transmission Line Conductors.

Wire pulls are the length of any given continuous wire installation process between two selected points along the line. Wire pulls are selected, where possible, based on availability of dead-end structures at the ends of each pull, geometry of the line as affected by points of inflection, terrain, and suitability of stringing and splicing equipment setups. In some cases, it may be preferable to select an equipment setup position between two suspension structures. Anchor rods would then be

installed to provide dead-ending capability for wire sagging purposes, and also to provide a convenient splicing area.

To ensure the safety of workers and the public, safety devices such as traveling grounds, guard structures, and radio-equipped public safety roving vehicles and linemen would be in place prior to the initiation of wire-stringing activities.

The following four steps describe the wire installation activities proposed by SCE:

- Step 1: Sock Line, Threading: Typically, a lightweight sock line is passed from structure to structure, which would be threaded through the wire rollers in order to engage a camlock device that would secure the pulling sock in the roller. This threading process would continue between all structures through the rollers of a particular set of spans selected for a conductor pull.
- Step 2: Pulling: The sock line would be used to pull in the conductor pulling cable. The conductor pulling cable would be attached to the conductor using a special swivel joint to prevent damage to the wire and to allow the wire to rotate freely to prevent complications from twisting as the conductor unwinds off the reel. A piece of hardware known as a running board would be installed to properly feed the conductor into the roller; this device keeps the bundle conductor from wrapping during installation.
- Step 3: Splicing, Sagging, and Dead-ending: After the conductor is pulled in, the conductor would be sagged to proper tension and dead-ended to structures.
- Step 4: Clipping-in, Spacers: After the conductor is dead-ended, the conductors would be secured to all tangent structures; a process called clipping in. Once this is complete, spacers would be attached between the bundled conductors of each phase to keep uniform separation between each conductor.

The dimensions of the area needed for the stringing setups associated with wire installation are variable and depends upon terrain. The preferred minimum area needed for tensioning equipment set-up sites requires approximately an area of 150 feet by 500 feet (1.72 acres); the preferred minimum area needed for pulling equipment set-up sites requires approximately an area of 150 feet by 300 feet (1.03 acres); however, crews can work from within slightly smaller areas when space is limited. Each stringing operation would include one puller positioned at one end and one tensioner and wire reel stand truck positioned at the other end.

For stringing equipment that cannot be positioned at either side of a dead-end transmission structure, field snubs (i.e., anchoring and dead-end hardware) would be temporarily installed to sag conductor wire to the correct tension.

The puller and tensioner set-up locations require level areas to allow for maneuvering of the equipment. When possible, these locations would be located on existing level areas and existing roads to minimize the need for grading and cleanup. The final number and locations of the puller and tensioner sites will be determined during detailed engineering for the Proposed Project and the construction methods chosen by SCE or its Contractor.

An overhead ground wire (OHGW) for shielding would be installed on the transmission line. The OHGW would be installed in the same manner as the conductor; it is typically installed in

conjunction with the conductor, depending upon various factors, including line direction, inclination, and accessibility.

Housekeeping and Construction Site Cleanup

During construction, water trucks may be used to minimize the quantity of airborne dust created by construction activities. Any damage to existing roads as a result of construction would be repaired once construction is complete.

SCE would restore all areas that are temporarily disturbed by project activities (including equipment and material staging yard, pull and tension sites, and structure laydown and assembly sites) to preconstruction conditions following the completion of construction. Restoration may include grading and restoration of sites to original contours and reseeding where appropriate. In addition, all construction materials and debris would be removed from the area and recycled or properly disposed of at an off-site disposal facility in accordance with all applicable laws. SCE would conduct a final inspection to ensure that cleanup activities are successfully completed.

Operation and Maintenance

Following the completion of project construction, operation and maintenance of the new lines would commence. Operation, inspection, and maintenance activities would occur at least once per year, and are consistent with CPUC General Order No. 165. The frequency of inspection and maintenance activities would depend upon weather effects and any unique problems that may arise due to such variables as substantial storm damage or vandalism.

Labor and Equipment

Construction of the Proposed Project would be performed by SCE Crews or contract personnel with SCE responsible for project administration and inspection.

TECHNICAL AREA: TRANSMISSION LINE UPGRADES

Item 5: With regards to cultural resources, provide appropriate additions to background sections to cover regions not covered in the original Cultural Resources Technical Report.

Response: The Applicant will provide a general write up of the existing setting of the transmission line for archeological, architectural history, and paleontological resources. This write up will include an overview of the area of potential effect, prehistoric context, ethnography, regional historic context and a review of site records and literature. All of this information will be collected through existing literature search and desk-top research and is anticipated to be docketed Feburary, 2010. This approach was sent to the CEC and BLM on December 17th, 2009 for concurrence. The Applicant has not yet received a response.

TECHNICAL AREA: TRANSMISSION LINE UPGRADES

Item 6: Provide results from a pedestrian cultural resources survey of no less than 25 percent of the transmission line Right-of-Way and the regulatory buffer zone, with a sample survey structure developed in consultation with the BLM and CEC.

Response: The Applicant will perform a record search and denote all areas within the transmission line right-of-way and regulatory buffers which have been previously surveyed. The results are anticipated to be docketed Febuary, 2010. A pedestrian survey will be performed as part of Southern California Edison's environmental impact analysis of the proposed transmission line upgrade project once they have completed their engineering analysis and verified the specific alignment of the line and areas of disturbance including tower locations, substation location, pull sites, and lay down areas. These will be provided at a later date. This approach was sent to the CEC and BLM on December 17th, 2009 for concurrence. The Applicant has not yet received a response.

TECHNICAL AREA: TRANSMISSION LINE UPGRADES

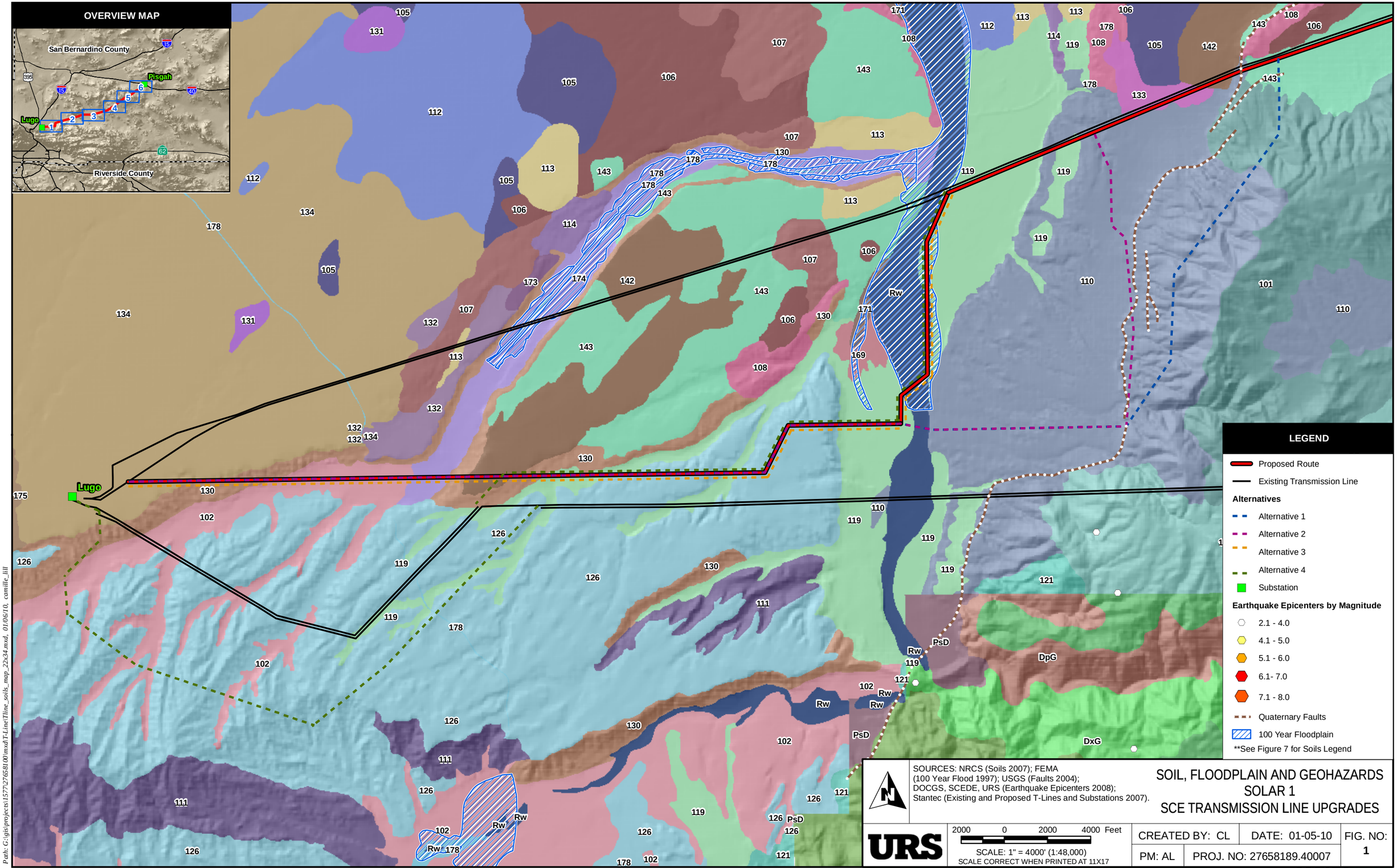
Item 7: Provide a delineation of waters of the U.S. and state waters cross by the alignment of transmission line upgrades.

Response: Please see the response to Item 2.

TECHNICAL AREA: TRANSMISSION LINE UPGRADES

Item 8: Identify locations where the alignment of transmission line upgrades cross 100-year flood zones.

Response: The location of the transmission line alignment in relation to FEMA's Flood Insurance Rate Map Zones, including Zone A (the 100-year flood zone), is provided in attachment TRANS-4, located behind this response.


OVERVIEW MAP
San Bernardino County
Riverside County
Pisgah
Lugo
1
2
3
4
5
6
Lugo
Rw
PsD
DpG
DxG
LEGEND
Proposed Route
Existing Transmission Line
Alternatives
Alternative 1
Alternative 2
Alternative 3
Alternative 4
Substation
Earthquake Epicenters by Magnitude
2.1 - 4.0
4.1 - 5.0
5.1 - 6.0
6.1- 7.0
7.1 - 8.0
Quaternary Faults
100 Year Floodplain
**See Figure 7 for Soils Legend
SOURCES: NRCS (Soils 2007); FEMA
(100 Year Flood 1997); USGS (Faults 2004);
DOCGS, SCEDE, URS (Earthquake Epicenters 2008);
Stantec (Existing and Proposed T-Lines and Substations 2007).
SOIL, FLOODPLAIN AND GEOHAZARDS
SOLAR 1
SCE TRANSMISSION LINE UPGRADES
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SCALE CORRECT WHEN PRINTED AT 11X17
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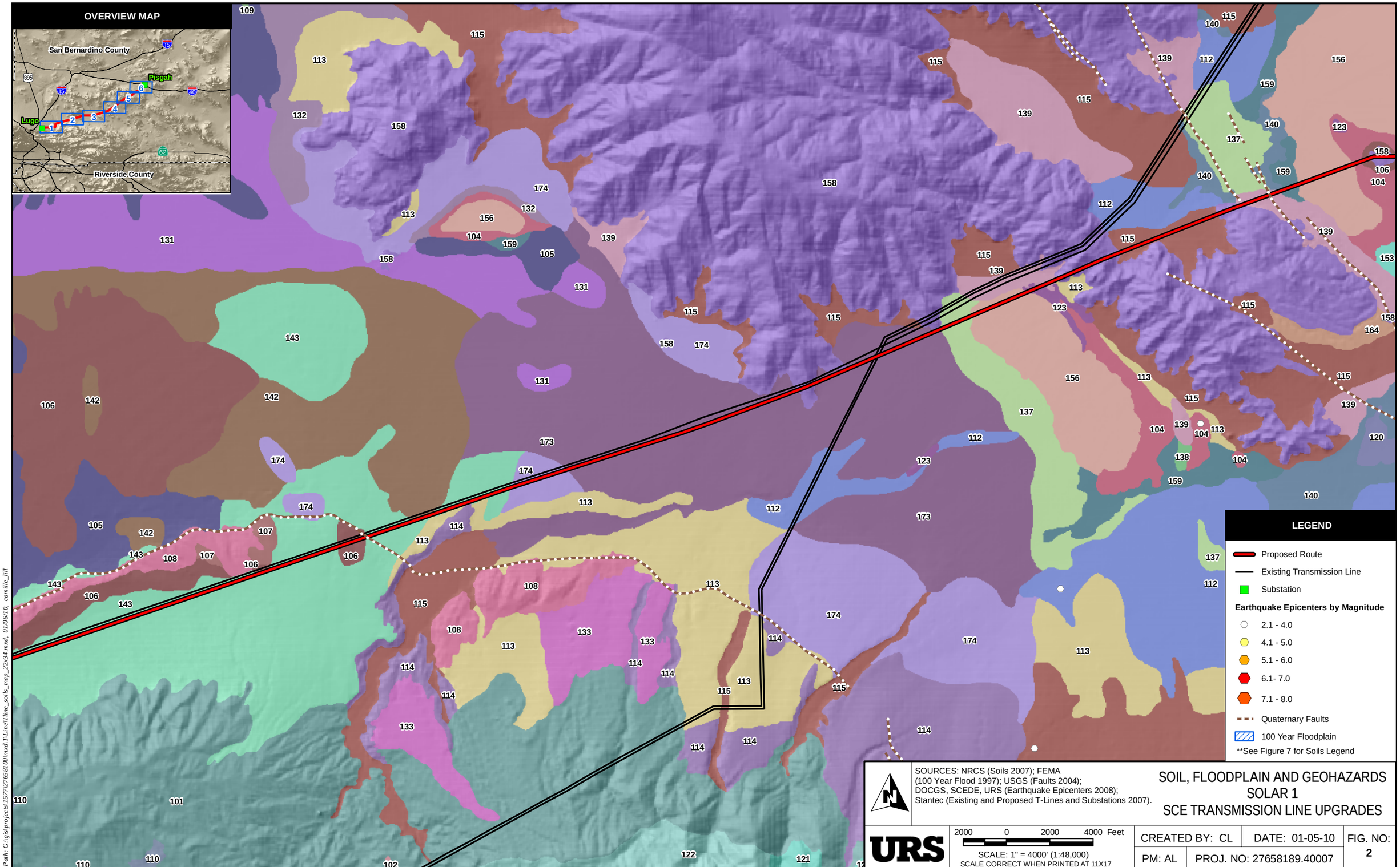
OVERVIEW MAP
San Bernardino County
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LEGEND
Proposed Route
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SOIL, FLOODPLAIN AND GEOHAZARDS
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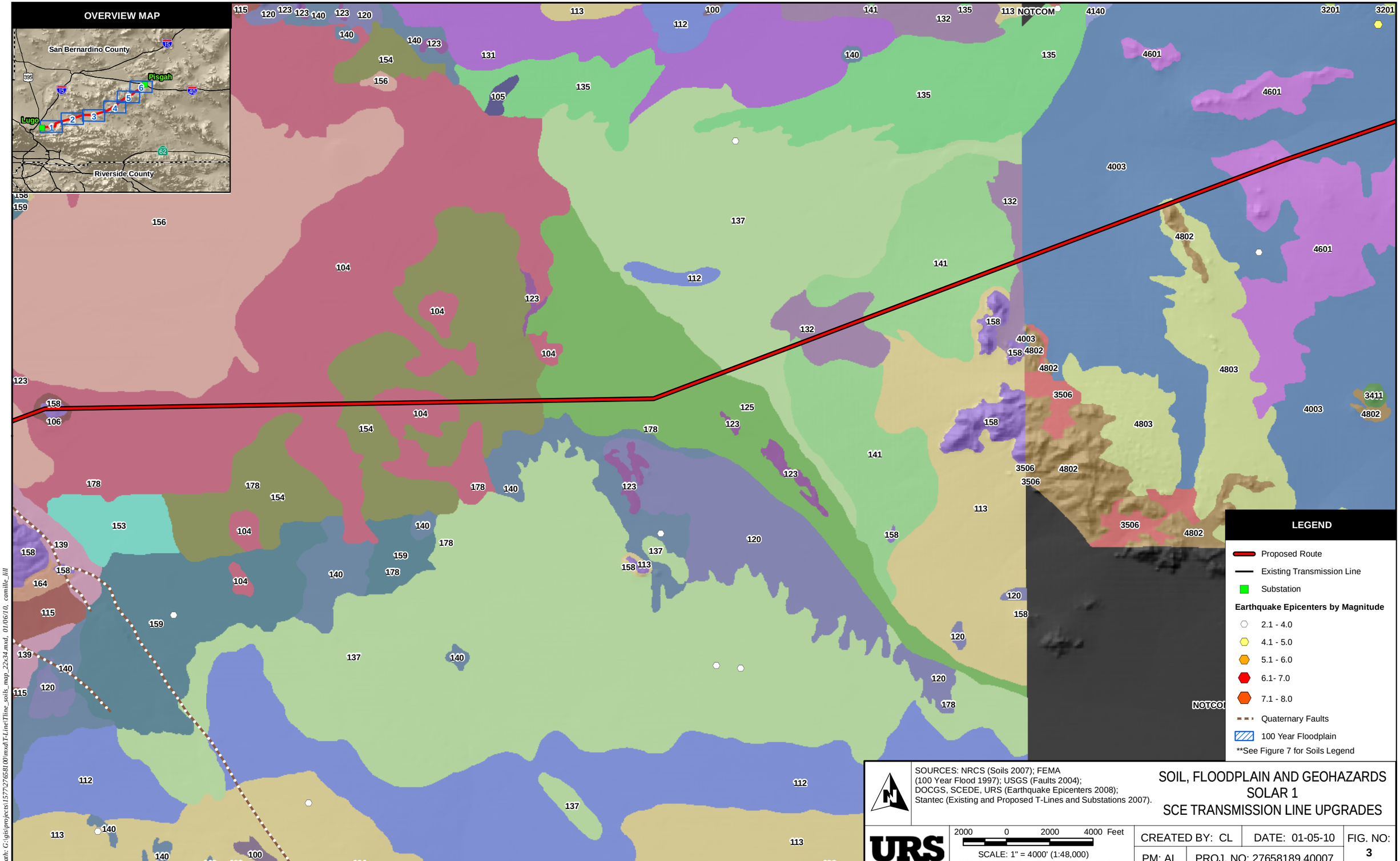

SOURCES: NRCS (Soils 2007); FEMA (100 Year Flood 1997); USGS (Faults 2004); DOCGS, SCEDE, URS (Earthquake Epicenters 2008); Stantec (Existing and Proposed T-Lines and Substations 2007).

SOIL, FLOODPLAIN AND GEOHAZARDS
SOLAR 1
SCE TRANSMISSION LINE UPGRADES

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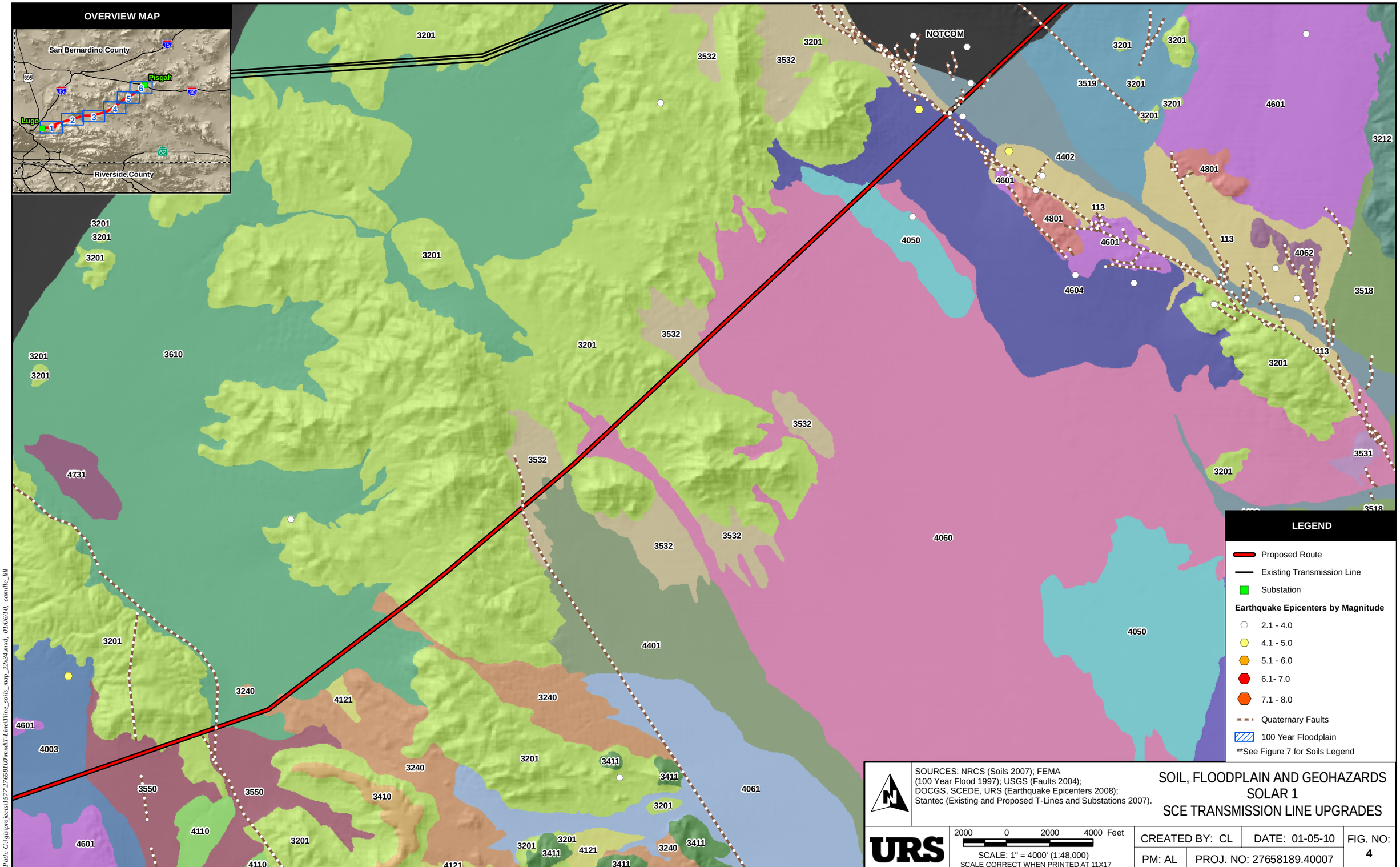

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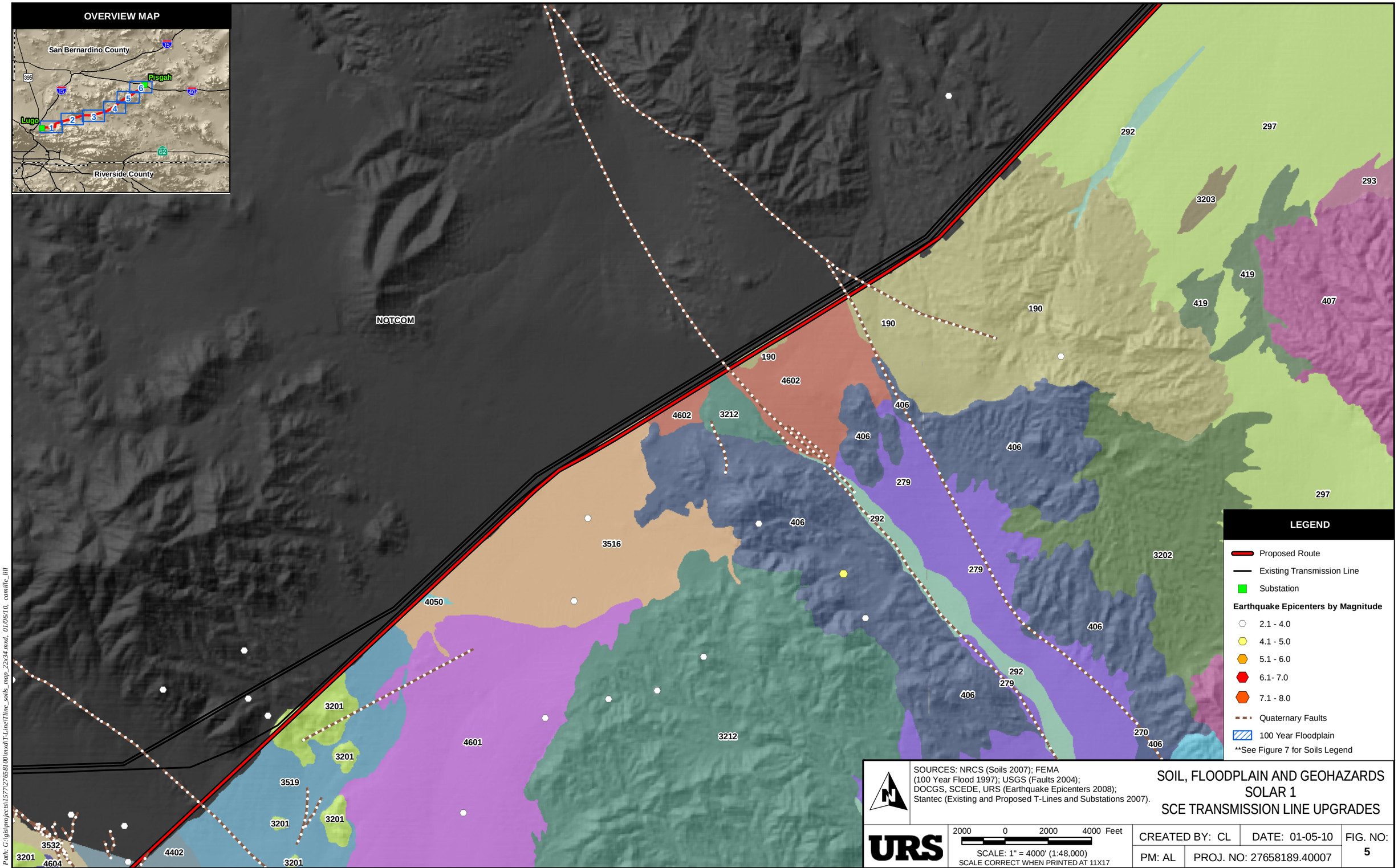

SOURCES: NRCS (Soils 2007); FEMA (100 Year Flood 1997); USGS (Faults 2004); DOCGS, SCEDE, URS (Earthquake Epicenters 2008); Stantec (Existing and Proposed T-Lines and Substations 2007).

SOIL, FLOODPLAIN AND GEOHAZARDS
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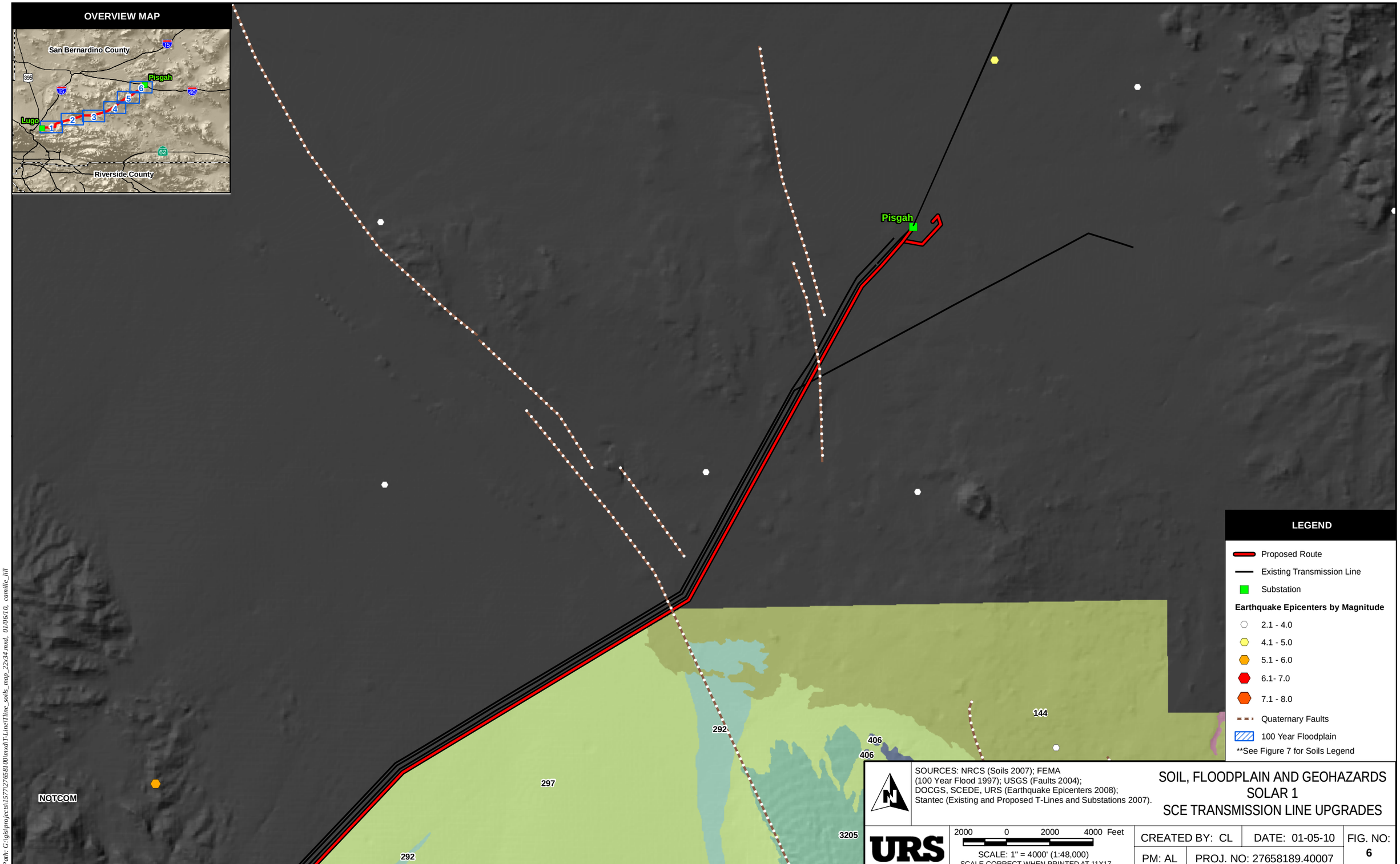

SOURCES: NRCS (Soils 2007); FEMA (100 Year Flood 1997); USGS (Faults 2004); DOCGS, SCEDE, URS (Earthquake Epicenters 2008); Stantec (Existing and Proposed T-Lines and Substations 2007).

SOIL, FLOODPLAIN AND GEOHAZARDS
SOLAR 1
SCE TRANSMISSION LINE UPGRADES

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SCALE: 1" = 4000' (1:48,000)
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CREATED BY: CL	DATE: 01-05-10	FIG. NO: 6
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Soil Type

- Arizo Gravelly Loamy Sand, 2 to 9% Slopes (100)
- Arrastre-Rock Outcrop Complex, 30 to 50% Slopes (101)
- Avawatz-Oak Glen Assocation, Gently Sloping (102)
- Arizo association, 0 to 4% Slopes (4402)
- Arizo association, 2 to 4% Slopes (292)
- Arizo association, flooded, 2 to 4% Slopes (3516)
- Arizo extremely gravelly loamy sand, 2 to 8 % Slopes (270)
- Arizo sand, 2 to 4% Slopes (279)
- Arizo-Burntshack association, 2 to 8% Slopes (3519)
- Arizo-Gravesumit-Daisy-Hypoint complex, 2 to 8% Slopes (3518)
- Arizo-Hypoint-Olympus complex, 2 to 8% Slopes (297)
- Arizo-Twobitter association, 2 to 4% Slopes (293)
- Avawatz-Oak Glen, dry families association, 2 to 15% Slopes (PsD)
- Bousic Clay (104)
- Bryman Loamy Fine Sand, 0 to 2% Slopes (105)
- Bryman Loamy Fine Sand, 2 to 5% Slopes (106)
- Bryman Loamy Fine Sand, 5 to 9% Slopes (107)
- Bryman Loamy Fine Sand, 9 to 15% Slopes (108)
- Bryman Sandy Clay Loam, 0 to 2% Slopes (109)
- Bryman-Cajon Assocation, Rolling Slopes (110)
- Bull Trail-Typic Xerorthents Assocation, Moderately Steep (111)
- Brader-Morical Families Association, 30 to 50% Slopes (DcF)
- Burntshack-Hypoint Association, 2 to 4% Slopes (3610)
- Cajon Gravelly Sand, 2 to 15% Slopes (115)
- Cajon Sand, 0 to 2% Slopes (112)
- Cajon Sand, 2 to 9% Slopes (113)
- Cajon Sand, 9 to 15% Slopes (114)
- Cave Loam, dry, 0 to 2% Slopes (120)
- Crafton-Sheephead-Rock Outcrop Assocation, Steep (121)
- Cushenbury-Crafton-Rock Outcrop Complex, 15 to 50% Slopes (122)
- Cajon sand, 0 to 4 percent slopes, moist (3506)
- Cajon-Wasco, Cool Complex, 2 to 9% Slopes (119)
- Calcic Haplosalids-Sodic Haplosalids complex, 0 to 2% Slopes (4731)
- Coyote-Popups association, 2 to 8% Slopes (4140)
- Dune Land (123)
- Daisy-Arizo association, 0 to 4% Slopes (4401)
- Daisy-Gravesumit-Cajon complex, 2 to 4% Slopes (4003)
- Dalvord association, 15 to 50% Slopes (423)
- Dalvord-Angelpoint-Rock outcrop association, 15 to 75% Slopes (3212)
- Dalvord-Rock outcrop association, 15 to 75% Slopes (3201)
- Dalvord-Searchlight association, 2 to 30% Slopes (419)
- Eastrange gravelly sandy loam, 8 to 30 percent Slopes (3205)
- Eastrange-Gayspass-Edalph complex, 8 to 50% Slopes (3202)
- Glendale Variant Silt Loam, Saline-Alkali (125)
- Gullied Land-Haploxeralfs Assocation (126)
- Gravesumit-Arizo-Owlshead association, 2 to 30% Slopes (4062)
- Gravesumit-Daisy complex, 2 to 8% Slopes (4061)
- Gravesumit-Noagua complex, 2 to 4% Slopes (4060)
- Haplargids-Calciorthids Complex, 15 to 50% Slopes (130)
- Helendale Loamy Sand, 0 to 2% Slopes (131)
- Helendale Loamy Sand, 2 to 5% Slopes (132)
- Helendale-Bryman Loamy Sands, 2 to 5% Slopes (133)
- Hesperia Loamy Fine Sand, 2 to 5% Slopes (134)
- Haleburu association, 2 to 30% Slopes (3410)
- Haleburu-Noble Pass complex, 15 to 50% Slopes (406)
- Haleburu-Rock outcrop association, 8 to 50% Slopes (3411)
- Hypoint-Gravesumit association, 2 to 8% Slopes (3532)
- Hypoint-Gravesumit, silty substratum association, 2 to 15% Slopes (3531)
- Ironped-Gravesumit-Typic Haplocalcids association, 2 to 15% Slopes (4602)
- Ironped-Rock outcrop-Cougarbutte complex, 2 to 15% Slopes (4601)
- Ironped-Silvermine-Typic Haplocalcids complex, 2 to 8% Slopes (4604)
- Joshua loam, 2 to 5% Slopes (135)
- Kimberlina Gravelly Sandy Loam, cool, 2 to 5% Slopes (139)
- Kimberlina Loamy Fine Sand, cool, 0 to 2% Slopes (137)
- Kimberlina Loamy Fine Sand, cool, 2 to 5% Slopes (138)
- Lacid Loamy Fine Sand (140)
- Lovelace Loamy Sand, 5 to 9% Slopes (141)
- Lucerne Sandy Loam, 0 to 2% Slopes (142)
- Lucerne Sandy Loam, 2 to 5% Slopes (143)
- Langwell-Rock outcrop association, 4 to 30% Slopes (3240)
- Lavabed-Dalvord association, 8 to 50% Slopes (190)
- Lithic Xerorthents, warm-Rock outcrop complex, 50 to 100% Slopes (DpG)
- Mapping not complete
- Noagua-Popups-Edalph association, 2 to 15% Slopes (4110)
- Noble Pass-Pacific Mesa-Sunrock complex, 15 to 75% Slopes (407)
- Oldwoman-Gravesumit-Noagua complex, 2 to 4% Slopes (4050)
- Olympus-Cajon complex, 2 to 8% Slopes (3550)
- Owlshead association, 8 to 30% Slopes, very stony (3203)
- Owlshead complex, 4 to 50% Slopes, extremely stony (3204)
- Peterman Clay (154)
- Peterman Loam (153)
- Playas (156)
- Popups-Silvermine complex, 2 to 8% Slopes (4121)
- Riverwash (Rw)
- Rock Outcrop-Lithic Torriorthents Complex, 15 to 50% Slopes (158)
- Rosamond Loam, Saline-Alkali (159)
- Rock outcrop (4802)
- Rock outcrop-Cougarbutte association, 2 to 15% Slopes (4803)
- Rock outcrop-Ironped association, 15 to 75% Slopes (4801)
- Silvermine-Noagua complex, 2 to 8% Slopes (4040)
- Sunrock-Lava flows complex, 8 to 30% Slopes, extremely stony (144)
- Trigger Gravelly Loam, 5 to 15% Slopes (164)
- Victorville Sandy Loam (169)
- Villa Loamy Sand (171)
- Wasco Sandy Loam, cool, 0 to 2% Slopes (173)
- Wasco Sandy Loam, cool, 2 to 5% Slopes (174)
- Water (178)
- Wrightwood-Bull Trail Assocation, Sloping (175)
- Wapi-Pacifico families, dry-Rock outcrop complex, 15 to 30% Slopes (DxE)
- Wapi-Pacifico families, dry-Rock outcrop complex, 30 to 50% Slopes (DxF)
- Wapi-Pacifico families, dry-Rock outcrop complex, 50 to 75% Slopes (DxG)
- Yermo-Kimberlina, cool, Assocation, Sloping (177)

SOURCES: NRCS (Soils 2007).

SOIL LEGEND
SOLAR 1
SCE TRANSMISSION LINE UPGRADES

URS

NO SCALE

CREATED BY: CL	DATE: 01-05-10	FIG. NO: 7
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TECHNICAL AREA: TRANSMISSION LINE UPGRADES

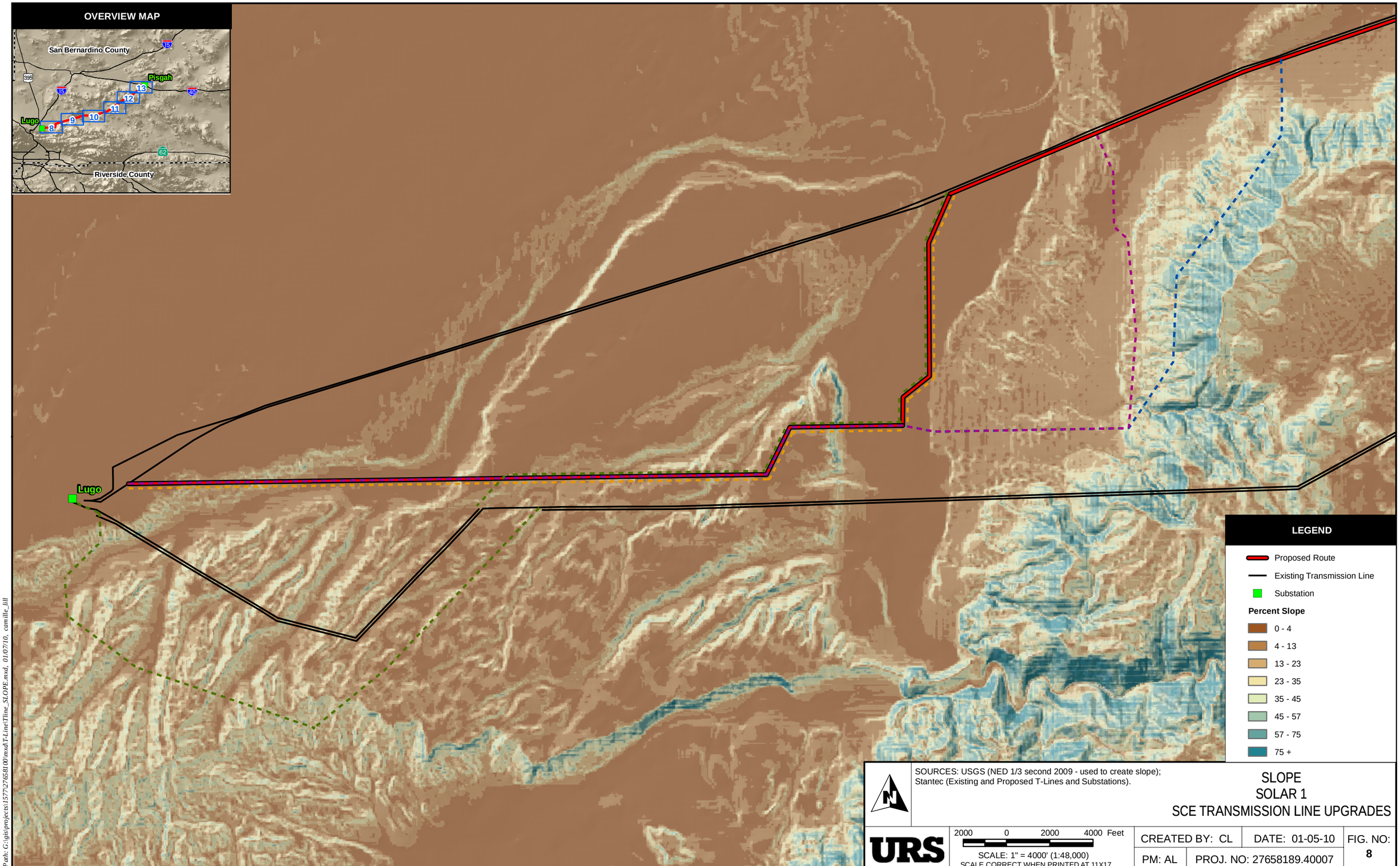
Item 9: Identify the depth of transmission line upgrade foundations in order to assess any impact to ground water.

Response: Each structure would require single to multiple drilled, poured-in-place, concrete footings that form the structure foundation. The maximum depth below ground level for the various types of structures is expected to be approximately 45 feet. Actual footing depths for the structure foundation would depend on the soil conditions and topography at each site and would be determined during detailed engineering.

TECHNICAL AREA TRANSMISSION LINE UPGRADES

Item 10: Provide the slope gradients traversed by the alignments of transmission line upgrades and roads.

Response: Slope gradients for the proposed alignments (as shown in the AFC) and roads are depicted in attachment TRANS-5.



SOURCES: USGS (NED 1/3 second 2009 - used to create slope);
Stantec (Existing and Proposed T-Lines and Substations).

SLOPE
SOLAR 1
SCE TRANSMISSION LINE UPGRADES

URS

2000 0 2000 4000 Feet
SCALE: 1" = 4000' (1:48,000)
SCALE CORRECT WHEN PRINTED AT 11X17

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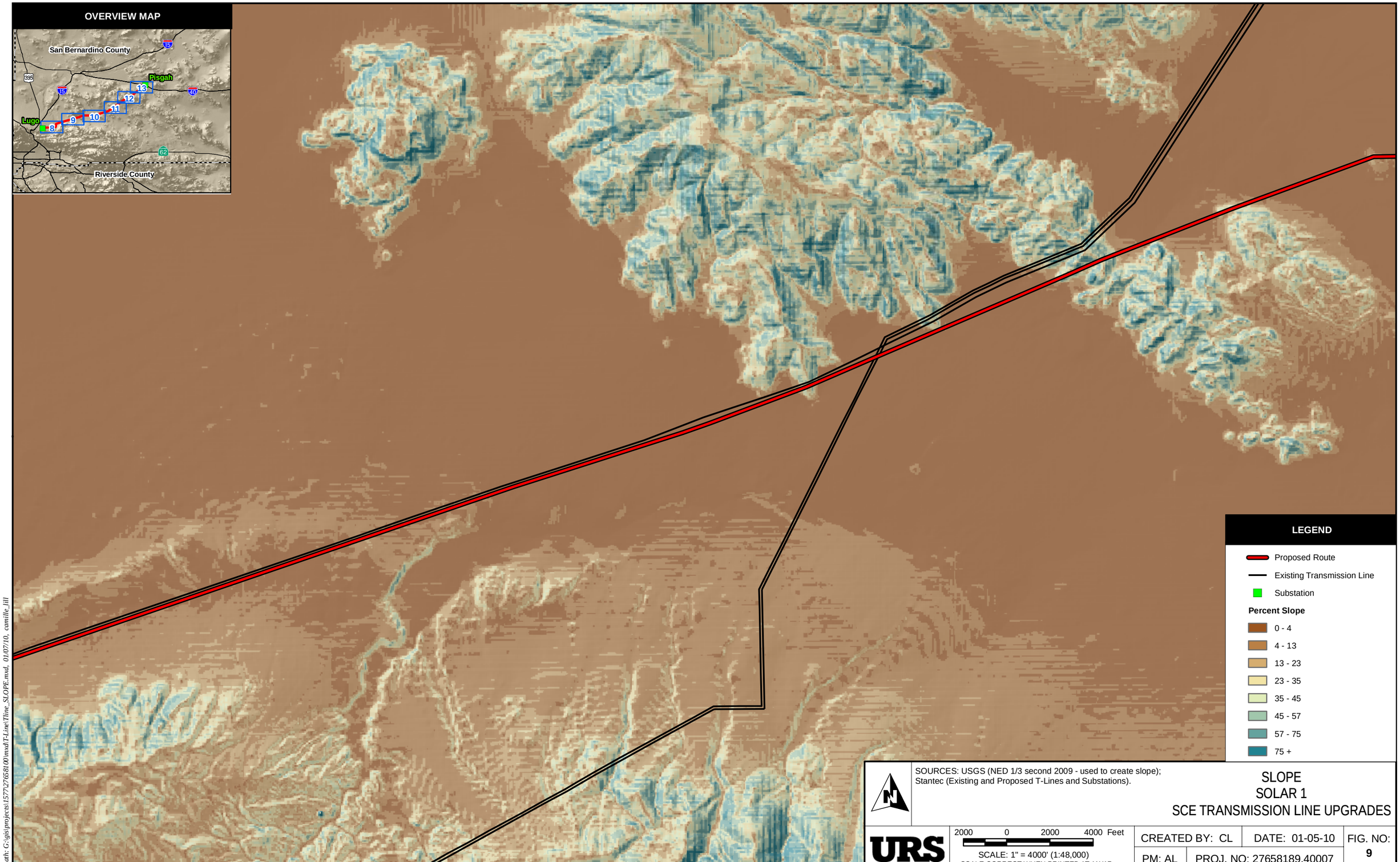

SOURCES: USGS (NED 1/3 second 2009 - used to create slope);
Stantec (Existing and Proposed T-Lines and Substations).

SLOPE
SOLAR 1
SCE TRANSMISSION LINE UPGRADES

URS

2000 0 2000 4000 Feet
SCALE: 1" = 4000' (1:48,000)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: CL	DATE: 01-05-10	FIG. NO: 9
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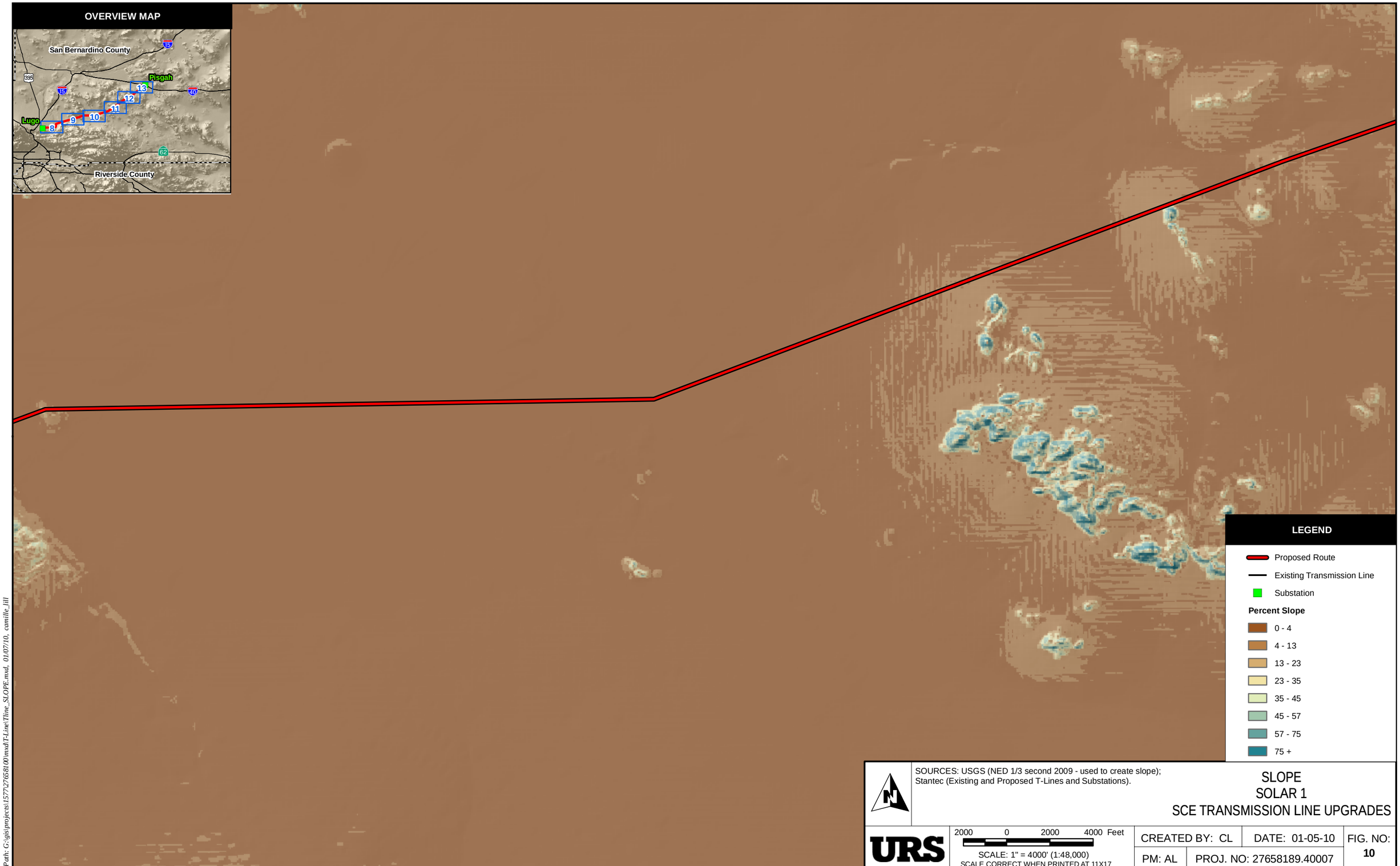

SOURCES: USGS (NED 1/3 second 2009 - used to create slope);
Stantec (Existing and Proposed T-Lines and Substations).

SLOPE
SOLAR 1
SCE TRANSMISSION LINE UPGRADES

URS

2000 0 2000 4000 Feet
SCALE: 1" = 4000' (1:48,000)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: CL	DATE: 01-05-10	FIG. NO: 10
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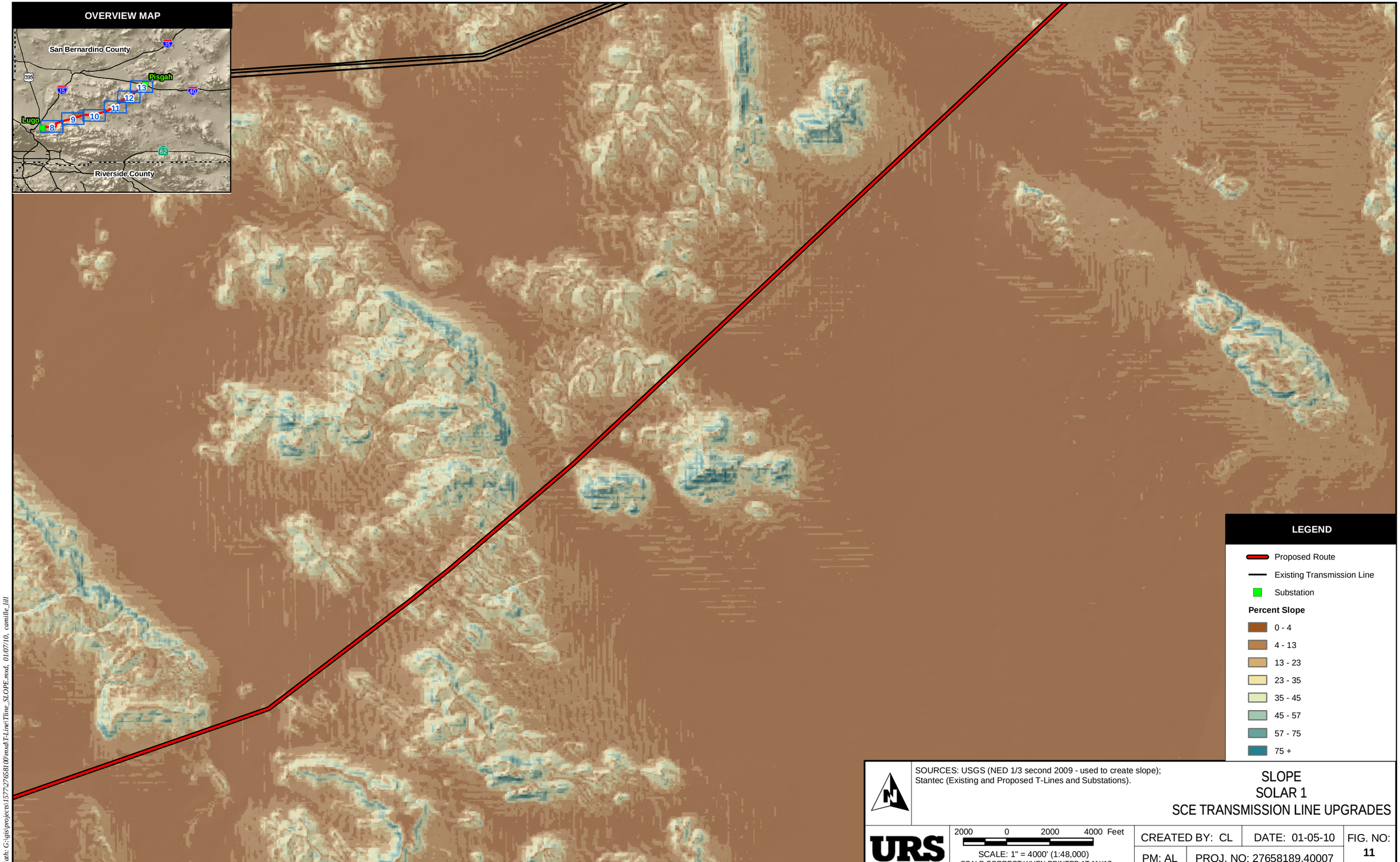

SOURCES: USGS (NED 1/3 second 2009 - used to create slope);
Stantec (Existing and Proposed T-Lines and Substations).

SLOPE
SOLAR 1
SCE TRANSMISSION LINE UPGRADES

URS

2000 0 2000 4000 Feet
SCALE: 1" = 4000' (1:48,000)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: CL	DATE: 01-05-10	FIG. NO: 11
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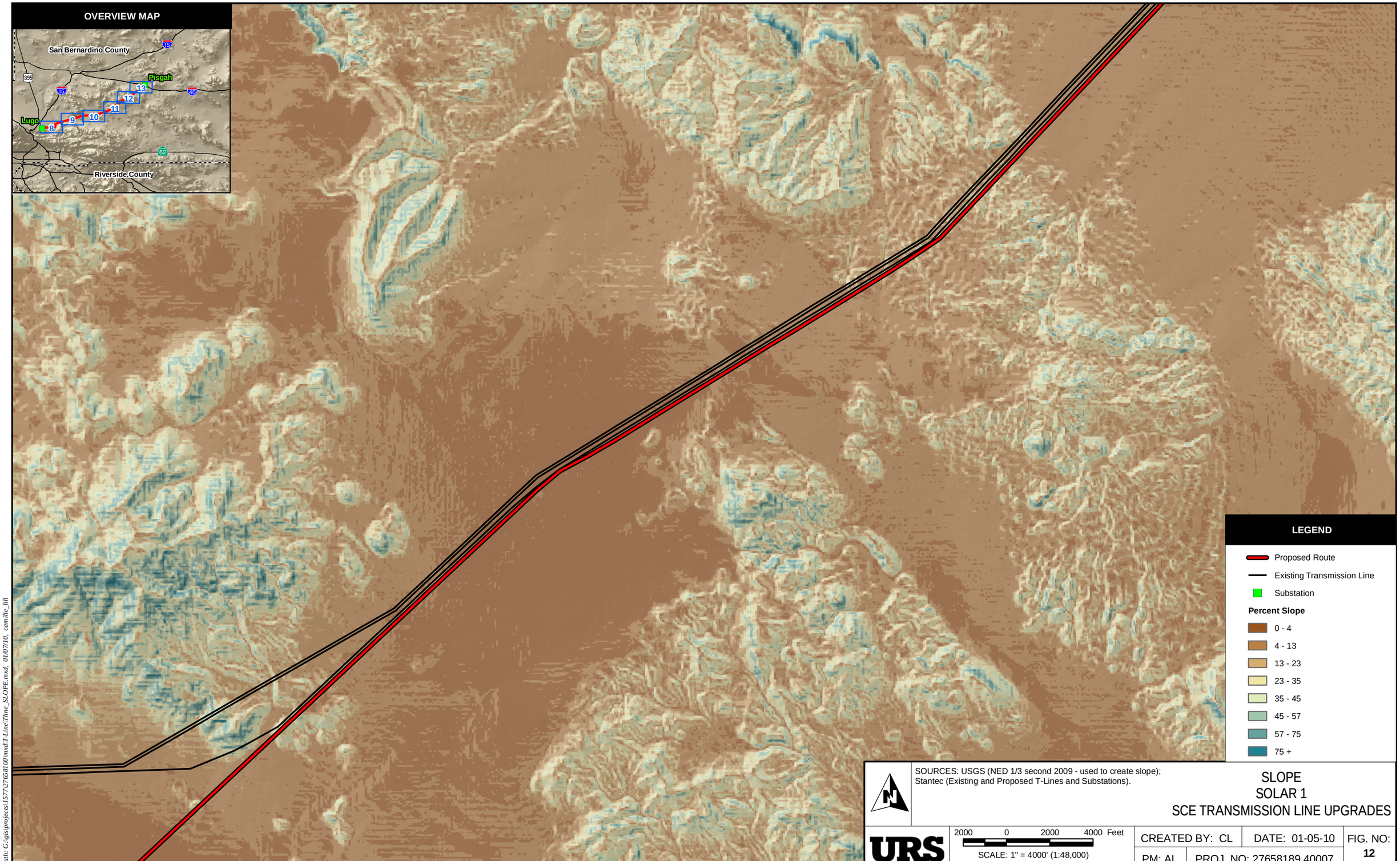

SOURCES: USGS (NED 1/3 second 2009 - used to create slope);
Stantec (Existing and Proposed T-Lines and Substations).

SLOPE
SOLAR 1
SCE TRANSMISSION LINE UPGRADES

URS

2000 0 2000 4000 Feet
SCALE: 1" = 4000' (1:48,000)
SCALE CORRECT WHEN PRINTED AT 11X17

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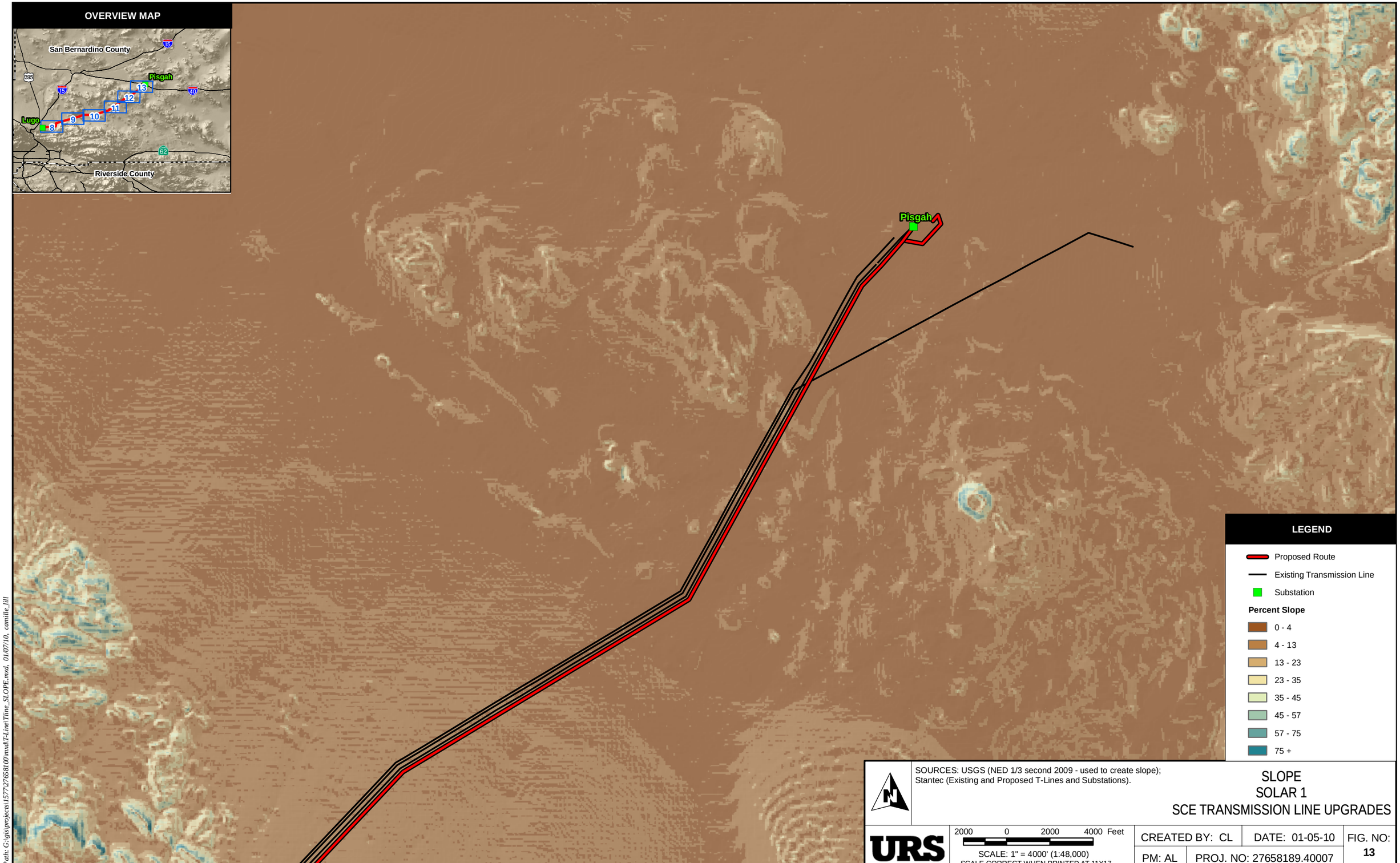

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TECHNICAL AREA: TRANSMISSION LINE UPGRADES

Item 11: Provide information on road construction methods (including side cast, haul and store) for roads associated with transmission line upgrades.

Response: This portion of the project involves construction within existing right of way (ROW) and new right of way in the developed areas near the Lugo Substation. It is assumed that existing public roads as well as existing transmission line roads would be used during construction of this project.

This project will also require new transmission line roads to access the new transmission line segments and structure locations in the vicinity of the Lugo Substation. Transmission line roads are classified into two groups: access roads and spur roads. Access roads are through roads that run between tower sites along a ROW and serve as the main transportation route along line ROWs; spur roads are roads that lead from access roads and terminate at one or more structure sites.

It is anticipated that rehabilitation work will be necessary in some locations along the existing transmission line roads to accommodate construction activities. The amount of rehabilitation work is unknown at this time, and will depend upon the existing road conditions at the time of construction. The road rehabilitation work may include the re-grading and repair of existing access and spur roads, including any drainage structures and/or retaining walls. These roads would be cleared of vegetation, blade-graded to remove potholes, ruts, and other surface irregularities, fill material would be deposited where necessary, and roads would be re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The graded road would have a minimum drivable width of 14 feet (preferably with 2 feet of shoulder on each side).

Similar to rehabilitation of existing roads, all new road alignments would first be cleared and grubbed of vegetation. Roads would be blade-graded to remove potholes, ruts, and other surface irregularities, fill material would be deposited where necessary, and roads would be compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The graded road would have a minimum drivable width of 14 feet (preferably with 2 feet of shoulder on each side) but may be wider depending on final engineering requirements and field conditions. New road gradients would be leveled so that any sustained grade does not exceed 12 percent. All curves would have a radius of curvature of not less than 50 feet, measured at the center line of the usable road surface. Spur roads would usually have turnaround areas near the structure locations. All dead-end spur roads over 500 feet long would include a Y-type or circle-type turnaround. In addition, drainage structures (e.g., wet crossings, water bars, overside drains, pipe culverts, and energy dissipaters would be installed along access and spur roads to allow for construction equipment usage as well as to prevent erosion from uncontrolled water flow. Areas susceptible to slides, washouts, and other slope failures would be stabilized by installing retaining walls or other means necessary to prevent future failures. The type of mechanically stabilized earth-retaining structure to be used would be based on site-specific conditions.

TECHNICAL AREA: TRANSMISSION LINE UPGRADES

Item 12: Provide information about the erodibility of soils in the project area pertaining to transmission line upgrades.

Response: The soils along the alignment of the transmission line upgrades are depicted in attachment TRANS-4.

TECHNICAL AREA: TRANSMISSION LINE UPGRADES

Item 13: Identify plans and BMPs for erosion and sediment control for the transmission line upgrades.

Response: Plans and BMPs for the erosion and sediment control for the transmission line upgrades will be included in a construction phase Stormwater Pollution Prevention Plan (SWPPP) to meet State Water Resources Control Board construction stormwater quality requirements. The SWPPP will identify Best Management Practices (BMPs) to be employed in and around areas of soil disturbance for erosion and sediment control along the Transmission Line (including access routes and laydown areas). The BMPs will be selected based upon site conditions and areas of soil disturbance. The California Stormwater Quality Association (CASQA) stormwater BMP handbook and SWPPP template will be used, at minimum, to identify the proposed BMPs and provide an initial construction SWPPP.

BMPs for consideration along the T-Line may include, but are not limited to, the following, as appropriate:

- Temporary Soil Stabilization techniques such as scheduling construction sequences to minimize land disturbance during the rainy and non-rainy seasons and employing BMPs appropriate for the season; preservation of existing vegetation by marking areas of preservation with temporary orange propylene fencing; use of geotextiles, mats, plastic covers or erosion control blankets to stabilize disturbed areas and protect soils from erosion by wind or water; use of earth dikes, drainage swales and lined ditches to intercept, divert and convey surface runoff to prevent erosion; use of outlet protection devices and velocity dissipation devices at pipe outlets to prevent scour and erosion from stormwater flows.
- Sediment Control techniques including use of silt fences, straw bales, and/or fiber rolls to intercept and slow the flow of sediment laden runoff such that sediment settles before runoff leaves the site.
- Wind Erosion control by applying water or dust palliatives as required to prevent or alleviate wind blown dust.
- Tracking Control techniques to limit track-out include stabilized points of entering and exiting the site and stabilized construction roadways on the site.

TECHNICAL AREA: TRANSMISSION LINE UPGRADES

Item 14: Identify any locations where the alignment of transmission line upgrades crosses environmental hazard areas.

Response: Potential environmental hazard areas along the transmission line upgrades alignment is presented in attachment TRANS-4.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION
For the SES SOLAR ONE PROJECT

Docket No. 08-AFC-13

PROOF OF SERVICE
(Revised 12/2/09)

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Public Adviser
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*indicates change

DECLARATION OF SERVICE

I Corinne Lytle , declare that on January 10,2009, I served and filed copies of the attached Applicant's Response to the CEC Transmission Upgrades Memo. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [www.energy.ca.gov/sitingcases/solarone].

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(*Check all that Apply*)

FOR SERVICE TO ALL OTHER PARTIES:

__X__ sent electronically to all email addresses on the Proof of Service list;

__X__ by personal delivery or by depositing in the United States mail at_____ with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses NOT marked "email preferred."

AND

FOR FILING WITH THE ENERGY COMMISSION:

__X__ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

OR

_____ depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 08-AFC-13
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct.

_____
Corinne Lytle

*indicates change

DOCKET
08-AFC-13
DATE JAN 29 2010
RECD. FEB 04 2010

CALICO SOLAR

Applicant's Response to the CEC Transmission Line Upgrades Memo-Cultural Resources Responses

Application for Certification (08-AFC-13)

January 2010

Submitted to:
Bureau of Land Management
2601 Barstow Road
Barstow, CA 92311

Submitted to:
California Energy Commission
1516 9th Street, MS 15
Sacramento, CA 95814-5504

Submitted by:
SES Solar Three, LLC
SES Solar Six, LLC

Stirling Energy Systems
4800 N. Scottsdale Road, Suite 5500
Scottsdale, AZ 85251

Tessera Solar
power from stirling energy systems

January 29, 2010

Mr. Christopher Meyer
CEC Project Manager
Attn: Docket No. 08-AFC-13
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Mr. Jim Stobaugh
BLM Project Manager
Attn: Docket No. 08-AFC-13
Bureau of Land Management
P.O. Box 12000
Reno, NV 89520

RE: Calico Solar (Formerly Solar One) Project
Applicant's Responses to the CEC Memo Regarding Transmission Line Upgrades – Cultural Resources

Dear Mr. Meyer and Mr. Stobaugh,

Tessera Solar hereby submits the Cultural Resources Responses to the CEC Memo Regarding Transmission Line Upgrades. I certify under penalty of perjury that the foregoing is true, correct, and complete to the best of my knowledge.

Sincerely,

Felicia Bellows
Vice President of Development

TECHNICAL AREA: TRANSMISSION LINE UPGRADES

Item 5: With regards to cultural resources, provide appropriate additions to background sections to cover regions not covered in the original Cultural Resources Technical Report.

Response: Presented below is a general summary of the existing setting for the archeological and the architectural history background as it relates to the transmission line corridor for Calico Solar (formerly SES Solar One). It includes an overview of the area of potential effect, prehistoric context, ethnography, regional historic context and a review of site records and literature for the entire corridor. The information was collected through the current literature search and record check at the San Bernardino Archaeological Information Center (SBAIC) for the transmission line data request, as well as from desk-top research. In addition, the *Setting* section of the March 2009 report entitled *Draft Final Class III Cultural Resources Technical Report for the (Calico Solar) Project, San Bernardino County, California (Nixon and Glenn 2009)* was used for the cultural history portion of this Data Response. Additional information has been added to the cultural history section where appropriate given that the transmission line covers a much broader extent of the Mojave Desert than the original cultural resources setting that was prepared for the Calico Solar project site. This approach was sent to the CEC and BLM on December 17th, 2009 for concurrence. The Applicant has not yet received a response.

Regional Prehistoric Context

The project's Area of Potential Effect (APE) passes through several regions, beginning in the Mojave Desert and ending near the Cajon Pass in the Transverse Ranges near San Bernardino. During the Late Pleistocene and Holocene periods, the desert regions were subjected to dramatic climactic fluctuations that shaped much of the early history of human occupation and adaptation in the area, especially as they directly impacted the availability of prehistoric food resources and surface water. Other aspects of the prehistory of the area are related to influences from the agriculturalists to the east and the coastal peoples to the west.

Recorded archaeological sites in the Mojave Desert include evidence for villages and camps, trails, special purpose sites (e.g., hunting blinds, bedrock mortars and grinding slicks), burials, quarries, rock features, and petroglyphs. Sites may be readily visible on the desert floor, a function of sparse vegetation and continual use of the desert. Though early archaeological remains are rare, when found they are usually located along the margins of pluvial lakes or in areas of dune deflation. Conversely, artifacts on the desert floor may be sparse, widely scattered, and not easily recognized among the desert pavement. Archaeologists have reached a broad consensus regarding the region's basic cultural chronology on the basis of an observed sequence of assemblages that are predominantly identified by the presence of distinctive projectile point types (Bamforth 1990:72).

The Cajon Pass and surrounding regions, in contrast to the adjacent desert, contains a variety of resources that reflect its unique location along the Transverse Ranges and the variation in elevation exhibited. The pass acted as a conduit for prehistoric peoples moving from the Los Angeles and San Bernardino basins to the Mojave Desert. Little evidence of early (Paleoindian) populations has been documented in the Cajon Pass region; however, later periods are better represented and exhibit a mixture of coastal and desert traditions (Moratto 1984). Because the Project APE crosses such a board and varying expanse of territory, no single chronology, many of which have been developed

within a limited geographical scope, can summarize developments for the entire project area. Regional sequences of the cultural complexes for the Mojave Desert have been proposed by Warren (1980, 1984) and Warren and Crabtree (1986), who divide the prehistoric era into temporal periods based on projectile point typology: Lake Mohave, Pinto, Gypsum, Saratoga Springs, and Shoshonean. Sequences proposed for the Mojave Desert do not serve the entire project area well. For example, Warren's (1980) "Shoshonean" includes the ethnographic era, while the four earlier periods encompass the Archaic of the Great Basin and, in the Saratoga Springs period, an influx of formative influences from the Southwest (Lyneis 1982, 1995). The Mojave Desert sequence has recently been addressed by Sutton *et al.* (2007), who provide a useful concordance of terms for the temporal periods and complexes identified in the Mojave Desert in relation to the history of climactic change in the region.

The chronological sequence of the cultural complexes for the Mojave Desert initially proposed by Warren (1980, 1984) and Warren and Crabtree (1986), divides the prehistoric era into five temporal periods: Lake Mojave, Pinto, Gypsum, Saratoga Springs, and Shoshonean. The four earlier periods encompass what is called the Archaic Period of the Great Basin and, in the Saratoga Springs period, formative influences from the Southwest (Lyneis 1982), while the Shoshonean period includes the ethnographic era. Claims have been made for archaeological assemblages dating to periods earlier than Lake Mojave, but as Warren and Crabtree (1986) note, all are controversial and, even if valid, have little or no relationship to later cultural developments in the region.

The Mojave Desert sequence has recently been expanded by Sutton *et al.,* (2007) to include elements more closely aligned to prehistoric cultural complexes in the Central Mojave Desert. Similar to Warren and Crabtree (1986), Sutton *et al.,* (2007) notes little evidence of a "Pre-Clovis" occupation of the Mojave Desert during the Pleistocene, but does not discount the possibility of such evidence existing in the region. In contrast to the earlier sequence, Pleistocene era occupation is identified and termed the hypothetical "Pre-Clovis" and "Paleo-Indian" Complexes. Other elements of the Sutton *et al.,* (2007) Mojave Desert chronology for the Holocene period include the Lake Mojave complex, Pinto complex, Dead Man Lake complex, Gypsum complex, Rose Spring complex, and Late Prehistoric complex, as described below. As used herein, "climactic periods (*e.g.,* Early Holocene) [refers] to specific spans of calendric time and cultural complexes (*e.g.,* Lake Mojave Complex) to denote specific archaeological manifestations that existed during (and across) those periods" (Sutton *et al.,* 2007:233).

Additionally, Sutton *et al.,* (2007: Table 15.1 and 15.2) provide good summaries of major archaeological research conducted in the Mojave Desert since 1982. Due to the advent of cultural resource management projects, primarily on military bases and on federal land in the Mojave, more than 3 million acres have been surveyed with more than 20,000 sites identified in the last twenty-seven years. These include surveys at China Lake Naval Weapons Center, Edwards Air Force Base, Fort Irwin, Twenty-Nine Palms Marine Corps Center, and federal BLM Land (Basgall and Glambastiani 2000; Basgall 2004; Hall 1993; Warren 1991). In terms of excavation projects in the Mojave, work has been conducted on a wide range of site types, from Paleo-Indian sites to Late Prehistoric sites, several of which have provided radiocarbon dates that support the cultural chronology that has evolved with these more recent investigations (Sutton *et al.,* 2007: Table 15.3). The chronological sequence presented below is based on both the earlier and more recent archaeological survey and excavation projects in the Mojave.

Paleo-Indian Complex (10,000 to 8000 cal B.C.)

The Paleo-Indian Complex was an era of environmental transition between the late

Pleistocene and early Holocene. The beginning of the Paleo-Indian Complex was characterized by increased rainfall and cooler temperatures, which formed deep lakes and marshes, even in the interior desert regions of California. As temperatures warmed at the start of the Holocene, glaciers slowly retreated, sea levels rose, and the interior lakes and marshes gradually evaporated over the millennia (Moratto 1984:78).

The earliest, clear evidence for human occupation of the Mojave Desert begins at about 12,000 years ago, while claims for earlier, pre-Holocene era occupations such as those made for the Calico Early Man site (Duvall and Venner 1979), Tule Springs (Harrington and Simpson 1961), Lake China (Davis 1978), and Lake Manix (Simpson 1958, 1960, 1961) remain unsubstantiated.

In 1926, a fluted point found in Folsom, New Mexico transformed the debate about the antiquity of the earliest inhabitants of the New World, pushing the date back to approximately 15,000 years before present (B.P.) Since that time, many other sites containing this type of point have been identified throughout the United States. Many of these sites contain variations of the fluted point tradition including the Clovis.

The Paleo-Indian Complex within the Mojave Desert is, thus far, represented exclusively by the Clovis Complex, though the relationship with the later Great Basin stemmed series points is also a consideration. The Paleo-Indian Complex experienced profound environmental changes, as cool, moist conditions of the terminal Wisconsin glacial age gave way to a warmer, drier climate of the Holocene (Spaulding 1990).

The China Lake site remains the only presumed occupation of the Paleo-Indian complex in the Mojave Desert for the late Pleistocene Period. China Lake is located near an ancient Pleistocene lake. Excavations at this site began in 1968 and lasted through the end of the 1970s (Moratto 1984:66-70). China Lake has a well-sealed stratigraphic context with prehistoric tools intermixed with the fossilized remains of extinct mammals. The tool sequence from the site suggests that China Lake was inhabited from as early as 9,200 cal. Before Christ (B.C.) (Sutton *et al.,* 2007: 234). The earliest calibrated dates for China Lake are from habitation debris at the Pleistocene lakeshore that continued through 10,000 B.C., where Proto-Clovis and Clovis cultures were identified. Nearly all of the tools identified at this site were produced from obsidian and fine-grained cryptocrystalline silicates (cherts and jaspers).

One common theme among nearly all Paleo-Indian sites in North America is the tool assemblage: projectile points, hafted to the end of a spear and launched using a throwing tool (atlatl), made from fine-grained lithic material and fluted. Fluted points, defined as a component of the Clovis culture in California, have been found nearly throughout the entire state from coastal estuary environments to ancient Pleistocene lakeshores, which are now in desert areas. At least five sites near Cajon Pass have been identified containing fluted projectile points, suggesting an early occupation of approximately 12,000 B.P., which corresponds to the “hypothetical Pre-Clovis” complex (pre-10,000 cal B.P.) for San Bernardino County (Sutton *et al.,* 2007:236). In addition to fluted points, the Paleo-Indian tool assemblage was composed mainly of scrapers, burins, awls, and choppers, all used for the processing of animal remains and foodstuffs.

The late Pleistocene to early Holocene geological period of transition, approximately 14,000 to 8,000 B.P., was a period of global climatic change and in the California interior, pluvial lakes formed from glacial melt (Roberts 1989). Some early researchers pose the theory of two different traditions relating to interior and coastal adaptation during this transition. Based on work in the Panamint Valley, Davis (1969) posited the theory of “Paleo-Desert,” a geographic distinction from Paleo-Indian sites of the “Paleo-Coastal”

tradition. In the Paleo-Desert geographic region, Paleo-Indian sites are generally located along the shorelines of these ancient pluvial lakes (Davis 1969).

One area where pluvial adaptation is not a factor is in the mountains west of the Mojave. The San Dieguito Complex artifacts found in the area around the Cajon Pass and elsewhere to the west are technically similar to the Lake Mojave assemblages. They include two forms of leaf-shaped knives, foliate to ovoid bifaces, foliate and short-bladed shouldered points, crescents, engraving tools, choppers, core hammers, pebble hammerstones, cores, and many types of scrapers (Moratto 1984).

Lake Mojave Complex (ca. 8000 – 6500 cal B.C.)

The temporal period 8000 to 6500 cal B.C. is referred to as the Altithermal Climatic Phase in which there was a dramatic shift towards a much warmer environment in the desert regions, and which appears to have witnessed a near hiatus in the occupation of the Mojave Desert. During this time it seems that people living in the desert regions migrated towards the coastal region. As the climate changed, so did the distribution of floral and faunal communities, as a result of these changes people migrated toward the coast to exploit littoral resources. A small frequency of ground stone implements is present during this time, from which infers limited hard seed grinding activities (Sutton *et al.,* 2007:237). The high incidence of extra-local materials and marine shell is interpreted as wider spheres of interaction than witnessed previously. Sutton *et al.,* (2007: 237) interprets these and other data as indicators of "a forager-like strategy organized around relatively small social units."

Cultural materials dating from this Complex encompass the Playa cultures (Rogers 1939), the San Dieguito Complex (Warren 1967), and the Lake Mojave Complex (Warren and Crabtree 1986). This phase is considered ancestral to the Early Archaic cultures of the Pinto Complex, representing a shift toward a more diversified and generalized economy (Sutton 1996:228). The Lake Mojave assemblages, first identified at Lake Mojave (Campbell *et al.,* 1937), include Lake Mojave series projectile points (leaf-shaped, long stemmed points with narrow shoulders) and Silver Lake points (short bladed, stemmed point with distinct shoulders), also identified at three sites at Edwards Air Force Base (deBarros 2004). Other diagnostic items include flaked stone crescents; abundant bifaces; and a variety of large, well-made scrapers, gravers, perforators, heavy core tools, and ground stone implements (Sutton *et al.,* 2007:234).

Millingstones generally occur in small numbers during this time. In the Mojave Desert and southern Great Basin, this assemblage is typically (but not exclusively) found around the margins of ancient lakes, although the role of the lakes in the overall adaptation remains unclear. According to Sutton (1996:229), Lake Mojave Complex sites occur more commonly in the eastern and central Mojave Desert, while rare occurrences have been noted within the western Mojave in the Lake China, Coso, and Owens Lake areas.

The Lake Mojave cultural pattern seems to represent relatively small nomadic social units centered on foraging strategies with undefined hunting and lacustrine resource exploitation patterns. Studies conducted at Fort Irwin show a reliance on smaller taxa with less reliance on large game based on protein residue analysis; however, these data are contradictory to the cultural constituents recorded for this complex that suggest large game exploitation (Sutton *et al.,* 2007:237). There is an overlap in time between the Lake Mojave Complex and the Pinto Complex of approximately 1,000 years, in which continuity of technology occurs with a steady introduction of technologies referred to as the Pinto Complex.

In the mountains to the west of the Mojave Desert, the early Archaic is represented by the millingstones, manos, and scraper planes found in coastal Millingstone Horizon assemblages and an intensification of seed collecting and processing (Moratto 1984). Towards the end of this period when the Mojave Desert was being more intensively utilized, Pinto Complex artifacts begin to appear. This blending of Millingstone and Pinto artifacts continues and develops into the Late Archaic and is known as the Sayles Complex (Moratto 1984).

The Pinto Complex (ca. 6500 – 4000 cal B.C.)

The Pinto Complex represents a broad continuity in the use of flaked stone technology, including less reliance on obsidian and cryptocrystalline silicates, as well as the prevalence of ground stone implements in the material culture (Sutton *et al.,* 2007:238), which distinguishes it from the Lake Mojave Complex. Climatic changes occur between the Early and Middle Holocene periods about 7500 B.P. and 5000 B.P. appears to have been more arid across the Mojave region (S. Hall 1985; Spaulding 1991). It is during this time that woodland attained its approximate modern elevation range and the modernization of desert scrub communities was completed with the migration of plant species such as creosote bush into the area (Byers and Broughton 2004). Warren (1984) sees this period as marking the beginning of cultural adaptation to the desert, as materials characteristic of the Pinto Complex gradually replace those of the preceding Lake Mojave Complex. Sites associated with this era are usually found in open settings, in relatively well-watered locales representing isolated oases of high productivity.

From the period 5000 B.C. to 3500 B.C., there was increased occupation of the desert regions during the Medithermal Climatic Period, a period of moister and cooler temperatures allowing for the intensive re-occupation of the desert region. In the desert region, the occupation is referred to as the Pinto Basin Complex. However, Sutton *et al.,* (2007:238) cite recent work conducted on Fort Irwin and Twenty-Nine Palms that produced radiocarbon dates as 6870 cal B.C., thus pushing back the inception of the complex coincidental with the Lake Mojave Complex.

The Pinto Complex is marked by the appearance of Pinto series projectile points, characterized as thick, shouldered, expanding stem points with concave bases, as well as bifacial and unifacial core tools, and an increase in millingstones. Pinto points were typically produced by percussion reduction, with limited pressure retouch. Named for the Pinto Basin site (Campbell and Campbell 1935), the points were presumably used on atlatl darts. Large numbers of such artifacts were also recovered from the Stahl site near Little Lake (Harrington 1957; Schroth 1994). Earle (1997) reports differences between artifact assemblages between the eastern and western Mojave Desert, with the eastern area seemingly devoid of milling equipment but this is not the case for the western Mojave. In general, milling stones are rare during the Pinto Period (Warren 1984, Wallace 1962).

Major technological shifts for this Complex include a significant increase in the use of millingstones (Warren and Crabtree 1986; Sutton *et al.,* 2007:238). Warren (1990) attributes the latter development to the exploitation of hard seeds, part of a process of subsistence diversification brought on by increased aridity and reduced ecosystem carrying capacity. Big game hunting probably continued as an important focus during this time, but the economic return of this activity likely decreased as mountain sheep and deer (artiodactyls) populations declined in response to increased aridity (Warren and Crabtree 1986). During this transitional period there is faunal evidence that indicates exploitation of rabbit, rodent, reptile, and fresh water mussel resources.

The majority of Pinto Complex archaeological sites have been found near pluvial lakes, adjacent to fossil stream channels, near springs, and in upland regions. Many of these sites contain substantial midden deposition and cultural debris, which indicates larger groups and prolonged occupation for this time period (Sutton *et al.,* 2007:238).

A new complex has been proposed by Sutton *et al.,* (2007) that appears to be a variation of the Pinto Complex: the Dead Man Lake Complex (7000-3000 cal. B.C.), based on archaeological findings from the Twenty-Nine Palms area. The primary variation between Pinto and the Dead Man Complex is the presence of small to medium sized contracting stemmed or lozenge shaped points, battered cobbles, bifaces, simple flaked tools, milling implements, and shell beads (Sutton *et al.,* 2007:239).

Prior to 3000 B.P., Basgall and True (1985) note the presence of several millingstone sites in the general western San Bernardino region west and southwest of San Bernardino and in Los Angeles County. Millingstones tend to increase in frequency as one moves from the mountains to the desert during this time (Basgall and True 1985).

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Based on the current archaeological data there appears to have been a gap between the Middle and Late Holocene period, since few sites have been found that date between 3000 and 2000 cal B.C. It is believed that climatic changes during this period resulted in hotter and drier conditions, which may have led to the abandonment of this region for approximately 1,000 years (Sutton *et al.,* 2007:241). People migrated to areas with more suitable climates (*e.g.,* San Bernardino Mountains).

Gypsum Complex (ca. 2000 cal B.C. – cal A.D. 200)

Gradual amelioration of the climate began by around 5000 B.P., culminating in the Neoglaciation at about 3600 B.P., with a period of increased moisture dating to the latter part of the Middle Holocene (Spaulding 1995). This increase in moisture would have presumably resulted in favorable conditions in the desert and may have influenced changes in cultural adaptations, including increasing population, trade, and social complexity (Sutton 1996: 232; Sutton *et al.,* 2007:241).

Gypsum Complex sites are characterized by medium to large stemmed and corner notched projectile points, including Elko series, Humboldt Concave Base, and Gypsum. In addition, rectangular-based knives; flake scrapers; occasional large scraper planes, choppers and hammerstones; handstones and milling tools become relatively commonplace and the mortar and pestle appear for the first time.

This Complex is marked by population increases and broadening economic activities as technological adaptation to the desert environment evolved. Hunting continued to be an important subsistence focus, but the processing of plant foods took on greater importance as evidenced by an increase in the frequency and diversity of ground stone artifacts. Later, the bow and arrow were introduced, increasing hunting efficiency. Perhaps due to these new adaptive mechanisms, the increase in aridity during the late Gypsum Complex (after ca. 2500 B.P.) seems to have had relatively little consequence on the distribution and increase in human populations (Warren 1984; Warren and Crabtree 1986). In addition to open sites, the use of rockshelters appears to have increased at this time. Base camps with extensive midden development are a prominent

site type in well-watered valleys and near concentrated subsistence resources (Warren and Crabtree 1986). Additionally, evidence of ritualistic behavior during this time exists through the presence of rock art, quartz crystals, and paint (Sutton *et al.,* 2007:241).

A shift in subsistence orientation and mobility near the end of the Gypsum Complex is suggested, with increased emphasis on the hunting of smaller mammals (Basgall *et al.,* 1986; Sutton 1996:234). Rock art suggests that the hunting of mountain sheep was important during the Gypsum Complex (Grant *et al.,* 1968); mountain sheep and deer, rabbits and hares, rodents, and reptiles remains are reported from Gypsum Complex sites in the central Mojave Desert (Hall and Basgall 1994). Evidence from the western Mojave Desert suggests that there was a major population increase ca. 3000 to 2300 B.P. (Gilreath and Hildebrandt 1991; Sutton 1988).

Rose Spring Complex (ca. cal A.D. 200 – 1100)

The climate during the Rose Spring Complex remains relatively stable and consistent during the middle of the Late Holocene period. In the western Mojave Desert, some regions show an increase in lake stands, such as at Koehn Lake during this time (Sutton *et al.,* 2007:241). At the beginning of this period lakes were at high points; as the environment began to shift towards the end of this period, lakes began to desiccate and recede, which marked the end of the Rose Spring Complex around Anno Domini (A.D. 1100).

The Rose Spring Complex is characterized by small projectile points, such as the Eastgate and Rose Spring series, stone knives, drills, pipes, bone awls, various milling implements, and marine shell ornaments; the use of obsidian is prevalent during this time (Sutton *et. al.,* 2007:241). Smaller projectile points appear to mark the introduction of a bow and arrow technology and the decline of the atlatl and spear weaponry (Sutton 1996: 235). Sutton (1996: 235; 2007:241) notes that Rose Spring Complex sites are common in the Mojave Desert and are often found near springs, washes, and lakeshores.

Subsistence practices during the Rose Spring Complex appear to have shifted to the exploitation of medium and small game, including rabbits/hares and rodents, with a decreased emphasis on large game. At the Rose Spring archaeological site, numerous bedrock milling features, including mortar cups and slicks, are associated with rich midden deposits, indicating that milling of plant foods had become an important activity. In addition, evidence of permanent living structures are found during this time and include wickiups, pit houses, and other types of structures (Sutton *et al.,* 2007:241). In the eastern Mojave Desert, agricultural people appear to have been present, as Anasazi populations from Arizona controlled or influenced a large portion of the northeastern Mojave Desert by cal A.D. 700 (Sutton *et al.,* 2007:242).

Late Prehistoric Complexes (cal A.D. 1100 - Contact)

Paleoenvironmental studies conducted within the western Mojave Desert point to increased effective moisture beginning just after 2000 B.P., as evidenced by a shoreline bench feature at Koehn Lake (Sutton 1996:238). The Koehn Lake site appears to have been abandoned by 1,000 years ago, as Koehn Lake desiccated during a major "medieval drought." This drought may have influenced the movement of people from this area north and east across the Great Basin (Sutton 1996:239). Population began to decrease, due in part to a drier climate, and later as a result of European contact.

Characteristic artifacts of this Complex include Desert series projectile points (Desert

Side-notched and Cottonwood Triangular), Brownware ceramics, Lower Colorado Buff Ware, unshaped handstones and millingstones, incised stones, mortars, pestles, and shell beads (Warren and Crabtree 1986). The faunal assemblages typically contain deer, rabbits/hares, reptile, and rodents. The use of obsidian dropped off during this time with the increased use of cryptocrystalline silicates.

Between 1,000 and 750 years ago, ethnic and linguistic patterns within the Mojave Desert increased in complexity. One of the most important regional developments during the Late Prehistoric Period was the apparent expansion of Numic-speakers (Shoshonean groups) throughout most of the Great Basin. Many researchers accept the idea that sometime around A.D. 1000 the Numa spread westward from a homeland in the southwestern Great Basin, possibly from Death Valley (Lamb 1958) or Owens Valley (Bettinger and Baumhoff 1982). While there is little dispute that the Numic spread occurred, there is much disagreement over its mechanics and timing (see Madsen and Rhode 1995).

The Late Prehistoric Complexes mark the first recorded historical documentation of Native American inhabitants at European contact. The ethnohistoric record provides valuable data for understanding Late Prehistoric archaeology. The Late Prehistoric Complexes reveal a significantly different suite of material culture than that seen in earlier Complex assemblages. Manos and millingstones became more frequent, as did mortar and pestles. In addition, bow and arrow technology with the use of Desert Side-notched and Cottonwood points, both emerge during the Late Prehistoric Complexes. Large occupation sites, representing semi-permanent and permanent villages, emerge during this time as well.

During this time the first locally produced pottery is seen in the Mojave Desert Region, likely coming from the Anasazi in the southwest. Also, smaller projectile points, Cottonwood and later Desert Side- Notched points were introduced to use with bow and arrow technology. Plant food processing is indicated by the presence of manos and metates.

Ethnography

Prehistorically, there was a large movement of people across the Mojave Desert and ethnographically several groups are associated with the Project APE and surrounding Mojave Desert region. The Kawaiisu, Kitanemuk, Southern Paiute, Serrano, Chemhuevi, Tabtulabal, and Panamint occupied the Mojave Desert region, north, south, west, and east of the Project. In this region there were four major linguistic groups originating from northern Uto-Aztecan groups; Tubatulabalic, Hopic, Numic, and Takic (Sutton *et al.,* 2007:243). The Mojave River appears to have been a major boundary between Takic and Numic speaking groups during prehistoric times. Groups occupying the Central Mojave Desert were of the Takic and Numic linguistic groups. Takic speaking groups originated in the southwestern Mojave Desert, expanding south and east sometime around 500 cal. B.P., and include the Serrano and Kitanemuk (Sutton *et al.,* 2007:243). At time of contact, groups south of the Mojave River and much of southern California were part of the Takic linguistic group. The groups north and east of the Project were of the Numic linguistic group, which included the Kawaiisu, Chemhuevi, and Southern Paiute.

During the ethnographic period, the Serrano, Vanyume (Beñeme) and the Chemehuevi occupied the region in which the Project is located. The Vanyume were a small division of the Serrano, about whom little ethnographic information is known. The Chemehuevi

entered the Mojave Desert much later in time. Other groups that could have entered the Project area were the Kawaiisu, the Kitanemuk, the Southern Paiute, the Mohave, and the Ancestral Pueblo. Eerkens (1999:301) states that the area around Fort Irwin, northeast of the Project Site, was inhabited by the Kawaiisu, Chemehuevi, Las Vegas Paiute, and the Vanyume, although he acknowledges that all groups in the area maintained flexible settlement patterns based on availability of resources (1999:302). The Project APE and surrounding valleys were not conducive for large scale inhabitation based on the fluctuating environmental conditions and overall arid nature of the region; therefore groups occupying/utilizing the area would have been small and nomadic (Zigmond 1986:398).

Serrano

The Project APE is situated within the traditional boundaries associated with Mission San Gabriel during the Spanish Period (1769–1821) (Bean and Vane 1979). The natives in this area were known as the Yucaipaiem clan of the Serrano (Altschul, Rose and Lerch 1984; Kroeber 1925; Strong 1929; Bean and Smith 1978). They spoke a language that falls within the Takic family of the Uto-Aztecan language group. This language family is extremely large and includes the Shoshonean groups of the Great Basin. Due to the proximity of the Serrano and Gabrieliño bands in the area and their linguistic similarities, ethnographers have suggested that these two bands shared the same ethnic origins (Kroeber 1925; Bean and Smith 1978). For this reason, they will be referred to as the Serrano.

According to Kroeber (1976:611), the Serrano comprised five groups or bands: Kitanemuk, Alliklik, Vanyume, Kawaiisu and Serrano. They inhabited lands from the San Bernardino Mountains, part of the Transverse Mountains east of the Cajon Pass, across the Mojave Desert east as far as Twenty-Nine Palms, and from the Tehachapi Mountains to the northern Colorado Desert. They occupied most of modern day San Bernardino County (Bean and Smith 1978). Relatives of the Serrano included the Gabrieliño and Luiseño to the west at the Pacific Coast, and the Cahuilla inhabiting the Colorado Desert. For much of the Late Prehistoric Complex, the Serrano band of the much larger Serrano tribe were the likely inhabitants of the western Mojave Desert, what is today the Cajon Pass and Barstow area. Most of what is known about the Serrano has been based upon the work done by Hicks (1958) and by later researchers working on a site known as CA-SBR-1000, located near Yucaipa, San Bernardino County, California. Studies indicate that the village had been occupied for thousands of years and that it was a major trading center both prehistorically and historically. Little is known about early Serrano social organization because the band was not studied until the 1920s (Kroeber 1925) and enculturation had seriously compromised their native lifeway. Kroeber (1925) indicates that the Serrano were a hierarchically ordered society with a chief who oversaw social and political interactions both within their own culture and with other groups. The Serrano had multiple villages ranging from seasonal satellite villages to larger, more permanent villages.

Resource exploitation was focused on village-centered territories and ranged from gathering to hunting with occasional fishing. The primary staple varied depending on locality. Acorns and piñon nuts were gathered by groups in the foothills; honey mesquite, piñon nuts, yucca roots, mesquite and cacti fruits were gathered by groups in or near the desert (Bean and Smith 1978). The Serrano hunted deer, mountain sheep, antelope, rabbits, other small rodents, birds, with the most desired game bird being quail (Bean and Smith 1978).

Serrano structures were situated near water sources and consisted of large, circular

thatched and domed structures of willow, covered with tule thatching. These living structures were often sufficient to house a large family. In addition to the living structure, a ramada, an open air structure for outdoor cooking, was located adjacent to the home (Benedict 1924; Kroeber 1925; Drucker 1937; Bean and Smith 1978). A large ceremonial structure was often present and was used as the religious center where the lineage leader resided. Additional structures, such as granaries for food storage and sweathouses for ritual activities, were often located adjacent to pools or streams (Strong 1929; Bean 1962-1972; Bean and Smith 1978).

The Serrano, like the neighboring groups, were primarily semi-nomadic, hunter-gatherers. Because of their inland location, Serrano society was left relatively intact during the period of initial Spanish colonialization, unlike the Gabrielino, who inhabited the coastal area. In 1772, Spanish explorer Pedro Fagès traveled through the Cajon Pass to the Mojave Desert in an attempt to identify the native groups in this region. Fages' ultimate goal was to place the Serrano under supervision of a mission. By 1819, the Serrano were relocated to the Estancia of the Mission San Gabriel in Redlands (Bean and Smith 1978:573). At the time of relocation, there were likely on the order of 3,500 Serrano inhabiting the Mojave Basin. Between 1840 and 1860 a smallpox epidemic decimated the population. By 1885, there were only "390 Serranos [sic] remaining in all of southern California" (AccessGenealogy.com 2005) and the census of 1910 recorded only 100 Serrano (Kroeber 1976:616).

Vanyume (Beñeme)

Limited information is available on the Vanyume during the historic period. What information exists describes the Vanyume as a small division of the Serrano living in the Mojave Desert, north of Serrano territory. They were referred to as the "Serrano of the Mohave River" (Kroeber 1925:614). The name Vanyume is a Mohave word; the name Beñeme was given to the entire Serrano cultural group by Father Garcés. The Vanyume spoke a Takic language related to the Kitanemuk to the west and the Serrano to the South. Kroeber reported that the Vanyume were occasionally friendly with the Mohave and Chemehuevi, but hostile to the Serrano (Kroeber 1925:614). Kroeber also stated that the population of the Vanyume was very small at the time of historic contact. The "chief" of the Vanyume reportedly lived in one of the villages at the upper reaches of the Mojave River near Victorville. The Vanyume were hunters and gatherers, and shell beads and millingstones were known to have been used. The Vanyume are generally associated with similar life ways as the Serrano to the south (Yohe II and Sutton 1991).

Chemehuevi

The Chemehuevi were a band of the Southern Paiute that possibly entered the eastern Mojave Desert area from the north in fairly recent prehistoric times. The Chemehuevi, also called the Pah-Utes, were closely related to the Southern Paiute in Death Valley and the Southern Nevada region. At the time of ethnographic contact, the Chemehuevi claimed a large portion of the eastern and central Mojave Desert, perhaps as far west as Afton Canyon on the Mojave River (Kelly and Fowler 1986:368). Although the Chemehuevi territory boundaries are unclear, it is certain that they inhabited the Providence Mountains. Based on archaeological data, the Chemehuevi entered the Mojave Desert sometime in the 17th century (Yohe II and Sutton 1991).

The Chemehuevi were strongly influenced by the Mohave. It is possible that they displaced the Desert Mohave, a Yuman speaking group (Kelly and Fowler 1986:368). Many Chemehuevi words are related to Mohave vocabulary, along with agricultural practices, house construction, warfare, and other cultural elements such as religious

practices. Like the Mohave, the Chemehuevi used square metates, paddle and anvil pottery techniques and hair dye (Kelly and Fowler 1986:369). In addition to their close association with the Mohave, the Chemehuevi traded widely with the Shoshone, Kawaiisu, Serrano, Vanyume, Cahuilla, and Diegueno (Kelly and Fowler 1986:369).

Influence from the Pueblo area to the east is seen in the form of agricultural practices of many of the Southern Paiute groups. The Chemehuevi, in more well watered areas and flood plains, grew yellow maize, gourds, beans, and winter wheat, combining Mohave and Pueblo practices (Kelly and Fowler 1986:371). Kroeber reported that the Chemehuevi occasionally farmed small areas of corn, beans, melon and pumpkins and wheat. In more arid areas the Chemehuevi were hunter-gatherers. They hunted large game, such as deer and mountain sheep, along with rabbits, rodents, lizards and other small game (Kroeber 1925:597). Plant foods were of great importance and included a variety of grass seeds, pinyon, and mescal (yucca).

The Chemehuevi had a large range associated with seasonal food practices and traveled through most of the Mojave Desert as far as the Tehachapi area and the San Bernardino Mountains. Occasionally they traveled to the Pacific coast to collect haliotis shells (Kelly and Fowler 1986:377). It was also reported that they would travel as far east as the Hopi's territory, about a two month round trip (Kelly and Fowler 1986:377).

Little is known about the Chemehuevi material culture. However, in historic times they used basketry, primarily willow, to a great extent both for storage and for carrying possessions (Kroeber 1925:97). They also made basketry hats. The Chemehuevi used some pottery but relied more on basketry.

Spanish colonization had little effect on the Chemehuevi until the early 1800s. Although other Southern Paiute groups were enculturated earlier by the Spanish, the Chemehuevi's isolated territory protected from being assimilated into the mission system. With the opening of the Old Spanish Trail, the Chemehuevi became more affected by the Spanish, and were brought to the missions to work (Kelly and Fowler 1986:386).

In 1874, the United States government established the Colorado River Reservation in an effort to move the remaining Chemehuevi onto the reservation. However, the reservation was shared with the Mohave band, with whom the Chemehuevi had differences from 1865 to 1871, the Chemehuevi were at war with the Mohave. They were therefore, reluctant to move to the reservation (Kelly and Fowler 1986:388). Some of them were forced to move to the reservation, while some of them would not move. Many stayed in their historic locations, finding work on farms and ranches and in mines. In 1901, the Chemehuevi received their own reservation in the Chemehuevi Valley.

Other Native American Groups Associated With the Region

In addition to those groups affiliated with the Project area, many other groups occupied and utilized the Mojave Desert in a variety of ways. For example, it appears that the Anasazi of southern Nevada greatly influenced the cultures within the region. By 1450 B.P., the Anasazi were exploiting turquoise deposits at Halloran Springs, approximately 25 miles northeast of the Calico Solar APE. The Anasazi Pueblo was 150 miles across the desert; therefore Anasazi miners must have spent a considerable amount of time in the area based on the amount of turquoise mined and the abundance of "Basketmaker III" pottery found near the springs (Fagan 2003: 310). Turquoise was mined up to twelve feet below the ground and for centuries Mojave turquoise was traded to the east of its source, throughout the Southwest; however, it does not appear that turquoise was traded

to the west as evidence of it does not appear in the material cultural of California tribes.

About 1450 B.P., the use of bow and arrow technology spread throughout California's eastern deserts, eventually becoming the dominant hunting technology throughout California. The bow and arrow has many advantages over spears and atlatls and made hunting much more efficient. Bow and arrow technology could have been introduced to California by the Anasazi or by another Great Basin group during this time. In addition, by 1200 B.P., buff, gray, and brownware pottery, made by Ancestral Pueblo groups and other surrounding tribes of the Lower Colorado River region, entered the Mojave Desert. The trade of technology along with items such as sea shells and steatite objects probably took place along the Mojave Trail (Fagan 2003:311).

Other tribes in the region include the Mohave. The Mohave lived long both the east and west banks of the Colorado River. During the winter, they inhabited semi-subterranean houses and depended upon maize agriculture for subsistence (Kroeber 1902; 1925). Throughout the rest of the year they were a hunting and gathering group, often traveling west far into the Mojave Desert. The Mohave traveled throughout southern California and northern Arizona utilizing a large network of trails (King and Casebier 1976:281). Two major geographical features influenced the Mohave's trade routes: the location of their villages along the Colorado River, and the waterless portions of the desert, also known as the Mojave Sink or Mojave Trough. Two major trade routes were used which started at villages along the Colorado River. The first route was the Pah-Ute Creek to Soda Springs route, which later became known as the Mojave Road wagon train. The other route ran south of the Mojave Road route through Poshay Pass and the Mojave River flood plain to the southeast corner of Soda Lake. The more northern route, the Mojave Road, was more heavily used, both prehistorically and in more recent historic times by Native Americans and European and American settlers alike (King and Casebier 1976:282).

Although the Mohave lived southeast of the Project area, they had a great amount of influence over the Mojave Desert region. They were skilled traders and traveled long distances to either fight or trade with other groups (Fagan 2003:297). Their movement across the southwest promoted the spread of new technologies, beliefs and ideas throughout the desert and southwestern regions.

Three other groups occupied the San Gabriel Mountains to the west and the southern Antelope Valley during this time: the Kitanemuk, the Gabrielino, and the Tataviam (Bean and Smith 1978a: 538; Bean and Smith 1978b; Blackburn and Bean 1978: 564; King and Blackburn 1978: 535; Kroeber 1925: 611). Earle (2002) argues that the southern half of Antelope Valley may have been an area of shared use among several groups including Serrano, Tataviam, Kitanemuk and the Beñmè or Vanyume. The Kitanemuk occupied the upper Tejon and Paso Creeks, the streams on the rear side of the Tehachapi Mountains, and the northern Antelope Valley and part of the westernmost end of the Mojave Desert (Blackburn and Bean 1978:564).

The Gabrielino are named after San Gabriel Mission which was established in their territory and inhabited the area of modern day Los Angeles and Orange counties to the west of the transmission line. Tataviam territory was south of the Kitanemuk and north of the Gabrielino in modern day Los Angeles and Kern counties. Their territory included the upper reaches of the Santa Clara River King and Blackburn 1978:535).

Regional Historic Context

Spanish Period (1540 to 1821)

The Spanish had explored much of the California coast and San Francisco and Monterrey bays by 1769, but paid little attention to the California interior. Several factors were detrimental to European exploration in the Project area: travel and communication were slow; there were few roads, trails and maps; and no supply stations existed in California's interior deserts (King and Casebier 1976).

Between 1775 and 1776, Father Francisco Garcés, a Franciscan missionary originally stationed near present-day Tucson, Arizona, explored the Mojave Desert as part of Spain's effort to forge an overland route to its settlements in Alta California. Garcés traveled with the 1775 Anza expedition until it crossed the Colorado River near present-day Yuma, Arizona (King and Casebier 1976:283). Garcés left the expedition at the Colorado River crossing and traveled north to the Mohave Villages near present-day Needles, California, while Anza continued west. Garcés, in the company of Mohave guides, proceeded west to Mission San Gabriel in Los Angeles along the Mohave Trail, in the approximate location of the Mojave Road wagon route. The corridors of the Mojave Trail and the later Mojave Road are approximately 15 miles north of the Burlington Northern Santa Fe Railroad, north of the Cady Mountains near Interstate Highway 15 (I-15) (Figure 2.8-1). On his return trip he visited several Mohave villages on the banks of the Colorado River. The journal Garcés kept during this expedition is the earliest written record of the eastern Mojave Desert (King and Casebier 1976; Robinson 2005). Spanish contact with the Mohave and Colorado Desert peoples likely came from both the east and west during this time (Vane and Bean 1994:1-8), as evidenced by the Anza/ Garcés expeditions, as well as known contacts made on the California coast.

The closest Spanish mission, Mission San Gabriel in Los Angeles, was too far away to have an every day effect on the Native Americans in the Mojave Desert. Native Americans who fled the missions often escaped into the Mojave Desert and exposed the Mohave tribe to Spanish influences, including the use of horses, which led to raids on the missions and horse thievery. In 1819, Lieutenant Gabriel Moraga led an expedition of fifty soldiers into the Mojave Desert in an attempt to retrieve stolen horses, to exact revenge against the Mohave for their raids on the coastal Spanish settlements, and to counter their ability to spread unrest against the Spanish and other Native American groups (King and Casebier 1976:284). Moraga's expedition was only the second Spanish-sponsored trip into the Mojave Desert. Lack of water in the arid Mojave Desert forced Moraga and his soldiers to turn back.

During the Spanish period, no permanent European settlements were established in the project vicinity, although there were reports that the Spanish had active mines in the Barstow area. It is unknown if the mines were being worked by the Spanish, Native Americans, or later Mexican or American prospectors because only mine shafts remained and no written records have been discovered (King and Casebier 1976:300).

Mexican Period (1821 to 1848)

In 1810, an independence movement began as many rancheros sought to split Mexico (and California) from Spain. In 1821, this desire came to fruition when New Spain (Mexico) became independent. Following Mexico's independence, the Alta and Baja California missions received less financial support from Spain and Mexico, and ultimately, independence from Spain was a catalyst for Mexico to secularize all California missions. Secularization would free vast amounts of land that had been under mission

control and the land would become civilian pueblos or large land grants awarded to Mexican, American, or European settlers. In 1831, Governor Jose Maria Echeandia announced the secularization of a number of missions, and by 1834, all the missions were secularized, including Mission San Gabriel in Los Angeles, the nearest mission to the Project. Within ten years, the mission system had failed, the neophytes had left, and the buildings were in disrepair. Following secularization, San Gabriel mission became a parish for the City of San Gabriel and had little further effect on the Native Americans in the Project vicinity (Rolle 2003).

During Mexican control of Alta California, Americans started to enter California through the Mojave Desert, many of them using the Mojave Trail located north of the Project Area (Confidential Appendix A, Figure 2.8-1). Jedediah Smith, mountain man and fur trapper, was the first American to reach California using an overland route. Smith followed a route from the Great Salt Lake in Utah south to the Virgin and Colorado rivers and across the Mojave Desert to Spanish southern California. Smith arrived at the Mohave Villages in October 1826, then proceeded west on the Mojave Trail. After Smith's initial visit other American mountain men and trappers ventured into the desert, including William Wolfskill, George C. Yount, Christopher "Kit" Carson, James Ohio Pattie, and Ewing Young (Brooks et al. 1981; King and Casebier 1976:285; Robinson 2005).

Jedediah Smith's ventures down the Virgin and Colorado rivers, combined with Garcés' route across the Mojave Desert, linked the Spanish settlements in New Mexico and California, stimulating trade between these regions (Wright 1982). In 1829, New Mexico merchant Antonio Armijo reached the Las Vegas Valley via the Virgin River, pioneering a route that became known as the Old Spanish Trail. Armijo's route followed the Mojave Trail in the project vicinity, but later routes of the Old Spanish Trail turned southwest out of Utah and headed toward the Mojave River through the San Bernardino Mountains. This route became known as the Northern Route of the Old Spanish Trail (Confidential Appendix A, Figure 2.8-1). The Mohave Indians had become increasingly hostile to travelers through their territories, and blazers of the northern route most likely took this path to avoid conflicts. The junction of the Northern Route of the Old Spanish Trail and the Mojave Trail was approximately 18 miles east of present-day Barstow, at a location historically called Fork of the Roads, northwest of the project area (Confidential Appendix A, Figure 2.8-1). Trade along the trail ended in 1848 with the Mexican-American War (Nystrom 2003; Robinson 2005; Rogge 2008).

American Period

Transportation

Mojave Road

The term "Manifest Destiny" was one of the likely causes for the Mexican-American War, which took place between 1846 and 1848. Jacksonian Democrats coined the phrase in the 1840s as a political philosophy whereby the United States would control all of the land between the Atlantic and Pacific oceans. The focus for expansion was on the northwest coast in Oregon territory and on the Texas territory. In 1845, during the Presidency of James K. Polk, the United States annexed Texas; the following year, the U.S. invaded Mexico. In 1848, the United States, victorious over the Mexican Army, signed the Treaty of Guadalupe Hidalgo, and acquired all Mexican territory north and west of the Rio Grande and Gila Rivers, which included Texas, New Mexico territory, and Alta California. American settlers began to migrate to the newly acquired territory, and the discovery of gold in 1848 and the ensuing Gold Rush in 1849 brought numerous

settlers to California. Most of these travelers likely used the northern route of the Old Spanish Trail to enter California from New Mexico, Utah, and Nevada, although some likely followed the Mojave Trail as well (Robinson 2005).

Soon after California was granted statehood in 1850, the government wanted to recognize all of the trails running through California to promote immigration to the state, facilitate trade and communication, and develop routes of defense. A year after the Treaty of Guadalupe Hidalgo was signed, Lieutenant James H. Simpson of the Army Corps Topographical Engineers attempted to follow Father Garcés direct route across the Mojave Desert (Mohave Trail), and in 1851, the U.S. Army Corps of Engineers sent another expedition to explore the area. During the 1840s and 1850s, the Union Pacific Railroad also contemplated using Gracés' route in an attempt to find the most practical course for a railroad line across the desert. Several explorers, hired by railroad companies, traveled throughout the Mojave Desert during the 1840s and 1850s. Eventually, a more northern route was selected for the transcontinental railroad line. In the late 1850s the General Land Office in California began the process of mapping the Mojave Desert area, and at that time several groups of surveyors mapped the desert (King and Casebier 1976:288-289).

Beale's Wagon Road was built in 1857 north of the Project APE, along the 35th Parallel, and was in use between 1857 and 1861. Edward Fitzgerald Beale was a famous American Frontiersmen and was superintendent of the wagon road development. Beale, along with his party and 25 camels, crossed the Colorado River into California 15 miles north of present-day Needles, California, and followed the Mojave Trail west. In 1859, the U.S. Army established Fort Mojave near the location of Beale's river crossing in an effort to protect travelers from Mohave Indian attacks. As a result, the Mojave Trail developed into a wagon road, which allowed supplies to be brought to Fort Mojave overland from Los Angeles. The wagon road was called the Mojave Road or the Government Road and was actively used until the beginning of the Civil War in 1861 (Figure 2.8-1).

During the Civil War, troops stationed at Fort Mojave were ordered to abandon the fort and report for duty in Los Angeles. The fort remained abandoned until the middle of 1863, when California Volunteers occupied it to protect travelers on the Mojave Road. Traffic had increased along the road as a result of gold discoveries about 100 miles south of Fort Mohave in the La Paz Mining District. Other travelers along the Mojave Road in the 1860s were members of the military on their way to Arizona to fight in the Apache Wars or merchants and ranchers hauling supplies and livestock to Prescott, the capital of the Arizona Territory. The Mojave Road also was used as a mail route between 1866 and 1868 (King and Casebier 1976; Nystrom 2003; Robinson 2005).

Although there was considerable traffic through the Mojave Desert into Southern California, most followed the Old Spanish Trail to the west of the Project APE or the Mojave Road to the north, and any settlements associated with these routes would have been located adjacent to the trails. Except for miners, most other settlers did not stay in the desert until a railroad was constructed. Only a few early homestead claims were filed. These early homesteads consisted mainly of ranches raising sheep and cattle. The arid environment prohibited large scale agriculture except on the banks of the Mojave or Colorado Rivers (Walthall and Keeling 1986).

Atlantic & Pacific Railroad

Plans for a transcontinental railroad had been delayed due to the Civil War, but once the war ended, interest in the construction of transcontinental railroads resumed. In 1866,

Congress contracted the Atlanta & Pacific Railroad (A&P) to construct a railway from the east to the California border. In 1879, the A&P partnered with the St. Louis & San Francisco Railroad and the Atchison, Topeka, & Santa Fe Railroad to facilitate construction of the transcontinental railroad. The A&P began construction of their track in Albuquerque, New Mexico in 1880 and reached Needles, California in May 1883. The A&P constructed a bridge over the Colorado River at Needles in August 1883 (Gustafson and Serpico 1992; Myrick 1992; Robinson 2005).

As the A&P tracks were being laid, the Southern Pacific Railroad was constructing a new railroad line between Mojave and Needles to intercept the A&P tracks at the Arizona border and protect its California interests. The Southern Pacific constructed the Mojave to Needles branch between 1882 and 1883, working east from their Mojave station (Figure 2.8-1) (Gustafson and Serpico 1992; Myrick 1992). When surveyors initially explored the project vicinity for a viable railroad route, they assessed the Mojave Road corridor, and found that the terrain was too steep and unsuitable for railroad construction. In the arid Mojave, the trail through the mountain range was preferred to the flatter terrain because more sources of water could be found in the mountainous areas. In 1868, General William J. Palmer of the Union Pacific Railroad eastern division surveyed a railroad route to the south of the Cady Mountains, where the terrain was more favorable for railroad construction. Although the Union Pacific never constructed the railroad through the Mojave Desert, it was largely Palmer's route that the Southern Pacific used to construct the Mojave to Needles branch (Nystrom 2003; Robinson 2005).

For more than a year, the A&P and the Southern Pacific lines continued to operate independently. The Southern Pacific Railroad instituted tri-weekly service to Needles in 1883, but the trip through the Mojave Desert was long and desolate. The railroad had constructed only one station and turntable in the 124-mile stretch between Mojave and Ludlow. The Southern Pacific Railroad was reluctant to join rails with the A&P fearing that the completed line would compete with their newly constructed Sunset Route, which crossed into California further south on the Arizona border at Yuma. Passengers heading east on the Southern Pacific Railroad's line to Needles were inconveniently required to disembark from the train with their belongings and transfer to the A&P cars. Although each of the railroads developed local business, the volume of passenger travel was not large enough to support operations. The Southern Pacific Railroad's route through the Mojave Desert did facilitate mining operations in the area. Anticipating large future revenues from hauling bulk ore, the railroad provided water for miners at 2 cents per gallon anywhere on the route, putting an end to the water scarcity problem for mine development in the area (Myrick 1992).

By the end of 1883, the A&P began making plans to construct their own line parallel to the Southern Pacific's line across the Mojave Desert to San Francisco. The Southern Pacific Railroad realized that if the A&P constructed a parallel line across the desolate Mojave Desert, its line would essentially become useless. In October 1884, an agreement was signed in which the Southern Pacific Railroad would sell its Needles to Mojave section to the A&P for $30,000 per mile. Until the debt was paid, the A&P would lease the line. In addition, the A&P also received an option for trackage rights between Mojave and San Francisco. The A&P received full title to the Mojave to Needles branch in 1911 (Gustafson and Serpico 1992; Myrick 1992). The construction of the railroad changed the course of travel across the Mojave Desert in the project vicinity. The railroad provided travelers with water sources across the vast desert and travel was much easier along the flat railroad corridor than along the mountainous Mojave Road to the north. A wagon road was constructed adjacent to the railroad alignment and use of the Mojave Road decreased.

The California Southern Railroad joined with the A&P in 1885 to provide service from Kansas City to San Diego. The junction of the two lines was initially called Waterman Junction, but in 1886, it was renamed Barstow. Barstow is located approximately 40 miles west of the Project APE and is the closest city. The construction of the railroad brought numerous settlers to the area and although other railroad lines were eventually constructed throughout southern California, the route passing through Barstow remained a popular line for both freight and passenger service. In addition, the railroad acted as a lifeline connecting Barstow, alone in the desert, to the rest of Southern California. Barstow was a sizable railroad hub, and the railroad was the main employer in the city for many years.

In 1897, the A&P was redesignated as the Santa Fe Pacific Railroad and later became the Atchison, Topeka, & Santa Fe Railroad. When the A&P took over the Mojave to Needles branch in 1884, there were depots at Daggett, Fenner, and Needles. During the 1880s, 1890s, and the first decade of the twentieth century, Santa Fe Pacific constructed facilities at various locations along the line. All of the structures were wood frame, with the exception of brick and reinforced concrete structures in Needles. Santa Fe Pacific railroad sidings in the project vicinity include Troy, Hector, Pisgah, and Lavic (Figure 2.8-1). The Hector siding is the closest to the Project APE. Neither the Pisgah or Troy sidings had any depot facilities. Hector had a 12-by-14-foot wood frame telegraph and train-order office that was constructed in 1906, which was closed in 1923 and moved to Earp in 1934. The Lavic siding was the largest of the four with a 24-by-34-foot frame combination passenger and freight depot that was constructed in 1901. The depot was closed in 1923 and removed (Gustafson and Serpico 1992; Myrick 1992).

The lack of water along the Mojave to Needles branch required the railroad to haul water in large tanks to the stations and construction camps. In 1897, a station was constructed at Newberry Springs, approximately 6 miles west of Troy, and this station became the railroad's primary source of water in the region. Although freight trains typically carried surplus water cars, engineers often had to go back to Newberry Springs for additional water supply (Gustafson and Serpico 1992; Myrick 1992).

The A&P Railroad/Santa Fe Pacific Railroad/Atchison, Topeka & Santa Fe Railroad (AT&SF) is located between the Calico Solar Phase I and Phase II APEs and within the Pisgah triangle area. The railroad is now operated as the Burlington Northern Santa Fe Railway.

National Old Trails Highway and U.S. Route 66

Prior to the construction of the railroad between Needles and Barstow in 1883, travel across the Mojave Desert in the project vicinity was limited to the Mojave Road corridor, which evolved from a network of prehistoric trails, early trails developed by mountain men, early explorers, and gold seekers; and routes developed during the railroad surveys of the 1850s (Figure 2.8-1). After the railroad was completed, the travel corridor shifted south of the Cady Mountains, new roads were constructed between local mines and railroad sidings, and a wagon road was constructed adjacent to the railroad tracks from Barstow to the Arizona border (Hatheway 2001). In the first decade of the 1900s, this wagon road would be converted to an auto route, as the use and ownership of the automobile became more prevalent.

The automobile first made its appearance to the American public in the late 1890s, and by 1900 automobiles were still the toys of the wealthy, with only one for every one

thousand Americans. Although Henry Ford introduced his Model T in 1907, widespread use of the automobile did not occur until after World War I. In 1914, Ford perfected full assembly line production and two years later more than half a million automobiles were sold. As the use of the automobile rose, the demand for good roads increased. Most rural roads in the 1900s had been constructed for wagon traffic and were not suited to automobile traffic (Fischer and Carroll 1988; Keane and Bruder 2004; Lyman 1999; Paxson 1946).

By 1910, national and local organizations promoted good roads in the United States, including the National Old Trails Highway (Figure 2.8-1). A precursor to U.S. Route 66, the National Old Trails Highway was part of the 2,448-mile ocean-to-ocean highway from Baltimore, Maryland to the California coast. The National Old Trails Highway also was part of the National Auto Trail System, an informal network of automobile routes marked by local organizations in the early 20th century. The National Old Trails Highway, where it traverses the Project APE, was located along and in the vicinity of the alignment of the old wagon road that was constructed adjacent to the Santa Fe Railroad tracks in the 1880s. The highway was designated by booster organizations in 1912, and by 1914 the Auto Club of Southern California had provided signage for much of the highway (Keane and Bruder 2004; Robinson 2005; Wikipedia contributors 2008).

In 1916, the Federal Highway Aid Act was passed to help fund rural roads, using a 50/50 funding match for states with a highway department. Route planning, however, remained a local matter, which usually did not include engineering surveys. In 1919, Congress liberalized the funding match requirements, and by late 1921, Congress passed the Federal Highway Act that further reduced the state match to about 26 percent (Lyman 1999) and required federal aid to be concentrated upon “such projects as will expedite the completion of an adequate and connected system of highways, interstate in character” (Paxson 1946:245). Up to seven percent of a state’s roads could be listed for reconstruction to create the national highway system. By 1923 a tentative plan had been developed linking every city with a population of 50,000 or more, with construction planned over a ten-year period (Paxson 1946).

During the early 1920s, automobile travel was an adventure for many Americans and was subsequently heavily promoted. By the late 1920s, much of the National Old Trails Highway in the project vicinity had been widened and oiled or surfaced with gravelly sand. The segment of the highway across the Mojave Desert was notorious for its poor condition, and by 1925 the highway was full of ruts and chuck holes. The highway was narrow with no road shoulders or striping, tended to follow the natural topography of the area, and was vulnerable to the effects of erosion. The State of California had designated the highway as a public highway in 1919, but did not take any responsibility for the segment between Barstow and Needles until 1923, leaving the burden of maintenance to San Bernardino County. Despite the poor conditions, motorists were never more than four miles from the railroad, where they could find help in the form of stations and section crews, and water was available every 5 to 10 miles (Bischoff 2005; Hatheway 2001; Scott and Kelly 1988).

In 1926, the American Association of State Highway and Transportation Officials designated the National Old Trails Highway in the Mojave Desert as U.S. Route 66. U.S. Route 66 was one of the main arteries of the National Highway System and was one of the first great highways in the United States, running from Chicago to the Pacific Ocean. Federal funding allowed for improvements, such as the construction of road shoulders. In the 1930s, the original alignment of the National Old Trails Highway in the Project Area was abandoned in favor of a route to the south, which is the current alignment of

historical U.S. Route 66 (Bischoff 2005; Scott and Kelly 1988; Wikipedia contributors 2008).

The new U.S. Route 66 alignment eliminated sharp turns, reduced steep grades, and straightened the roadway to accommodate higher speeds. The use of heavy machinery allowed for large road cuts that had not been possible in the early days of road building. The section of U.S. Route 66 from Needles to Los Angeles was the most heavily traveled section of the highway, and in 1934 this segment was paved. Much of the paving of U.S. Route 66 was completed by the Works Progress Administration during the Great Depression of the 1930s. By 1938 all of U.S. Route 66 was paved (Bischoff 2005; Scott and Kelly 1988).

U.S. Route 66 was an important transportation route during the Great Depression. In his book, *The Grapes of Wrath*, John Steinbeck wrote about migration of Midwestern farmers to the Pacific coast along this roadway. World War II caused further migration to the west coast along U.S. Route 66 as millions of Americans went to work in war related jobs in California. U.S. Route 66 became so famous that it was memorialized in Bobby Troup's popular song "Get Your Kicks on U.S. Route 66" (Scott and Kelly 1988) and was featured in many Hollywood movies.

As a consequence of its heavy use, thousands of businesses opened along U.S. Route 66, mostly serving cross-country travelers. Businesses varied from grocery stores, service stations, restaurants, and motels to dance halls and tourist attractions. One of these tourist attractions in the project vicinity may have been the Pisgah Crater, a young volcanic cinder cone located south of the Project APE (Figure 2.8-1). A road was constructed from U.S. Route 66 to the Pisgah Crater between the late 1930s and early 1950s from U.S. Route 66 either to provide access for travelers along the highway or for local aggregate miners (Scott and Kelly 1988).

Barstow was the last stop from Los Angeles before crossing the desert or the first stop after the desert, and was a popular rest area along the highway even during the Depression. During that time, business from U.S. Route 66 was an important part of the economies of many towns and small cities. By World War II, many businesses along U.S. Route 66 competed for travelers' money. Native American crafts sales became an important industry along the route. During the war, military use of the road increased in conjunction with development of military training bases in the Mojave Desert (Scott and Kelly 1988).

The Golden Age of U.S. Route 66 was the era after World War II and before the opening of other major east-west interstate highways, such as I-40. The increased traffic along U.S. Route 66 also led to its demise. Although the highway was an important east-west thoroughfare, it could no longer handle the volume of traffic and heavy military equipment using the road. After World War II, a new national interstate highway system was planned, which eventually replaced much of U.S. Route 66 (Scott and Kelly 1988).

There are no historic buildings associated with U.S. Route 66 along the segment of the road that is within 0.5 miles of the Project APE. There are historical buildings associated with U.S. Route 66 in the town of Ludlow, located about 12 miles east of Pisgah and about 11 miles east of the Project, and in Newberry Springs, about 15 miles west of the I-40 Hector exit and about 13 miles west of the Project.

Interstate Highways

Throughout the 1950s and 1960s, U.S. Route 66 remained the main road between the Midwest and the West Coast. Increased traffic and the narrowness of the roadway eventually led to the downfall of the road. On August 2, 1956, President Dwight D. Eisenhower signed the Federal Aid Highway Act which provided funding to upgrade America's roads. Eisenhower based his vision of a more connected America on Germany's Reichautobahen rural super highways. Eisenhower and his advisors originally envisioned creating a 40,000 mile interstate system costing approximately twenty-seven billion dollars. Construction began almost immediately throughout the United States (Weingroff 2008).

On December 13, 1958, I-15 opened between Victorville and Barstow. This marked the beginning of the modern highway era in the Barstow area. The entire length of I-15 from Los Angeles to Las Vegas was opened by July 1961. At that time, the stretch between Baker and Las Vegas was used by more than 500 vehicles an hour in one direction (Swisher 1997).

I-40 begins at its junction with I-15 in Barstow, then runs through the Mojave Desert to Needles and into Arizona. I-40 is located along the southern edge of the Project APE. Although the I-40 is now a cross-country highway, its last sections were not built until 1980. In the southwest, much of present day I-40 absorbed U.S. Route 66. Many of the western portions of I-40 also follow the Beale Wagon Road. The segment of I-40 in the project vicinity was not constructed until 1968.

Mining in the Mojave Desert

Since the 1860s, mining has been the most important commercial industry near the Project APE. Silver was discovered in 1863, although it is possible the Spanish had mined in the area almost a century before. Prospectors attempted to establish mines in the area to sell to investors with sufficient capital. In the following decade, smaller operators attempted to compete with larger corporations, but without railroad transportation, very little money was made until the early 1880s with the coming of railroad through the eastern Mojave Desert (Brooks and others 1980; King and Casebier 1976:300-305).

The period between 1900 and 1919 was known as the "the Great Years" for mining in northeastern San Bernardino County (King and Casebier 1976:305) as it was more profitable than any other time. Copper, lead, zinc, and other base metals, as well as gold and silver, were mined throughout the Mojave Desert and San Bernardino County. Also, during World War I, chromium, manganese, tungsten, and vanadium were mined. Several large mining districts were developed, including Copper World, near Valley Wells; gold mines at Hart; lead, zinc, and copper in the Mohawk mines near Mountain Pass; copper mines near Von Trigger Spring; and gold mines at the north end of Old Dad Mountain (King and Casebier 1976).

During the Great Depression, a resurgence of gold mining took place, but World War II caused a return to the mining of base metals. The Vulcan Iron mine, in the Providence Mountains northeast of the Project, was excavated during that time. Since the end of World War II, mining in the area has considerably slowed. More recently, other nonmetals such as clay, talc and cinder mining have gained popularity, especially around the Kingston Mountains in the vicinity of I-15. Aggregate mining for sand and gravel has

become prevalent in the area (King and Casebier 1976).

Manganese Mining in the Project Vicinity

Manganese metal is essential for manufacturing iron and steel, and was first mined in earnest in the United States during World War I. Because of the absence of high-grade ores, more than 95 percent of the manganese used in the United States was imported from the Union of Soviet Socialist Republics, the Gold Coast of Africa, Cuba, Brazil, and India. The onset of World War I threatened the foreign supply of manganese, stimulating development of domestic manganese mining. During World War I, low-grade deposits were mined in Montana and California, and in 1918, the United States produced 16.8 percent of the world supply of manganese, 35 percent of which was used domestically (Jones 1994; Time Magazine 1940a).

After World War I, domestic manganese mining decreased substantially because of the high costs compared to foreign production. Between 1930 and 1940, about 37 percent of the manganese imported into the United States came from the Union of Soviet Socialist Republics. When World War II began in Europe in 1939, domestic manganese mining once again increased. Imports from Russia were curtailed when Italy entered the war in June 1940 and prevented Russian ore shipments from traveling through the Mediterranean Sea, and later war blockades further thwarted manganese imports (Jones 1994; Time Magazine 1940a; Tucker and Sampson 1943; Williams 1940).

Beginning in 1940, the federal government took steps to build stockpiles of strategic metals, including manganese. In June 1940, the Metals Reserve Company, a branch of the Reconstruction Finance Corporation, was established to stockpile critical metals and subsidize domestic producers. The Metals Reserve Company awarded a contract to the Anaconda Copper Company for 240,000 tons of manganese from the company's Emma Mine in Butte, Montana. The Emma Mine produced much of the domestic manganese during World War II, but the Metals Reserve Company stimulated additional domestic production by offering $48 per ton for high grade ore (48 percent or more manganese), $35.20 per ton for low grade A ore (44 percent manganese), and $26.00 per ton for low grade B ore (40 percent manganese). Ores containing 35 to 39 percent manganese also were purchased at a reduced price (Jones 1994; Life Magazine 1942; Time Magazine 1940a, 1940b; Williams 1940).

During World War II, California was the second largest producer of domestic manganese, behind Montana. By the end of 1946, more than 168,000 tons had been produced from 800 known deposits in 675 locations in 44 counties. More than 80 percent of this production occurred during World War I and World War II (70,000 tons between 1915 and 1919 and 79,000 tons between 1941 and 1945). Between 1930 and 1940, production was limited to a few hundred tons because of the small size and low grade of California's deposits. Manganese mining was profitable during times of war because prices were subsidized to cover the costs of concentrating the ore and buyers were willing to accept ores with high silica content (Trask 1950). A new flotation process developed in Cuba after World War II enhanced recovery of manganese from lower grade ores.

Between 1867, when manganese was first mined in California, and 1946, six California counties each produced more than 10,000 tons of manganese ore. San Bernardino County was sixth on the list, with 12,989 tons of low-grade ore, much of which was produced during World War II. The county with the highest production numbers was Stanislaus County with 40,647 tons, followed by San Joaquin County with 34,917 tons,

Trinity County with 16,634 tons, Riverside County with 14,906 tons, and Mendocino County with 13,087 tons (Trask 1950).

Manganese deposits have been documented in San Bernardino County in the following areas:

1. South end of the Owlshead Mountains (about 60 miles north of the Project APE)
2. Avawatz and Silver Lake region about 25 miles south of the Owlshead Mountains (about 30 miles north of the Project APE)
3. South slope of the Cady Mountains between Newberry and Ludlow (includes the Project APE)
4. Newberry Mountain south of Newberry (about 15 miles east of Project APE)
5. Whipple Mountains north of Parker (about 120 to 130 miles southeast of the Project APE)
6. Needles area (about 95 miles east of the Project APE) (Tucker and Sampson 1943; Wright et al. 1953).

Reports of the California Division of Mines and Geology in 1943 and 1953 provided specific information about eleven manganese mines in San Bernardino County (Table 2.9-1). (There likely were other manganese deposits worked at some point within the county that either were not substantial enough to be mentioned or were unknown to the Division of Mines and Geology.) At least four of these mines were in operation toward the end of World War I; the rest of the mines began operation during World War II, with the exception of the Logan Mine, which was located in 1930. Manganese mines in San Bernardino County typically were small operations owned by individuals residing in nearby communities. During World War II, many of the property owners leased their mines to corporations or other individuals. Only five of the documented manganese mines in San Bernardino County were part of larger mining districts. Four of these are in the Monumental District in the Whipple Mountains in the vicinity of Parker, Arizona and the fifth is in the Ibex District northwest of Needles (Tucker and Sampson 1943; Wright et al. 1953).

During World War II, manganese producers in San Bernardino County shipped their ore to Metals Reserve Company stockpile points in Parker and Phoenix, Arizona and to Sacramento. Lower grade ores with 15 to 35 percent manganese were shipped to the Kaiser Steel Corporation in Fontana, California. After the war, the U.S. government continued to stockpile manganese, but domestic production decreased. Several manganese deposits continued to be sporadically worked in San Bernardino County after World War II. California as a whole produced less high grade ore (greater that 35 percent manganese) after World War II. In 1949 and 1950, the state produced less than 500 tons and none in 1951. Between 1952 and 1958, 70,000 tons were shipped from California mines, but no additional manganese shipments were recorded between 1959 and 1990 (Jones 1994; Tucker and Sampson 1943; Wright et al. 1953).

The quality of the California manganese deposits, including those in San Bernardino County, required hand sorting to identify the higher grade ores. Hand sorting was labor intensive and operation of the mines was cost effective only at times when manganese was in great demand and prices were high. As a result, the manganese mines were only intermittently worked by small crews, and often stood idle for extended periods of time. California Division of Mines and Geology reports indicate that the smaller mines typically employed 2 men, and the larger mines employed as many as 6 to 10 men. Because of the remote locations of the mines, employees likely camped or constructed simple residential structures on site. The extraction and hand sorting of the manganese ore

required little capital, and most mines were operated by individual miners who opportunistically operated their own claims or leased claims during the war periods. During World War II some mines in San Bernardino County were leased by corporations, but due to the small size of the mines and the low grade of the ore, relatively few miners were employed (Trask 1950; Wright and others 1953).

Most of the manganese deposits were shallow and often were worked to depths of 10 of feet or less. The deepest mines were the New Deal Mine (90 feet) and the Stewart Mine (50 feet). Documentation indicates that equipment at most of the mines was limited to shovels, compressors, ore carts, and structures used for sorting such as chutes and conveyor belts. Dynamite may have been used to extract ore. According to reports of the California Division of Mines and Geology, only the New Deal Mine (also known as the Owl's Hole Mine, Old Hole Mine, and Owl's Head Mine), which was the most productive mine in San Bernardino County, had its own mill. (Field investigations conducted during this study indicate that miners also operated a small mill at the Logan Mine). Although some ore from nearby mines might have been hauled to the mill at the New Deal Mine for processing, the mill was in a remote location and most of manganese ore extracted from the San Bernardino County manganese mines probably was shipped without any processing other than sorting (Jenkins 1943; Wright et al. 1953).

Southern California Edison (SCE) and the Hoover Dam

Two parallel SCE steel-tower 220kV transmission lines are located the Pisgah Substation Triangle area and the historic built environment 0.5-mile buffer of the Project APE (Figure 2.8-1). The SCE 220kV North Transmission Line was constructed between 1936 and 1939 and the SCE South 220-Kilvolt South Transmission Line between 1939 and 1941. The transmission lines originate at the SCE switchyard at the Hoover Dam and terminate in Chino, California. The transmission lines were constructed to deliver power from the Hoover Dam to SCE service areas in southern California.

Plans for development of a hydroelectric plant on the Colorado River were conceived as early as 1902 in response to fuel shortages that were limiting the mining activities in the vicinity of the river. SCE began to investigate development of such a plant and signed an option to utilize river water for power generation. Engineers surveyed the Colorado River and a preferred dam site was selected, but at the time the technology to transport the power to the SCE's service area (a distance of 300 to 400 miles) at high voltages did not exist. Because of technological limitations and the decline in mining activity along the Colorado River, SCE abandoned this option (Myers 1983).

Throughout the next twenty years, development of a power generating facility on the Colorado River was discussed and debated by public and private power companies and the concept of the use of a dam was investigated to control the highly variable flows of the river. In 1921, SCE and U.S. Geological Survey engineers once again surveyed the river and throughout the 1920s, SCE filed licensing applications with the Federal Power Commission in an effort to obtain the right to construct dams and power generating facilities, but none were approved. In 1928, Congress passed the Boulder Canyon Act, which stipulated that the federal government would construct a dam on the Colorado River if public and private utility companies would take responsibility for the distribution of electrical hydropower. In 1930, SCE signed a contract stating that they would buy and distribute power for themselves and all other investor-owned utility companies. The Los Angeles Bureau of Power and Light agreed to purchase and distribute power for state and municipal utilities, as well as for the metropolitan water district (Myers 1983).

Construction of Hoover Dam began in 1931 and was completed in 1935. Power

production for use began in 1936 when power was delivered to the cities of Los Angeles, Pasadena, Glendale, and Burbank through three parallel transmission lines constructed by the Los Angeles Bureau of Power and Light (currently Los Angeles Department of Water and Power). The second company to distribute Hoover Dam power was the Nevada-California Corporation. The power was conveyed by a 132kV transmission line that had been originally constructed in 1930 and 1931 to deliver power to the dam site during construction. This transmission line is known as the Edison Company Boulder Dam-San Bernardino Electrical Transmission Line (Hatheway 2006; Hughes 1993; Myers 1983).

The Metropolitan Water District of Southern California was the next to distribute electrical power in 1938. This transmission line, known as the Metropolitan Water District Line, used technology similar to that used previously by SCE for 220kV transmission lines in southern California. Utility companies in southern California, such as the Pacific Light and Power Company (which merged with SCE in 1917) and SCE, were innovators in the development of high voltage systems. In 1926, Stanford University established a high-voltage laboratory and worked with PG&E and SCE in research and development. Through this collaboration insulators for California's 220kV lines were developed (Hughes 1993; Myers 1983; Schweigert and Labrum 2001).

The SCE 220kV North Transmission Line was constructed between 1936 and 1939, using the same design and technology SCE had been using for its high-voltage transmission lines in southern California (including its Vincent 220kV line) and the design used by the Metropolitan Water District for its Hoover Dam line. The transmission line was energized in 1939, after the completion of Hoover generating units A-6 and A-7 (Myers 1983; Schweigert and Labrum 2001).

When World War II began in Europe, SCE planners anticipated an increase in demand for power in southern California. SCE began construction on a second transmission line, the SCE South 220-Kilvolt South Transmission Line, in 1939. SCE North and SCE South take divergent courses from the SCE switchyard at the Hoover Dam, but meet near Hemenway Wash in Nevada, and run nearly parallel to each other from north of Boulder City, Nevada to Chino, California. SCE North and SCE South are parallel within the Project APE (Figure 2.8-1). Both SCE North and SCE South delivered electricity that was essential to war-time industries in Southern California. These industries included the Douglas, Vultee, and Northrup aircraft plants, Consolidated Steel, the Long Beach Naval Shipyard, Kaiser Steel, Alcoa, Columbia Steel, as well as automobile factories, tire plants, oil refineries, ordnance works, and military bases and depots (Myers 1983; Schweigert and Labrum 2001).

Natural Gas Pipelines

Two natural gas pipelines run through the Project APE: the PG&E Pipeline and the Mojave Pipeline (Figure 2.8-1). Although it was known that natural gas could be used for fuel in the early years of the nineteenth century, it was not until 1859 when large amounts of natural gas were discovered in Titusville, Pennsylvania, that a commercial market for natural gas developed. Wide-spread use of natural gas began in the west when southwestern natural gas fields were discovered in the 1920s. Large natural gas fields found in the north Texas panhandle in 1918 and in Kansas in 1922, as well as the development of the technology needed to transport natural gas the long distances to urban areas, resulted in the development of the interstate gas pipeline industry (Castaneda 2001).

The PG&E Pipeline on the Project Site is a 33-to-44-inch natural gas pipeline. The

pipeline is an interstate pipeline that carries natural gas from the natural gas fields of Texas and New Mexico to Northern California. The 502-mile long pipeline was constructed in 1948, and at the time, was the largest pipeline in the country (PG&E Corporation 2004).

The Mojave Pipeline on the Project Site is a 24-inch natural gas pipeline, owned by El Paso Natural Gas Corporation, one of the largest natural gas companies in North America. The El Paso Natural Gas Corporation expanded their services into southern California in the 1940s in response to the post World War II population growth. The Mojave Pipeline is a 450-mile-long interstate pipeline that carries natural gas from Arizona to Kern County, California. It was constructed in the late 1940s (El Paso Corporation 2008; International Directory of Company Histories 1996).

Military Use

Several military bases are located in the Mojave Desert region and within the same region as the Project, including Twenty-Nine Palms, south of the Project, and Fort Irwin, located approximately 37 miles northeast of Barstow. These, and other military installations in the area, led to an increase of traffic near the Project, and in the area population as civilians associated with the military took up residence.

During World War II, General George S. Patton established the Desert Training Center in California and Arizona, much of which was located on public land east of the Project APE. Training exercises were designed to prepare U.S. troops for combat in the hostile desert terrain and climate. The army established camps and emergency airfields, remnants of which can still be found, including rock alignments designating tent camps and emergency airfields. The Desert Training Center closed in 1944 toward the end of World War II. During desert training, the army created the first detailed maps of the Mojave Desert to facilitate training activities. The maps were created using aerial photography and land-based methods. After the war, those maps were used by the U.S. Geological Survey to create 15-minute topographic quadrangles in the late 1940s and early 1950s (Nystrom 2003). These training areas were located on public land east of the Project APE; there are no known desert training areas in the project vicinity.

Twenty years later, during the Cold War, the Mojave Desert in the vicinity of the Project APE again hosted a major training exercise. A training exercise, known as Desert Strike included troops from both the U.S. Army and Air Force and encompassed a 12 million-acre area in California and Arizona centered on the Colorado River. The two-week exercise was designed to test tactical deployment of nuclear weapons, and involved combat training between two hypothetical countries. Desert Strike occurred in May 1964 and resulted in the expenditure of approximately $60 million and 33 deaths (Garthoff 2001; Nystrom 2003; Time Magazine 1964).

TECHNICAL AREA: TRANSMISSION LINE UPGRADES

Item 6: Provide results from a pedestrian cultural resources survey of no less than 25 percent of the transmission line Right-of-Way and the regulatory buffer zone, with a sample survey structure developed in consultation with the BLM and CEC.

Response:

URS performed a record search and literature review of the project corridor and a ¼ mile radius on either side of the corridor for the transmission line right-of-way and regulatory buffers. A pedestrian survey will be performed as part of Southern California Edison's environmental impact analysis of the proposed transmission line upgrade project once they have completed their engineering analysis and verified the specific alignment of the line and areas of disturbance including tower locations, substation location, pull sites, and lay down areas. These will be provided at a later date. This approach was sent to the CEC and BLM on December 17th, 2009 for concurrence. The Applicant has not yet received a response.

A self-directed record search and literature review was conducted by URS archaeologist Dustin Kay at the San Bernardino Archaeological Information Center (SBAIC) in January 2010. The review consisted of reviewing historic topographic maps, researching available archaeological and historical studies, and accessing federal and state listings of significant cultural resource properties and other records available at the SBAIC.

Results of the SBAIC record search are summarized in the tables below. The 65-mile long transmission line corridor was researched for previous cultural resource studies that have been conducted in and near the transmission line corridor, as well as previously recorded cultural resource sites that have been recorded along the alignment. A total of 71 cultural resource studies have been conducted along the route, and a total of 109 cultural resource sites have been recorded along the alignment. Of the 109 sites recorded along the alignment, a total of 18 are either in the corridor or within ¼ mile of the corridor, while the remainder (91) are outside of the corridor or farther than ¼ mile of it. Of these 91 resources outside the corridor, 29 resources fall within the Solar 1 survey area. Previous cultural resource studies are summarized in table 1, and previously recorded cultural resource sites are summarized in table 2 below.

The records search conducted at the SBAIC included specific information about previous studies as well as information about previously recorded sites in the area described above. The 71 previous studies conducted within and near the corridor are summarized in Table 1, provided as attachment TRANS-1, located behind this response. A figure showing the areas along the proposed upgrade alignment which have been previously surveyed is filed under confidential cover. Approximately 17 percent of the alignment has been previously surveyed. Results of the previous surveys are contained within this response and in the figures filed under confidential cover.

The 109 cultural resource sites that have been previously recorded along the alignment are summarized in Table 2, provided as attachment TRANS-2, located behind this response. A figure showing the previously recorded sites is filed under confidential cover.

Table 1 - Previous Surveys within Project Area and within 1/4-Mile Radius of Project

N.A.D.B. #	Project Name	Prepared By	Prepared For	Date Submitted	Within Project Area (Yes/No)?
1060046	Mohave Desert Pipeline Survey	Gordon Grosscup and Jack Smith	Southern California Gas Company	August 1960	Yes
1060078	Life and Adventure Along the Mojave River Trail	Clifford Walker	San Bernardino County Museum	Fall 1967	Yes
1060108	An Archaeological Survey of the Proposed Right-of-Way of the Morongo-Yucca-Upper Coachella Valley Pipeline	Thomas F. King	U.S. Department of the Interior, National Park Service	September 1971	Yes
1060124	Preliminary Report on Archaeological Impact Study Southern California Edison Company Fry Mountain Project	Thomas F. King	Southern California Edison Company	June 1, 1972	Yes
1060191	Archaeological, Historical, and Paleontological Site Survey for County Service Area No. 70, Improvement Zone J	Robert Reynolds	County Service Area No. 70	December 26, 1973	Yes
1060213	Archaeological Analysis Summit Valley Road from State Highway #138 to Ranchero Street	Robert Reynolds	San Bernardino County Road Department, Public Works Agency	February 1974	Yes
1060240	Archaeological Impact Evaluation Southern California Edison Proposed Generating Station in Upper Johnson Valley and Associated Transmission, Gas and Fuel Routes	Carol A. Mortland	Southern California Edison Company	December 31, 1974	Yes
1060314	Archaeological Survey and Excavation Report of the proposed Southern California Edison 500 kV Tower Locations	Jack Preston Marshall	Southern California Edison Company	March 1976	Yes
1060466	Archaeological Historical Resources Assessment of proposed Arrowhead Lake Road HO4221, Hesperia area	Joseph E. Hearn	San Bernardino County Transportation Department	January 26, 1977	Yes
1060701	Archaeological Reconnaissance Report Checkers Motorcycle Race	Gary Stumpf	American Motorcycle Association	1978	Yes
1060772	Cultural Resources of Smith-Grube Subdivision, Tentative Tract No. 10717, Hesperia	Joseph E. Hearn	Inland Engineering Corporation	April 2, 1979	Yes
1060879	Cultural Resources Assessment Section 36, Township 8 North, Range 5 East, San Bernardino Base Meridian, San Bernardino County, California	Joseph E. Hearn	Duval Corporation	December 12, 1979	Yes
1060900	Prehistoric Cultural Resource Investigations Southern California Edison Lucerne Valley Project Summary Report	Edward B. Weil	Applied Conservation Technology, Inc.	October 29, 1979	Yes

N.A.D.B. #	Project Name	Prepared By	Prepared For	Date Submitted	Within Project Area (Yes/No)?
1060901	Prehistoric Cultural Resource Investigations for the Lucerne Valley Project, San Bernardino County, California	Edward B. Weil and Jamie Lytle-Webb	Southern California Edison Company	January 24, 1980	Yes
1060964	Cultural Resource Survey for a Portion of the Earp to Johnson Valley, California Enduro Racecourse Route	Richard H. Norwood	Bureau of Land Management	June 11, 1980	Yes
1060965	A Cultural Resource Inventory: Johnson Valley to Parker Motorcycle Race – the Public Comment Alternative	Ruth A. Musser	Bureau of Land Management	September 15, 1980	Yes
1061025	Archaeological, Historical, and Paleontological Site Survey for County Service Area No. 70	Ruth Harris	County Service Area No. 70	December 26, 1973	Yes
1061026	Archaeological, Historical, and Paleontological Site Survey for County Service Area No. 70, Improvement Zone J Addendum	Ruth Harris	County Service Area No. 70	February 7, 1974	Yes
1061027	Cultural Resources Assessment Baldy Mesa Water Lines County Service Area 70, Improvement Zone J	Robert E. Reynolds	County Service Area No. 70	September 1980	Yes
1061120	Cultural Resources Assessment of Tentative Tract No. 11842, Hesperia, California	Michael K. Lerch	Cubit Engineering	May 1981	Yes
1061219	An Archaeological Survey of the Proposed Southern California Edison Ivanpah Generating Plant Site and Related Rail, Coal Slurry, Water, and Transmission Line Corridors	Matthew Hall, Philip Wilke, Doran Cart, James Swenson, Stephan Bouscaren, and Kendall Kroesen	Southern California Edison Company	December 1981	Yes
1061220	The Ivanpah Generating Station Project Ethnographic (Native American) –Resources	Cultural Systems Research, Inc (Lowell Bean, Sylvia Vane, Jackson Young	Southern California Edison Company	March 10, 1982	Yes
1061256	Plan of Operations from Duval Company	Mark Q. Sutton	Bureau of Land Management	March 26, 1982	Yes
1061466	Cultural Resources Assessment of the Arrowhead Lake Road Improvement Project	San Bernardino County Museum Association	Environmental Public Works Agency County of San Bernardino	November 1984	Yes
1061499	Class I Cultural Resource Investigation for the Pacific Texas Pipeline Project State of California	John M. Foster and Roberta S. Greenwood	Engineering-Science	July 1985	Yes
1061712	Minor Subdivision 7/17/87/01V	Russell Kaldenberg	County of San Bernardino	August 31, 1987	Yes
1061787	Archaeological Field Visit 5-19-87-01V (Thomas Hassey)	Russell Kaldenberg	County of San Bernardino	August 6, 1997	Yes
1061800	A Cultural Resource Assessment of 10 Acres of Land in the Vicinity of Hesperia, San Bernardino County, California	Victor C. deMunck	Cubit Engineering	May 10, 1988	Yes
1061801	A Cultural Resource Assessment of 30 Acres of Land Designated as DN 87-0398 in the Vicinity of Hesperia, San Bernardino County, California	Victor C. deMunck	Cubit Engineering	May 21, 1988	Yes

N.A.D.B. #	Project Name	Prepared By	Prepared For	Date Submitted	Within Project Area (Yes/No)?
1061802	A Cultural Resource Assessment of 60 Acres of Land Designated as DN 87-0599 in the Vicinity of Hesperia, San Bernardino County, California	Victor C. deMunck	Cubit Engineering	May 25, 1988	Yes
1061856	A Reevaluation of and a Proposed Mitigation Plan for Archaeological Site CA-SBR-4597, Located on Tentative Tract No. 14073 in Hesperia, San Bernardino County, California	Joan S. Schneider	Carriage Homes	February 1989	Yes
1061891	Las Flores Ranch Archaeological Project Phase 1 Summary and Phase 2 Workplan	Claude Warren, Kevin Pete, Craig Woodman, Brenda Bowser	County of San Bernardino	December 3, 1987	Yes
1061895	Cultural Resources Inventory of the Proposed Rancho Las Flores Planned Unit Development San Bernardino California	Kevin Peter, Craig Woodman, Claude Warren, Robert Weaver	County of San Bernardino	July 20, 1989	Yes
1061915	Archaeological Survey of the Mojave River and Adjacent Regions	Gerald A. Smith	San Bernardino County Museum Association	1963	Yes
1061944	The Deep Creek Site (CA-SBR-176): A Late Prehistoric Base Camp in the Mojave River Forks Region, San Bernardino County, California	Jeffrey Altschul, William Johnson, and Matthew Sterner	Statistical Research Incorporated	1989	Yes
1061979	Cultural Resources Report for the All American Pipeline Project: Santa Barbara to McCamey, Texas	New Mexico State University	All American Pipeline Company	1989	Yes
1062158	Archaeological Impact Evaluation Southern California Edison Proposed Generating Station in Upper Johnson Valley and Associated Transmission, Gas, and Fuel Lines	Carol A. Mortland	Southern California Edison Company	June 30, 1974	Yes
1062220	Archaeological Sites of the California Desert Area (Owlshead, Amargosa Mojave Basin Planning Unit, Phase I-III: Sample Unit Records	Author Unknown	Bureau of Land Management	1978	Yes
1062388	A Cultural Resources Inventory and Limited Evaluation of the Proposed Mojave Pipeline Corridor in California and Arizona	Kelly R. McGuire	Woodward Clyde Consultants	July 9, 1990	Yes
1062396	Cultural Resources Assessment of Sumit Valley Management Company Planning Area 5 Near Hesperia, San Bernardino County, California	Kathleen C. Del Chario, Carol R. Demcak	Summit Valley Management Company	March 1991	Yes
1062399	A Cultural Resources Inventory of a Proposed Natural Gas Pipeline Corridor from Adelanto to Ward Valley, San Bernardino County, California	Kelly R. McGuire and Leslie Glover	Southern California Gas Company	March 1991	Yes
1062496	An Archaeological Assessment of Tentative Tract #14995, Apple Valley, San Bernardino County, California	Robert E. Parr	California Desert Studies Consortium	January 1992	Yes
1062515	Class III Cultural Resources Inventory of the Morongo Basin Pipeline Project, Hesperia to Landers, San Bernardino County, California	Michael K. Lerch & Associates	Tom Dodson & Associates	February 1992	Yes

N.A.D.B. #	Project Name	Prepared By	Prepared For	Date Submitted	Within Project Area (Yes/No)?
1062564	Cultural Resources Management Plan Rancho Las Flores Project, Hesperia, San Bernardino County, California	Chambers Group, Inc.	ARC Las Flores Limited Partnership	December 1990	Yes
1062688	Cultural Resources Assessment Parcel 13577 Located in the Apple Valley Area of San Bernardino County, California	Michael Hogan	David Tarango	October 23, 1992	Yes
1062689	Archaeological Literature and Records Review for the Rancho Lucerne Planned Development Project in the County of San Bernardino, California	Joan C. Brown	STA Consultants	October 1992	Yes
1062690	Addendum to: Archaeological Literature and Records Review for the Rancho Lucerne Planned Development Project in the County of San Bernardino, California	Joan C. Brown	STA Consultants	October 1992	Yes
1062807	Addendum to Cultural Resources Survey Report for the Fort Cady Boric Acid Mining and Processing Facility, Newbery Springs, California	Rebecca McCorkle Apple	Fort Cady Minerals Corporation	March 1993	Yes
1062830	Appendix A: Historic Resource Evaluation: Archaeological Literature and Records Review for the Rancho Lucerne Planned Development Project in the County of San Bernardino, California	Joan C. Brown	STA Consultants	October 1992	Yes
1062994	Prehistoric and Historic Land Use of he Pisgah Crater Lava Flows and Lavic Lake Area, Marine Corps Air Ground Combat Center, San Bernardino County, California	Meg McDonald and Daniel McCarthy	U.S. Army Corps of Engineers	December 1994	Yes
1063019	Results of a Cultural Resources Assessment, Crystal Creek Pumped Storage Hydroelectric Facility, Lucerne Valley, San Bernardino County, California	Jane Rosenthal	Creamer and Nobel Engineers	January 1993	Yes
1063020	Draft Adelante-Lugo Transmission Project Cultural Resources Assessment	Brad Sturm, Deborah McLean, Kenneth Becker, Jane Rosenthal	City of Anaheim	December 7, 1993	Yes
1063719	A Resurvey, Reevaluation & Revised Mitigation Plan for CA-SBR-4597	Roger Hatheway	Pleasant & Associates	2001	Yes
1063720	Negative Archaeological Survey Report Southern California Edison AT&T Cell Site Utility Connection Project	Compass Rose Archaeological, Inc.	Southern California Edison Company	March 2002	Yes
1063729	Cultural Resources Inventory of a Land Transfer of Solid Waste Landfill Facilities from the Bureau of Land Management to the County of San Bernardino	Michael K. Lerch & Associates	County of San Bernardino	June 1997	Yes
1063840	Cultural Resources Survey for the Cadiz Groundwater Storage and Dry-Year Supply Program, San Bernardino County, California	Applied Earthworks, Inc.	P&D Consultants	November 1999	Yes

N.A.D.B. #	Project Name	Prepared By	Prepared For	Date Submitted	Within Project Area (Yes/No)?
1064027	Cultural Resources Report Rancho Lucerne Development	Bruce Love and Bai Tang	Tom Dodson and Associates	February 5, 1998	Yes
1064028	Adaptive Use Report: The Oasis/Rabbit Springs Ranch Historic Buildings Rancho Lucerne Development, Lucerne Valley, San Bernardino County, California	Andrea Urbas	Tom Dodson and Associates	March 12, 1998	Yes
1064520	Cultural Resource Monitoring Program Mesa Estates (Tract No. 14073) City of Hesperia, San Bernardino County, California	Riordan Goodwin	KB Home	March 23, 2005	Yes
1064541	Skyhi and Hercules 12 kV Distribution Lines Lucerne Valley and Hesperia Areas, San Bernardino County	Compass Rose Archaeological, Inc.	Southern California Edison Company	October 18, 2004	Yes
1064562	Cultural Resources Inventory of the Big Bear Reinforcement Project, San Bernardino County, California	Daron G. Duke	Trigon, EPC	June 2005	Yes
1064698	Results of a Phase I Cultural Resources Investigation for the Deep Creek Assemblage Project Area, San Bernardino County, California	McKenna, et al.	United Engineering Group	April 14, 2006	Yes
1064741	Historical/Archaeological Resources Survey Report Tentative Parcel Map Number 16584 in the City of Hesperia, San Bernardino County, California	Bai Tang, Michael Hogan, Terri Jacquemain	Peterson Land and Development, Inc.	February 9, 2006	Yes
1064883	An Historical Resources Investigation within APN 0438-163-06, Kiowa Road, San Bernardino County, California	John Stephen Alexandrowicz	Westar Plaza, LLC	August 26, 2006	Yes
1064966	Phase I Cultural Resources Assessment Tentative Tract Map No. 17550, Hesperia, San Bernardino County, California	Richard S. Shepard	Bonterra Consulting	July 25, 2005	Yes
1065225	Cultural Resources Overview and Management Plan Rancho Las Flores Project, Hesperia, San Bernardino County, California	Professional Archaeological Services	Rancho Las Flores, LLC	October 2004	Yes
1065371	Phase I Cultural Resources Investigation of Approximately 101 Acres of Unimproved Land in the City of Hesperia, San Bernardino County, California	McKenna, et al.	AEI-CASC Engineering		Yes
1065893	Archaeological Survey of an 18-Acre Parcel south of Lugo Substation, Hesperia, San Bernardino County, California	Koral Ahmet	Southern California Edison Company	April 2008	Yes
1065903	Results of a Class III Archaeological Survey for the Proposed Expansion of the Hector Mine Operations SE of Newberry Springs and in the Mohave Desert of San Bernardino Co., California	McKenna, et al.	Lilburn Corporation	March 3, 2008	Yes
1065981	Archaeological Survey of Four Parcels Totaling 55 Acres Near Lugo Substation, Hesperia, San Bernardino County, California	Koral Ahmet	Southern California Edison Company	September 2008	Yes
1066333	Cultural Resources Survey for the Mohave Water Agency Water Banking Project	Applied Earthworks, Inc.	Mohave Water Agency	June 2005	Yes

Table 2
Known Cultural Resource Sites Previously Documented Within a ¼ -Mile Search Radius

Primary No.	Site Description	Characterization of Artifacts	Within Project Area (Yes/No)?
36-000181	Sparse Lithic Scatter	Jasper and chalcedony flakes and points	No
36-001505	A large prehistoric lithic reduction site	Chipping stations, cobble test/quarry areas and lithic reduction loci of cryptocrystalline silicates and basalt.	Yes
36-001906	A prehistoric low density lithic scatter.	Several hundred flakes of cryptocrystalline silicates and some cores.	No
36-002073	Rock shelter site	Choppers, cores and burnt wood	No
36-002298	Prehistoric lithic reduction site	Containing low density quartzite flakes, shatter and a core.	No
36-002910	Refer to Solar One Technical Report April 2009.		Yes
36-003033	Historic Trail/ Road	The Mojave Trail/ Road. CHL-963	Yes
36-003132	Prehistoric lithic scatter.	Low density of quartzite flakes and a knife fragment	No
36-003516	Prehistoric lithic reduction site	Three cleared areas, cryptocrystalline silicate flakes, cores and test blocks.	No
36-003819	Prehistoric lithic scatter.	Quartzite scraper, hammerstone and flakes.	No
36-003849	Prehistoric food preparation site.	Fire affected rock, quartzite flakes and core, and a roasting pit.	Yes
36-003850	Prehistoric lithic scatter.	Quartzite flakes and cores.	No
36-003851	Prehistoric lithic scatter.	Flakes of various materials, and leaf shaped knife or point.	No
36-004132	Prehistoric occupation site.	Groundstone, core, flakes, scraper, fire affected rock and burnt bone.	No
36-004255	Historic telephone line.	The Hesperia Pole Line built in 1920-1921. Removed in 1950s.	No
36-004256	Historic road	The Hesperia Road.	Yes
36-004274	Historic road	Toll Road Hesperia-Road Bypass.	No
36-004276	Historic road	Coxey Road, built in 1861.	Yes
36-004307	Prehistoric lithic scatter.	Two basalt edge modified flakes and a single flake.	No
36-004308	Prehistoric lithic reduction site	Two lithic reduction loci and a sparse scatter.	No
36-004309	Prehistoric lithic scatter.	Flakes of jasper and possible basalt tools.	No
36-004597	Prehistoric lithic reduction site	Groundstone, milling features, and lithics	No
36-004598	Prehistoric occupation site.	Midden soil, fire affected rock, burnt bone and quartzite flakes.	No
36-004680	Prehistoric lithic reduction site	Sparse scatter of lithics and cores.	No
36-004740	Prehistoric lithic scatter.	Three quartzite flakes	No
36-005566	Prehistoric lithic scatter.	Two quartzite scrapers and flakes	No
36-005667			No
36-006512	Refer to Solar One Technical Report April 2009.		Yes
36-006513	Refer to Solar One Technical Report April 2009.		Yes
36-006693	Refer to Solar One Technical Report April 2009.		No
36-006793	Historic Railroad	A.T. & S.F. Railroad.	No

Table 2
Known Cultural Resource Sites Previously Documented Within a ¼ -Mile Search Radius

Primary No.	Site Description	Characterization of Artifacts	Within Project Area (Yes/No)?
36-006844	Prehistoric lithic reduction site	Quartzite flakes, cores, hammerstones, scrapers, core tools and chopper.	Yes
36-006845	Prehistoric lithic scatter.	Quartzite, scrapers, two flakes and hammerstone.	No
36-006846	Prehistoric lithic reduction site	Manos, core tool, and flakes.	No
36-007069	Prehistoric lithic scatter.	Four quartzite flakes	No
36-007100	Prehistoric lithic reduction site	Two chipping stations, core and lithic debitage.	No
36-007102	Prehistoric lithic reduction site	Two chipping stations, core and lithic debitage.	No
36-007103	Prehistoric lithic scatter.	12 cryptocrystalline silicate flakes	No
36-007105	Historic trash scatter	Milled wood and can scatter.	No
36-007106	Prehistoric lithic scatter.	Basalt flakes	No
36-007107	Prehistoric lithic reduction site	Four chipping stations, with basalt and rhyolite cores and flakes.	No
36-007108	Prehistoric lithic reduction site	One chipping station, with lithic debitage from various materials.	No
36-007966	Prehistoric lithic reduction site	Jasper flakes and bifaces.	No
36-007968	Prehistoric lithic reduction site	Chalcedony flakes, biface, core, brownware sherd, and flakes from various materials.	No
36-007969	Prehistoric lithic reduction site	Chalcedony and jasper flakes, two biface..	No
36-007974	Historic Road	Goat Trail Road; Las Flores Road	Yes
36-010316	Historic Transmission Line	Arrowhead-Mohave Siphon-Devil Canyon-Shandin 115kV Live; AE-Shapiro-2H; South Sierras Power Company Transmission Line	No
36-012999	Historic Trash scatter	Sparse can scatter	No
36-013000	Prehistoric lithic scatter.	Quartzite flakes, scrapers, fire affected rock and mano fragment.	No
36-013001	Prehistoric lithic scatter.	Quartzite flakes, and scrapers	No
36-013007	Prehistoric isolate	Basalt core	No
36-013008	Historic isolate	Two amethyst glass fragments	No
36-013009	Prehistoric isolate	Quartzite flake	No
36-013010	Prehistoric isolate	Quartzite flake	No
36-013015	Historic isolate	One vent hole can	No
36-013017	Historic isolate	One church key Coors beer can	No
36-013018	Prehistoric isolate	Two basalt tested cobbles	No
36-013762	Prehistoric lithic reduction site	Fire hearths and lithic debitage	No
36-013767	Historic can scatter	150 – 200 cans	No
36-013768	Historic or prehistoric rock feature	A partial rock ring	No
36-013769	Prehistoric lithic scatter.	Eight quartzite flakes	No
36-013770	Prehistoric lithic scatter.	Quartzite flakes and cores	Yes
36-013771	Prehistoric lithic scatter.	Quartzite flakes and cores	Yes
36-014067	Prehistoric lithic scatter.	A flake, core and hearth feature	No

Table 2 Known Cultural Resource Sites Previously Documented Within a ¼ -Mile Search Radius			
Primary No.	**Site Description**	**Characterization of Artifacts**	**Within Project Area (Yes/No)?**
36-014412	Prehistoric lithic scatter.	Two Pinto points and two flakes.	No
36-014622	Refer to Solar One Technical Report April 2009.		No
36-014623	Refer to Solar One Technical Report April 2009.		No
36-014626	Prehistoric lithic scatter.	13 jasper flakes	No
36-014804	Refer to Solar One Technical Report April 2009.		No
36-014805	Refer to Solar One Technical Report April 2009.		Yes
36-014825	Refer to Solar One Technical Report April 2009.		No
36-014826	Refer to Solar One Technical Report April 2009.		No
36-014827	Refer to Solar One Technical Report April 2009.		Yes
36-014828	Refer to Solar One Technical Report April 2009.		No
36-014829	Refer to Solar One Technical Report April 2009.		No
36-014830	Refer to Solar One Technical Report April 2009.		No
36-014831	Refer to Solar One Technical Report April 2009.		No
36-014855	Refer to Solar One Technical Report April 2009.		No
36-014856	Refer to Solar One Technical Report April 2009.		No
36-014875	Refer to Solar One Technical Report April 2009.		No
36-014876	Refer to Solar One Technical Report April 2009.		No
36-014877	Refer to Solar One Technical Report April 2009.		No
36-014878	Refer to Solar One Technical Report April 2009.		Yes
36-014880	Refer to Solar One Technical Report April 2009.		No
36-015508	Historic Landmark	Chimney Rock, CHL 737	No
36-020872	Refer to Solar One Technical Report April 2009.		No
36-060660	Prehistoric isolate	Jasper flake	No
36-060781	Prehistoric isolate	Quartz flake	No
36-060871	Prehistoric isolate	Quartzite flake	No
36-060874	Prehistoric isolate	Jasper knife	No
36-060888	Prehistoric isolate	Two basalt flakes	No
36-060889	Prehistoric isolate	Quartzite flake	No
36-061431	Refer to Solar One Technical Report April 2009.		No
36-061432	Refer to Solar One Technical Report April 2009.		No
36-061433	Refer to Solar One Technical Report April 2009.		No
36-061434	Refer to Solar One Technical Report April 2009.		No
36-061435	Refer to Solar One Technical Report April 2009.		No
36-061436	Refer to Solar One Technical Report April 2009.		No
36-061438	Prehistoric isolate	Cryptocrystalline silicate flake	No
36-061439	Prehistoric isolate	Four cryptocrystalline silicate flakes	No
36-061441	Prehistoric isolate	Five red cryptocrystalline silicate flakes	No
36-061445	Prehistoric isolate	One cryptocrystalline silicate core, two core fragments and one flake	No
PSBR-15	Prehistoric village site	Three locations with lithics, core tools, bifacial tools, groundstone, and pottery.	Yes
P1321-3	Prehistoric features	Wind carved rock shelter	No

Table 2 **Known Cultural Resource Sites Previously Documented Within a ¼ -Mile Search Radius**			
Primary No.	**Site Description**	**Characterization of Artifacts**	**Within Project Area (Yes/No)?**
P1321-4	Prehistoric lithic reduction site	Flakes, cores, hammerstones	Yes
P1321-5	Prehistoric lithic scatter.	Sparse concentration of lithics	No
P1321-6	Prehistoric feature	Rock Shelter	No
P1334-7	Prehistoric lithic scatter	Three manos, five flakes and one core	Yes
P1334-9	Prehistoric lithic scatter	Hammerstones, flakes, chopper, cobble tool, and shell.	No

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION
For the SES SOLAR ONE PROJECT

Docket No. 08-AFC-13

PROOF OF SERVICE
(Revised 12/2/09)

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ENERGY COMMISSION
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Vice Chair and Presiding Member
jboyd@energy.state.ca.us

JEFFREY D. BYRON
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Sacramento, California 95814
cholmes@energy.state.ca.us

Christopher Meyer
Project Manager
cmeyer@energy.state.ca.us

Public Adviser
publicadviser@energy.state.ca.us

*indicates change

DECLARATION OF SERVICE

I Corinne Lytle, declare that on January 29, 2009, I served and filed copies of the attached Applicant's Response to the CEC Transmission Line Upgrades Memo--Cultural Resources Responses. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at:

[www.energy.ca.gov/sitingcases/solarone].

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(*Check all that Apply*)

FOR SERVICE TO ALL OTHER PARTIES:

_____ sent electronically to all email addresses on the Proof of Service list;

_____ by personal delivery or by depositing in the United States mail at _____ with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses NOT marked "email preferred."

AND

FOR FILING WITH THE ENERGY COMMISSION:

_____ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

~~*OR*~~

depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 08-AFC-13
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct.

Original signed by

Corinne Lytle

*indicates change

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512

DOCKET
08-AFC-13
DATE MAY 05 2010
REC'D MAY 05 2010

May 5, 2010

NOTICE OF AVAILABILITY
STAFF ASSESSMENT and DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR THE PROPOSED CALICO SOLAR PROJECT
(08-AFC-13)

TO: MEMBERS OF THE PUBLIC

This notice is to inform you of the availability of the Staff Assessment and Draft Environmental Impact Statement (SA/DEIS) for the Calico Solar Project (08-AFC-13). The SA/DEIS contains the California Energy Commission staff's and U.S. Bureau of Land Management's (BLM's) environmental, public health and engineering evaluation of the proposed Calico Solar Project. The SA/DEIS also contains a proposed BLM land use plan amendment to the California Desert Conservation Area Plan. The SA/DEIS was published by the Energy Commission on March 30, 2010.

The California Energy Commission encourages public participation in the review of the Calico Solar Project Application for Certification and the SA/DEIS. Written comments on the SA/DEIS which a member of the public or interested party would like to have entered into the record before the Energy Commission's Evidentiary Hearing should be provided to Christopher Meyer, Energy Commission Project Manager, **no later than 5:00 p.m., June 4, 2010** at the address on this letterhead or by email to cmeyer@energy.state.ca.us.

The Energy Commission and the BLM have been jointly conducting the state and federal environmental review for the Calico Solar Project and recently released a joint SA/DEIS; however, the two agencies have now determined that it is necessary to produce separate, but coordinated, final environmental reviews and decision documents.

When the applicant filed separate applications with the Energy Commission and the BLM to obtain separate approvals to develop the project, it was deemed to be in the interest of both agencies and the public to share in the preparation of a joint environmental analysis of the proposed project to avoid duplication of staff efforts, to share staff expertise and information, to promote intergovernmental coordination at the local, state, and federal levels, and to facilitate public review by providing a joint SA/DEIS and a more efficient environmental review process.

The SA/DEIS also serves as the DEIS for an amendment to the California Desert Conservation Area (CDCA) plan that will allow for the development of the renewable energy projects should the BLM grant a Right-of-Way for the project. The BLM is required to issue a Final Environmental Impact Statement (FEIS) that will meet the specific National Environmental Policy Act (NEPA) requirements to accomplish the Plan Amendment, and to complete the Right-of-Way process. Similarly, the Energy Commission staff will publish a Revised Staff Assessment which, with the SA/DEIS, will be the staff's testimony and will allow the Energy Commission to proceed with evidentiary hearings, take public comment and testimony from parties to the process, and allow the Committee of two Commissioners to proceed with developing the

PROOF OF SERVICE (REVISED 05/05/10) FILED WITH
CD COPIES MAILED FROM SACRAMENTO ON 05/05/10
AA

Presiding Member's Proposed Decision in a timeframe that will allow both Agencies' required permitting actions to be concluded in a coordinated manner.

The Energy Commission Committee assigned to the Calico Solar Project proceedings will consider and weigh the testimony or comments or recommendations of all interested parties, including Energy Commission staff, the applicant, intervenors, public, and other local, state, and federal agencies, before issuing the Presiding Member's Proposed Decision (PMPD) for consideration by the full Energy Commission. The public, intervenors, local, state and federal agencies are encouraged to participate in these hearings. BLM will participate with the Energy Commission's Calico Solar Project Committee and staff in the hearings. The Energy Commission will issue notices at least ten days prior to any scheduled hearings.

The public comment period noticed in the Federal Register for the SA/DEIS and the Desert Plan Amendment closes on July 1, 2010. Please send your comments to Christopher Meyer, the Energy Commission Project Manager, at the Energy Commission's street address shown on the letterhead of this notice or by e-mail at cmeyer@energy.state.ca.us or Jim Stobaugh, the BLM Project Manager, at the BLM Nevada State Office at P.O. Box 12000, Reno NV 89520, or by e-mail at: cacalicospp@blm.gov. Both agencies will address all comments received on the SA/DEIS in their decision processes.

Summary of the Proposed Calico Solar Project

On December 1, 2008, Stirling Engine Systems Solar Three, LLC and Stirling Engine Systems Solar Six, LLC (SES, LLC) submitted an Application for Certification (AFC) to the California Energy Commission to develop the Stirling Engine Systems Solar One Project (now referred to as the Calico Solar Project) on 8,230 acres of public land managed by the Bureau of Land Management (BLM) in San Bernardino County, California. The project site is along Interstate 40 (I-40) approximately 115 miles east of Los Angeles, 37 miles east of Barstow, 17 miles east of Newberry Springs, and 57 miles northeast of Victorville.

The proposed project would utilize SunCatcher technology, consisting of approximately 34,000 25-kilowatt solar power dishes with a generating capacity of approximately 850 megawatts (MW). The project is proposed for development in two phases. Phase I includes 11,000 SunCatchers located on approximately 2,320 acres (3.6 square miles) to produce 275 MW. Phase II would include an additional 23,000 SunCatchers on an additional approximately 5,910 acres (9.2 square miles) to produce an additional 575 MW for the total 850 MW planned production. The total area required for both phases, including the area for the operation and administration building, the maintenance building, and the substation building, is approximately 8,230 acres. Each SunCatcher system consists of an approximate 40-foot high by 40-foot wide solar concentrator dish that supports an array of curved glass mirror facets designed to automatically track the sun and focus solar energy onto a Stirling engine Power Conversion Unit which generates electricity.

A new 230-kilovolt (kV) substation for the proposed project would be located approximately in the center of the project site. This new substation would be connected to the existing Southern California Edison (SCE) Pisgah Substation adjacent to the

project site via approximately 2 miles (primarily on-site) of single-circuit, 220kV transmission line. In addition to this interconnection transmission line that will be constructed by Calico Solar, LLC, the proposed project would require SCE to expand and upgrade the existing 220kV SCE Pisgah Substation to support the increase in voltage to 500kV, loop the Eldorado-Lugo 500kV line into the SCE Pisgah Substation and demolish 65 miles of the existing Lugo-Pisgah No. 2 220kV transmission line and replace it with 500kV towers and conductors. In addition, modifications within the SCE Eldorado and Lugo substations would be required.

Energy Commission Licensing Authority

The Energy Commission is responsible for reviewing and ultimately approving or denying all applications for construction and operation of thermal electric power plants, 50 MW and greater, proposed for construction in California. The Energy Commission's facility certification process carefully examines public health and safety, environmental impacts and engineering aspects of proposed power plants, and all related facilities such as electric transmission lines and natural gas and water pipelines. The Energy Commission is the lead agency under the California Environmental Quality Act (CEQA), and produces several environmental and decision documents rather than an Environmental Impact Report.

Summary of the Energy Commission Staff's Conclusions and BLM's Analysis

The Calico Solar facility would help meet California's goals of reducing greenhouse gas emissions and producing 33 percent of its electricity retail sales from renewable resources by 2020. The project technology uses water primarily for the washing of mirrors and does not require water for steam production, reducing water use to fraction of the water that would be consumed with an evaporative cooling system as is associated with some other power plants.

While acknowledging the benefit of developing renewable energy to curb climate change and achieve state/federal goals, the SA/DEIS states that the proposed project would result in significant and unavoidable environmental effects. The project would have direct impacts on biological, cultural, and visual resources, and cumulative impacts on biological resources, land use, and visual resources; however, mitigation measures have been identified to avoid or lessen project impacts to the extent possible.

The project proposed by Calico Solar, at a site situated in San Bernardino County in proximity to Interstate 40 and bisected by a Burlington Northern Santa Fe (BNSF) railroad mainline, would develop approximately 8,230 acres of occupied desert tortoise habitat. Approximately 100 desert tortoises, a state and federal-listed endangered species, would need to be relocated. Loss of habitat would be compensated by acquiring, improving conditions for, and preserving other existing habitat to increase the carrying capacity for desert tortoise to offset this loss of habitat. The project site also supports a diverse flora including numerous special-status plant species. While recommended mitigation measures would help avoid and minimize impacts to special-status plants, not all effects would be fully mitigated.

The Calico Solar Project would have significant impacts/effects on a presently unknown subset of approximately 139 known prehistoric and historical surface archaeological resources and may have significant impacts/effects on an unknown number of buried

archaeological deposits, many of which may be determined historically significant (i.e. eligible for the National Register of Historic Places and the California Register of Historical Resources) under the Programmatic Agreement currently under development as part of the Bureau of Land Management's National Historic Preservation Act Section 106 (Section 106) consultation process. The adoption and implementation of staff's proposed mitigation measures and Conditions of Certification would reduce the potential impacts of the proposed project on these cultural resources to less than significant under CEQA, would resolve effects under Section 106, and would further ensure that the proposed project would be in conformity with all applicable LORS.

Impacts of the Calico Solar Project combined with the potential impacts of reasonably foreseeable projects in the project vicinity and southern California Mojave desert would result in significant and unavoidable cumulative impacts related to land used currently for multiple purposes such as recreation, wildlife habitat, and open space.

The proposed project would substantially degrade the existing visual character and quality of the site and its surroundings, including motorists on Interstate 40 and National Trails Highway/Route 66. With staff recommended Conditions of Certification, these impacts could be greatly reduced but would remain significant and unavoidable. In addition, the proposed project could result in a substantial impact that could not be mitigated as it would be altering existing scenic resource values as seen from several vantage points in the Rodman Mountains Wilderness Area, and from a cumulative perspective within the southern California Mojave Desert.

Mitigation measures have been proposed to address the potential glare from the project's SunCatchers on the adjacent Interstate 40, as well as to operators on the BNSF mainline.

Public Resources, Contact Information and Additional Sources for Information

Technical or project schedule questions should be directed to Christopher Meyer, Energy Commission Project Manager, at (916) 653-1639 or cmeyer@energy.state.ca.us. Also, for those persons with limited English knowledge, please request interpreter services by contacting Christopher Meyer.

If you desire information on how to participate in the Energy Commission's review of the proposed project, please contact the Energy Commission's Public Adviser, Jennifer Jennings, at (916) 654-4489 or toll free in California at (800) 822-6228, or publicadviser@energy.state.ca.us.

If you need reasonable accommodation in terms of assistance due to a disability, please contact Lourdes Quiroz of the Administrative Services Division at (916) 654-5146 or lquiroz@energy.state.ca.us.

The status of the project, an electronic copy of the Application for Certification, the SA/DEIS, copies of notices, and other relevant documents are also available on the Energy Commission's web site at http://www.energy.ca.gov/sitingcases/calicosolar/index.html**.**

News media inquiries for the Energy Commission should be directed to Susanne Garfield, Assistant Director, at (916) 654-4989 or mediaoffice@energy.state.ca.us.

The SA/DEIS will be available for review at the following local libraries:

San Bernardino County Library
Barstow Branch
304 East Buena Vista
Barstow, CA 92311

San Bernardino County Library
Needles Branch
1111 Bailey
Needles, CA 92363

Victorville Public Library
15011 Circle Drive
Victorville, CA 92395

Copies will also be available at the Energy Commission's Library in Sacramento, the California State Library in Sacramento, and at California public libraries in Eureka, Fresno, San Francisco, Los Angeles, and San Diego. Copies will also be available at two of BLM's offices including the public room at the BLM California State Office in Sacramento and the BLM Barstow Field Office in Barstow, CA. In addition, copies will be distributed to those public agencies that would normally have jurisdiction except for the Energy Commission's exclusive authority to certify sites and related facilities.

If you would like a CD of the SA/DEIS, please fill out the enclosed form and return it to California Energy Commission, Attention: April Albright, Siting Project Assistant, at (916) 653-1640, or by e-mail at aalbright@energy.state.ca.us.

Sincerely,

Date: 5/5/10

Original signed by:
ROGER JOHNSON, Office Manager
Siting, Transmission and Environmental Protection Division

Enclosure

Mailed to list:
7338 - Property Owners

Please send me a CD of the California Energy Commission staff's and U.S. Bureau of Land Management's Staff Assessment / Draft Environmental Impact Statement for the Calico Solar Project Application for Certification (08-AFC-13).

Name:

Address:

City/State/Zip:

FOLD HERE

_____

_____

_____

California Energy Commission
Attention: April Albright
1516 Ninth Street, MS-15
Sacramento, CA 95814-5512

FOLD HERE

Staple or Tape closed.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION
For the CALICO SOLAR (Formerly SES Solar One)

Docket No. 08-AFC-13

PROOF OF SERVICE
(Revised 3/11/10)

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Project Manager
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Jennifer Jennings
Public Adviser
publicadviser@energy.state.ca.us

*indicates change

DECLARATION OF SERVICE

I, April Albright declare that on May 5, 2010, I served and filed copies of the attached Notice of Availability of Staff Assessment/Draft Environmental Impact Statement; Request for Agency Comments on the Staff Assessment; and Document Handling for the Staff Assessment. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [www.energy.ca.gov/sitingcases/solarone].

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(*Check all that Apply*)

FOR SERVICE TO ALL OTHER PARTIES:

__✓__ sent electronically to all email addresses on the Proof of Service list;

__✓__ by personal delivery;

__✓__ by personal delivery on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses NOT marked "email preferred."

AND

FOR FILING WITH THE ENERGY COMMISSION:

__✓__ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

OR

_____ depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 08-AFC-13
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

Original signed by: _____
April Albright

*indicates change

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION FOR THE
CALICO SOLAR PROJECT
(Formerly SES SOLAR 1)

DOCKET NO. 08-AFC-13

NOTICE OF PREHEARING CONFERENCE

AND

EVIDENTIARY HEARINGS

PLEASE TAKE NOTICE that the Committee designated by the Energy Commission to conduct proceedings on the Application for Certification (AFC) for the **CALICO SOLAR PROJECT (CSP)** has scheduled a Prehearing Conference and an Evidentiary Hearing as follows:

The Prehearing Conference will be conducted on:

FRIDAY, July 30, 2010
Beginning at 1:00 p.m.

California Energy Commission
Hearing Room A
1516 Ninth Street
Sacramento, CA 95814

Evidentiary Hearings will be conducted on:

WEDNESDAY, August 4, 2010
Beginning at 12:00 noon

and continuing into the evening hours, if necessary, and on

THURSDAY, August 5 and FRIDAY, August 6, 2010,
Beginning each day at 9 a.m.

Hampton Inn & Suites Barstow
2710 Lenwood Road
Barstow, CA 92311
(Map attached)

Public Comment may be accepted at various times during the Evidentiary Hearings but a specific public comment period will begin at 6:00 p.m. on <u>Wednesday, August 4.</u>

An additional Evidentiary Hearing will be conducted on:

WEDNESDAY, August 18, 2010
Beginning at 10:00 a.m.

California Energy Commission
Hearing Room B
1516 Ninth Street
Sacramento, CA 95814

The August 18, 2010 hearing is noticed to be held in Sacramento. Until the July 30, 2010, Prehearing Conference, the Committee will entertain arguments in favor of holding the hearing in Barstow and may choose to change the location after consideration of those arguments, the status of the state budget and any travel and other restrictions that may apply if a budget has not yet been adopted, and Committee workloads.

If the location is changed, notice of the change will be given and posted on the Energy Commission's web site (address below). Whether held in Sacramento or Barstow, teleconference access will be provided for those who choose not to attend in person.

Teleconference Option

Parties and the Public may attend the Prehearing Conference and Evidentiary Hearing in person at the above locations or by telephone and/or by computer via our "WebEx" web conferencing system. For details on how to participate by WebEx, please see the **"Participation through WebEx"** directions attached to this Notice.

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PLEASE TAKE NOTICE that the Committee has established the following filing schedule:

ITEM	***DATE***
Applicant's testimony filed	Wednesday, June 30, 2010
Committee Conference (separately noticed)	Friday, July 9, 2010
Staff publishes Supplemental Staff Assessment (SSA) (except Cultural Resources)	Monday, July 12 – Friday, July 16, 2010
Staff and other parties file and serve opening testimony (other than SSA)	Friday, July 23, 2010
All parties file rebuttal testimony and Prehearing Conference statements	12:00 Noon, Thursday, July 29, 2010
Prehearing Conference	Friday, July 30, 2010
Paper copies of Exhibits delivered to Hearing Officer	4 p.m., Monday, August 2, 2010
Evidentiary Hearings begin	Wednesday, August 4, 2010
Cultural Resources SSA Section published	Monday, August 9, 2010
Post Hearing Briefs filed	Wednesday, August 18, 2010
Evidentiary Hearing (Cultural Resources), to receive FEIS, Biological Opinion, and any additional evidence	Wednesday, August 18, 2010

Purpose of Prehearing Conference

The Prehearing Conference is a public forum where the Committee will assess the parties' readiness for an evidentiary hearing, identify areas of agreement or dispute, and discuss the remaining schedule and procedures necessary to conclude the certification process. (Cal. Code Regs., tit. 20, § 1718.5.)

At the Prehearing Conference, all parties (Staff, Applicant, and Intervenors) shall present their respective positions regarding: the substantive topic areas ready for evidentiary hearing; those topics that require further analysis, including the nature of, and time frame for, any such analysis; the topic areas that have been resolved; and the topic areas that are disputed and require adjudication. The parties shall also identify proposed witnesses, as well as the time required for direct testimony and/or cross-examination.

Prehearing Conference Statements

To facilitate the process, each party shall serve and file a **Prehearing Conference Statement**. The statements shall be received by the Hearing Officer and other parties on the Proof of Service list and the Commission's Docket Unit, 1516 9th Street, MS-4, Sacramento, California 95814-5512, by **12:00 Noon on July 29, 2010**. The parties shall also submit Word versions of their statements, including the Exhibit List, to the Hearing Officer via e-mail.

FAILURE TO FILE A PREHEARING CONFERENCE STATEMENT BY THE DEADLINE MAY PRECLUDE A PARTY FROM PARTICIPATING AT THE PREHEARING CONFERENCE AND EVIDENTIARY HEARING.

Each statement shall specify:

1. The topic areas that are complete and ready to proceed to evidentiary hearing;

2. The topic areas that are not complete and not yet ready to proceed to evidentiary hearing, and the reasons therefor;

3. The topic areas that remain disputed and require adjudication, and the precise nature of the dispute for each topic;

4. The identity of each witness sponsored by each party (**note**: witnesses must have professional expertise in the scope of their testimony); the topic area(s) which each witness will present; a brief summary of the testimony to be offered by each witness; qualifications of each witness; and the time required to present direct testimony by each witness;

5. Topic areas upon which a party desires to cross-examine witnesses, a summary of the scope of such cross-examination, and the time desired for such cross-examination;

6. An exhibit list identifying exhibits and declarations that each party intends to offer into evidence, **provided in the format attached to this notice**. The hearing Office will provide the parties with a Word version of the Exhibit List template;

7. Proposals for briefing deadlines, vacation schedules, and other scheduling matters;

8. For all topics that are ready for hearing, the parties shall review the proposed Conditions of Certification for enforceability, comprehension, and consistency with the evidence, and submit any proposed modifications;

9. Comments, if any, on the Committee's intention to use informal hearing procedures, described below; and

10. Comments, if any, on the location of the August 18, 2010, Evidentiary Hearing (Sacramento or Barstow).

Format for Presenting Evidence

Each document shall be numbered and identified on an **Exhibit List**.

- *Applicant's* exhibits shall be numbered consecutively as **Exhibits 1 through 299**.
- *Staff's* exhibits shall be numbered consecutively as Exhibits **300 through 399**.

- *Intervenor CURE's* exhibits shall be numbered consecutively as **Exhibits 400 through 499**.
- *Intervenor County of San Bernardino's* exhibits shall be numbered consecutively as **Exhibits 500 through 599**.
- *Intervenor Defenders of Wildlife's* exhibits shall be numbered consecutively as **Exhibits 600 through 699**.
- *Intervenor Society for the Conservation of Bighorn Sheep's* exhibits shall be numbered consecutively as **Exhibits 700 through 799**.
- *Intervenor Basin and Range Watch's* exhibits shall be numbered consecutively as **Exhibits 800 through 899**.
- *Intervenor Patrick C. Jackson's* exhibits shall be numbered consecutively as Exhibits **900 through 999**.
- *Intervenor Sierra Club's* exhibits shall be numbered consecutively as **Exhibits 1000 through 1099**.
- *Intervenor Newberry Community Services District's* exhibits shall be numbered consecutively as **Exhibits 1100 through 1199**.

Printed or electronic (i.e., email or compact disk) copies of the Exhibits shall be provided to the Committee and other parties no later than 4 p.m. on the dates set forth in the filing schedule table, above. If sent by email, a compact disk or paper copy shall also be placed in the first class or overnight mail by the deadline. In addition, printed and electronic copies of all exhibits shall be provided to the Hearing Officer no later than 4:00 p.m. on August 2, 2010.

Notice of Committee's Intention to Use Informal Hearing Procedures

Pursuant to Government Code Section 11445.10 et seq. and section 1217 of the Commission's regulations, the Committee may conduct all or portions of the Evidentiary Hearings in an informal manner in which, for example but not by way of limitation, a panel of witnesses sponsored by a single party or by multiple parties testify at one time, with an exchange of questions and responses between the witnesses and counsel for the various parties substituting for formal direct and cross-examination. Any objections to the taking of testimony in an informal manner shall be filed on or before the deadline for filing Prehearing Conference Statements (**12:00 Noon on July 29, 2010**). The Parties are encouraged to comment on the appropriate format for informal hearings and identify the topics for which informal hearings are appropriate, in their Prehearing Conference Statements, above.

Notice of Committee's Intention to Take Official Notice of Documents

Pursuant to section 1213 of the Commission's regulations, the Committee intends to take Official Notice of the report issued by the Commission's Siting Committee entitled:

> ***COMMITTEE GUIDANCE ON FULFILLING CALIFORNIA ENVIRONMENTAL QUALITY ACT RESPONSIBILITIES FOR GREENHOUSE GAS IMPACTS IN POWER PLANT SITING APPLICATIONS.***

The report was issued in March 2009 and is found on the Commission website at: http://www.energy.ca.gov/2009publications/CEC-700-2009-004/CEC-700-2009-004.PDF

Petitions to Intervene to Become a Formal Party

The Energy Commission's Decision on the CSP will be based on the official evidentiary record developed at the Evidentiary Hearing. Only formal parties (Applicant, Staff, and Intervenors) may present evidence and cross-examine witnesses at the Evidentiary Hearing.

Anyone with an appropriate interest in the CSP may file a Petition to Intervene and become a formal party. At the Evidentiary Hearing, a formal party may offer testimony and documentary evidence, receive documents filed by other parties, and cross-examine witnesses. However, a formal party must also comply with Committee orders, procedures, and filing requirements, and is subject to discovery and having its own witnesses cross-examined by other parties.

The deadline to file a Petition to Intervene in this case was **Tuesday, July 6, 2010.**[1] Petitions filed after that date and time extensions for new Intervenors to review case materials will be granted only upon a showing of extraordinary good cause. Intervenors will take the case as they find it at the time intervention is granted. For example, if the deadline for filing opening testimony has passed, the newly approved Intervenor will not be allowed to file opening testimony. Persons interested in obtaining intervenor status are therefore encouraged to file their petitions as soon as possible.

How to Intervene

The Energy Commission's Public Adviser's office will assist any person or organization interested in preparing a Petition to Intervene. For assistance in this process, contact the Public Adviser's office at (916) 654-4489 or (800) 822-6228 or e-mail: **[publicadviser@energy.state.ca.us]**.

Agency and Public Participation

It is not necessary to be an Intervenor to participate in the public process. Anyone desiring information on how to participate may contact the Public Adviser's office as indicated above.

Local, state, and federal governmental agencies may participate at the Prehearing Conference and Evidentiary Hearing, as necessary. (Cal. Code Regs., tit. 20, § 1714.5.) Elected officials and members of the public may present public comments at these events and/or submit written comments to the Energy Commission's Docket Unit.

[1] Though the deadline passed before the issuance of this Notice, the date of the first Evidentiary Hearing, which establishes the deadline to petition to intervene [see Cal. Code Regs., tit. 20, § 1207(b)], was known at least as early as the Notice of June 15 Committee Conference and Revised Committee Schedule issued on June 3, 2010.

Please include “Docket No. 08-AFC-13” on any written comments. **Comments made or submitted after the close of the Evidentiary Hearings will not be considered. Persons wishing to make comments after the close of the Evidentiary Hearings shall withhold those comments until the release of the Presiding Member’s Proposed Decision and submit those comments in reference to the PMPD during the 30-day PMPD comment period.**

Energy Commission Information

Questions of a legal or procedural nature should be directed to Paul Kramer, the Hearing Officer, at (916) 654-5103 or e-mail: **[pkramer@energy.state.ca.us]**.

Technical questions concerning the Project should be addressed to Christopher Meyer, the Staff Project Manager, at (916) 653-1639 or e-mail: **[cmeyer@energy.state.ca.us]**.

Technical questions concerning the BLM permitting process should be addressed to Jim Stobaugh, at (775) 861-6478, **[Jim_Stobaugh@blm.gov].**

Media inquiries should be directed to the Office of Media and Public Communications at (916) 654-4989 or e-mail: **[mediaoffice@energy.state.ca.us]**.

Information concerning the status of the project, as well as notices and other relevant documents may be viewed on the Energy Commission's Internet web page at: **[www.energy.ca.gov/sitingcases/calicosolar**]. You may also subscribe to receive email notification of all notices at **[www.energy.ca.gov/listservers]**.

Dated: July 13, 2010, at Sacramento, California.

Original Document Signed By:

ANTHONY EGGERT
Commissioner and Presiding Member
Calico Solar AFC Committee

Original Document Signed By:

JEFFREY D. BYRON
Commissioner and Associate Member
Calico Solar AFC Committee

Mailed to Lists: POS, 7337, 7338, 7339, 7340

PARTICIPATION IN THE COMMITTEE CONFERENCE THROUGH WEBEX
THE ENERGY COMMISSION'S ON-LINE MEETING SERVICE

1. *Meeting number*: July 30 **491 997 353**
August 4 – 6 **497 454 084**
August 18 **497 228 554**

Meeting password (all days): calico@solar1

2. *COMPUTER LOG-ON WITH A DIRECT PHONE NUMBER:*

- Please go to https://energy.webex.com and enter the above ***meeting number.***
- When prompted, enter your information and the above ***meeting password.***

After you login, a prompt will appear on-screen for you to provide your phone number. In the Number box, type your area code and phone number and click OK. You will receive a call back on your phone for the audio of the meeting. International callers can use the "Country/Region" button to help make their connection.

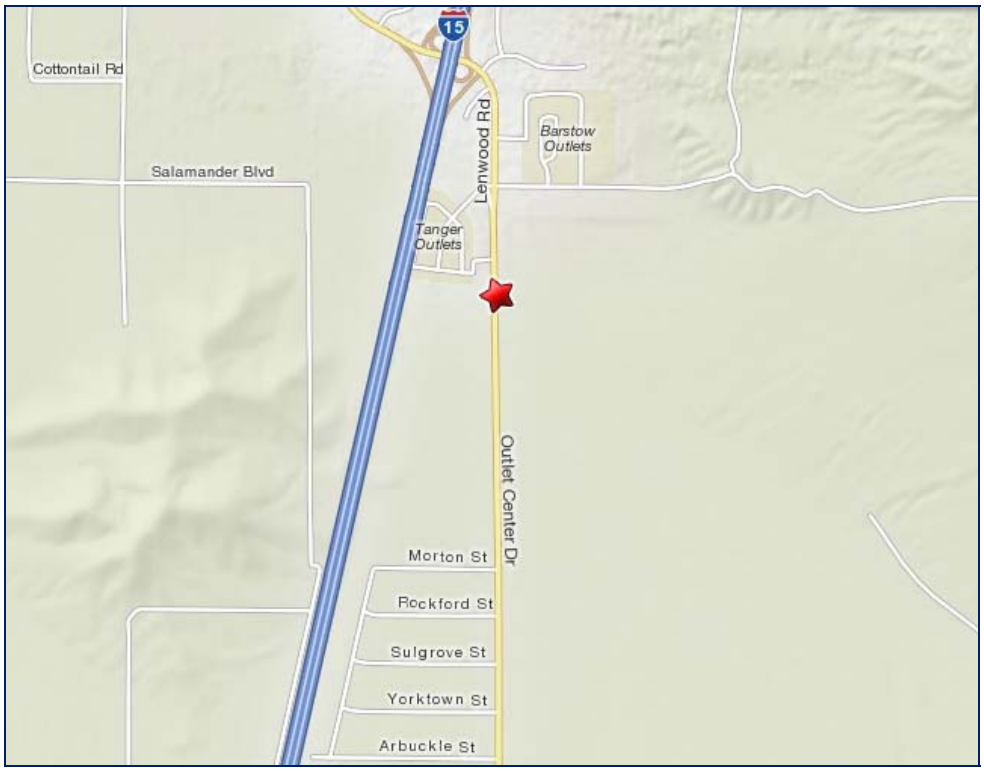
3. *COMPUTER LOG-ON FOR CALLERS WITH AN EXTENSION PHONE NUMBER, ETC:*

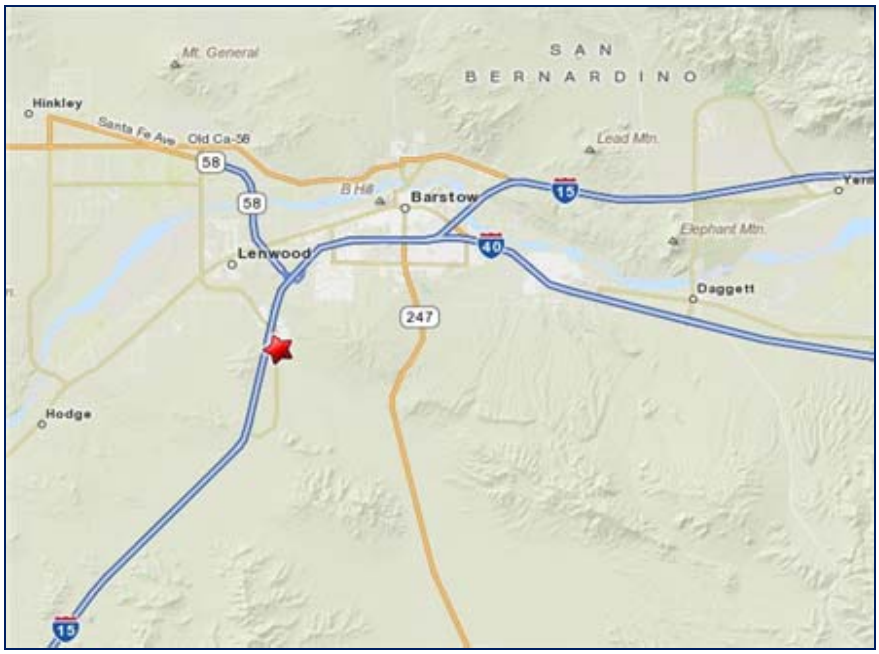
- Please go to https://energy.webex.com and enter the above ***meeting number.***
- When prompted, enter your information and the above ***meeting password.***
- *After you login, a prompt will ask for your phone number. Click "CANCEL."*

Instead call 1-866-469-3239 (toll-free in the U.S. and Canada). When prompted, enter the meeting number above and your unique Attendee ID number which is listed in the top left area of your screen after you login.

- - - -

***Evidentiary Hearings will be conducted on: WEDNESDAY, August 4, 2010 b*eginning at 12:00 noon *and continuing into the evening hours, if necessary, and on* THURSDAY, August 5 and FRIDAY, August 6, 2010, beginning each day at 9 a.m.**





Hampton Inn & Suites Barstow
2710 Lenwood Road
Barstow, CA 92311
Tel: 760-253-2600.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

Docket Number: 08-AFC-13

Project Name: Application for Certification for the Calico Solar Project

SAMPLE TENTATIVE EXHIBIT LIST

NOTE: ***The format of the samples provided below is equally applicable to all parties. However, given the likely differences in the documentary evidence submitted by the parties, the samples illustrate how to address specific types of evidence that might be unique to each party.***

Exhibit	Brief Description (Include date and docketed date)	Offered	Admitted	CEC Use Only
1	**ABC** Power Plant Project Application for Certification (AFC); dated [month, day, year], and docketed on [month, day, year]. (a) Executive Summary (b) Project Description (c) Air Quality (d) Biological Resources (e) Cultural Resources (f) Hazardous Materials Management (g) Land Use (h) Noise and Vibration (i) Public Health (j) Socioeconomics (k) Soil and Water Resources (l) Traffic and Transportation (m) Transmission Line Safety and Nuisance			

	(n) Visual Resources (o) Waste Management (p) Worker Safety and Fire Protection (q) Facility Design (r) Geology and Paleontology (s) Power Plant Efficiency (t) Power Plant Reliability (u) Transmission System Engineering (v) Alternatives			
2	**ABC**, LLC's Objection to California Energy Commission Staff Data Requests (Set 1); dated [month, day, year], and docketed on [month, day, year]. (a) Objections to Data Request 16 (b) Objections to Data Request 53 (c) Objections to Data Requests 66, 67, and 68			
3	**ABC**, LLC's, Response to California Energy Commission Data Requests 1-74; [month, day, year], and docketed on [month, day, year]. (a) Responses 1-6; Exhibit 2-1 (b) Responses 7-10; Exhibits 7-1, 7-2, 7-3, 10-1 (c) Responses 11-20; Exhibits 17-1, 17-2 (d) Response 21 (e) Responses 22-23; Exhibits 22-1, 23-1 (f) Responses 24-53; Exhibits 25-1, 35-1, 38-1, 48-1, 48-2 (g) Responses 54-58; Exhibit 58-1 (h) Responses 59-68; Exhibit 61-1 (i) Responses 69-74			
4	Declaration of John Doe regarding Project Description; dated [month, day, year] and docketed. (month, day, year).			

Energy Commission Staff Exhibits

Exhibit	Brief Description (Include date and docketed date)	Offered	Admitted	CEC Use Only
300	Final Staff Assessment for the ABC Power Plant Project, dated [month, day, year], and docketed [month, day, year].			
301	Energy Commission Staff's Errata to the Final Staff Assessment, dated [month, day, year] and docketed [month, day, year].			

Intervenor Exhibits (List the name of your organization, and use the correct Exhibit Numbers assigned above on Page 5.)

Exhibit	Brief Description (Include date and docketed date)	Offered	Admitted	CEC Use Only

CALICO SOLAR POWER PROJECT

Supplemental Staff Assessment

CALIFORNIA
ENERGY COMMISSION
Arnold Schwarzenegger, Governor

JULY 2010
CEC-700-2010-009-SSA

DOCKET NUMBER 08-AFC-13

CALIFORNIA
ENERGY COMMISSION
1516 Ninth Street
Sacramento, CA 95814

http://www.energy.ca.gov/sitingcases/calicosolar/index.html

Christopher Meyer
Project Manager

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Deputy Director
Siting, Transmission and
Environmental Protection Division

MELISSA JONES
Executive Director

DISCLAIMER

Staff members of the California Energy Commission prepared this report. As such, it does not necessarily represent the views of the Energy Commission, its employees, or the State of California. The Energy Commission, the State of California, its employees, contractors and subcontractors make no warrant, express or implied, and assume no legal liability for the information in this report; nor does any part represent that the uses of this information will not infringe upon privately owned rights. This report has not been approved or disapproved by the Energy Commission nor has the Commission passed upon the accuracy or adequacy of the information in this report.

CALICO SOLAR PROJECT (08-AFC-13)
SUPPLEMENTAL STAFF ASSESSMENT

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EXECUTIVE SUMMARY

Christopher Meyer

INTRODUCTION

Calico Solar, LLC (applicant) is seeking approval to construct and operate the Calico Solar Project (formerly the Stirling Energy Systems Solar One Project) and its ancillary facilities (Calico Solar Project). The applicant is a private party that is a wholly owned subsidiary of Tessera Solar. The main objective of the Calico Solar Project is to provide clean, renewable, solar-powered electricity to the State of California. The electricity from the Calico Solar Project will assist the State in meeting its objectives as mandated by the California Renewable Portfolio Standard (RPS) Program and the California Global Warming Solutions Act. The Calico Solar Project will also address other state and local mandates adopted by California's electric utilities for the provision of renewable energy.

Southern California Edison (SCE) selected the Calico Solar Project to help meet its objectives under the legislative requirements of the RPS Program through a least-cost, best-fit competitive solicitation. The Applicant and SCE have entered into a 20-year Power Purchase Agreement (PPA) for the provision of renewable electricity. This PPA will help SCE meet both its statutory mandate to purchase at least 20% of its electric power from renewable resources by 2010 and its future electricity requirements. The California Public Utilities Commission (CPUC) approved the PPA on October 27, 2005.

The applicant submitted an Application for Certification (AFC) to the California Energy Commission (Energy Commission) for the proposed project on December 2, 2008. (The application was originally submitted by SES Solar One, LLC, SES Solar Three, LLC and SES Solar Six, LLC for the SES Solar One Project. In January 2010, the above entities merged into Calico Solar, LLC, and the name of the SES Solar One Project was changed to the Calico Solar Project.

The Energy Commission is the lead State agency responsible for evaluating the environmental effects of project and for complying with the California Environmental Quality Act (CEQA). The project proposes the use of land managed by the United States Department of the Interior, Bureau of Land Management (BLM); therefore the applicant has submitted a request for a right-of-way grant to the BLM. The BLM is the federal lead agency for the evaluation of project effects and compliance of the proposed project with the requirements of the National Environmental Policy Act (NEPA) related to possible BLM discretionary actions related to the right-of-way grant request.

Although the two agencies filed a joint environmental document in the Staff Assessment/Draft Environmental Impact Statement (SA/DEIS), the BLM and the Energy Commission prepared separate final documents for compliance with NEPA and CEQA, respectively. Specifically, the BLM is preparing the Final Environmental Impact Statement (FEIS) and the Energy Commission prepared this Supplemental Staff Assessment (SSA). The SA/DEIS was the primary reference used by the BLM in preparing the FEIS and is incorporated by reference in the BLM's FEIS for the Calico Solar Project. After the publication of the FEIS, the BLM will prepare a Record of Decision (ROD) regarding the Agency Preferred Alternative. The publication of the ROD in the Federal Register is the final step required of the BLM to meet the requirements of

NEPA for the Calico Solar Project. While the Energy Commission SSA is not written jointly with the BLM, the proponent will be required to comply with all terms and conditions required by the BLM, as will be described in the BLM's Record of Decision and Right-of-Way grant documents for this project. The conditions of certification within this document may also require the submittal of documents and reports to other federal, state, or local agencies. It is the project owner's responsibility to ensure the timely submittal of these documents and reports.

The Energy Commission staff identified significant unmitigable impacts to Biological Resources, Land Use, and Visual Resources. Impacts to Cultural Resources and Traffic & Transportation are being analyzed and will be addressed in a document filed subsequently to this document.

PROPOSED PROJECT

Project Location and Description

The applicant intends to develop an electric-generating facility with a nominal capacity of 850 megawatts (MW) using concentrated solar power. The Calico Solar Project was originally proposed to be constructed on an approximately 8,230-acre site in the Mojave Desert in San Bernardino County, California. Based on recommendations from the Renewable Energy Action Team agencies, the applicant reduced the size of the proposed project to 6,215 acres to avoid environmental resources. This SSA analyzes the reduced project footprint. The site is approximately 37 miles east of Barstow, 174 miles east of Newberry Springs, 57 miles northeast of Victorville, and approximately 115 miles east of Los Angeles (straight line distances). The Calico Solar site is located on BLM managed lands. Key features of the proposed project are described briefly below and in more detail in the following sections:

- The electric-generating facility would include the construction of a new 230-kilovolt (kV) substation approximately in the center of the project site, an operation and administration building, a maintenance building, and a substation building.
- The Calico Solar Project would be constructed in two phases: Phase I would consist of up to 11,000 SunCatchers configured in 1.5-MW solar groups of 60 SunCatchers per group. The total net nominal generating capacity of Phase 1 is 275 MW described as Southern California Edison's (SCE) Early Interconnection Option. Phase I would require approximately 2,327 acres. The renewable energy from Phase I will be transmitted via the existing 220-kV SCE Lugo to Pisgah transmission line. The Calico Solar Project will be connected to the grid at the SCE Pisgah Substation via a 2.0-mile-long, 230-kV interconnection transmission line. Approximately 739 feet of this connecting transmission line is outside of the project site. Phase I would require only minor upgrades to the Pisgah Substation and no upgrades to the existing Pisgah to Lugo transmission line.
- Phase II would expand the Calico Solar Project to a total of 34,000 SunCatchers configured in 1.5-MW solar groups of 60 SunCatchers each, with a total net generating capacity for both phases of 850 MW. Phase II would require approximately 3, 888 acres of the project site. The 575-MW Phase II would consist of approximately 23,000 SunCatchers. The additional 575 MW generated in Phase II would require

new transmission capacity within the grid. This is anticipated to be provided by the proposed 500-kV Pisgah to Lugo transmission line (assumed to be a project independent of the Calico Solar Project). This upgrade is described as SCE's Full Build-out Option. The construction and operation of Phase II is contingent on the approval and development of this transmission line.

Solar Power Plant Equipment and Facilities

The Calico Solar Project would use the proprietary SES SunCatcher™ technology. Each SunCatcher consists of a 25-kilowatt (kW) solar power generating system. The system is designed to track the sun automatically and to focus solar energy onto a Power Conversion Unit (PCU), which generates electricity. The system consists of an approximately 38-foot-diameter solar concentrator dish that supports an array of curved glass mirror facets. These mirrors collect and focus solar energy onto the heat exchanger of the PCU. The PCU converts the solar thermal energy into electricity via a Solar Stirling Engine designed to convert solar power to rotary power through a thermal conversion process. Each SunCatcher would operate independently and would generate grid-quality electricity. Power generated by groups of 60 SunCatchers would be collected through a 600-volt (V) underground power collection system. This collection system would combine the output from the units and connect each 1.5-MW group to a generator step-up unit (GSU) transformer with an output voltage of 34.5 kilovolt (kV). The output from the GSUs would be grouped into 3-, 6-, and 9-MW groups, which would be connected via 34.5-kV underground collection circuits to 48- or 51-MW, 34.5-kV overhead collection circuits, each of which would be connected directly to the on-site collection substation. The on-site collection substation would be connected via a 230-kV, double-circuit overhead interconnection transmission line for delivery of generated electricity to the SCE Pisgah Substation, where the interconnection to the California Independent System Operator (CAISO)-controlled grid would take place.

The Calico Solar Project includes construction and operation of an on-site substation, which would include transformers, circuit breakers, metering, and other protection required to connect the project to the SCE Pisgah Substation. The Calico Solar Project interconnect transmission system would require construction of approximately 2.0 miles of double-circuit 230-kV transmission line to transmit the electricity generated on the project site to the SCE transmission facilities.

Related permanent facilities on the project site will include a Main Services Complex, which would be in a central location on site to provide for efficient access routes for maintenance vehicles servicing the SunCatcher solar field. The Main Services Complex would include the following:

- Operation and Administration Building. The project administration offices and personnel facilities would be in this one-story building. This building would also contain meeting and training rooms, engineering offices, a visitor's room, and support services. The project maintenance facilities, shop, and warehouse storage will be adjacent to the operation and administration building.
- Maintenance Building. The maintenance building would contain maintenance shops and offices, PCU rebuild areas, maintenance vehicle servicing bays, chemical storage rooms, the main electrical room, and warehouse storage for maintenance parts to service the SunCatchers.

- Water Treatment System. The water treatment structure would be southeast of the Main Services Complex. The water treatment structure would house water treatment equipment and safe storage areas for water treatment chemicals. A motor control center for the water treatment equipment and pumps will be located within this structure. Two wastewater evaporative ponds designed for wastewater containment would be located south of the water treatment structure.
- Yard Tanks. The yard tanks would be at-grade steel tank reservoirs and/or polyethylene tanks. The water treatment system would include a raw water tank with a permanent booster pump station, a potable water treatment system, ground-set steel or polyethylene potable water and a fire water storage tank, a booster pump station to accommodate potable water needs and fire-flow requirements, a disinfection system, a demineralized water treatment system for mirror washing water, a polyethylene storage tank for demineralized water storage, chemical storage, reject water and sludge disposal and evaporation ponds, and various support piping, valves, and miscellaneous equipment to support the system. All tanks, foundations, and piping connections would be designed and constructed to the appropriate standards for contents and seismic zone considerations.
- Control Building. The control building would be near the substation. This building would contain relay and control systems for the substation and the operations control room.
- Utilities and Services for Ancillary Facilities and Structures. A diesel powered fire water pump and a diesel operated standby power generator would be adjacent to the operation and administration building. Electric service for the Main Services Complex would be obtained from SCE. Electric power will be provided via overhead service from an SCE overhead distribution line located. Communications service will be provided via an overhead service from existing underground communications lines located on the north side of the railroad located north of Interstate 40.

Construction Logistics Area

The applicant proposes using one temporary construction logistics area for staging contractor equipment and trailers, assembly yards, storage of materials, equipment laydown and wash area, construction personnel parking, and assembly areas for SunCatchers. The temporary facilities and structures in that construction logistics area would include:

- Assembly Building. SunCatcher assembly would be performed in one temporary assembly building in the construction logistics area. This building would be removed after all of the SunCatchers have been assembled and installed. The assembly building would be beside the Main Services Complex.
- Transport trailer storage. Storage for trailers would be provided south of the assembly buildings in a storage facility that will accommodate 75 to 100 trailers, maintaining a 3- to 5-day inventory of SunCatcher parts during the assembly phase. These trailers would be removed and salvaged after all of the SunCatchers have been installed.
- Laydown Area. One construction laydown area would be provided: immediately south of the Main Services Complex.

Construction of the Calico Solar Project is expected to begin in late 2010 and would take a total of approximately 40 months for full project construction. The construction period may not be continuous. However, renewable power from the project could come online much earlier than 40 months after the start of the project. As groups of SunCatchers are constructed and become operational, their renewable power would immediately be supplied to the grid.

Water Supply and Discharge

The applicant has changed the proposed water source analyzed in the SA/DEIS and is not longer planning to use groundwater from a well located in Cadiz, California. The applicant completed drilling wells and conducting aquifer testing to further assess groundwater conditions at the project site and determined that well water from the Lavic Groundwater Basin would be used for project construction and operation.

The applicant proposes to use treated groundwater for potable needs. The groundwater would first be demineralized, then stored in a designated storage facility equipped with chemical dosage for disinfection. This treated potable water would be available at the Main Services Complex and may be piped to the Satellite Service Complex. If potable water is not piped to the Satellite Services Complex, bottled water would be made available.

Fire Protection

The Main Services Complex would include an approximately 230,000-gal water tank for mirror washing and fire suppression and control. Portable fire extinguishers would be located at strategic locations throughout the site. The fixed fire protection system would provide a wet, water-based sprinkler fire suppression system for the buildings. Employees would be given fire safety training, including instruction in fire prevention, the use of portable fire extinguishers and hose stations, and the reporting of fires to the local fire department.

Access Roads and Maintenance Paths

Arterial roads, unpaved perimeter roads, and unpaved access routes would be constructed on the Calico Solar Project site. Site access during the construction phase will be provided from Hector Road, which has an existing interchange from I-40 at the southwest portion of the site.

Site Security and Fencing (During Construction and Operations)

The 6,215-acre project site would be fenced, excluding the private parcels of land designated as not a part of the project. Access to the federal land managed by the BLM would be authorized under a ROW grant. Operations site security would consist of controlled access gates, perimeter security fencing, 24-hour site security monitoring via closed-circuit television and intercom, and regular vehicular patrols. Construction security would consist of fencing installed around the perimeter of the project site at the start of construction, and gated entrances and exits.

Stormwater Management Approach

The project site would be developed utilizing the existing land features without undergoing major grading operations. Off-site flow would be intercepted prior to entering the project site using large debris basins located at the toe of each mountainous drainage basin near the northern project boundary. These project debris basins are designed to retain storm water discharge and associated debris resulting from a 100-year storm. In addition to intercepting debris from the mountains, the proposed debris basins will also provide for peak runoff attenuation of the surface flows. The design attempts to protect the project site from flooding, sediment deposition, and scour. Onsite runoff will be intercepted in detention basins constructed onsite and sized to retain the 100-year onsite runoff and debris flows. The onsite basins are designed to retain 4-years of average sediment accumulation for the area or subarea they are designated to serve.

A Storm Water Pollution Prevention Plan (SWPPP) would be prepared. Site drainage during construction would follow pre-development flow patterns, with ultimate discharge to the property boundary. Low-flow culverts consisting of a small diameter storm drain with a perforated stem pipe will be installed for sediment control and to provide for storm peak attenuation. The design and location of the detention basins would depend upon the Proposed Action or Action Alternative selected.

Facility Operation and Maintenance

The Calico Solar Project would be an “as-available” resource. Therefore, the project would operate anywhere between a minimum of approximately 18 MW net when the first SunCatcher units are interconnected to the transmission grid during the construction period to 850 MW on completion of construction. The capability for independent operation of all 34,000 units would give maximum flexibility in operations. The applicant expects the Calico Solar Project to have an annual availability of 99%.

The Calico Solar Project would operate approximately 3,500 hours annually. The number of available operating hours would depend on the availability of the sun’s energy at greater than 250 watts per square meter. SunCatchers would be unable to generate electricity when the sun’s energy is below 250 watts per square meter in the early morning or late evening hours and when cloud cover limits the sun’s energy for power generation. Also, SunCatchers would be unable to generate electricity during daylight hours when the wind speed exceeds 35 miles per hour (mph), as SunCatchers will be stowed in a safe de-track position at and above this wind speed to prevent damage. The applicant anticipates that the Calico Solar Project would be operated with a staff of approximately 164 full-time employees. The project would operate 7 days per week, generating electricity during daylight hours when solar energy is available. Maintenance activities would occur 7 days a week, 24 hours a day to ensure SunCatcher availability when solar energy is available. Maintenance activities would include SunCatcher mirror washing. The daily average water requirement for SunCatcher mirror washing under regular maintenance routines would be approximately 10.4 gal of raw water per minute.

Waste Management

Wastewater generated at the Main Services Complex would be discharged into a septic system with

sanitary leach fields, and would be designed in accordance with applicable Laws, Ordinances, Regulations, and Standards (LORS), including those of San Bernardino County, the Regional Water Quality Control Board (RWQCB), and the California Department of Health Services (CDHS). Disposal of clear liquids would be conveyed to on-site sanitary leach fields, and sewer sludge would be pumped and disposed of by trucks to an approved offsite disposal facility.

Solid waste from the Calico Solar Project water treatment system would be trucked to an appropriate off-site landfill from two evaporation ponds as a non-hazardous, low-moisture cake. An estimated 60,000 pounds (lbs) per year of salt cake would be trucked off-site to an appropriate landfill or recycled. The full 60,000 lbs would be scheduled for removal at the end of the evaporation process. Approximately 1.5 loads would be required per year.

Non-hazardous wastes generated during construction and operation includes scrap wood, concrete, steel/metal, paper, glass, scrap metals and plastic waste. All non-hazardous wastes would be recycled to the extent possible and non-recyclable wastes would be collected by a licensed hauler and disposed in a Class III solid waste disposal facility. Hazardous wastes would be recycled to the extent possible and disposed in either a Class I or II waste facility as appropriate. All operational wastes produced at the Calico Solar Project would be properly collected, treated (if necessary), and disposed of at either a Class I or II waste facility as appropriate.

Hazardous materials used during facility construction and operations would include paints, epoxies, grease, transformer oil, and caustic electrolytes (battery fluid). Several methods would be used to properly manage and dispose of hazardous materials and wastes. A Hazardous Materials Management Program

(HMMP) would be developed and implemented during the project construction and operation phases. At a minimum, the HMMP would include procedures for hazardous materials handling, use and storage; emergency response; spill control and prevention; employee training; and recordkeeping and reporting.

Project Decommissioning

Project closure can be temporary or permanent. Temporary closure is defined as a shutdown for a period exceeding the time required for normal maintenance, including closure for overhaul or replacement of the major components, such as major transformers, switchgear, etc. Causes for temporary closure include inclement weather and/or natural hazards (e.g., winds in excess of 35 mph, or cloudy conditions limiting solar insolation values to below the minimum solar insolation required for positive power generation, etc.), or damage to the Project from earthquake, fire, storm, or other natural acts. Permanent closure is defined as a cessation in operations with no intent to restart operations owing to Project age, damage to the Project that is beyond repair, adverse economic conditions, or other significant reasons.

In the unforeseen event that the Calico Solar Project is temporarily closed, a contingency plan for the temporary cessation of operations would be implemented. The contingency plan would be followed to ensure conformance with applicable LORS and to protect public health, safety, and the environment. The plan, depending on the expected duration

of the shutdown, may include the draining of chemicals from storage tanks and other equipment and the safe shutdown of equipment.

The planned life of the Calico Solar Project is 40 years; however, if the Calico Solar Project is still economically viable, it could be operated longer. It is also possible that the Calico Solar Project could become economically noncompetitive before 40 years have passed, resulting in early decommissioning. When the Calico Solar Project is permanently closed, all the project equipment, facilities, structures and appurtenant facilities must be removed from the site. Because the conditions that would affect the decommissioning decision are largely unknown at this time, these conditions would be presented to the Energy Commission, the BLM, and other applicable agencies in a detailed decommissioning plan prior to the planned permanent decommissioning.

ALTERNATIVES

In addition to the proposed Calico Solar Project, two other Build Alternatives on the same general site and three No Project/No Action Alternatives are also evaluated in detail in the SA/DEIS. **Executive Summary Table 1** summarizes the acreages and MW production of the two build alternatives and **Executive Summary Table 2** describes the three No Project/No Action Alternatives. The two build alternatives include a Reduced Acreage Alternative, and the Avoidance of Donated and Acquired Lands Alternative that would avoid donated lands and lands acquired with federal Land and Water Conservation Funds. With the reduction of the proposed project base on the recommendations of the Renewable Energy Action Team agencies, much of the buildable area in the Avoidance of Donated and Acquired Lands Alternative was eliminated. Therefore, this alternative was no longer feasible as analyzed and was moved from the individual technical sections to the **Alternatives** section (B.2) of this SSA.

The No Project/No Action Alternatives all consider not approving the Calico Solar Project and either amending or not amending the CDCA Plan as required regarding land use designations for the site.

Comparison of the Alternatives

Executive Summary Table 3 describes the ability of the Calico Solar Project, the two build alternatives, and the three No Project/No Action Alternatives to meet the defined project purpose and objectives.

Executive Summary Table 1
Summary of the Build Alternatives

Build Alternative	Megawatts	Acres (approximate)	SunCatchers
Calico Solar Project	850	6,215	34,000
Reduced Acreage Alternative: proposes construction and operation of a 2,600-acre facility using the SunCatcher technology. On-site facilities would be similar to the Calico Solar Project. This alternative would require the SCE 275-MW Early Interconnection Option upgrade.	275	2,600	11,000
Avoidance of Donated and Acquired Lands Alternative: developed to avoid impacts to donated and LWCF-acquired lands on the project site. The boundary of this alternative would be similar to the site boundary of the proposed action less donated and acquired land parcels. This alternative would require the SCE Full Build-out Option upgrade.	720	7,050	28,800

Executive Summary Table 2
Summary of the No Project/No Action Alternatives

No Project/No Action Alternative	Calico Solar Project?	Amendment to the CDCA Plan?
1) No Approval of the Calico Solar Project and no CDCA Plan Amendment	Calico Solar Project not approved: no solar energy power generation project would be constructed on the project site	No CDCA Plan Amendment: BLM would continue to manage the site consistent with the existing land use designation in the CDCA Plan for the site
2) No Approval of the Calico Solar Project and Amendment of the CDCA Plan to Allow Solar Energy Power Generation Projects on the Project Site	Calico Solar Project not approved: solar energy power generation projects could be constructed on the site (as a result of the CDCA Plan amendment)	Yes: BLM would amend the CDCA Plan to allow for solar energy power generation projects on the site
3) No Approval of the Calico Solar Project and BLM Amends the CDCA Plan to Not Allow Any Solar Energy Power Generation Projects on the Project Site	Calico Solar Project not approved: no solar energy power generation projects could be constructed on the site (as a result of the CDCA Plan amendment)	Yes: BLM would amend the CDCA Plan to not allow any solar energy power generation projects on the project site

Executive Summary Table 3
Ability of the Alternatives to Meet the Project Purpose and Objectives and Site Criteria

Project Purpose and Objectives	Calico Solar Project	275-MW Reduced Acreage Alternative	Avoidance of Donated and Acquired Lands Alternative	No Approval of Calico Solar Project and No CDCA Plan Amendment	No Approval of Calico Solar Project and Amendment of CDCA Plan to Allow Solar Energy Power Generation Projects on Project Site	No Approval of Calico Solar Project and BLM Amends CDCA Plan to Not Allow Any Solar Energy Power Generation Projects on Project Site
Provide clean, renewable, solar-powered electricity and to assist SCE in meeting its obligations under California's Renewable Portfolio Standard Program (RPS)	Yes	Yes	Yes	No	Potentially	No
Assist SCE in reducing its greenhouse gas emissions as required by the California Global Warming Solutions Act	Yes	Yes	Yes	No	Potentially	No
Provide up to 850 MW of renewable electric capacity under a 20-year PPA with SCE	Yes	No	No	No	Potentially	No
Contribute to the 20% renewables RPS target set by California's governor and legislature	Yes	Yes	Yes	No	Potentially	No
Assist in reducing greenhouse gas emissions from the electricity sector	Yes	Yes	Yes	No	Potentially	No

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Project Purpose and Objectives	Calico Solar Project	275-MW Reduced Acreage Alternative	Avoidance of Donated and Acquired Lands Alternative	No Approval of Calico Solar Project and No CDCA Plan Amendment	No Approval of Calico Solar Project and Amendment of CDCA Plan to Allow Solar Energy Power Generation Projects on Project Site	No Approval of Calico Solar Project and BLM Amends CDCA Plan to Not Allow Any Solar Energy Power Generation Projects on Project Site
Contribute to California's future electric power needs	Yes	Yes	Yes	No	Potentially	No
Assist the California Independent System Operator (CAISO) in meeting its strategic goals for the integration of renewable resources, as listed in its Five-Year Strategic Plan for 2008-2012 (CAISO 2007)	Yes	Yes	Yes	No	Potentially	No
To construct and operate a 850 MW renewable power generating facility in California capable of selling competitively priced renewable energy consistent with the needs of California utilities	Yes	No	No	No	Potentially	No
To locate the facility in areas of high solarity with ground slope of less than 5%	Yes	Yes	Yes	No	Potentially	No

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PUBLIC AND AGENCY COORDINATION

The Energy Commission's CEQA-equivalent process and the BLM's NEPA process provide opportunities for the public and other agencies to participate and consult in the scoping of the environmental analysis of this proposed project, and in the evaluation of the technical analyses and conclusions of that analysis. The following subsections describe the status of these outreach efforts for the proposed Calico Solar Project. These activities are also described in the *Final Scoping Report*.

Agency Coordination

The Energy Commission certification is in lieu of any permit required by state, regional, or local agencies and by federal agencies to the extent permitted by federal law (Public Resources Code, Section 25500). However, both the Energy Commission and BLM typically seek comments from and work closely with other regulatory agencies that administer LORS that may be applicable to a proposed project. The following paragraphs describe the agency coordination that has occurred through this joint SA/EIS process for the proposed Calico Solar Project.

United States Army Corps of Engineers

The United States Army Corps of Engineers (USACE) has jurisdiction to protect water quality and wetland resources under Section 404 of the Clean Water Act. Under that authority, USACE reviews proposed projects to determine whether they may impact such resources, and/or be subject to the requirements for a Section 404 permit. Throughout the SA/DEIS process, the Energy Commission, BLM, and the Applicant have provided information to the USACE to assist them in making a determination regarding their jurisdiction and need for a Section 404 permit. No jurisdictional determination has yet been made.

United States Fish and Wildlife Service

The United States Fish and Wildlife Service (USFWS) has jurisdiction to protect threatened and endangered species under the federal Endangered Species Act (ESA). Formal consultation with the USFWS under Section 7 of the ESA is required for any federal action that may adversely affect a federally listed species. The site is known to be occupied by desert tortoise. The desert tortoise is currently listed as threatened under the federal ESA and state ESA.

State Water Resources Control Board/Regional Water Quality Control Board

The Regional Water Quality Control Board (RWQCB) has the authority to protect surface water and groundwater. Throughout the SA/DEIS process, the Energy Commission, BLM, and the Applicant have invited the RWQCB to participate in public scoping and workshops, and have provided information to assist the agency in evaluating the potential impacts and permitting requirements of the proposed project.

California Department of Fish and Game

The California Department of Fish and Game (CDFG) have the authority to protect water resources through regulation of modifications to streambeds, under Section 1602 of the Fish and Game Code. The Energy Commission, BLM, and the applicant have provided

information to CDFG to assist in their determination of the impacts to streambeds, and identification of permit and mitigation requirements. The CDFG also has the authority to regulate potential impacts to species that are protected under the California Endangered Species Act (CESA).

San Bernardino County

The revised Calico Solar Project site contains no private land under the jurisdiction of San Bernardino County (County). The Energy Commission and BLM provided opportunities during scoping for the County to provide input to the environmental technical studies for the project.

Public Coordination

The Energy Commission's CEQA-equivalent process and the BLM's NEPA process provide opportunities for public participation in the scoping of the environmental analysis, and in the evaluation of the technical analyses and conclusions of that analysis. For the Energy Commission, this outreach program is primarily facilitated by the Public Adviser's Office (PAO). As part of the coordination of the environmental review process required under the Memorandum of Understanding (MOU) between the Energy Commission and the BLM California Desert District, the Energy Commission and BLM have jointly held public meetings and workshops which accomplish the public coordination objectives of both agencies.

The PAO's public outreach is an integral part of the Energy Commission's AFC review process. The PAO reviewed information provided by the Applicant and also conducted its own outreach efforts to identify and locate local elected and certain appointed officials, as well as "sensitive receptors" (including schools, community, cultural and health facilities and daycare and senior-care centers, as well as environmental and ethnic organizations). Those agencies and individuals that provided comments concerning the project have been considered in staff's analysis. The SA/DEIS provided agencies and the public with an opportunity to review the Energy Commission's staff's analysis of the proposed project. Comments received on the SA/DEIS were taken into consideration in preparing the subsequent project documents, including this SSA.

The AFC, the SA/DEIS, this SSA and other project documents are located on the Energy Commission's website at http://www.energy.ca.gov/sitingcases/calicosolar/index.html.

STAFF'S ASSESSMENT

Each technical area section of this SAA contains a discussion of the project setting, impacts, and where appropriate, mitigation measures and conditions of certification. The SSA includes the staff's assessment of:

- the environmental setting of the proposal;
- impacts on public health and safety, and measures proposed to mitigate these impacts;
- environmental impacts, and measures proposed to mitigate these impacts;

- the engineering design of the proposed facility, and engineering measures proposed to ensure the project can be constructed and operated safely and reliably;
- project closure;
- project alternatives;
- compliance of the project with all applicable laws, ordinances, regulations and standards (LORS) during construction and operation;
- environmental justice for minority and low income populations, when appropriate; and
- proposed mitigation measures/conditions of certification.

SUMMARY OF PROJECT RELATED IMPACTS

Executive Summary Table 4 summarizes the potential short- and long-term and cumulative adverse impacts of the proposed Calico Solar Project, the anticipated mitigation and Conditions of Certification, and the level of significance of the impacts after mitigation, under CEQA.

Executive Summary Table 4
Summary of Potential Short-Term, Long-Term, and Cumulative Adverse Impacts

Environmental Parameter	Complies with Applicable LORS	Short- and Long-Term Adverse Impacts	Cumulative Adverse Impacts	Mitigation and Conditions of Certification	CEQA Level of Significance After Mitigation
Air Quality	Yes	No significant short-term or long-term adverse impacts with mitigation/ Conditions of Certification incorporated	No cumulative adverse impacts	**AQ-1** through **AQ-15** and **AQ-SC1** through **AQ-SC9**	Less than significant
Biological Resources	Yes	No significant short-term or long-term adverse impacts with mitigation/Conditions of Certification incorporated	Would result in significant impacts Mohave fringe-toed lizard	**BIO-1** through **BIO-30**	Significant and unavoidable
Cultural Resources	TBD	TBD	TBD	TBD	TBD
Facility Design	Yes	No significant short-term or long-term adverse impacts with mitigation/ Conditions of Certification incorporated	Not applicable	General Conditions	Less than significant
Geology, Paleontology, and Minerals	Yes	No significant short-term or long-term adverse impacts with mitigation/ Conditions of Certification incorporated	No cumulative adverse impacts	**PAL-1** through **PAL-7,** and **GEN-1, GEN-5,** and **CIVIL-1**	Less than significant
Hazardous Materials	Yes	No significant short-term or long-term adverse impacts with mitigation/ Conditions of Certification incorporated	No cumulative adverse impacts	**HAZ-1** through **HAZ-6**	Less than significant

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Environmental Parameter	Complies with Applicable LORS	Short- and Long-Term Adverse Impacts	Cumulative Adverse Impacts	Mitigation and Conditions of Certification	CEQA Level of Significance After Mitigation
Hydrology, Soils and Water Resources	Yes	No significant short-term or long-term adverse impacts with mitigation/ Conditions of Certification incorporated	No cumulative adverse impacts	**SOIL&WATER-1** through **SOIL&WATER-6**	Less than significant
Land Use and Recreation	Yes	No Significant short-term and long-term adverse impacts reduced with mitigation/Conditions of Certification incorporated	Would result in significant impacts related to cumulative land conversion	**None proposed**	Cumulative land use impacts from land conversion would be significant and unavoidable.
Noise and Vibration	Yes	No significant short-term or long-term adverse impacts with mitigation/ Conditions of Certification incorporated	No cumulative adverse impacts	**NOISE-1** through **NOISE-6**	Less than significant
Public Health and Safety	Yes	No significant short-term or long-term adverse impacts with mitigation/ Conditions of Certification incorporated	No cumulative adverse impacts	None required	Less than significant
Power Plant Efficiency	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Power Plant Reliability	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Socioeconomic and Environmental Justice	Yes	No significant short-term or long-term adverse impacts with mitigation/ Conditions of Certification incorporated	No cumulative adverse impacts	None required	Less than significant

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Environmental Parameter	Complies with Applicable LORS	Short- and Long-Term Adverse Impacts	Cumulative Adverse Impacts	Mitigation and Conditions of Certification	CEQA Level of Significance After Mitigation
Traffic and Transportation	TBD	TBD	TBD	TBD	TBD
Transmission Line Safety/Nuisance	Yes	No significant short-term or long-term adverse impacts with mitigation/ Conditions of Certification incorporated	No cumulative adverse impacts	**TLSN-1** through **TLSN-4**	Less than significant
Transmission System Engineering	Yes	No significant short-term or long-term adverse impacts with mitigation/ Conditions of Certification incorporated	No cumulative adverse impacts	**TSE-1** through **TSE-7**	Less than significant
Visual Resources	Yes	Would result in significant short-term (construction) and long-term (operation) adverse impacts.	Could result in cumulative adverse impacts	**VIS-1** through **VIS-5**	Significant and unavoidable
Waste Management	Yes	No significant short-term or long-term adverse impacts with mitigation/ Conditions of Certification incorporated	No cumulative adverse impacts	**WASTE-1** through **WASTE-8**	Less than significant
Worker Safety and Fire Protection	Yes	No significant short-term or long-term adverse impacts with mitigation/ Conditions of Certification incorporated	Could result in cumulative adverse impacts	**WORKER SAFETY-1** through **WORKER SAFETY-7**	Less than significant

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Air Quality

The staff concludes that with the adoption of the air quality Conditions of Certification the proposed Calico Solar Project would comply with all applicable LORS and would not result in any significant CEQA air quality impacts. These Conditions of Certification meet the Energy Commission's responsibility to comply with CEQA.

Staff has concluded that the proposed project would not have the potential to exceed Prevention of Significant Deterioration (PSD) emission threshold levels during direct source operation and the facility is not considered a major stationary source with potential to cause adverse National Environmental Policy Act air quality impacts. However, without adequate fugitive dust mitigation, the proposed project would have the potential to exceed the General Conformity PM10 applicability threshold during construction and operation, and could cause potential localized exceedances of the PM10 National Ambient Air Quality Standards during construction and operation. This potential exceedance of federal air quality standards would be considered a direct, adverse impact under the National Environmental Policy Act. This impact would be less than adverse with the proposed mitigation measures controlling fugitive dust emissions.

The Calico Solar Project would emit substantially lower greenhouse gas (GHG)[1] emissions per megawatt-hour than fossil fueled generation resources in California. The Calico Solar Project, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]).

Alternatives. The Reduced Acreage Alternative would use approximately 32% of the SunCatchers, provide 32% of the power generating potential, and would affect approximately 32% of the land of the land of the proposed 850-MW project. The worst-case short-term construction emissions and ground level pollutant concentration impacts would be similar to the proposed project and would require the same level of mitigation. The total construction period and total construction emissions and long-term ground level pollutant concentration impacts would be reduced from those required to construct the proposed project. The benefits of the proposed project in displacing fossil fuel fired generation and reducing associated, but mainly out of air basin, criteria pollutant emissions would be reduced. The impacts of the proposed project would not occur on the lands not used due to the smaller project size. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's CDCA Plan, including another solar project. The CEQA level of significance for the Reduced Acreage Alternative would be the same as for the proposed project, with the same significance rationale, where if left unmitigated there is the potential for significant NOx and PM emission impacts during the Alternative project's construction and operation. The mitigation that would be proposed for the Reduced Acreage Alternative would be the same as that proposed for the proposed project.

[1] Greenhouse gas emissions are not criteria pollutants, but they affect global climate change. In that context, staff evaluates the GHG emissions from the proposed project (Appendix Air-1), presents information on GHG emissions related to electricity generation, and describes the applicable GHG standards and requirements.

Under the three No Action/No Project Alternatives, the air quality impacts of the proposed project would not occur. However, the land on which the project is proposed could become available to other uses, including another renewable energy project, if the proposal is consistent with BLM's California Desert Conservation Area (CDCA) land use plan. This would occur under the No Action/No Project Alternative (2) which includes a CDCA Plan Amendment allowing for future renewable energy development on this project site.

Biological Resources

Vegetation and Rare Plants: The Calico Solar Project would have major impacts to the biological resources of the Newberry Springs/Ludlow area of the Mojave Desert, eliminating a broad expanse of relatively undisturbed Mojave Desert habitat and affecting all plant and wildlife species on the site, including special status species. Construction of the project would result in the permanent land use conversion of approximately 6,215 acres of the Mojave Desert to support operation of the solar field and appurtenant structures. The applicant has indicated that the project site includes 5,946 acres of creosote bush scrub (88.6 acres of this has been previously disturbed; this total also includes 3.3 acres of microphyll woodland described below); 242 acres of salt bush scrub; and 28 acres of developed areas (e.g., linear facilities such as unpaved roads).

Although construction would not result in the complete loss of vegetation, staff considers the construction of exclusion fencing (designed to prevent desert tortoise from entering the project site), vegetation mowing, introduction of shade and added moisture from mirror washing, noise from individual SunCatcher engines (i.e., each engine would have a noise level of approximately 84 dBA Leq at 50 feet, which is equivalent to a compressor), power plant maintenance activity, and risk of invasion by weedy annuals to effectively eliminate the functional use of the site for all but the most disturbance-tolerant native species. To reduce project effects on vegetation communities, staff has proposed Conditions of Certification **BIO-1** through **BIO-9** (Designated Biologist Selection, Designated Biologist Duties, Biological Monitor Qualifications, Biological Monitor Duties, Designated Biologist and Biological Monitor Authority, Worker Environmental Awareness Program, Biological Resources Mitigation Implementation and Monitoring Plan, Impact Avoidance and Minimization Measures, and Compliance Verification), **BIO-10** (Revegetation and Compensation for Impacts to Native Vegetation), and **BIO-11** (Weed Management Plan). To address specific construction-related impacts to native vegetation communities and habitat loss, staff has incorporated measures proposed by the applicant and has proposed supplemental measures in Condition of Certification **BIO-17** (Desert Tortoise Habitat Compensation).

The Calico Solar Project site supports several special-status plant species. Nine special-status plant species, one of which is also considered sensitive by the Bureau of Land Management (BLM), but none of which are listed under the federal Endangered Species Act, were identified on or near the proposed project site. Three of these species would be directly impacted by construction of the Calico Solar Project. Two others occur north of the proposed site boundary, within the previously-proposed project footprint. Staff concludes that the project as analyzed in this SSA would not affect those locations. Several of the special-status plant species reported in 2007 and 2008 were

not found on the site during more thorough field surveys in 2010, and the earlier reports may have been based on misidentifications. Staff believes that impacts to small-flowered androstephium and Utah vine milkweed would be less than significant under CEQA, and that potentially significant impacts to white-margined beardtongue can be reduced below a level of significance with the implementation of staff's proposed impact avoidance and minimization measures. These measures are detailed in staff's proposed Conditions of Certification **BIO-1** through **BIO-11, BIO-12** (Special-Status Plant Impact Avoidance and Minimization)**,** and **BIO-17**.

Common Wildlife and Nesting Birds: Construction of the Calico Solar Project would adversely affect common wildlife and nesting birds due to ground disturbance, operation, and the placement of permanent exclusion fencing around the perimeter of the site. Species that are not capable of dispersing to surrounding areas will be confined within the project boundaries by the exclusionary fencing, and would be subject to increased risks of road kill and repeated disturbance from human activities during construction and operation. The project exclusion fencing would also exclude many species from the entire 9.7 square mile site, resulting in loss of habitat and disruption of wildlife movement through the area. Noise levels would attenuate to approximately 60 dBA Leq at approximately 850 feet from the project fence line. Staff believes that noise may adversely affect wildlife, on the desert bajada at distance less than 850 feet from the project boundary. To reduce project effects on wildlife, staff has proposed Conditions of Certification **BIO-1** through **BIO-11**. Impacts to habitat loss would be compensated by the application of Condition of Certification **BIO-17** (Tortoise Habitat Compensation), and impacts to nesting birds would be avoided by the application of **BIO-19** (Pre-Construction Nest Surveys and Impact Avoidance Measures for Migratory Birds). However, overall effects to wildlife within the project perimeter are expected to be severe.

Construction of the project is expected to result in adverse effects on bird species. It is unknown how birds will respond to the project once operational, due to the fact that SunCatcher technology has not been implemented and studied on a large scale. Therefore, staff cannot assess the potential for bird collisions and mortality associated with these structures. Staff has proposed Condition of Certification **BIO-22** (Avian Protection Plan / Monitoring Bird Impacts from Solar Technology), which would require the applicant to prepare and implement an Avian Protection Plan, including a Bird Monitoring Study to monitor the death and injury of birds from collisions with facility features such as reflective mirror-like surfaces and from heat, and bright light from concentrating sunlight. In addition, while some disturbance-tolerant birds are expected to continue foraging on the project site once it is developed, it is unknown the degree to which the site may be used by native birds. The noise levels within the proposed project site would be in excess of 85 dBA Leq at each SunCatcher, and would be expected to adversely affect birds. Many avian species avoid developed areas within urban settings; these species would likely also avoid the SunCatchers.

Desert Tortoise: Implementation of the Calico Solar Project will result in adverse effects to desert tortoise (federally and State listed as a threatened species). Construction of the proposed project would result in the permanent loss of approximately 6215 acres of occupied desert tortoise habitat (4,075 acres of good quality habitat north of the Burlington Northern Santa Fe (BNSF) Railroad and 2,140 acres of less suitable habitat

south of the BNSF tracks). In addition, the applicant has indicated that approximately 57 desert tortoises would need to be translocated outside of the Calico Solar Project site. Currently staff, CDFG, and USFWS are working with the applicant to develop a Desert Tortoise Translocation Plan for the project. The translocation of tortoises and other construction related impacts of the proposed project pose substantial effects to this species. To reduce these effects staff has proposed Conditions of Certification **BIO-1** through **BIO-9**, which apply to protection of desert tortoise and other biological resources in and near the Calico Solar Project area, and Conditions of Certification **BIO-15** through **BIO-17**, which are specific to desert tortoise. To reduce effects of the large scale land use conversion, staff, CDFG, and USFWS are requiring compensatory mitigation. This compensatory mitigation is designed to fully mitigate impacts as required under the California Endangered Species Act (CESA), and requires a full mitigation finding, which usually contemplates a mitigation ratio greater than 1:1 to compensate for loss of high-value habitat (i.e., acquisition or preservation of more than 1 acre of compensation lands for every acre lost). On past energy projects considered by the Energy Commission, the California Department of Fish and Game (CDFG) has required a 3:1 compensation ratio to meet the CESA full mitigation standard for good quality habitat such as that found on much of the Calico Solar Project site. The higher ratio reflects the limits to increases in carrying capacity that can be achieved on the acquired lands, even with implementation of all possible protection and enhancement measures. The BLM typically applies a 1:1 compensation requirement and pursues desert tortoise recovery goals through implementation of region-wide management plans and land use planning as described in the West Mojave Plan (BLM et al. 2005; BLM 2006) and the Desert Tortoise Recovery Plan (USFWS 1994b).

Energy Commission staff proposes compensation at a 3:1 ratio for loss of desert tortoise habitat north of the BNSF Railroad, and at a 1:1 ratio for habitat south of the railroad, to achieve full mitigation under CESA and to mitigate under CEQA for habitat loss and other significant impacts to desert tortoises. These mitigation ratios include the 1:1 mitigation ratio proposed by the BLM for impacts to desert tortoise habitat as well as additional mitigation proposed by the Energy Commission staff for impacts to the species. Staff has proposed that impacts to the area south of the BNSF Railroad be mitigated at a 1:1 ratio, because this area supports lower-quality habitat for the desert tortoise, and is enclosed to the north and south by the BNFS Railroad and the I-40, respectively. These barriers to tortoise movement in this area reduce effective habitat value.

Based on these ratios, the total acreage of desert tortoise compensation land acquisition and protection would be 14,365 acres. BLM's requirement for mitigation at a 1:1 ratio, which will include funding for BLM to implement desert tortoise habitat enhancement projects on BLM land, will also serve to satisfy a portion of the Energy Commission's compensation lands requirement. However, even with credit for mitigation provided to BLM, no fewer than 8,150 acres of compensation land will be acquired, permanently protected and managed. Staff estimates total cost of acquisition, protection, and enhancement at $49,223,057.50.

<u>Mojave Fringe-Toed Lizard</u>: The Mojave fringe-toed lizard, a BLM sensitive species and California Species of Special Concern, occurs on the proposed project site, in areas of fine wind-blown (aeolian) sand deposits such as dunes and sandy patches within

scrubby vegetation. Mojave fringe-toed lizards can also utilize sandy washes. The project would interfere with both aeolian and fluvial sand deposits on and near the site, which would result in habitat loss and degradation for this and other sand-associated species and would result in direct impacts to occupied habitat. The applicant reported approximately 16.9 acres of Mojave fringe-toed lizard habitat onsite, which is concentrated in a small dune complex in the southern portion of the site. However, during site visits conducted January and May 2010, staff noted that suitable habitat for this species was more extensive, and in May, observed several Mojave fringe-toed lizards outside the habitat area as originally reported. Staff estimates total acreage of suitable habitat, including sandy drainages and small patches of aeolian sand deposits and micro-dunes scattered throughout the southern portion of the site, as 164.7 acres. Staff believes that avoidance of habitat on-site would not prevent adverse impacts to Mojave fringe-toed lizards, due to habitat fragmentation, road kill, and increased predation (project facilities would serve as perch sites for foraging raptors, facilitating their ability to find and capture lizards and other ground-dwelling species). Staff has proposed Condition of Certification **BIO-13** (Mojave Fringe-Toed Lizard Mitigation)**,** which requires the acquisition of suitable dune/sand habitat at a 3:1 ratio to mitigate loss of suitable breeding habitat and at a 1:1 ratio for surrounding habitat suitable for foraging and cover. While this mitigation would reduce the project's impacts below a level of significance, a residual adverse impact remains, including a net loss of habitat and interruption of suitable east-west movement habitat.

Burrowing Owl: Construction of the proposed Calico Solar Project would result in direct loss of foraging habitat for the burrowing owl (a BLM sensitive species and a California Species of Special Concern). Two burrowing owls and eleven active burrows were recorded by the applicant north of the project boundary, near the toe of the Cady Mountains. Numerous additional burrows that could support burrowing owls were noted during desert tortoise surveys. Staff's proposed Condition of Certification **BIO-21** (Burrowing Owl Impact Avoidance and Minimization Measures) provides minimization and avoidance measures for this species, and prescribes that the applicant must establish the breeding status of the owls onsite. Depending on how owls use the site (i.e., breeding vs. wintering), relocation methods would be implemented to accommodate the full life cycle of the species. Staff's proposed Condition of Certification **BIO-17**, the compensatory mitigation plan for desert tortoise, would likely also offset burrowing owl habitat loss provided the species occurs on the potential relocation sites.

Golden Eagle: Golden eagle, a BLM sensitive and California Fully Protected species (i.e., may not be taken or possessed as defined under State law), nests within 5 miles of the project site and has been observed foraging over the project area. The large scale land use conversion for the Calico Solar Project would in essence remove approximately 6,215 acres of foraging habitat in the region. This loss could substantially interfere with normal breeding, feeding, or sheltering behavior, by causing golden eagles to forage more widely and therefore spend less time at or near their nests. This effect could be considered a "take," pursuant to the federal Bald and Golden Eagle Protection Act. Staff has proposed Conditions of Certification **BIO-20** (Pre- Construction Surveys for Golden Eagles) to avoid impacts to nesting golden eagles and ensure project compliance with federal requirements. The USFWS has also raised concerns regarding potential collision threats associated with solar and renewable technologies.

To address potential collision concerns (discussed below under operational effects) staff has proposed Condition of Certification **BIO-22** (Avian Protection Plan / Monitoring Bird Impacts from Solar Technology). This condition requires a monitoring and reporting program that would document and report potential collision mortality from the proposed solar fields, and implementation of adaptive management measures as determined necessary.

Nelson's Bighorn Sheep: Nelson's bighorn sheep, a BLM sensitive species, is well known from the Cady Mountains, where its population consists of at least 300 animals (SES 2009aa; DW 2010). During surveys conducted in winter 2010 for golden eagles, the applicant detected 62 sheep within 10 miles of the proposed project. The northern boundary of the project area is on the upper bajada of the Cady Mountains, an area generally considered potential spring foraging habitat. The project area as analyzed in this SSA does not include year-around occupied habitat (DW 2010). Direct effects to Nelson's bighorn sheep would include the loss of approximately 1,078 acres of spring foraging habitat. Indirect effects to habitat would include roughly 400 additional acres of spring foraging habitat that may be within the 850-foot 60 dB noise contour around the northern project boundary. Staff notes, however, that project flood control structures would be sited in this area and that significant noise sources (SunCatchers) may be several hundred feet south of the boundary, thus reducing the potential for off-site noise impacts. Additional indirect project effects would include avoidance of manmade structures and activity and surrounding habitat; increased disturbance from public traffic on a new northern boundary road ; and the introduction or spread of non-native, invasive plants. The project could also act as a barrier to movement for sheep using the south side of the Cady Mountains or their foothills to traverse to winter ranges in the Bristol Mountains. The applicant has also proposed general monitoring of sheep behavior if Nelson's bighorn sheep are seen within 200 feet of construction activities. Staff has incorporated the applicant's proposal into staff's proposed Condition of Certification **BIO-23** (Nelson's Bighorn Sheep Mitigation) and recommended additional measures to require construction monitoring and the potential cessation of construction activities should sheep be present within 500 feet of the project area.

American Badger and Kit Fox: American badgers and kit fox were detected on the Calico Solar Project site and the area supports suitable foraging and denning habitat for these species. Construction of the proposed project would cause direct effects to badgers and kit fox. Because of the large size of the project, numerous badgers or kit foxes may be affected. Animals confined within the exclusionary fence would be subject to ongoing long-term impacts that may result in mortality from road kill, loss or alteration of foraging habitat, overlapping territories and barriers to dispersal. Staff believes that avoidance of badgers and kit fox alone will not mitigate the direct, indirect, and operational effects of the Calico Solar Project. Staff's proposed Condition of Certification **BIO-24** (American Badger and Desert Kit Fox Impact Avoidance and Minimization Measures) requires that prior to ground disturbance, a qualified biologist perform a preconstruction survey for badger and kit fox dens in the project area, including areas within 250 feet of all project facilities, utility corridors, and access roads. If present, the applicant will flag and avoid occupied badger and kit fox dens during ground-disturbing activities and establish a buffer to avoid loss of maternity dens. Should the applicant need to work in an area with occupied badger dens, the applicant will slowly excavate the den in accordance with Condition of Certification **BIO-24**. Staff's proposed Condition of

Certification **BIO-17**, the compensatory mitigation plan for desert tortoise habitat, would also offset the loss of habitat for these species and reduce the impact from habitat loss to less-than-significant levels under CEQA.

Jurisdictional Waters: The project would directly or indirectly affect numerous ephemeral washes on the Calico Solar Project site. There are 282.2 acres of State jurisdictional streambeds on the site. All of these streambeds would be directly or indirectly affected by project construction and operation, including upstream interruption and redirection of natural flows. In addition, washes downstream of the project would be subject to impacts from the modification of drainage patterns onsite. The attenuation of peak storm flows and the subsequent loss of sediment to the system from the detention basins can adversely affect biological resources dependent on these features.

Staff has proposed Condition of Certification **BIO-26** (Streambed Impact Minimization and Compensation Measures), and has provided additional recommendations and guidance consistent with typical CDFG Streambed Alteration Agreement requirements. These include the acquisition of offsite habitat, the implementation of Best Management Practices, and the replacement of lost smoke tree and catclaw acacia habitats at a 3:1 ratio. It is possible that the applicant could meet the compensatory requirements, including replacement of smoke tree and catclaw acacia habitat, with the implementation of Condition of Certification **BIO-17,** which requires compensatory mitigation lands for desert tortoise. With implementation of staff's proposed Condition of Certification **BIO-26**, impacts to State jurisdictional waters associated with the desert washes would be mitigated to less-than-significant levels under CEQA. In addition, staff has identified Condition of Certification **BIO-28** (Channel Decommissioning and Reclamation Plan), to be implemented upon project termination.

Cumulative Impacts: Staff concludes that without mitigation, the Calico Solar Project will contribute to the cumulatively significant loss of the Mojave Desert's biological resources, including the State and federally threatened desert tortoise and other special status species. Impact avoidance and minimization measures described in staff's analysis and included in the conditions of certification would help reduce impacts to these resources. These compensatory measures are necessary to offset project-related losses, and to assure compliance with State and federal laws such as the federal and State Endangered Species Acts. Even with the implementation of these measures, the project's contribution to cumulative significant impacts to Mojave fringe-toed lizard would be considerable because of the project's effect on habitat isolation and fragmentation, even after implementing staff's recommended conditions of certification.

Staff concludes that, with the incorporation of recommended Conditions of Certification **BIO-1** through **BIO-30**, the proposed Calico Solar Project would be in compliance with applicable Laws, Ordinances, Regulations, and Standards (LORS).

Alternatives. The Reduced Acreage Alternative would reduce some impacts to biological resources identified on the site, including desert washes, desert tortoise habitat and some identified populations of rare plants. The footprint of the Reduced Acreage Alternative would also minimize potential conflicts with Nelson's bighorn sheep by avoiding potential foraging habitat and providing greater distance between bighorn sheep and construction/operation activities. While barriers to wildlife movement would

still remain, by moving the project footprint away from the foothills, the project would reduce barriers to wildlife movement for desert tortoise, bighorn sheep and other species. The Conditions of Certification are the same as those for the proposed project. Implementation of these Conditions would mitigate for the direct, indirect and cumulative impacts of the Reduced Acreage Alternative, and would be less than significant under CEQA.

Under the three No Action/No Project Alternatives, the impacts to biological resources from the proposed project would not occur. However, the land on which the project is proposed could become available to other uses, including another renewable energy project, if the proposal is consistent with BLM's California Desert Conservation Area (CDCA) land use plan. This would occur under the No Action/No Project Alternative (2) which includes a CDCA Plan Amendment allowing for future renewable energy development on this project site.

Cultural Resources

This technical analysis will be presented in a subsequent document.

Facility Design

Staff conclude that the design, construction, and decommissioning of the project and its linear facilities would likely comply with applicable engineering LORS. The proposed Conditions of Certification in **Executive Summary Table 4** would ensure compliance with the applicable LORS. The Facility Design section is not intended to address environmental impacts under either CEQA or NEPA.

Alternatives. The same LORS and Conditions of Certification would also apply to the Reduced Acreage Alternative. The Facility Design section is not intended to address environmental impacts under either CEQA or NEPA.

Under the three No Action/No Project Alternatives, the proposed project would not occur. However, the land on which the project is proposed could become available to other uses, including another renewable energy project, if the proposal is consistent with BLM's California Desert Conservation Area (CDCA) land use plan. This would occur under the No Action/No Project Alternative (2) which includes a CDCA Plan Amendment allowing for future renewable energy development on this project site.

Geology, Paleontology, and Minerals

Staff believes that the potential is low for significant adverse impacts to the proposed project from geologic hazards during its design life and to potential geologic, mineralogic, and paleontologic resources from the construction, operation, and closure of the proposed project. The Calico Solar Project could be designed and constructed in accordance with all applicable LORS and in a manner that both protects environmental quality and assures public safety, to the extent practical.

Alternatives. Like the proposed project, the potential is low for significant adverse impacts to the Reduced Acreage Alternative from geological hazards during its design life and moderate to high paleontological resources from the construction, operation, and closure of the proposed project. Staff concludes that this alternative would be

designed and constructed in accordance with all applicable LORS and in a manner that both protects environmental quality and assures public safety. The CEQA level of significance would remain unchanged from the proposed project.

Under the three No Action/No Project Alternatives, the impacts to geology, paleontology and mineral resources from the proposed project would not occur. However, the land on which the project is proposed could become available to other uses, including another renewable energy project, if the proposal is consistent with BLM's California Desert Conservation Area (CDCA) land use plan. This would occur under the No Action/No Project Alternative (2) which includes a CDCA Plan Amendment allowing for future renewable energy development on this project site

Hazardous Materials

The staff's evaluation of the proposed project, along with staff's proposed mitigation measures, indicate that hazardous materials use at the proposed Calico Solar Project would not present a significant impact pursuant to CEQA on the public or environment. With adoption of the proposed Conditions of Certification, the proposed project would comply with all applicable LORS.

Alternatives. The Reduced Acreage alternative would not result in any significant change in the potential for impact associated with hazardous materials handling and storage. The proposed project would not pose a significant risk of public impact as a result of an accidental release of hazardous materials. This alternative would not significantly change the risk profile of the facility.

Like the proposed project, the construction and operation of the Reduced Acreage alternative would be in compliance with all applicable LORS. The significance criteria for the Reduced Acreage alternative are exactly the same as the criteria for the proposed project.

Under the three No Action/No Project Alternatives, the use and generation of hazardous materials from the proposed project would not occur. However, the land on which the project is proposed could become available to other uses, including another renewable energy project, if the proposal is consistent with BLM's California Desert Conservation Area (CDCA) land use plan. This would occur under the No Action/No Project Alternative (2) which includes a CDCA Plan Amendment allowing for future renewable energy development on this project site.

Hydrology, Water Use and Water Quality

Based on the information provided to date, staff has determined that construction, operation, and decommissioning of the proposed Calico Solar (formerly known as the Stirling Energy Systems Solar One) Project could potentially impact soil and water resources. Where potential impacts have been identified, staff has proposed mitigation measures to reduce identified impacts to levels that are less than significant. The mitigation measures, as well as measures needed to ensure conformity with applicable laws, ordinances, regulations and standards, are included as conditions of certification. Staff's conclusions, based on analysis of the information submitted to date, are as follows:

1. The proposed project would be located in the Mojave Desert of San Bernardino County in an area characterized by braided stream channels, flash flooding, alluvial fan conditions, low rainfall, sparse vegetation, and the potential for wind erosion/ deposition.
2. The project proposes to place 34,000 solar dishes, known as SunCatchers, on individual pole foundations within areas known to be subject to flash flooding and erosion. Project-related changes to the braided and alluvial fan stream hydraulic conditions could result in on-site erosion, stream bed degradation or aggradation, and erosion and sediment deposition impacts to adjacent land. SunCatchers within the stream courses could be subject to destabilization by stream scour. Impacts to soils related to wind erosion and runoff-borne erosion are potentially significant, as are impacts to surface water quality from sedimentation and the introduction of foreign materials, including potential contaminants, to the project area. Compliance with laws, ordinances, regulations and standards and Conditions of Certification **SOIL&WATER-1**, **SOIL&WATER-2**, **SOIL&WATER-3** and **SOIL&WATER-5** will mitigate these potential impacts to a level less than significant.
3. The applicant completed a hydrologic study and hydraulic modeling of the major stream channels on the project site. The applicant has proposed the construction of large debris basins in channels upstream of the proposed solar array. The most recently-submitted design indicates that dams will be constructed to temporarily retain flows in the basins. The applicant has not submitted the comprehensive detail that staff needs to analyze the ability of the basins to retain maximum flows and protect the project from flooding. As a result, staff has recommended adoption of Conditions of Certification **GEO-2** and **-3**, which contain performance standards that ensure that the design of the debris basin dams will comply with current engineering practices and existing regulations, and prevent significant impacts. However, any proposed design must comply with requirements set forth in Conditions of Certification **SOIL&WATER-1**, **-2**, **-3** and **-8**, which will ensure that no adverse impacts due to flooding will occur.
4. Basins or other forms of flood protection have not been addressed for the three drainages that traverse private property near the center of the project and enter the proposed solar array. Impacts due to flooding in these areas are potentially significant without adequate mitigation. This leaves portions of the project subject to significant adverse impact due to flooding. Any proposed designs to mitigate these potential flood-related impacts must comply with requirements set forth in Conditions of Certification **SOIL&WATER-1**, **-2**, **-3** and **-8**, which will ensure that no adverse impacts due to flooding will occur.
5. The applicant's Draft Drainage, Erosion, and Sedimentation Control Plan may mitigate the potential on site project-related storm water and sediment impacts. However, the calculations and assumptions used to evaluate potential storm water and sedimentation impacts in the Draft Plan are imprecise and have limitations and uncertainties associated with them such that the magnitude of potential impacts that could occur cannot be determined precisely. As a result, staff drafted Conditions of Certification **SOIL&WATER-1**, **-2**, and **-3** to define specific methods of design analysis, development of best management practices, and monitoring and reporting procedures to mitigate impacts related to flooding, erosion, sedimentation, and stream morphological changes.

6. The applicant has not provided information necessary to complete development of requirements for dredge and fill in waters of the State. Compliance with LORS, particularly the Clean Water Act requirements, will insure no adverse impacts to waters of the State. In addition, staff drafted Conditions of Certification **SOIL&WATER-1**, **-2**, and **-3** to define specific methods of design analysis, development of best management practices, and monitoring and reporting procedures to mitigate impacts related to flooding, erosion, sedimentation, and stream morphological changes.

7. Surface water and groundwater quality could be affected by construction activities and ongoing operational activities on the project site including mirror washing, vehicle use and fueling, storage of oils and chemicals, the proposed septic and leach field system for sanitary wastes, and wastes generated from the water treatment system. These impacts are potentially significant. Conditions of Certification **SOIL&WATER-1**, **-2**, **-3 and -5** will mitigate these potential impacts to a level less than significant. The applicant has not provided information necessary to complete development of requirements for discharges of brine waters to evaporation ponds or sanitary septic systems. However, staff has identified performance standards that will ensure no significant adverse impacts will occur, and included these performance standards in Conditions of Certification **SOIL&WATER-2** and **-3** and **Soil and Water Appendix B.**

8. There is uncertainty in the long-term reliability of the proposed water supply. Condition of Certification **SOIL&WATER-9** is proposed to provide water conservation and plans for an alternative supply, if necessary, to ensure power plant and potable water demands are met for the project.

9. Dust control (during both construction and operation) and mirror washing (during operation) will comprise the primary water uses for the project. Daily maximum water use is estimated to be 43.7gallons per minute (gpm) during construction and 69.8 gpm during operation (maximum annual construction and operational water use is 142.4 acre feet per year (AFY) and 20.4 AFY, respectively). Condition of Certification **SOIL&WATER-4** ensures groundwater storage depletion and water level declines due to project groundwater use are less than significant by limiting annual construction water use to 145 AF and annual operational water use to 21 AF.

10. Water budget estimates and simulated drawdown due to proposed project pumping indicate groundwater storage depletion and water level declines will be less than significant. Condition of Certification **SOIL&WATER-4** limits annual groundwater use during construction and project operations. Condition of Certification **SOIL&WATER-7** shall confirm these findings by requiring groundwater level monitoring and reporting to document pre-project groundwater conditions and measure changes that occur as a result of groundwater use for project construction and operations.

11. Waste water will be generated as a byproduct of water treatment processes, equipment maintenance and from sanitary practices. Conditions of Certification **SOIL&WATER-2** and **-5** are proposed by staff to ensure impacts caused by generation and disposal of wastewater would be less than significant.

12. The proposed project would use air-cooled radiators fitted on each individual engine for heat rejection. Use of this technology would substantially reduce potential water use and is consistent with Energy Commission water policy.

Alternatives. All of the potential impacts identified for the proposed project remain with the Reduced Acreage Alternative. However, due to the alternative's reduced physical size and reduction in number of SunCatchers, these potential impacts are proportionately reduced. There would be no change in the CEQA Level of Significance of impacts between the proposed project and the Reduced Acreage alternative.

Under the three No Action/No Project Alternatives, the impacts to hydrology, water use, and water quality from the proposed project would not occur. However, the land on which the project is proposed could become available to other uses, including another renewable energy project, if the proposal is consistent with BLM's California Desert Conservation Area (CDCA) Plan. This would occur under the No Action/No Project Alternative (2) which includes a CDCA Plan Amendment allowing for future renewable energy development on this project site.

Land Use and Recreation

Implementation of the proposed Calico Solar Project would not result in adverse impacts to agricultural lands, rangeland resources, or horses and burros. The conversion of approximately 6,215 acres of land to support the proposed project's components and activities could disrupt wilderness resources and recreational activities in established federal, state, and local recreation areas. Potential impacts from the proposed project would indirectly affect the Cady Mountains Wilderness Study Area (WSA); however, numerous wilderness and recreation areas surround the project site. Therefore, this indirect impact would not be adverse.

The applicant has submitted an application to the BLM requesting a right-of-way (ROW) to construct the proposed project and its related facilities. Pursuant to the California Desert Conservation Area (CDCA) Plan (1980, as amended), sites associated with power generation or transmission not identified in the CDCA Plan are considered through the Plan Amendment process. Therefore, the proposed project would require a BLM ROW grant and a project-specific plan amendment for consistency with the CDCA Plan. However, in an interim policy dated May 28, 2009, the State Director of the BLM issued an Instruction Memorandum regarding management of donated land and lands acquired by Land and Water Conservation Funds (LWCF), which requires LWCF lands to be managed as avoidance/exclusion areas for land use authorizations that could result in surface disturbing activities (BLM 2009a). Construction and operation of the proposed project (i.e., the revised 6,215-acre project site) would not comply with this policy, as the revised project boundary still includes LWCF lands. Although, the exact acreage of the LWCF lands affected is unclear.

In May 2010, the applicant submitted a supplemental report for modifications to the primary water supply, which would require a pipeline that would traverse two private parcels located within the San Bernardino County (county) Resource Conservation (RC) zoning designation. The county recently adopted Development Code Chapter 84.29 (Renewable Energy Generating Facilities), which allows for development of solar energy facilities in the RC zone. Therefore, the proposed project's water supply pipeline is consistent with San Bernardino County's General Plan and Development Code.

For purposes of CEQA compliance, the level of significance of each impact of the proposed project on land use resources has been determined and is discussed in detail

in Section C.8.4.3 (CEQA Level of Significance). In summary, impacts on agricultural lands and rangelands would be less than significant, and there would be no impacts related to Williamson Act contracts. Impacts to recreation and wilderness resources would be less than significant. Impacts to horses and burros would be less than significant. Impacts related to LORS compliance would be significant and unavoidable.

Under NEPA, impacts to land use, recreation and wilderness would be minimal. No Herd Management Area is affected by the proposed project.

Because the Calico Solar Project would have no impacts on agricultural resources, rangelands, horses and burros, it would have no potential to contribute to cumulative impacts in this respect. However, the proposed project would combine with other past and reasonably foreseeable future projects to substantially reduce scenic values of wilderness areas and recreational resources in the Mojave Desert and southern California desert region and therefore, would result in a significant and unavoidable cumulative land use impact in this regard.

Alternatives. The Reduced Acreage Alternative would be approximately 2,600 acres or 42% of the lands affected by the proposed project, and would eliminate any construction on LWCF lands. In contrast to the proposed project, this alternative would comply with all applicable LORS, in particular the BLM's Interim Policy Memorandum regarding management of donated LWCF mitigation lands. Otherwise, in general, the impacts associated with the alternative would be similar to the proposed project, but proportionally less intense.

Under the three No Action/No Project Alternatives, the impacts to land use and recreation from the proposed project would not occur. However, the land on which the project is proposed could become available to other uses, including another renewable energy project, if the proposal is consistent with BLM's California Desert Conservation Area (CDCA) land use plan. This would occur under the No Action/No Project Alternative (2) which includes a CDCA Plan Amendment allowing for future renewable energy development on this project site.

Noise and Vibration

The staff concludes that the Calico Solar Project can be built and operated in compliance with all applicable noise and vibration LORS. If the proposed project is built in accordance with Conditions of Certification **NOISE-1** through **NOISE-7**, it would produce no significant adverse noise impacts under CEQA on people within the affected area, whether direct, indirect, or cumulative.

Alternatives. Given the nature of the operational noise produced by the chosen project technology, the Reduced Acreage Alternative would most likely correspond to lower operational noise impacts at noise receptors located east of the project (SR2), a receptor that faces significant, though mitigable noise impacts from the proposed project. Operational noise impacts at the receptors south of the project would likely be the same as that of the proposed 850-MW project. The CEQA level of significance of the Reduced Acreage Alternative would be unchanged from the proposed project.

Under the three No Action/No Project Alternatives, the noise and vibration impacts from the proposed project would not occur. However, the land on which the project is proposed could become available to other uses, including another renewable energy project, if the proposal is consistent with BLM's California Desert Conservation Area (CDCA) land use plan. This would occur under the No Action/No Project Alternative (2) which includes a CDCA Plan Amendment allowing for future renewable energy development on this project site.

Power Plant Efficiency

The project would decrease reliance on fossil fuel, and would increase reliance on renewable energy resources. It would not create significant adverse effects on fossil fuel energy supplies or resources, would not require additional sources of energy supply, and would not consume fossil fuel energy in a wasteful or inefficient manner. No efficiency standards apply to this project. Staff therefore concludes that this project would present no significant adverse impacts on fossil fuel energy resources.

Employing a less land-intensive solar technology, such as the linear parabolic trough technology, would increase the solar land use efficiency of Calico Solar. Staff believes Calico Solar represents one of the least land use-efficient solar technologies proposed by the projects currently in the Energy Commission's licensing process. Staff recognizes that the modular technology of the SunCatcher system allows the project to avoid environmental resource areas within the project boundaries, reducing the density of the SunCatcher units and likewise the land use efficiency. Nonetheless, larger project footprint per megawatt precludes other use of the land.

Alternatives. The Reduced Acreage Alternative would produce 275 MW while occupying 2,300 acres, resulting in a power-based land use efficiency of 0.12 MW/acre. If the Reduced Acreage Alternative were constructed, the CEQA Level of Significance as measured by land use (occupied acreage) would amount to approximately 28% of the levels described for the proposed project.

Under the three No Action/No Project Alternatives, the proposed project would not occur. However, the land on which the project is proposed could become available to other uses, including another renewable energy project, if the proposal is consistent with BLM's California Desert Conservation Area (CDCA) land use plan. This would occur under the No Action/No Project Alternative (2) which includes a CDCA Plan Amendment allowing for future renewable energy development on this project site.

Power Plant Reliability

An expert familiar with the machines claims that the SunCatcher exhibits a Mean Time Between Failures (MTBF) of only 40 hours. It is believed by this expert that a MTBF of 2,000 to 10,000 hours must be proven before a technology is ready for incorporation into a utility grid (Butler 2007, Public 2009a; Conklin 2009).

Recently, the applicant provided a report to the energy commission, claiming an overall availability factor of 95.1% for the 1.5 Megawatt (MW) Maricopa Plant (a pilot plant using the Stirling Energy Systems SunCatcher units) during the period of March 16 to June 5, 2010 (TS 2010ai). (The availability factor of a power plant is the percentage of

time it is available to generate power; both planned and unplanned outages subtract from this availability.) The proposed Calico Solar Project would be essentially a multiplication of the 60-unit Maricopa Plant with similar configuration. The Maricopa Plant has generated 833,738 kWh, representing a capacity factor of 26.7%. This represents several hundred hours of plant operation. The applicant claims that it has used lessons learned from the Maricopa Plant to incorporate engineering and maintenance improvements.

The applicant's data above demonstrates an encouraging first-step effort toward achieving a reliable technology. However, this data demonstrates an availability factor based on a limited number of operational hours. Had this technology represented an operational experience equivalent to that of a well-proven, commercial-scaled technology with thousands of hours of operational experience, such as the natural gas turbine technology, staff would have been confident in determining the availability factor. Therefore, at this time, staff cannot determine what the actual availability factor for the long-term operation of the Calico Solar Project would be, but it believes that with more operational experience we will have a better idea of the long-term availability factor of this technology.

Alternatives. The Reduced Acreage power plant would produce only 275 MW (32% of the proposed project's 850 MW) so its impacts on the SCE grid would be proportionately less. The CEQA Level of Significance would not change from the levels described for the proposed project if the Reduced Acreage alternative were constructed.

Under the three No Action/No Project Alternatives, the proposed project would not occur. However, the land on which the project is proposed could become available to other uses, including another renewable energy project, if the proposal is consistent with BLM's California Desert Conservation Area (CDCA) land use plan. This would occur under the No Action/No Project Alternative (2) which includes a CDCA Plan Amendment allowing for future renewable energy development on this project site.

Public Health and Safety

Staff have analyzed potential public health and safety risks associated with construction and operation of the Calico Solar Project and do not expect any substantial adverse cancer or short- or long-term noncancerous health effects from project toxic emissions under CEQA. According to the results of staff's health risk assessment, emissions from the Calico Solar Project would not contribute substantially to morbidity or mortality in any age or ethnic group residing in the project area.

Alternatives. The Reduced Acreage Alternative would likely result in reduced emission which would decrease the cancer risk and chronic and acute health hazard indices predicted for the proposed project. However, the public health analysis has determined that these indices are far below the level of significance at the point of maximum impact for the project as proposed. Therefore, with respect to public health impacts, the Reduced Acreage Alternative is not preferable over the project as proposed. Similar to the proposed project, staff considers project compliance with LORS to be sufficient to ensure that no significant impacts would occur as a result of waste management associated with the Reduced Acreage Alternative.

Under the three No Action/No Project Alternatives, the public health and safety impacts from the proposed project would not occur. However, the land on which the project is proposed could become available to other uses, including another renewable energy project, if the proposal is consistent with BLM's California Desert Conservation Area (CDCA) land use plan. This would occur under the No Action/No Project Alternative (2) which includes a CDCA Plan Amendment allowing for future renewable energy development on this project site.

Socioeconomics and Environmental Justice

Staff conclude that the 850-megawatt Calico Solar Project would cause neither a significant adverse direct or indirect impact nor contribute to a cumulative socioeconomic impact on the area's housing, schools, parks and recreation, police, emergency medical services, or hospitals, since most of the project's construction and operation workforce currently resides in the regional or local labor market area. Gross public benefits from the project include capital costs, construction and operation payroll, and sales taxes.

Alternatives. The Reduced Acreage Alternative would eliminate approximately 67% of the proposed project area, would not require an upgraded transmission line, and would consist of fewer (11,000) SunCatchers than the proposed project (34,000). Accordingly, the Reduced Acreage Alternative would require less construction with the above mentioned infrastructure and operation of the solar facility. This would result in a smaller fiscal impact than the proposed project, with a reduced need for housing, schools, parks and recreation, law enforcement and emergency medical services. The Reduced Acreage Alternative would have a smaller impact than the proposed project on substantial population growth, impact housing supply, displace existing housing or substantial numbers of people or result in substantial physical impacts to government facilities. In addition, this alternative would have a smaller impact than the proposed project with respect to project cost, payroll, and local construction materials/supplies. Similar to the proposed project, this alternative would not a cause adverse significant socioeconomic impact from construction or operation. Similar to the proposed project, the Reduced Acreage Alternative would not require socioeconomic Conditions of Certification.

Under the three No Action/No Project Alternatives, the socioeconomic benefits from the proposed project would not occur. However, the land on which the project is proposed could become available to other uses, including another renewable energy project, if the proposal is consistent with BLM's California Desert Conservation Area (CDCA) land use plan. This would occur under the No Action/No Project Alternative (2) which includes a CDCA Plan Amendment allowing for future renewable energy development on this project site.

Traffic and Transportation

This technical analysis will be presented in a subsequent document.

Transmission Line Safety and Nuisance

The applicant proposes to transmit the power from the two phases of the proposed Calico Solar Project to Southern California Edison's existing Pisgah Substation from which it would be delivered to the California Independent Operator-controlled power grid. Since the line would be operated within the Southern California Edison service

area, it would be constructed, operated, and maintained according to Southern California Edison's guidelines for line safety and field management which conform to applicable laws, ordinances, regulations and standards. Also, the route would traverse undisturbed desert land with no nearby residents thereby eliminating the potential for residential electric and magnetic field exposures. With the proposed Conditions of Certification, any safety and nuisance impacts from construction and operation of the proposed line would be less than significant.

Alternatives. The Reduced Acreage Alternative would have fewer (11,000) SunCatchers than with the proposed alternative (34,000), but the system of aggregation and method of power transmission would be the same as the proposed project. Because the staff finds the safety and nuisance impacts of the proposed 850-MW project to be less than significant under CEQA, staff would expect the design's implementation for the 275-MW Reduced Acreage Alternative (as required by the Conditions of Certification) to result in impacts that would be less than significant as well.

Under the three No Action/No Project Alternatives, the impacts pertaining to transmission line safety and nuisance from the proposed project would not occur. However, the land on which the project is proposed could become available to other uses, including another renewable energy project, if the proposal is consistent with BLM's California Desert Conservation Area (CDCA) land use plan. This would occur under the No Action/No Project Alternative (2) which includes a CDCA Plan Amendment allowing for future renewable energy development on this project site.

Transmission System Engineering

The proposed Calico Solar Project outlet lines and termination are acceptable and would comply with the NERC/WECC planning standards, California ISO reliability criteria, and all applicable LORS with implementation of the Conditions of Certification. The analysis of project transmission lines and equipment, both from the power plant up to the point of interconnection with the existing transmission network as well as upgrades beyond the interconnection that are attributable to the project have been evaluated by staff and are included in the environmental sections of this SSA.

Staff concludes that mitigation of thermal overloads caused by the Calico Solar Project under the Base case and N-1 conditions would require the following facilities:

- Expand Southern California Edison's existing Pisgah 230 kV interconnection facility and install a new 2,240 MVA, 500/230 kV substation with two 1,120 MVA transformer banks. The expansion of the existing Pisgah 230 kV substation requires California CEQA/NEPA analysis.
- Loop the existing Eldorado-Lugo 500 kV transmission line into the expanded Pisgah substation forming the Eldorado-Pisgah and Lugo-Pisgah No. 1 500 kV transmission lines.
- Install a new Lugo-Pisgah No. 2 500 kV transmission line by removing the existing Lugo-Pisgah No. 2 230 kV transmission line, widening the existing Right-of-Way (ROW) where needed and constructing the new 500 kV structures within the vacated ROW. The widening the existing ROW would require CEQA/NEPA analysis.

- Additionally, a Special Protection System (SPS) will be required to trip the proposed project to mitigate the thermal overloads caused by the N-1 emergency condition.
- The proposed Calico Solar Project should be designed and constructed with adequate reactive power resources to compensate the consumption of Var by the generator step-up transformers, distribution feeders and generator tie-lines.

Alternatives. The Reduced Acreage Alternative would require 11,000 SunCatchers to generate approximately 275 MW. This alternative was developed because it could be constructed without upgrading the existing SCE Lugo-Pisgah transmission line and Pisgah Substation. Therefore, the 275-MW Alternative would require fewer distribution facilities and a smaller substation to be built within the project site. Because this alternative would require fewer transformers, fewer collector distribution feeders and other electrical components, it would also result in fewer impacts to the environment

Under the three No Action/No Project Alternatives, the proposed project would not occur. However, the land on which the project is proposed could become available to other uses, including another renewable energy project, if the proposal is consistent with BLM's California Desert Conservation Area (CDCA) land use plan. This would occur under the No Action/No Project Alternative (2) which includes a CDCA Plan Amendment allowing for future renewable energy development on this project site.

Visual Resources

Staff concludes that under the proposed project, the character and quality of some views from foreground and near-middle-ground areas of the Cady Mountains Wilderness Study Area would be adversely affected, but the overall effect on views from the Cady Mountains Wilderness Study Area is considered to be less-than-significant.

The anticipated visual impacts of both the Calico Solar Project and the reduced acreage alternative, in combination with past and foreseeable future local projects in the immediate project viewshed, and past and foreseeable future region-wide projects in the southern California desert, are considered cumulatively considerable, potentially significant, and unavoidable.

Alternatives. Impacts of the Reduced Acreage Alternative would be substantially less than the proposed project. Based on further analysis and in light of additional information available to staff since publication of the SA/DEIS, impacts under this alternative are considered to remain significant.

Under the three No Action/No Project Alternatives, the impacts to visual resources from the proposed project would not occur. However, the land on which the project is proposed could become available to other uses, including another renewable energy project, if the proposal is consistent with BLM's California Desert Conservation Area (CDCA) land use plan. This would occur under the No Action/No Project Alternative (2) which includes a CDCA Plan Amendment allowing for future renewable energy development on this project site.

Waste Management

Staff concludes that management of the waste generated during construction and operation of the Calico Solar Project would not generate a significant impact under the CEQA. There is sufficient landfill capacity, and the project would be consistent with the applicable waste management LORS if the measures proposed in the Application for Certification and staff's proposed Conditions of Certification are implemented.

Alternatives. The Reduced Acreage Alternative would generate similar types of hazardous and non-hazardous wastes from construction, demolition and operation of the project. However, the quantities of waste would be reduced by 66%. The amount of non-hazardous and hazardous solid wastes generated under a Reduced Acreage Alternative that would require landfill/treatment would be approximately 3,000 and 74 cubic yards, respectively. Similar to the proposed project, wastes requiring off-site disposal would be significantly less than the remaining capacity of off-site disposal facilities. Similar to the proposed project, staff would not require investigation and remediation of soil and groundwater contamination. Disposal methods would remain the same as for the proposed project and the same Conditions of Certification would apply. Similar to the proposed project, staff considers project compliance with LORS and Conditions of Certification to be sufficient to ensure that no significant impacts would occur as a result of waste management associated with the Reduced Acreage Alternative.

Under the three No Action/No Project Alternatives, the waste management impacts from the proposed project would not occur. However, the land on which the project is proposed could become available to other uses, including another renewable energy project, if the proposal is consistent with BLM's California Desert Conservation Area (CDCA) land use plan. This would occur under the No Action/No Project Alternative (2) which includes a CDCA Plan Amendment allowing for future renewable energy development on this project site.

Worker Safety and Fire Protection

Staff has also determined that the project will have a significant impact on the local fire protection services. The proposed facility would be located in an area that is currently served by the San Bernardino County Fire Department (SBCFD). While staff believes that the SBCFD is adequately staffed, trained, and equipped to respond to a fire, hazardous materials spill, or a need for Emergency Medical Services in a reasonable time period given the great distances involved in a desert location, the added emergency response needs will pose significant added demands on local fire protection services, thus resulting in shifting equipment and personal from station to station to cover the entire county (the largest county in California and in the continental United States) and therefore staff proposes Condition of Certification **WORKER SAFETY-7** as mitigation to reduce the impacts to less than significant.

Newberry Springs Community Service District has petitioned to intervene and to present evidence that they should be the responsible fire district. Staff believes that the proper jurisdiction is the SBCFD and that all emergency services should be coordinated with San Bernardino County. The applicant appears to agree with staff's opinion in that the Application for Certification (AFC) also states that the SBCFD "will provide primary fire protection, fire fighting, and emergency response services to the project site.

Alternatives. Since the proposed project impacts are found to be less than significant with the incorporation of Conditions of Certification, the impacts of the Reduced Acreage Alternative would be smaller due to the smaller extent of construction disturbance and the fewer number of SunCatchers under this alternative. Like the proposed project, the construction and operation of the Reduced Acreage Alternative would be in compliance with all applicable LORS for both long-term and short-term project impacts in the area of worker safety and fire protection with adoption of the same proposed Conditions of Certification.

Under the three No Action/No Project Alternatives, the impacts pertaining to worker safety and fire protection from the proposed project would not occur. However, the land on which the project is proposed could become available to other uses, including another renewable energy project, if the proposal is consistent with BLM's California Desert Conservation Area (CDCA) land use plan. This would occur under the No Action/No Project Alternative (2) which includes a CDCA Plan Amendment allowing for future renewable energy development on this project site.

NOTEWORTHY PUBLIC BENEFITS

Staff has identified the following public benefits.

1) Greenhouse gas (GHG) related noteworthy public benefits include the construction and operation of renewable and low-GHG emitting generation technologies and the potential for successful integration into the California and greater WECC electricity systems. Additionally, the Calico Solar Project would contribute to meeting the state's Assembly Bill (AB) 32 goals.

2) Although the likelihood of finding paleontological resources on the project site is low, the science of paleontology is advanced by the discovery, study and duration of new fossils. These fossils can be substantial if they represent a new species, verify a known species in a new location and/or if they include structures of similar specimens that had not previously been found preserved. In general, most fossil discoveries are the result of excavations, either purposeful in known or suspected fossil localities or as the result of excavations made during earthwork for civil improvements or mineral extraction. Proper monitoring of excavations at the proposed Calico Solar facility, in accordance with an approved Paleontological Monitoring and Mitigation Plan, could result in a benefit to the science of paleontology and should minimize the potential to damage a substantial paleontological resource.

3) The proposed project would help in reducing greenhouse gas emissions from gas-fired generation. Both State and Federal law support the increased use of renewable energy and any resultant decreases in the use of riskier hazardous materials for power production at other facilities.

4) It is noteworthy that a solar electric generating facility such as the proposed Calico Solar Project would emit substantially less toxic air containment (TACs) to the environment than other energy sources available in California such as natural gas or biomass, thereby reducing the health risks that would otherwise occur with these non-renewable energy sources. At the same time, the proposed Calico Solar Project would provide

much needed electrical power to California residences and businesses, and would contribute to electric reliability. Electrical power is not only necessary to maintain a functioning society, but it also benefits many individuals who rely on powered equipment for their health (such as dialysis equipment and temperature control equipment). For example, it is documented that during heat waves in which elevated air-conditioning use causes an electrical blackout, hospitalizations and deaths due to heat stroke are increased.

5) Noteworthy socioeconomic public benefits include the direct, indirect an induced impacts of a proposed power plant. Direct impacts include permanent jobs and wages. Indirect and induced economic impacts from construction and operations and maintenance would also result.

6) Staff believes that there would be some positive transmission system impacts from the proposed project because the Calico Solar Project would supplement local solar generation and import of power to the SCE system, helping to meet the increasing load demand in San Bernardino County.

B.1 – PROPOSED PROJECT

B.1.1 INTRODUCTION

On December 2, 2008, Stirling Engine Systems Solar One, LLC, (SES Solar Three, LLC and SES Solar Six, LLC) submitted an Application for Certification (AFC) to the California Energy Commission to construct and operate the Stirling Energy Systems Solar One Project (SES Solar One) on public land managed by the Bureau of Land Management (BLM) in San Bernardino County, California. On May 6, 2009, the Energy Commission accepted the AFC as complete. In January 2010, the project formally changed its name to the Calico Solar Project. The applicant, SES Solar Three, LLC, was merged into SES Solar Six, LLC, and that surviving entity was re-named Calico Solar, LLC. Calico Solar is a subsidiary of Tessera Solar™. The applicant's development plans have been updated several times since filing its original right-of-way (ROW) application with the BLM and/or AFC applications with the Energy Commission. The most substantial revisions are summarized as follows in the **Project Description Table 1**.

Project Description Table 1
Summary of Applicant's Updates to the Calico Solar Development Plans

Posted Date	Reference Document	Revisions to Proposed Project
07/21/2009	Data Response #49-70, 74-45, 80, 82-84, 86-91	Additional information regarding evaporation pond design.
08/25/2009	Data Response #113-127	Removes Satellite Services Complex from project scope
09/03/2009	Data Response #1-48, 81, 109-112	Reduction in Project roads, vehicle type changes, fuel type changes, revisions to construction practices, sequencing and schedule, revision to placement of support facilities, vehicle travel pattern changes
12/01/2009	Data Response #71-73, 76-79, 85, 128-141	Removal of access road alternative options 2 through 4 as discussed in the AFC; hydrogen gas to be produced on site and brought to SunCatchers via a distributed system.
12/16/2009		Updated project map
01/11/2010	Submittal	CAISO reports
01/12/2010	Submittal	Geotechnical engineering report
01/28/2010		Change of project name and applicant name
02/08/2010	Supplemental Analysis for the AFC	Cadiz Water provided as primary water source for the Project
02/17/2010	Applicant's Drainage Layout Figure	Drainage layout figure and project layout figure

Posted Date	Reference Document	Revisions to Proposed Project
02/26/2010	Applicant's Drainage Layout Figure	Drainage layout figure; depicts Project phases and other layout changes resulting from agency and public input
05/14/2010	Applicant's Supplement to the AFC	Change water source for the project from BNSF Cadiz wells to water from the Lavic Groundwater Basin adjacent to the project site.
05/14/2010	Applicant's Supplement to the AFC	Modification of project boundary to 7,130 acres to reduce impacts to biological resources.
05/14/2010	Applicant's Supplement to the AFC	Increase of on-site hydrogen storage and request to analyze both centralized and distributed systems for approval.
06/02/2010	Applicant's Alternative Site Layout #2	Modification of project boundary to 6,215 acres to reduce impacts to biological resources

B.1.2 PROJECT LOCATION

The Calico Solar Project site is proposed to be located on public land managed by the BLM. The proposed project site is approximately 37 miles east of Barstow, California, 17 miles east of Newberry Springs, 57 miles northeast of Victorville, and approximately 115 miles east of Los Angeles (straight line distances). The following sections or portions of sections in Townships 8 and 9 North, Ranges 5 and 6 East of the San Bernardino Meridian identify the project site and the planned boundary for development of the Calico Solar Project (see **Project Description Figure 1**).

The project is proposed for development in two phases. Phase I is located on approximately 2,327 acres. Phase II is located on approximately 3,888 additional acres. The total area required for both phases is approximately 6,215 acres. The site was reduced from the 8,230 acres project originally proposed to avoid impacts to environmental impacts identified by the Renewable Energy Action Team agencies.

PHASE ONE

Within Township 8 North, Range 5 East:

- the portion of the northeast quarter section of Section 11 north of the railroad ROW, and
- the portion of Section 12 north of the railroad ROW, and
- the southern one-half of the southeastern quarter of Section 2.

Within Township 8 North, Range 6 East:

- a portion of the north half of the north half of northwest quarter of Section 4,
- a portion of the south half of the south half of the southwest quarter, a portion of the north half of the north half of the northeast quarter, and a portion of the northwest quarter of the northwest quarter of the northwest quarter of Section 5,

- a portion of the south half of the south half and a portion of the north half of the north half of Section 6,
- the portion of Section 7 north of the railroad ROW,
- all of the portion of Section 8 west of the SCE Transmission ROW, except for a portion of the north half of the north half of the northeast quarter of Section 8,
- the portion of Section 9 west of the SCE Transmission ROW, except for a portion of the north half of the north half of the northwest quarter of Section 9,
- the portion of Section 17 west of the SCE Transmission ROW and north of the railroad ROW, and
- the portion of Section 18 north of the railroad ROW,

Within Township 9 North, Range 6 East:

- the southern half of Section 32

PHASE 2 (BLM ADMINISTERED LAND)

Within Township 8 North, Range 5 East:

- eastern half of Section 2, excluding the southern one-half of the southeastern quarter of Section 2,
- the south half of Section 10 and that portion of the northeast quarter lying southerly of the southerly BNSF right of way,
- the portion of the northwest quarter of Section 14 lying north of the Interstate 40 ROW and west of the east half of the east half of the east half of the northwest quarter of Section 14 along with the northeast quarter of the northeast quarter of the northeast quarter of Section 14 and the east half of the northwest quarter of the northeast quarter of the northeast quarter of Section 14,
- the north one-half and the east one-half of Section 8 lying northerly of the northerly right of way line for the Mojave Pipeline Company, and the southerly of the southerly right of way line for BNSF railroad,
- of the portion of Section 11 lying south of the southerly right of way of BNSF railroad, except for the east half of the southwest quarter of the northwest quarter, the west half of the southeast quarter of the northwest quarter, the east half of the southeast quarter of the southeast quarter of the southwest quarter, the south half of the southwest quarter of the southeast quarter and the west half of the southwest quarter of the southeast quarter of the southeast quarter,
- the portion of Section 12 south of the railroad ROW, and
- the portion of Section 15 north of the I-40 ROW.

Within Township 8 North, Range 6 East:

- the west half of Section 4, west of the SCE Transmission ROW, except for a portion of the north half of the north half of the northwest quarter,

- all of Section 5 except a portion of the south half of the south half of the southwest quarter, a portion of the north half of the north half of the northeast quarter, and a portion of the northwest quarter of the northwest quarter of the northwest quarter of Section 5,
- All of Section 6, except a portion of the south half of the south half of the southwest and southeast quarters of Section 6,
- the portion of Section 7 south of the BNSF ROW, and
- the portions of Section 18 west of the SCE Transmission ROW, south of the BNSF ROW and north of the I-40 ROW, except a portion of the southwest quarter of the northwest quarter of Section 18.

Within Township 9 North, Range 5 East:

- the southeast quarter section of Section 35

The proposed Calico Solar Project also includes a new 230-kilovolt (kV) Calico Solar Substation, 2.0 miles of electrical transmission line, an administration building, maintenance complex, onsite routes interior to the project boundaries, a site access road and bridge over the Burlington Northern Santa Fe railroad tracks. Approximately 739 feet of the 2-miles of single-circuit, 230-kV generation interconnection transmission line would be constructed off the project site but still on BLM managed land. The transmission line would connect the proposed Calico Solar Substation to the existing Southern California Edison (SCE) Pisgah Substation. The main access for traffic to the project site during construction will be from Interstate 40 (I-40) to the project entrance on Hector Road through an existing at-grade crossing of the Burlington Northern Santa Fe (BNSF) Railroad tracks. This at-grade crossing will be used during the initial phases of construction until a bridge is constructed that will span the railroad. Traffic will exit the project site at Hector Road and the existing Hector Road crossing during the initial phases of construction. Once the bridge is completed, all traffic will use the bridge for ingress egress (see **Project Description Figure 2**).

B.1.3 PROCESS DESCRIPTION

The SunCatcher™ is a 25-kilowatt-electrical (kW) solar dish Stirling system designed to automatically track the sun and collect and focus solar energy onto a power conversion unit (PCU), which generates electricity. The system consists of an approximately 40-foot-high and 38-foot in diameter solar concentrator in a dish structure that supports an array of curved glass mirror facets. These mirrors collect and concentrate solar energy onto the solar receiver of the PCU (see **Project Description Figure 3**).

The PCU converts the focused solar thermal energy into grid-quality electricity. The conversion process in the PCU involves a closed-cycle, 4-cylinder, 35-horsepower reciprocating Stirling Engine utilizing an internal working fluid of hydrogen gas that is recycled through the engine. The Stirling Engine operates with heat input from the sun that is focused by the SunCatcher's dish assembly mirrors onto the PCU's solar receiver tubes, which contain hydrogen gas. The PCU solar receiver is an external heat exchanger that absorbs the incoming solar thermal energy. This heats and pressurizes the hydrogen gas in the heat exchanger tubing, his gas in turn powers the Stirling Engine.

A generator is connected to the Stirling Engine; this generator produces the electrical output of the SunCatcher. Each generator is capable of producing 25 kW at 575 volts alternating current (VAC)/60 hertz (Hz) of grid-quality electricity when operating with rated solar input. Waste heat from the engine is transferred to the ambient air via a radiator system similar to those used in automobiles.

The hydrogen gas is cooled by a standard glycol-water radiator system and is continually recycled within the engine during the power cycle. The conversion process does not consume water. The only water consumed by the SunCatcher is for washing of the mirrors to remove accumulated dust and replenishing small losses to the cooling system radiator in a 50-50 ethylene glycol-water coolant.

B.1.3.1 SUNCATCHER COMPONENTS

This section provides an overview of the three major SunCatcher components: the foundation/pedestal, the dish assembly, and the PCU.

Foundation/Pedestal

The solar dish would typically be mounted on a foundation consisting of a metal pipe that is hydraulically driven into the ground. This foundation is preferred because no concrete is required, no spoils are generated, and the foundations can be completely removed when the project is decommissioned. When conditions are not conducive to the use of the metal pipe foundation, the foundation would consist of rebar-reinforced concrete constructed below grade. Both of these foundation designs meet all applicable structural design requirements and applicable LORS.

The SunCatcher pedestal on which the SunCatcher Dish Assembly would be secured is approximately 18 feet 6 inches in height and would be an integrated part of the metal pipe foundation or would be a separate structure fastened to the rebar-reinforced concrete foundation at ground level.

Dish Assembly

The SunCatcher Dish Assembly would be fitted with a trunnion that attaches to the pedestal. Each Dish Assembly would consist of a 38-foot in diameter, 40-foot high steel structure that supported an array of curved glass mirror facets. These mirrors would form a curved shape engineered to concentrate solar energy onto the solar receiver portion of the PCU. The Dish Assembly includes azimuth and elevation drives for tracking the sun and a PCU support boom.

The SunCatcher Dish Positioning Control System employs proprietary algorithms to track the sun. This system focuses the solar energy onto the solar receiver by controlling elevation and azimuth drives, and executes startup, shutdown, and de-track procedures. These procedures allow the dish to “wake up” from the night-stow position in the morning to focus the dish mirror facets on the solar receiver of the PCU, and then to track the sun during the daylight operating time of the project. The dish control system also communicates with and receives instructions from the central control room via the Supervisory Control and Data Acquisition (SCADA) system. The system is designed to place the dish into a “wind stow” position when sustained winds exceed 35 miles per hour to protect the system from wind damage. The system also places the dish into

"wind stow" position on loss of communications with the central control room or on receipt of a fault signal from the PCU control system.

Power Conversion Unit

The SunCatcher PCU converts the solar energy into grid-quality electricity. Hydrogen gas is used in a closed-cycle heating/expansion – cooling/compression cycle to drive a high-efficiency, 380-cubic-centimeter displacement, 4-cylinder reciprocating Solar Stirling Engine. The Stirling Engine powers an electrical generator that produces 25 kWe net output after accounting for on-board parasitic loads at 575-volt alternating current, 60 Hz of grid-quality electricity. The PCU attaches to the end of the PCU boom.

The dimensions of the PCU are approximately 88 inches (7 feet) long by 63 inches (5 feet) wide by 37 inches (3 feet) high. The PCU weighs approximately 1,400 pounds.

The PCU consists of six subsystems: solar receiver, Stirling Engine, generator, cooling system, gas management system, and the PCU control system. Each subsystem is described below.

- **Solar Receiver:** The SunCatcher solar receiver consists of an insulated cavity with an aperture that allows the solar energy to enter. Within the cavity are 4 heater heads. Each heater head forms a tube network for one quadrant of the engine. The solar flux, radiant energy from the sun, heats the metal tubes and the heat is then transferred through the tubes to the working hydrogen gas. The heat absorbed at the solar receiver drives the Solar Stirling Engine.
- **Solar Stirling Engine:** The kinematic Stirling Engine has evolved from a Kockums kinematic Stirling Engine design. The Kockums kinematic Stirling Engine is used as a propulsion source for submarines and is highly reliable, low maintenance, and highly efficient. SES has further developed and improved the engine design specifically for use in the SunCatcher.
- **Generator:** A generator is connected to the Stirling Engine to produce the electrical output of the SunCatcher. The PCU generator attached to each Solar Stirling Engine is capable of producing up to 25 kW at 575 VAC, 60 Hz of grid-quality electricity when operating with a solar input of between 250 and 1,000 W/m^2. The generator output is connected to the power collection system.
- **Cooling System:** Waste heat from the hydrogen gas within the engine is transferred to the ambient air via a radiator system similar to the type used in automobiles. The SunCatcher cooling system is made up of ethylene glycol fluid, a cooler in the gas circuit, a radiator, a fluid circulation pump, and a cooling fan. The cooling fan and circulation pump are driven by electric motors.

  The system is used to cool the hydrogen gas before the compression portion of the cycle. The pump circulates the cooling fluid through the gas cooler and radiator. Waste heat from the hydrogen gas is transferred to the ethylene-glycol fluid in the cooler. The coolant is then pumped through the radiator where the fan forces ambient air over the cooling fins to remove heat. The heat is transferred to the atmosphere via the airflow over the radiator.

- **Gas Management System:** The gas management system controls the working pressure to ensure high efficiencies. The hydrogen gas is contained within a closed and sealed cycle, yet a very small amount of the hydrogen working fluid does leak (less than 200 cubic feet per dish per year) by the rod seals and is lost to the atmosphere. As a result, an on-site distributed hydrogen system has been proposed to replenish hydrogen lost to the atmosphere.
- **Control System:** The SunCatcher PCU control system monitors, controls, and communicates PCU performance. Thermal detectors are monitored by the PCU control system and the data are used to control the thermal balancing of the PCU. Alarms and faults monitored by the PCU control system are communicated to the Dish Positioning Control System and the Project SCADA system.

B.1.4 PROJECT DESCRIPTION

The proposed Calico Solar Project would be a nominal 850-megawatt (MW) Solar Stirling Engine project. The project is proposed for development in two phases. Phase I includes 11,000 SunCatchers located on approximately 2,327 acres to produce 275 MW. Phase II would include an additional 23,000 SunCatchers on an additional approximately 3,888 acres to produce an additional 575 MW for the total 850 MW planned production. The total area required for both phases, including the area for the operation and administration building, the maintenance building, and the substation building, is approximately 6,215 acres.

Construction is planned to begin in late 2010. Although construction would take approximately 44 months to complete, power would be available to the grid as each 60-unit group of SunCatchers is completed. The project includes construction of an on-site 230-kV Calico Substation near the center of the project area, and a 230-kV transmission line from the Calico Substation that would run southeast parallel to the north side of the BNSF railroad ROW inside the project area, then cross the railroad right of way (ROW) to run southwest and parallel the SCE transmission lines to the existing SCE Pisgah Substation.

The primary equipment for the generating facility would include approximately 34,000 SunCatchers, their associated equipment and systems, and their support infrastructure. The project site covers 6,215 acres and is located on public land managed by the BLM. No private lands are located within the 6,215 acres under BLM application.

The applicant has applied for a right-of-way (ROW) grant for the project site from the BLM Barstow Field Office. Although the project is phased, it is being analyzed in this SSA as if all phases would be operational at the same time.

B.1.4.1 PROJECT SITE ARRANGEMENT

The basic building blocks for the project are 1.5-MW solar groups consisting of 60 SunCatchers. The 1.5-MW groups would be connected in series to create 3-, 6-, and 9-MW solar groups. The 3-, 6-, and 9-MW groups would be connected to overhead collection lines rated at 48 MW or 51 MW. The typical solar groups would be arranged as necessary to fit the contours of the site.

The entire project would be fenced for security, however the design of the fencing is being determined in coordination with regulatory and resource agencies to protect sensitive ecological areas and address storm flows in washes. The project would have a laydown area on 14 acres adjacent to the Main Services Complex.

During project construction and operation, the main access to the project site would be from the south, off of Interstate 40 from the Hector Road exit. The applicant proposed the development of the following roadways on the project site: approximately 25.2 miles of surface-treated roadways, approximately 168 miles of north-south access routes, and approximately 102 miles of east-west access routes. The access routes would be surface-treated to reduce fugitive dust while allowing full access to all dishes and infrastructure. Polymeric stabilizers will be used in lieu of traditional road construction materials for paved roads and/or to stabilize unpaved roads. All access to the project site would be through controlled gates.

B.1.4.2 SOLAR POWER PLANT EQUIPMENT AND FACILITIES

Project Description Table 2, Significant Structures and Equipment, lists the major equipment and significant structures required for the Calico Solar Project.

Project Description Table 2
Significant Structures and Equipment

Description	Quantity	Length (feet)	Width (feet)	Height (feet)
SunCatcher power generating system	34,000	38 diameter		40
Main Services Complex administration building	1	60	70	17
Main Services Complex maintenance building	1	70	70	17
Main SunCatcher assembly buildings	3	1,000	100	78
Well water storage tank and Fire Water 230,000 gallons	1	40 diameter		20
Demineralized water tank, 17,000 gallons	2	18 diameter		10
Potable Water Tank, 5,000 gallons	1	40 diameter		20
230kV transmission line towers, double-circuit with upswept arms	12 to 15	--	32	90 to 110
Generator collection sub-panel; distribution panel, 42 circuit, 400A, 600V, with circuit breakers in a weatherproof enclosure	2,834	1	2.67	5
Generator collection power center, 2,000-A distribution panels with six 400-A circuit breakers	567	2	3.33	7.5
Collector group generator step-up unit transformer (GSU), 1,750kVA, 575 V to 34.5kV, with taps	567	6.67	7.5	6.67
Power factor correction capacitor, 600V, 1,000kVAR, switched in five, each 200kVAR steps	567	2.5	6.67	7.5
Open bus switch rack, 35kV, 7 bay with five 35kV, 1,200-A, 40kVA INT, circuit breakers, insulators, switches, and bus work	6	105	20	30
Shunt capacitor bank, 34.5kV, 90 MVAR switched in six each 15 MVAR steps	6	15	8	20
Dynamic VAR (DVAR) compensation system in coordination with shunt capacitor banks – size to be determined by studies	1	60	12	16
Disconnect switch, 35kV, 3,000 A, 200kV BIL, group-operated	6	3	11	16
Power transformer, three phase, 100/133/167 mega volt amp, 230/132.8-34.5/19.9kV, 750kV BIL, oil filled	6	15	35	23
Power circuit breaker, 242kV, 2000A, 40 kilo amp interrupting capacity	7	12	20	16
Coupling capacitor voltage transformer for metering, 242kV, 900kV BIL, 60 Hertz, Potential Transformer ratio 1,200/2,000:1	6	1	1	25
Disconnect switch, 242kV, 2000A	9	10	25	25

Source: Calico Solar, LLC

Notes: A = ampere (amp), BIL = basic impulse level, gpd = gallons per day, HP = horsepower, Hz = hertz, INT = international, kA = kilo amps kV = kilovolt, kVA = kilovolt amps, Kvar = kilovolt amp reactive, kW = kilowatt, kWe = kilowatt-electric, MVA = megavolt amps MVAR = megavolt amp reactive MW = megawatts, V = volts, VAR = volt amp reactive W = watts

B.1.4.3 SITE GRADING AND DRAINAGE

The original layout for the Calico Solar Project site was based on avoiding major washes and minimizing surface-disturbing activities. Following the completion of the 30% engineering in April 2009, the applicant determined that it would be necessary to place some SunCatcher units in washes to attain the proposed 850 MW yield.

Brush trimming would be conducted between alternating rows and would consist of cutting the top of the existing brush while leaving the existing native plant root system in place to minimize soil erosion. To minimize shading on SunCatchers and prevent potential brush fire hazards, natural vegetation trimmings would be cleared in the area of each SunCatcher as well as on either side of the surface-treated arterial roadways.

After brush has been trimmed, blading for roadways and foundations would be conducted between alternating rows to provide access to individual SunCatchers. Blading would consist of limited removal of terrain undulations. Although ground disturbance would be minimized wherever possible, the applicant proposes that localized rises or depressions within the individual 1.5-MW solar groups would be removed to provide for proper alignment and operation of the individual SunCatchers. Surface-treated roadways would be constructed as close to the existing topography as possible, with limited cut-and-fill operations to maintain roadway design slope to within a maximum of 10%.

The layout of the proposed Calico Solar Project would maintain the local pre-development drainage patterns where feasible, and water discharge from the site would remain at the southern and western boundaries. The paved roadways would have a low-flow, unpaved swale or roadway dip as needed to convey nuisance runoff to existing drainage channels/. It is expected that storm water runoff would flow over the crown of the paved roadways, which are typically less than 6 inches from swale flow line to crown at centerline of roadway, thus maintaining existing local drainage patterns during storms. The applicant has proposed that low-flow culverts would be used on emergency access routes and all other roads would be at grade.

The applicant has proposed localized channel grading on a limited basis to improve channel hydraulics within the dry washes and to control flow direction where buildings and roadways are proposed. The Main Services Complex would be protected from a 100-year flood by berms or channels that would direct the flow around the perimeter of the building site, if required.

Arizona Crossings (roadway dips) would be placed along the roadways, as needed to cross the minor or major channels/swales. These designs would be based on Best Management Practices (BMPs) for erosion and sediment control.

Arizona Crossings (roadway dips) would be used for major washes where the channel cross section exceeds 8 feet in width and 3 feet in depth or exceeds 20 feet in width and 2 feet in depth. The roadway section at the channel flow line would be without a crown.

It is anticipated that roadway maintenance would be required after rainfall events. For minor storm events, it is anticipated that the unpaved roadway sections may need to be bladed to remove soil deposition, along with sediment removal from stem pipe risers at the culvert locations. For major storm events, in addition to the aforementioned

maintenance, roadway repairs may be required due to possible damage to pavement where the roadways cross the channels and where the flows exceed the culvert capacity. Additional maintenance may be required after major storm events to replace soil eroded from around SunCatcher pedestals located in washes.

Building sites would be developed per San Bernardino County drainage criteria, with provision for soft bottom storm water retention basins. Rainfall from paved areas and building roofs would be collected and directed to the storm water retention basins. Volume on retention or detention basins should have a total volume capacity for a 3-inch minimum precipitation covering the entire site. Volume can be considered by a combination of basin size and additional volume provided within paving and/or landscaping areas.

The retention basins would be designed so that the retained flows would empty within 72 hours after the storm to provide mosquito abatement. This design can be accomplished by draining, evaporation, infiltration, or a combination thereof.

The post-development flow rates released from the project site are expected to be less than the pre-development flow rates, thus complying with BMPs. The expected flow reduction is based on the following factors.

- Except for the building sites, roads, and two evaporation ponds, the majority of the project site would remain pervious; only a negligible portion of the site would be affected by pavement and SunCatchers foundations.
- The increased runoff expected from the building sites would be over-mitigated by capturing 100% of the runoff in a retention basin, where the storm runoff would be infiltrated and/or evaporated to the atmosphere.
- The proposed perforated risers to be constructed upstream of the roadway culverts would provide for additional detention.

B.1.4.4 BUILDINGS

All buildings would be constructed in accordance with the appropriate edition of the California Building Code (CBC) and other applicable LORS.

The Main Services Complex would be located within the project site in a central location that provides for efficient access routes for maintenance vehicles servicing the SunCatcher solar field. The main control room would be located at the Main Services Complex.

Warehouse and shop spaces would provide work areas and storage for spare parts for project maintenance. The Main Services Complex would contain meeting and training rooms, maintenance and engineering offices, and administrative offices.

The project administration offices and personnel facilities would be located in a one-story operation and administration building. The operation and administration building would measure approximately 60 feet long by 70 feet wide by 17 feet high. This building would also contain meeting and training rooms, engineering offices, a visitor’s room, and support services.

The project maintenance facilities, shop, and warehouse storage would be located adjacent to the operation and administration building. The maintenance building would measure 70 feet wide by 70 feet long by 17 feet in height. This building would contain maintenance shops and offices, PCU rebuild areas, maintenance vehicle servicing bays, chemical storage rooms, the main electrical room, and warehouse storage for maintenance parts to service the SunCatchers.

The three assembly buildings will be located beside the Main Services Complex. Assembly buildings will be decommissioned after the project's SunCatchers are assembled and installed.

A water treatment shade structure will be located next to the Main Services Complex and to the northeast side of the Main Services Complex. The water treatment structure will house water treatment equipment and safe storage areas for water treatment chemicals. A motor control center for the water treatment equipment and pumps will be located within this structure. Two wastewater evaporative ponds designed for water treatment wastewater containment will be located just north of the water treatment structure. A control building will be located near the project substation. This building will contain relay and control systems for the substation in one room and the project operations control room in another room or rooms. A diesel-powered fire water pump and a diesel operated standby power generator will be located adjacent to the operation and administration building on the north side.

Electric service for the Main Services Complex will be obtained from SCE. Electric power will be provided via overhead service from an SCE overhead distribution line located on the north side of I-40. Communications service for the Main Services Complex will be obtained from the local phone company. Communications service will be provided via an overhead service from existing underground communications lines located on the north of I-40.

The operation and administration building, maintenance building, and Main Services Complex would be painted with a matching desert sand color and would be manufactured buildings. The water treatment building and the water holding tanks, including the potable water, raw water, and demineralized/fire protection water tanks located at the Main Services Complex would also be painted with a matching desert sand color.

SunCatcher assembly would be performed on-site in temporary structures. These buildings would be decommissioned after all project SunCatchers are assembled and installed. The assembly buildings would be located beside the Main Services Complex.

The primary purpose of the SunCatcher assembly buildings would be the assembly of the SunCatcher superstructure, the main beam assembly and trusses, the pedestal trunnion, mirrors, wire harnesses, control systems, drive position motors, and the calibration of the mirrors and control systems before field installation. Each assembly bay would be equipped with an automated platform on locating rails to move the SunCatcher through the assembly process.

The exterior material for the assembly buildings would be a fire retardant vinyl fluoride film with ultraviolet blocking characteristics and would be chemical and weather resistant. The exteriors would be painted desert sand to match the other structures.

Transport trailer storage would be located adjacent to the assembly building. The storage area would allow the project to maintain a supply of 3 to 5 days of inventory of SunCatcher parts during the assembly phase of construction.

These assembly buildings would be decommissioned and salvaged after all SunCatchers for the Project are installed.

B.1.4.5 WATER SUPPLY AND TREATMENT

The following types of water would be required for the project:

- equipment washing water,
- potable water,
- dust control water, and
- fire protection water.

When completed, the Calico Solar Project would require a total of approximately 36.2 acre-feet of raw water per year. SunCatcher mirror washing and operations dust control under regular maintenance routines will require an average of approximately 10.4 gallons of raw water per minute.

In the AFC, the applicant proposed the use of ground water from the Lavic Groundwater Basin. Calico initiated the drilling of four water wells adjacent to the project site, within the Lavic Groundwater Basin. As wells are drilled the flow rate (gallons per minute – gpm) were determined, concern over sufficiency of this water supply lead to the identification of a new primary water supply from Burlington Northern Santa Fe (BNSF). Initially, the Lavic Ground Basin wells were to be used as a backup water source since they were believed to lack the capacity to provide for construction water needs.

The applicant subsequently discovered that one of the wells within the Lavic Groundwater Basin could provide enough water for construction and operations of the proposed project and has returned to well water from the Lavic Groundwater Basin as the primary water source for the project.

The water from the Lavic Groundwater Basin well is characterized as raw water and will require treatment to remove dissolved solids for SunCatcher mirror wash water applications. The water will be required to be demineralized to prevent mineral deposits forming on the SunCatcher mirrors. Processes available for demineralization are Reverse Osmosis (RO) and ion exchange.

Calico believes that with this source, the project would obtain the water to provide an appropriate quantity and quality for mirror washing.

Potable Water: Potable water to meet plant requirements would be delivered by truck or rail and stored in a 5,000-gallon tank in the water treatment area. This tank would be

able to provide all required potable water for the operating facility for 2-3 days at which time it would need to be replenished.

Mirror Washing and Fire Protection Water: The Main Services Complex will include a location for an approximately 230,000-gallon tank that will be used to store water for SunCatcher mirror washing and fire protection applications. This volume of water will meet all LORS, including fire protection water for the Newberry Springs and the Harvard Station 46 (a County Fire Department staffed station), and for the San Bernardino Fire Department.

Dust Control Water: The water will be conveyed to the Main Services Complex via a 6 to 8-inch-diameter water line. The expected average well water consumption for the project during construction is approximately 50 acre-feet per year. Under normal operation (inclusive of mirror cleaning, dust control, and potable water usage), water required will be approximately 36.2 acre-feet per year. Emergency water may be trucked in from local municipalities. The Applicant would seek agreements at the time of the emergency.

The Calico Solar Project water supply requirements are tabulated in **Project Description Table 3**, Water Usage Rates for Operation. The table provides both the expected maximum water usage rates and the annual average usage rates.

Project Description Table 3
Water Usage Rates for Operation

Water Use	Daily Average (gallons per minute)	Daily Maximum (gallons per minute)	Annual Usage (acre feet)
Equipment Water Requirements			
SunCatcher Mirror Washing	11.8[1]	19.7[2]	16.1[3]
Water Treatment System Discharge			
Brine to Evaporation Ponds	6.0	11.1[4]	8.1
Potable Water Use			
For drinking and sanitary water requirements	3.8[5]	4.6[6]	5.2[7]
Dust Control			
Well water for dust control during operations	4.2[8]	8.3[9]	6.7[10]
Totals	**25.8**	**43.7**	**36.2**

Source: Stirling Energy Systems, Inc.

[1] Based on 34,000 SunCatchers requiring a monthly wash with an average of 14 gallons of demineralized water per spray wash and a 5-day work week (21 work days per month).

[2] During a 3-month period, all SunCatcher mirrors are given a scrub wash requiring up to three times the normal wash of 14 gallons per SunCatcher. Therefore, the Daily Maximum usage rate is based on 2/3 of the SunCatchers receiving a normal wash and one third receiving a scrub wash.

[3] Based on every SunCatcher having approximately 8 normal washes per year with one additional scrub wash.

[4] Based on the maximum amount of demineralized water required for mirror washing and assumes a decrease in raw water quality requiring an additional 20% of system discharge.

[5] Assumes 30 gallons per person per day for 182 people. [6] Max. amount assumes a 20% contingency over the Daily Avg.

[7] Assumes a 6-day work week and average daily usage. [8] Assumes 5,000 gallons per day.

[9] Assumes up to 10,000 gallons per day. [10] Assumes daily average dust control operations.

B.1.4.5 WASTEWATER AND WASTE MANAGEMENT

The water treatment wastewater generated by the reverse osmosis (RO) unit would contain relatively high concentrations of total dissolved solids (TDS). Wastewater or brine generated by the RO unit would be discharged to a polyvinyl chloride (PVC)-lined concrete evaporation pond that meets the requirements of the local Regional Water Quality Control Board. Each pond would be sized to contain 1 year of discharge flow, approximately 2.44 million gallons. A minimum of 1 year is required for the water treatment waste to undergo the evaporation process. The second pond would be in operation while the first is undergoing evaporation. The two ponds would alternate their functions on an annual basis.

After the brine has gone through the evaporation process, the solids that settle at the bottom of the evaporation pond will be tested by the applicant and disposed of in an appropriate non-hazardous waste disposal facility. The solids would be scheduled for removal during the summer months, when the concentration of solids is at its greatest due to an increase in evaporation rates, in order to achieve maximum solids removal.

Sanitary wastewater generated at the facility cannot be conveyed to an existing sewage facility or pipeline as there are no public or private entities that manage sanitary wastewater flows for locations in the vicinity of the project site. The wastewater generated at the Main Services Complex will be discharged into a sub-surface wastewater disposal system with septic tanks and leach fields, and will be designed in accordance with the applicable LORS, including San Bernardino County, California State Regional Water Quality Board, and the Department of Health Services.

The general threshold limit for a standard approval process for septic tanks and leach fields through the local Regional Water Quality Control Board (RWQCB) is 500 gallons per acre per day. The expected daily sanitary wastewater flow from Calico Solar ranges from an average of 5,500 gallons to a peak of 6,600 gallons; the required set aside area given this flow is approximately 14 acres. Given the project site area is much greater than 14 acres, the threshold limit for septic tank and leachfield applications will be met. The required leachfield area is estimated to be approximately 1,100 square-feet (0.025 acre).

B.1.4.6 HAZARDOUS WASTE MANAGEMENT

Hazardous materials used during facility construction and operations would include paints, epoxies, grease, transformer oil, caustic electrolytes (battery fluid), and products that would be generated by the construction equipment, such as waste fuel and waste oil. Several methods would be used to properly manage and dispose of hazardous materials and wastes. Waste lubricating oil would be recovered and recycled by a waste oil recycling contractor. Chemicals would be stored in appropriate chemical storage facilities. Bulk chemicals would be stored in large storage tanks, while most other chemicals would be stored in smaller returnable delivery containers. All chemical storage areas would be designed to contain leaks and spills in concrete containment areas.

B.1.4.7 HYDROGEN SYSTEM

The Applicant described the hydrogen use, supply and storage in the AFC, filed in December 2008. In the original design, it was proposed that hydrogen would be supplied to the SunCatchers through a distributed system. Each of the SCE, within the SunCatcher unit, would contain 14 cubic feet of hydrogen gas, and each SunCatcher unit would be equipped with a 196-scf k-bottle to replenish hydrogen gas lost within the gas circuit. K-bottles would be provided by a commercial hydrogen supplier. Section 4, Alternatives in the AFC described an alternative centralized hydrogen system. The Applicant responded to Energy Commission and BLM Data Requests 57-60 in July 2009, updating the hydrogen system to include a centralized hydrogen gas supply, storage and distribution system. The system included onsite generation of hydrogen through electrolysis and the storage of that hydrogen in a 36,400 scf steel storage tank. From the storage tank, the hydrogen would be piped to 95 individual compressor groups that include a compressor, a high pressure supply tank and a low pressure dump tank used to recover hydrogen from non-operational PCUs through a return line. This centralized hydrogen distribution system was the system analyzed in the SA/DEIS.

At this time, the applicant is evaluating the relative advantages between the centralized hydrogen distribution system and a distributed system that utilizes k-bottles on the PCUs of all SunCatchers. This supplement describes both systems and provides an environmental assessment of each. The details of both the centralized hydrogen system and the distributed system have evolved over time, and the May 2010 supplement to the AFC presented modifications to each system that are analyzed in this SSA.

Centralized Hydrogen System Description

The details of the centralized hydrogen system have been refined by the applicant as a result of experience from the applicant's Maricopa Solar Project and as a result of design having progressed to final engineering. The maximum amount of hydrogen stored for each SunCatcher would be increased from 3.4 to 11 scf which would accommodate two full charges of the PCU. In order to support this increased hydrogen storage at each SunCatcher, the high pressure supply tanks and low pressure dump tanks at each compressor group would accommodate 29,333 scf and 9,900 scf, respectively. In the July 2009 responses Energy Commission and BLM Data Requests 57-60, each high pressure supply tank was anticipated to be 648 scf and each low pressure dump tank was also reported to be 648 scf.

If a centralized hydrogen system is used at the Calico Solar site, the hydrogen gas would be produced through electrolysis by two redundant hydrogen generators. Each proposed hydrogen generator would be capable of producing 1,820 scfh. Although the hydrogen generators could run full time if needed to supply sufficient amount of hydrogen to the SunCatchers, the generators would be operated at off-peak electric hours using grid power and generated hydrogen would be stored onsite. Hydrogen gas produced by the onsite generators would be stored in a steel storage tank. The hydrogen tank, at approximately nine feet in diameter by 30 feet long, would be capable of storing approximately two-day supply of hydrogen (i.e., approximately 36,400 scf).

The hydrogen storage tank would distribute hydrogen fuel to 95 individual compressor groups. Each compressor group would be electrically operated and would consist of a

compressor and a high pressure supply tank with a 29,333 scf capacity, delivering gas at approximately 2,760 psi. Each compressor group would also be equipped with a low pressure dump tank with the same 9,900 scf capacity and used to recover hydrogen from non-operational PCUs through a ¼" and ½" stainless steel return line. In this option there are no other holding tanks or storage tanks in the compressor groups. Delivery of hydrogen is through pipelines.

Distributed Hydrogen System Description
If the distributed hydrogen supply system utilizing k-bottles at each SunCatcher PCU is utilized at the Calico Solar site, the system would use two redundant hydrogen generators and one steel storage tank located at the Main Services Complex as described in the centralized system. However, the system would not deliver hydrogen through pipelines. In lieu of the distribution equipment, hydrogen would be filled from the hydrogen storage tank to each individual SunCatcher through trucks. Each SunCatcher would include an 82-scf high pressure supply tank, 28-scf low pressure dump tank, and a 489-scf local storage tank. In addition, each SunCatcher unit would contain a minimum of 11-scf of hydrogen at 580 psi at all times, resulting in a total of around 610-scf of hydrogen in each SunCatcher.

The k-bottles would be delivered back to each SunCatcher, utilizing the mirror-washing truck trips included in the SA/DEIS analysis. Hydrogen refilling and replacement trips are expected occur approximately three times per year. Table 2.15-1 presents a summary of differences between each hydrogen supply system.

B.1.4.8 TRANSMISSION SYSTEM INTERCONNECTION AND UPGRADES

This section describes the on-site substation and the transmission interconnection between the Calico Solar Project and the existing SCE electric grid.

The proposed project would include the construction of a new 230-kV Calico Solar Substation approximately in the center of the project site. The proposed project substation would consist of an open air bus with 15, 35-kV collection feeder circuit breakers. Each feeder breaker would be connected to one of the 48-MW or 51-MW overhead collection lines. Additional 35-kV circuit breakers would connect to power factor correction capacitor banks located in the substation yard. This new substation would be connected to the existing SCE Pisgah Substation via an approximately 2-mile, single-circuit, 230-kV transmission line. Other than this interconnection transmission line, no new transmission lines or off-site substations would be required for the 275-MW Phase I construction.

For the 275-MW Phase I of the project, the first interconnection substation would initially consist of 2 power transformers rated at 120/160/200 megavolt amperes (MVA) each to convert the generation collection voltage from 34.5 kV to the transmission tie voltage of 230 kV. The substation would ultimately contain 6 120/160/200-MVA, 34.5-kV to 230-kV step-up power transformers. Each power transformer would serve 3 of the 15 overhead collection lines (one 48-MW line and 2 51-MW lines).

The power transformers would be protected by 230-kV power circuit breakers. Provisions would be made to expand the Calico Solar Substation from 275 to 850 MW

with the addition of 3 power transformers in Phase II of the proposed project. Each transformer would collect 150 MW of generation via 3 overhead 34.5-kV collection circuits, each protected by a 35-kV power circuit breaker. The 34.5-kV feeders would be terminated on outdoor circuit breakers.

Control, metering, and protection systems for the line, substation, and collection systems would be contained within a control building located adjacent to the Calico Solar Substation. The control building would also contain the necessary communications equipment to meet owner, California ISO, and SCE requirements. Additional substation equipment would include a 34.5-kV power-factor correction capacitor control system designed to meet the power factor and zero and low-voltage ride-through requirements of the Interconnect Agreement.

The on-site portion of the interconnection transmission line would be installed in a 100-foot ROW from the Calico Solar Project substation southeast to point of intersection with the SCE transmission ROW, then southwest to parallel the transmission ROW to the Pisgah Substation.

The transmission line towers would consist of H-Frame towers at the undercrossing of the existing 500-kV transmission line and double-circuit lattice steel towers and/or steel poles elsewhere. Both circuits of the overhead 230-kV transmission line would be constructed with one 1,590-kilo circular miles/phase, aluminum steel-reinforced conductor per line, each thermally rated to carry full project output in emergency conditions and one-half of project output in normal conditions. Two fiber optic cables would be provided for communication with SCE and the California Independent System Operator (California ISO).

B.1.5 RELATED FACILITIES (REASONABLY FORESEEABLE FUTURE ACTIONS)

This section describes reasonably foreseeable future actions related to the Calico Solar Project, that are outside of the BLM ROW grant and Energy Commission Decision addressed in this SSA. A series of upgrades for transmission capability purposes are anticipated by SCE. These projects would require additional environmental review and permitting.

B.1.5.1 SCE RELIABILITY NETWORK UPGRADES

Construction of the 275-MW Phase I of the Calico Solar Project would require an upgrade of the existing Pisgah Substation to a 500/220 kV substation designed for four 500/220 kV transformer banks. An upgrade would also be required to implement the Reduced Acreage Alternative of the Calico Solar project.

Construction of the 575-MW Phase II of the Calico Solar project, and delivery of the additional renewable power to the SCE system, would require the construction of Phase 2 Reliability Network Upgrades by SCE. The California Public Utilities Commission (CPUC) is the lead agency for CEQA compliance and the BLM is the lead agency for NEPA compliance on the Phase 2 Reliability Network Upgrades project. The SCE will

need a Certificate of Public Convenience and Necessity from the CPUC for these Network Upgrades.

The SCE Phase 2 Reliability Network Upgrades Project consists of expansion of the Pisgah Substation and installation of new power transmission facilities. The major components of the upgrades project include:

- Extension of the existing Lugo 500kV Substation East and West Buses to provide for a new 500 kV transmission line position
- Removal of 65 miles of the existing Lugo-Pisgah No. 2 220 kV transmission line between Lugo Substation and Pisgah Substation
- Construction of approximately 65 miles of new 500 kV transmission line between the Lugo and Pisgah Substations. Approximately 55 miles of the new transmission line will utilize the right-of-way (ROW) vacated by the removal of the existing 220 kV line, and approximately 10 miles will require new ROW
- Looping the existing Eldorado-Lugo 500 kV transmission line into the expanded Pisgah 500 kV Substation to form the Eldorado-Pisgah 500 kV transmission line and the Lugo-Pisgah No. 1 500 kV transmission line
- Obtaining required ROW as follows:
    i. New ROW to accommodate new 500/220 kV Pisgah Substation, estimated to require 0.6 acres adjacent to the existing substation location.
    ii. Update existing ROW to support construction of the new Lugo-Pisgah No. 2 500 kV transmission line within the existing ROW
    iii. Approximately 10 miles of new ROW (near Lugo, California) to support construction of the new Lugo-Pisgah No. 2 500 kV transmission line when use of the existing ROW is not feasible

The environmental review of SCE's Phase 2 Reliability Network Upgrades project by the BLM and CPUC has not yet been initiated although applications have been received by BLM. Therefore the discussion related to SCE network upgrades are being addressed in this document as reasonably foreseeable future actions per NEPA.

B.1.6 CONSTRUCTION

The project would be constructed in two phases. Phase I of the project would consist of up to 11,000 SunCatchers configured in 183 1.5-MW solar groups of 60 SunCatchers per group, and have a net nominal generating capacity of 275 MW. Phase II would add approximately 23,000 SunCatchers, expanding the project to a total of approximately 34,000 SunCatchers configured in 567 1.5-MW solar groups with a total net generating capacity of up to 850 MW (see **Project Description Figure 2)**.

Heavy construction for the project would be scheduled to occur between 0700 and 1900 Monday through Friday. Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities.

Some activities would continue 24 hours per day, 7 days per week. These activities include, but are not limited to, SunCatcher assembly, refueling of equipment, staging of materials for the next day's construction activities, quality assurance/control, and commissioning.

Project construction would be performed in accordance with plans and mitigation measures that would assure the project conforms to applicable LORS and would avoid significant adverse impacts. These plans that are to be developed by the applicant, for which some have already been prepared in draft and reviewed by staff to support this environmental analysis, and the necessary mitigation measures, are specified in the Conditions of Certification as appropriate of each technical area of this SSA.

B.1.7 OPERATION AND MAINTENANCE

The Calico Solar Project would be an "as-available" resource. Therefore, the project would operate anywhere between a minimum of approximately 18 MW net when the first units are interconnected to the grid during the construction period to 850 MW on completion of construction. The capability for independent operation of all 34,000 units would give maximum flexibility in operations. The applicant expects that the project would have an annual availability of 99%.

The project would be dispatched by the California ISO, through day-ahead, hour-ahead, and real-time scheduling, as required to meet the demands of the Southern California market. The market would dictate unit operations and total power requirements. The Calico Solar Project would operate approximately 3,500 hours per annum and is expected by the applicant to have an overall availability of 99% or higher. The number of available operating hours is determined by the availability of the sun's energy at greater than 250 watts per square meter. SunCatchers would be unable to generate electricity when the sun's energy is below 250 watts per square meter in the early morning or late evening hours and when cloud cover limits the sun's energy for power generation. Also, SunCatchers would be unable to generate electricity during daylight hours when the wind speed exceeds 35 miles per hour, as SunCatchers would be stowed in a safe de-track position at this wind speed to prevent damage. SunCatchers are designed to withstand wind speeds of 50 miles per hour in the operating mode and 90 miles per hour in the stowed position. Because the SunCatchers move slowly, they start moving into stow position once winds reach 35 miles per hour in order to be in stow position by the time winds reach 50 miles per hour. Because of the geographical size of the project, cloud cover and/or wind conditions may only affect a portion of the project at any given time.

It is expected that the Calico Solar Project would be operated with a staff of approximately 182 full-time employees. The project would operate 7 days per week, generating electricity during normal daylight hours when the solar energy is available. Maintenance activities would occur 7 days a week, 24 hours a day to ensure SunCatcher availability when solar energy is available.

Mirror washing would be needed approximately once every month, requiring 14 gallons of water per dish with an average washing rate of 20 minutes per washed dish pair. In

addition to monthly washing, seasonal scrubbing is anticipated. Seasonal scrubbing would occur prior to peak electricity demand season, June through September.

Maintenance of the PCU's and associated vehicle operations would be required every 6,000 hours of running time.

B.1.8 DECOMMISSIONING AND RESTORATION

Introduction

Project closure can be temporary or permanent. Temporary closure is defined as a shutdown for a period exceeding the time required for normal maintenance. Causes for temporary closure include inclement weather and/or natural hazards (e.g., winds in excess of 35 mph, or cloudy conditions limiting solar insolation values to below the minimum solar insolation required for positive power generation, etc.), or damage to the project from earthquake, fire, storm, or other natural acts. Permanent closure is defined as a cessation in operations with no intent to restart operations owing to project age, damage to the project that is beyond repair, adverse economic conditions, or other significant reasons.

Temporary Closure

In the unforeseen event that the project is temporarily closed, a contingency plan for the temporary cessation of operations will be implemented. The contingency plan will be followed to ensure conformance with applicable LORS and to protect public health, safety, and the environment. The plan, depending on the expected duration of the shutdown, may include the draining of chemicals from storage tanks and other equipment and the safe shutdown of equipment. Wastes will be disposed of according to applicable LORS, as discussed in the **WASTE MANAGEMENT** section.

Permanent Closure

The planned life of the Calico Solar Project is 40 years. However, if the project is still economically viable, it could be operated longer. It is also possible that the project could become economically noncompetitive before 40 years have passed, forcing early decommissioning. Whenever the project is permanently closed, the closure procedure will follow a plan that will be developed as described below.

The removal of the project from service, or decommissioning, may range from "mothballing" to the removal of equipment and appurtenant facilities, depending on conditions at the time. Because the conditions that would affect the decommissioning decision are largely unknown at this time, these conditions would be presented to the Energy Commission, the BLM, and other applicable agencies for review and approval as part of the decommissioning plan. The decommissioning plan would discuss the following:

- proposed decommissioning activities for the project and appurtenant facilities constructed as part of the project,
- conformance of the proposed decommissioning activities with applicable LORS and local/regional plans,

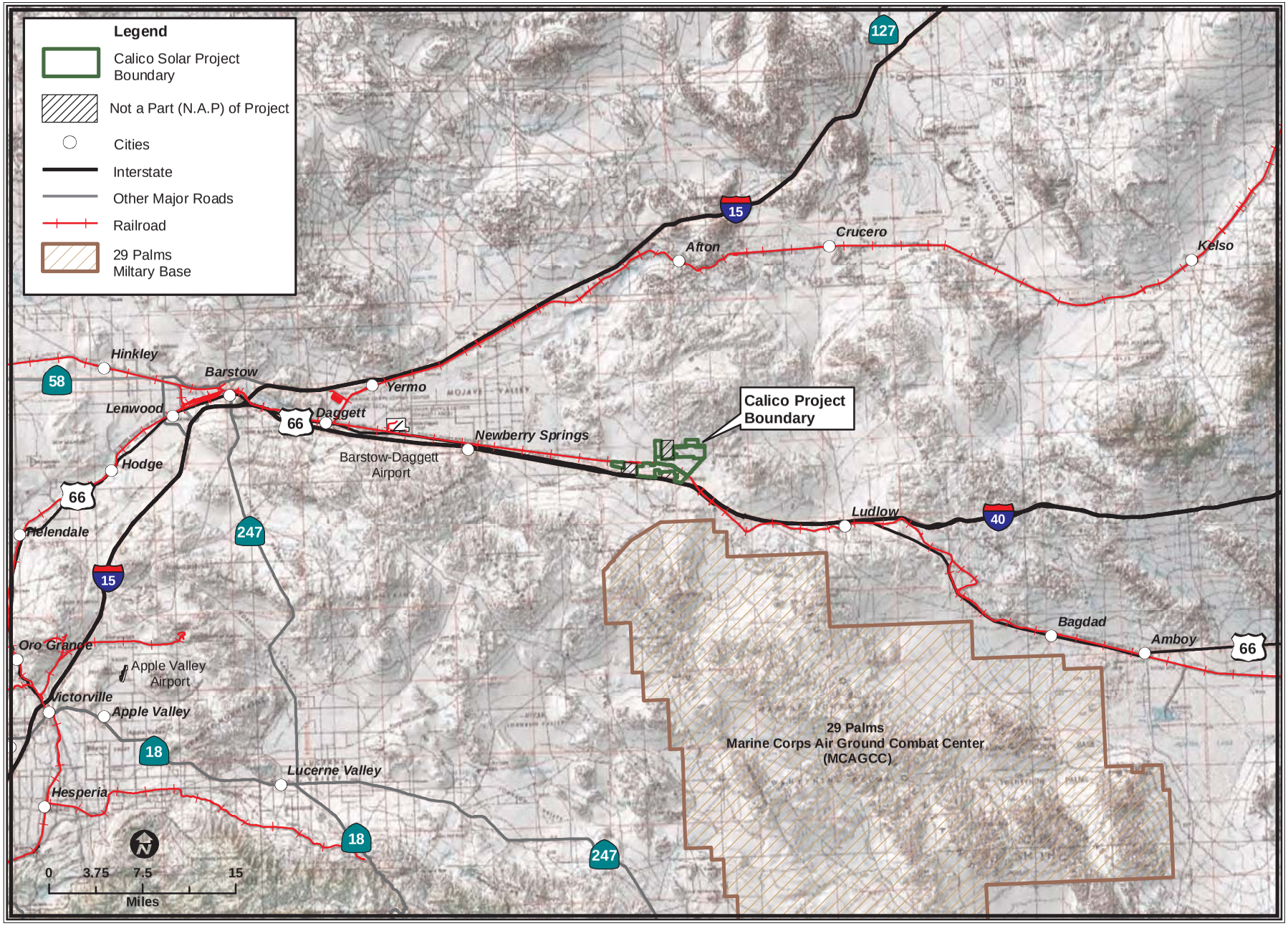
- activities necessary to restore the project site if the plan requires removal of equipment and appurtenant facilities,
- decommissioning alternatives other than complete restoration to the original condition, and
- associated costs of the proposed decommissioning and the source of funds to pay for the decommissioning.

In general, the decommissioning plan for the project would attempt to maximize the recycling of project components. Calico Solar would attempt to sell unused chemicals back to the suppliers or other purchasers or users. Equipment containing chemicals would be drained and shut down to ensure public health and safety and to protect the environment. Nonhazardous wastes will be collected and disposed of in appropriate landfills or waste collection facilities. Hazardous wastes will be disposed of according to applicable LORS. The site will be secured 24 hours per day during the decommissioning activities, and Calico Solar will provide periodic update reports to the Energy Commission, the BLM, and other appropriate parties.

Similar to project construction and facility operations, decommissioning would be performed in accordance with plans and mitigation measures that would assure the project conforms to applicable LORS and would avoid significant adverse impacts. These plans that are to be developed by the applicant, for which some have already been prepared in draft and reviewed by staff to support this environmental analysis, and the necessary mitigation measures, are specified in the Conditions of Certification as appropriate for each technical area of this SSA. The BLM would also require mitigation and restoration as stipulated in the identified Plan of Development, as well as other federal agency requirements. The authorized project would be bonded consistent with agency policy.

PROJECT DESCRIPTION - FIGURE 1

Calico Solar Project - Regional Transportation Network

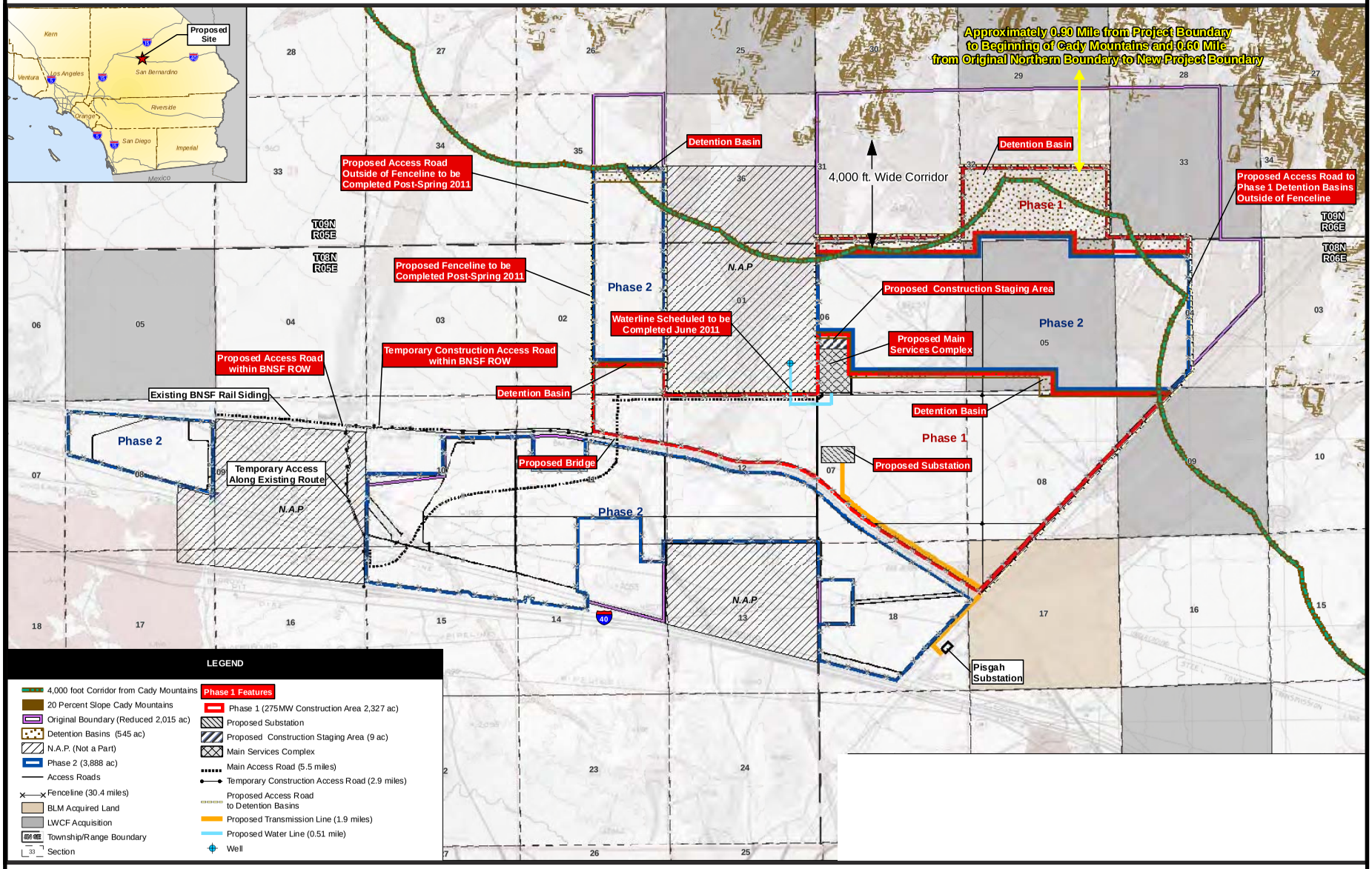


U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission - Tele Atlas Data - San Bernardino County

PROJECT DESCRIPTION - FIGURE 2

Calico Solar Project - Existing Projects - Project Layout

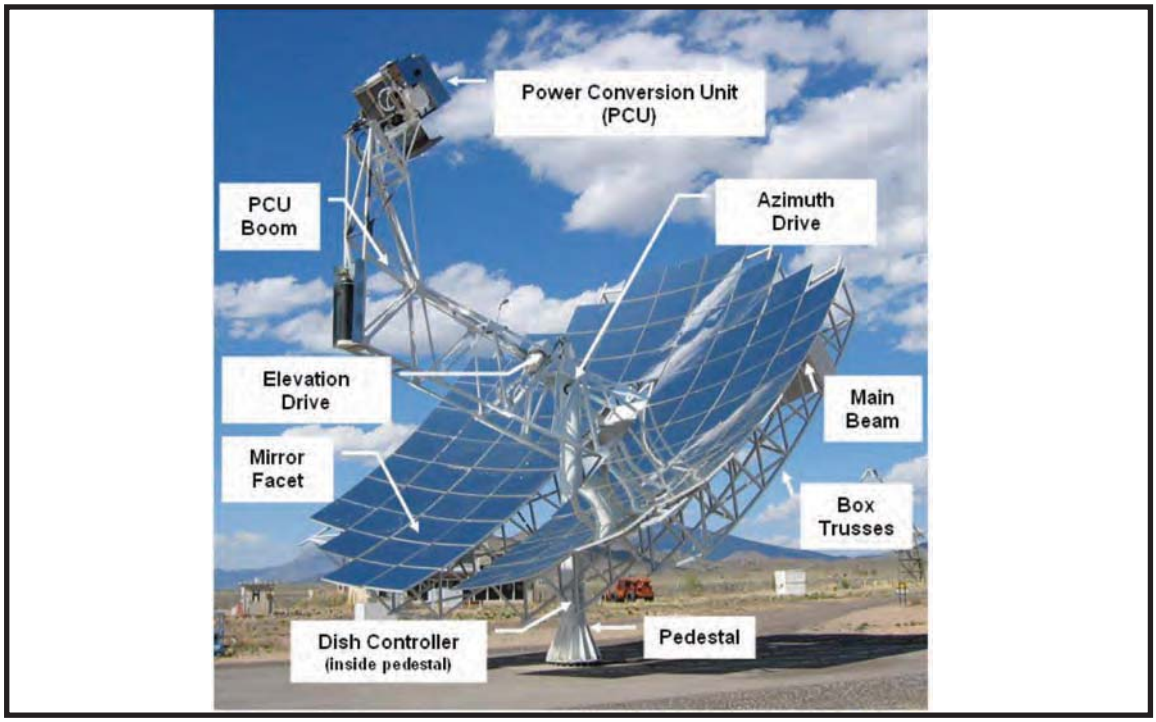


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: URS

PROJECT DESCRIPTION - FIGURE 3

Calico Solar Project - SunCatcher Details



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: SES Solar Two Project - AFC Photograph 1-1 and 1-2

C.1 – AIR QUALITY

Testimony of William Walters, P.E.

C.1.1 SUMMARY OF CONCLUSIONS

California Energy Commission staff[1] (hereinafter referred to as "staff") find that with the adoption of the attached conditions of certification the proposed Calico Solar, LLC's (applicant) Calico Solar Project (formerly the Stirling Energy Systems Solar One Project) would comply with all applicable laws, ordinances, regulations, and standards and would not result in any significant California Environmental Quality Act air quality impacts[2]. These Conditions of Certification meet the Energy Commission's responsibility to comply with California Environmental Quality Act.

Staff has concluded that the proposed project would not have the potential to exceed PSD emission threshold levels during direct source operation and the facility is not considered a major stationary source with potential to cause adverse National Environmental Policy Act air quality impacts. However, without adequate fugitive dust mitigation, the proposed project would have the potential to exceed the General Conformity PM10 applicability threshold during construction and operation, and could cause potential localized exceedances of the PM10 National Ambient Air Quality Standards during construction and operation. This potential exceedance of federal air quality standards would be considered a direct, adverse impact under the National Environmental Policy Act. This impact would be less than adverse with the proposed mitigation measures controlling fugitive dust emissions.

The Calico Solar Project would emit substantially lower greenhouse gas (GHG)[3] emissions per megawatt-hour than fossil fueled generation resources in California. The Calico Solar Project, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]).

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[1] This analysis has been completed solely by Energy Commission staff and only reflects the findings and recommendations of Energy Commission staff. BLM will complete a separate Final Environmental Impact Statement for this project and the official federal findings and recommended mitigation measures will be provided in that document. Please see the Executive Summary of this Supplemental Staff Assessment (SSA) for more information regarding the separation of Energy Commission and BLM environmental review process.

[2] Staff's conclusions provided in the SA/DEIS have not changed. This Supplemental Staff Assessment (SSA) includes information regarding minor changes to the project description and emissions and describes a project related future action. The applicant provided comments on the Staff Assessment/Draft Environmental Impact Statement (SA/DEIS). Revisions to the conditions and editorial revisions requested by the applicant, acceptable to staff, along with other revisions determined necessary based on other comments received or for continuity with other solar project recommended conditions of certification have been included in this SSA.

[3] Greenhouse gas emissions are not criteria pollutants, but they affect global climate change. In that context, staff evaluates the GHG emissions from the proposed project (Appendix Air-1), presents information on GHG emissions related to electricity generation, and describes the applicable GHG standards and requirements.

C.1.2 INTRODUCTION

Calico Solar, LLC (hereinafter referred to as the applicant) submitted an Application for Transmission and Utility Systems and Facilities on Federal Lands to the BLM on March 16, 2007 (CACA 048810) and an Application for Certification (AFC) to the California Energy Commission on December 2, 2008 to construct and operate a solar power plant in San Bernardino County, California. The Calico Solar Project would be one of the world's largest solar power projects. The originally proposed project would have 34,000 solar dish Stirling systems, occupying 8,230 acres of public land managed by the Bureau of Land Management (BLM). The project site is located in an undeveloped area of San Bernardino County, approximately 37 miles east of Barstow, and just north of Interstate 40 (I-40). This Supplemental Staff Assessment (SSA) includes staff's assessment of the applicant's May and June 2010 Supplements to the Calico Solar (formerly SES Solar One) Application for Certification (TS 2010ab, TS 2010am), which includes changes in water supply, project boundary and acreage (reduced to 6,215 acres), and source of hydrogen used in the Stirling engines. In general, these changes do not significantly affect the air quality analysis. Additionally, this SSA addresses applicant and other comments received to date on the SA/DEIS.

This analysis evaluates the expected air quality impacts from the emissions of criteria air pollutants from both the construction and operation of the Calico Solar Project (Calico or proposed project). Criteria air pollutants are defined as air contaminants for which the state and/or federal governments, per the California Clean Air Act and the federal Clean Air Act, have established an ambient air quality standard to protect public health.

The criteria pollutants analyzed within this section are nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), and particulate matter (PM). Lead is not analyzed as a criteria pollutant, but lead and other toxic air pollutant emissions impacts are analyzed in the Public Health Section of this Staff Assessment (SA). Two subsets of particulate matter are inhalable particulate matter (less than 10 microns in diameter - PM10) and fine particulate matter (less than 2.5 microns in diameter - PM2.5). Nitrogen oxides (NOx, consisting primarily of nitric oxide [NO] and NO_2) and volatile organic compound (VOC) emissions readily react in the atmosphere as precursors to ozone and, to a lesser extent, particulate matter. Sulfur oxides (SOx) readily react in the atmosphere to form particulate matter and are major contributors to acid rain. Global climate change and greenhouse gas (GHG) emissions from the proposed project are discussed in an Appendix Air-1 and analyzed in the context of cumulative impacts.

In carrying out this analysis, the California Energy Commission (Energy Commission) staff evaluated the following four major issues:

- whether the Calico Solar Project is likely to conform with applicable federal, state, and Mojave Desert Air Quality Management District (MDAQMD or District) air quality laws, ordinances, regulations and standards (Title 20, California Code of Regulations, section 1744 (b));

- whether the Calico Solar Project is likely to cause new violations of ambient air quality standards or contribute substantially to existing violations of those standards (Title 20, California Code of Regulations, section 1743);
- whether mitigation measures proposed for the proposed project are adequate to lessen potential impacts under California Environmental Quality Act (CEQA) to a level of insignificance (Title 20, California Code of Regulations, section 1742 (b)); and
- whether the Calico Solar Project would exceed regulatory benchmarks identified and used by staff to analyze National Environmental Policy Act (NEPA) air quality impacts, before or after implementation of recommended mitigation measures.

C.1.3 METHODOLOGY FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

A significant impact is defined under CEQA as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project" (Cal.Code Regs., tit.14 [hereinafter CEQA Guidelines] Section 15382). Questions used in evaluating significance of air quality impacts are based on Appendix G of the CEQA Guidelines (CCR 2006). The specific approach used by Energy Commission staff in determining CEQA significance is discussed in more detail below.

Similarly, NEPA states that "'Significantly' as used in NEPA requires considerations of both context and intensity…" (40 CFR 1508.27). Under NEPA, the agency considers three regulatory benchmarks in determining whether a project action would result in an adverse environmental impact when evaluated against the baseline. NEPA requires that an Environmental Impact Statement (EIS) be prepared when the proposed federal action (project) as a whole has the potential to "significantly affect the quality of the human environment." The three regulatory benchmarks that are used to assess impacts under NEPA are discussed in more detail below.

C.1.3.1 LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

The federal, state, and local laws and policies applicable to the control of criteria pollutant emissions and mitigation of air quality impacts for the Calico Solar Project are summarized in **Air Quality Table 1**. Staff's analysis examines the proposed project's compliance with these requirements.

Air Quality Table 1
Laws, Ordinances, Regulations, and Standards

Applicable LORS	Description
Federal	
40 Code of Federal Regulations (CFR) Part 52	Nonattainment New Source Review (NSR) requires a permit and requires Best Available Control Technology (BACT) and Offsets. Permitting and enforcement delegated to Mojave Desert Air Quality Management District (MDAQMD). Prevention of Significant Deterioration (PSD) requires major sources or major modifications to major sources to obtain permits for attainment pollutants. The Calico Solar Project is a new source that does not have a rule listed emission source thus the PSD trigger levels are 250 tons per year for NOx, VOC, SOx, PM10, PM2.5 and CO.
40 CFR Part 60	New Source Performance Standards (NSPS), Subpart IIII Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. Establishes emission standards for compressions ignition internal combustion engines, including emergency fire water pump engines.
40 CFR Part 93 General Conformity	Requires determination of conformity with State Implementation Plan for Projects requiring federal approvals if project annual emissions are above specified levels.
State	
Health and Safety Code (HSC) Section 40910-40930	Permitting of source needs to be consistent with Air Resource Board (ARB) approved Clean Air Plans.
HSC Section 41700	Restricts emissions that would cause nuisance or injury.
California Code of Regulations (CCR) Section 93115	Airborne Toxics Control Measure for Stationary Compression Ignition Engines. Limits the types of fuels allowed, establishes maximum emission rates, establishes recordkeeping requirements on stationary compression ignition engines, including emergency fire water pump engines.
Local (Mojave Desert Air Quality Management District, MDAQMD)	
Rule 201 and 203 Permits Required	Requires a Permit to Construct before construction of an emission source occurs. Prohibits operation of any equipment that emits or controls air pollutant without first obtaining a permit to operate.
Rules 401, 402, 403, and 403.2 Nuisance, Visible Emissions, Fugitive Dust	Limits the visible, nuisance, and fugitive dust emissions and would be applicable to the construction period of the project.
Rule 404 Particulate Matter - Concentration	Limits the particulate matter concentration from stationary source exhausts.
Rule 406 Specific Contaminants	The rule prohibits sulfur compound emissions in excess of 500 ppmv.
Rule 407 Liquid and Gaseous Air Contaminants	The rule prohibits carbon monoxide emissions in excess of 2,000 ppmv.
Rule 409 Combustion Contaminants	Limits the emissions from fossil fuel combustion.
Rule 431 Sulfur Content of Fuels	Limits the sulfur content of liquid fuels to no more than 0.5% by weight.

Applicable LORS	Description
Rule 461 Gasoline Transfer and Dispensing	This rule specifies the vapor recovery requirement for gasoline tank filling (Phase I) and vehicle refueling (Phase II) for gasoline storage and refueling facilities.
Rule 900 Standard of Performance for New Stationary Source	Incorporates the Federal NSPS (40 CFR 60) rules by reference.
Rule 1303 New Source Review	Specifies BACT/Offsets technology and requirements for a new emissions unit that has potential to emit any affected pollutants.
Rule 1306 Electric Energy Generating Facilities	Describes actions to be taken for permitting of power plants that are within the jurisdiction of the Energy Commission.

C.1.3.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Energy Commission staff assesses four kinds of primary and secondary[4] impacts: construction, operation, closure and decommissioning, and cumulative. Construction impacts result from the onsite and offsite emissions occurring during site preparation and construction of the proposed project. Operation impacts result from the emissions of the proposed project during operation, which includes all of the onsite auxiliary equipment emissions (emergency engine and gasoline tank), the onsite maintenance vehicle emissions, and the offsite employee and material delivery trip emissions. Closure and decommissioning impacts occur from the onsite and offsite emissions that would result from dismantling the facility and restoring the site. Cumulative impacts analysis assesses the impacts that result from the proposed project's incremental effect viewed over time, together with other closely related past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project. (Pub. Resources Code § 21083; Cal. Code Regs., tit. 14, §§ 15064(h), 15065(c), 15130, and 15355.)

C.1.3.3 METHOD FOR DETERMINING CEQA SIGNIFICANCE

Energy Commission staff evaluates potential impacts per Appendix G of the CEQA Guidelines (CCR 2006). A CEQA significant adverse impact is determined to occur if potentially significant CEQA impacts cannot be mitigated through the adoption of Conditions of Certification. Specifically, Energy Commission staff uses health-based ambient air quality standards (AAQS) established by the ARB and the U.S.EPA as a basis for determining whether a project's emissions would cause a significant adverse impact under CEQA. The standards are set at levels that include a margin of safety and are designed to adequately protect the health of all members of the public, including those most sensitive to adverse air quality impacts such as the aged, people with existing illnesses, children, and infants. Staff evaluates the potential for significant adverse air quality impacts by assessing whether the project's emissions of criteria pollutants and their precursors (NOx, VOC, PM10 and SO_2) could create a new AAQS exceedance (emission concentrations above the standard), or substantially contribute to an existing AAQS exceedance.

[4] Primary impacts potentially result from facility emissions of NOx, SOx, CO and PM10/2.5. Secondary impacts result from air contaminants that are not directly emitted by the facility but form through reactions in the atmosphere that result in ozone, and sulfate and nitrate PM10/PM2.5.

Staff evaluates both direct and cumulative impacts. Staff would find that a project or activity would create a direct adverse impact when it causes an exceedance of an AAQS. Staff would find that a project's effects are cumulatively considerable when the project emissions in conjunction with ambient background, or in conjunction with reasonably foreseeable future projects, substantially contribute to ongoing exceedances of an AAQS. Factors considered in determining whether contributions to ongoing exceedances are substantial include:

1. the duration of the activity causing adverse air quality impacts;
2. the magnitude of the project emissions, and their contribution to the air basin's emission inventory and future emission budgets established to maintain or attain compliance with AAQS;
3. the location of the project site, i.e., whether it is located in an area with generally good air quality where non-attainment of any ambient air quality standard is primarily or solely due to pollutant transport from other air basins;
4. the meteorological conditions and timing of the project impacts, i.e., do the project's maximum modeled pollutant impacts occur when ambient concentrations are high (such as during high wind periods, or seasonally);
5. the modeling methods, and how refined or conservative the impact analysis modeling methods and assumptions were and how that may affect the determined adverse impacts;
6. the project site location and nearest receptor locations; and whether the identified adverse impacts would also occur at the maximum impacted receptor location; and,
7. the potential for future cumulative impacts; and whether appropriate mitigation is being recommended to address the potential for impacts associated with likely future projects.

C.1.3.4 NEPA AIR QUALITY ANALYSIS METHOD

The National Environmental Policy Act (NEPA)[5] air quality analysis considers the following three regulatory benchmarks:

- The project would exceed General Conformity applicability thresholds for federal nonattainment pollutants. This regulatory threshold applies to both project construction and operation emissions.
- The project would exceed PSD permit applicability thresholds for federal attainment pollutants. This regulatory threshold only applies to project operation.
- The project would cause, for federal attainment pollutants, air quality impacts in exceedance of the NAAQS.

If the proposed project were to exceed either of the first two of these regulatory benchmarks then the impacts would be considered potentially adverse and would require a further refined impact and mitigation analysis in order to demonstrate that the proposed project would not result in an adverse impact based on the potential to cause exceedances of the NAAQS. A refined impact and mitigation analysis has been

[5] This is CEC staff's analysis approach that goes beyond the minimum procedural requirements of NEPA.

conducted per CEQA requirements, and that analysis is described in detail in this document.

C.1.3.5 IMPACTS FROM CLOSURE AND DECOMMISSIONING

Impacts from closure and decommissioning, as a one-time limited duration event, are evaluated with the same methods as construction emissions as discussed above.

C.1.4 PROPOSED PROJECT

C.1.4.1 SETTING AND EXISTING CONDITIONS

Climate and Meteorology

The Mojave Desert portion of San Bernardino County has a typical desert climate characterized by low precipitation, hot summers, mild winters, low humidity, and strong temperature inversions. Total rainfall in Barstow averages 4.33 inches per year with about 74% of the total rainfall occurring during the winter rainy season and 20% occurring during late summer and early fall thunderstorms (WC 2009). The Mojave Desert is in the rain shadow of the several mountain groups including the San Gabriel, San Bernardino, and Tehachapi Mountains, which greatly reduces the winter season rainfall in comparison with coastal and mountain areas located to the south and west.

The highest monthly average high temperature is 103°F in July and the lowest average monthly low temperature is 33°F in December (WC 2009). The applicant provided a wind rose from the Barstow-Daggett Airport during the years 2003 to 2007. During all seasons, the prevailing winds are predominantly from the west northwest through the west southwest with the highest single wind direction frequency being overwhelmingly from the west.

Sensitive Receptors

The general population includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. In addition, the location of the population in the area surrounding a project site may have a large bearing on health risk. Three residences have been identified within a 3-mile radius of the site, the nearest of which is located approximately 1,300 feet south of the property boundary on the other side of I-40. No sensitive receptors, such as schools or hospitals, are known to exist within 3 miles of the site (SES 2008a).

Existing Ambient Air Quality

The Federal Clean Air Act and the California Clean Air Act both require the establishment of standards for ambient concentrations of air pollutants, called ambient air quality standards (AAQS). The state AAQS, established by the California Air Resources Board, are typically lower (more protective) than the federal AAQS, which are established by the United States Environmental Protection Agency (U.S.EPA). The state and federal air quality standards are listed in **Air Quality Table 2**. The averaging times for the various air quality standards, the times over which they are measured, range from one-hour to an annual average. The standards are read as a concentration,

in parts per million (ppm), or as a weighted mass of material per a volume of air, in milligrams or micrograms of pollutant in a cubic meter of air (mg/m^3 or $\mu g/m^3$, respectively).

In general, an area is designated as attainment if the concentration of a particular air contaminant does not exceed the standard. Likewise, an area is designated as non-attainment for an air contaminant if that contaminant standard is violated. In circumstances where there are not enough ambient data available to support designation as either attainment or non-attainment, the area can be designated as unclassified. The unclassified area is normally treated the same as an attainment area for regulatory purposes. An area could be attainment for one air contaminant while non-attainment for another, or attainment for the federal standard and non-attainment for the state standard for the same air contaminant.

Air Quality Table 2
Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Standard	California Standard
Ozone (O_3)	8 Hour	0.075 ppm [a] (147 μg/m^3)	0.070 ppm (137 μg/m^3)
	1 Hour	—	0.09 ppm (180 μg/m^3)
Carbon Monoxide (CO)	8 Hour	9 ppm (10 mg/m^3)	9.0 ppm (10 mg/m^3)
	1 Hour	35 ppm (40 mg/m^3)	20 ppm (23 mg/m^3)
Nitrogen Dioxide (NO_2)	Annual	0.053 ppm (100 μg/m^3)	0.03 ppm (57 μg/m^3)
	1 Hour	0.100 ppm[b]	0.18 ppm (339 μg/m^3)
Sulfur Dioxide (SO_2)	Annual	0.030 ppm (80 μg/m^3)	—
	24 Hour	0.14 ppm (365 μg/m^3)	0.04 ppm (105 μg/m^3)
	3 Hour	0.5 ppm (1300 μg/m^3)	—
	1 Hour	—	0.25 ppm (655 μg/m^3)
Particulate Matter (PM10)	Annual	—	20 μg/m^3
	24 Hour	150 μg/m^3	50 μg/m^3
Fine Particulate Matter (PM2.5)	Annual	15 μg/m^3	12 μg/m^3
	24 Hour	35 μg/m^3	—
Sulfates (SO_4)	24 Hour	—	25 μg/m^3
Lead	30 Day Average	—	1.5 μg/m^3
	Calendar Quarter	1.5 μg/m^3	—
Hydrogen Sulfide (H_2S)	1 Hour	—	0.03 ppm (42 μg/m^3)
Vinyl Chloride (chloroethene)	24 Hour	—	0.01 ppm (26 μg/m^3)
Visibility Reducing Particulates	8 Hour	—	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70%.

Source: ARB 2009a.
Notes:
[a] The 2008 standard is shown above, but as of September 16, 2009 this standard is being reconsidered. The 1997 8-hour standard is 0.08 ppm.
[b] The U.S. EPA is in the process of implementing this new standard, which became effective April 12, 2010. This standard is based on the 3-year average of the 98th percentile of the yearly distribution of 1-hour daily maximum concentrations.

The project site is located in the Mojave Desert Air Basin (MDAB) under the jurisdiction of the Mojave Desert Air Quality Management District (MDAQMD). The San Bernardino County portion of the MDAB surrounding the project site is designated as non-attainment for the federal and state ozone and PM10 standards, and the state PM2.5 standard. This area is designated as attainment or unclassified for the state and federal CO, NOx, SOx, and the federal PM2.5 standards. **Air Quality Table 3** summarizes the area's attainment status for various applicable state and federal standards.

Air Quality Table 3
Federal and State Attainment Status
San Bernardino County

Pollutant	Attainment Status [a]	
	Federal	State
Ozone	Moderate Nonattainment	Moderate Nonattainment
CO	Attainment	Attainment
NO_2	Attainment[b]	Attainment
SO_2	Attainment	Attainment
PM10	Moderate Nonattainment	Nonattainment
PM2.5	Attainment	Nonattainment

Source: ARB 2009b, U.S.EPA 2009a.
Notes:
[a] Attainment = Attainment or Unclassified.
[b] Nitrogen dioxide attainment status for the new federal 1-hour NO_2 standard is scheduled to be determined by January 2012.

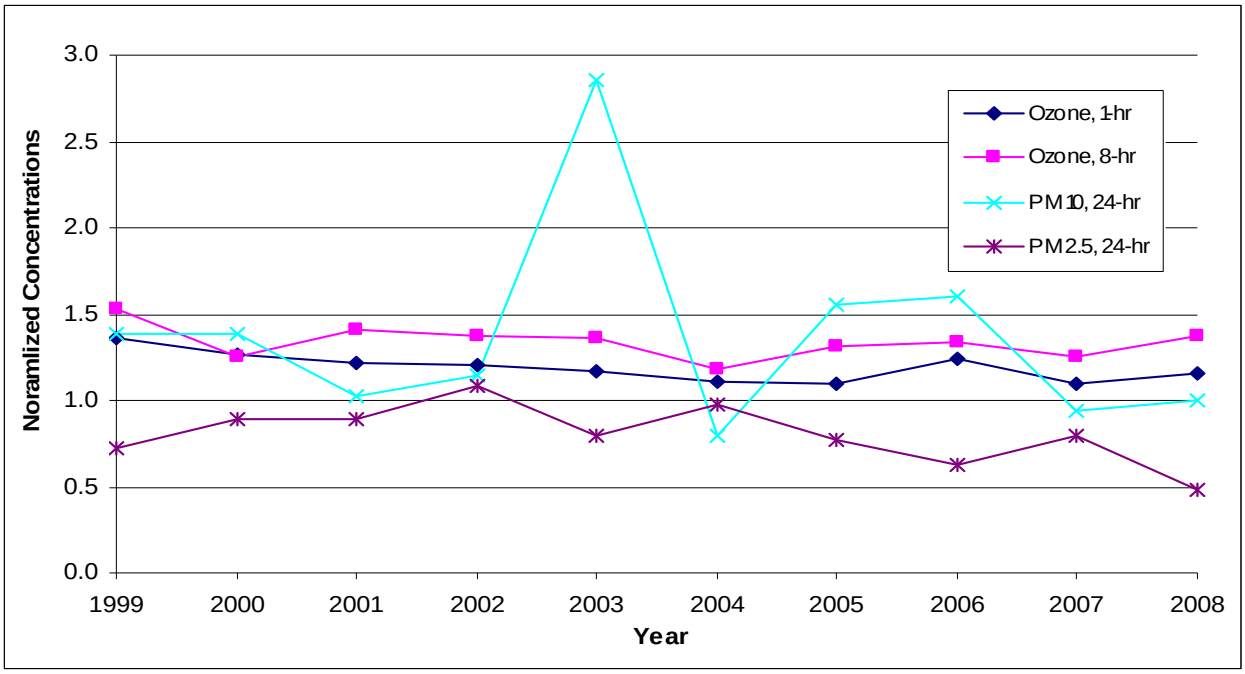
Ambient air quality monitoring data for ozone, PM10, PM2.5, CO, NO_2, and SO_2, compared to most restrictive applicable standards for the years between 2003 through 2008 (the last year that the complete annual data is currently available) at the most representative monitoring stations for each pollutant are shown in **Air Quality Table 4**, and the 1-hour and 8-hour ozone, and 24-hour PM10 and PM2.5 data for the years 1999 through 2008 are shown in **Air Quality Figure 1**. All data except PM2.5 and SOx are from the Barstow monitoring station. PM2.5 for the year 1999 were collected from Victorville-Armagosa Road monitoring station, and PM2.5 for the years 2000 to 2008 and all SOx data are from the Victorville-14306 Park Avenue monitoring station.

Air Quality Table 4
Criteria Pollutant Summary
Maximum Ambient Concentrations (ppm or µg/m^3)

Pollutant	Averaging Period	Units	2003	2004	2005	2006	2007	2008	Limiting AAQS[b]
Ozone	1 hour	ppm	0.105	0.1	0.099	0.112	0.099	0.104	0.09
Ozone	8 hours	ppm	0.095	0.083	0.092	0.094	0.088	0.096	0.07
PM10 [a]	24 hours	µg/m^3	143	40	78	80	47	50	50
PM10	Annual	µg/m^3	25.7	21.3	25.4	21.9	29.8	26.1	20
PM2.5 [a]	24 hours	µg/m^3	28	34	27	22	28	17	35
PM2.5	Annual	µg/m^3	--	10.8	--	10.3	9.7	--	12
CO	1 hour	ppm	2.7	1.6	3.3	3.5	1.4	1.4	20
CO	8 hours	ppm	1.51	1.18	1.34	1.19	0.7	1.23	9.0
NO_2	1 hour	ppm	0.095	0.101	0.087	0.082	0.073	0.081	0.18
NO_2	Annual	ppm	0.024	0.023	0.022	0.022	0.020	0.019	0.03
SO_2	1 hour	ppm	0.011	0.011	0.012	0.018	0.009	0.006	0.25
SO_2	24 hours	ppm	0.006	0.003	0.003	0.005	0.005	0.002	0.04
SO_2	Annual	ppm	0.001	0.001	0.001	0.001	0.001	0.001	0.03

Source: ARB 2008, ARB 2009c, U.S.EPA 2009b
Notes:
[a] Exceptional PM concentration events, such as those caused by wind storms, have been removed to the extent possible, but still may be included in the data presented.
[b] The limiting AAQS is the most stringent of the CAAQS or NAAQS for that pollutant and averaging period.

Air Quality Figure 1
1999-2008 Historical Ozone and PM Air Quality Data
Barstow and Victorville Monitoring Stations, San Bernardino County



Source: ARB 2009c, U.S. EPA 2009b

Note: The highest measured ambient concentrations of various criteria air contaminants were divided by their applicable standard and provided as a graphical point. Any point on the chart that is greater than one means that the measured concentrations of such air contaminant exceed the standard, and any point that is less than one means that the respective standard is not exceeded for that year. For example the 1-hour ozone concentration in 2006 is 0.112 ppm/0.09 ppm standard = 1.24.

Ozone

Ozone is not directly emitted from stationary or mobile sources, but is formed as the result of chemical reactions in the atmosphere between directly emitted nitrogen oxides (NOx) and hydrocarbons (Volatile Organic Compounds [VOCs]) in the presence of sunlight to form ozone.

As **Air Quality Table 4** and **Air Quality Figure 1** indicate, the 1-hour and 8-hour ozone concentrations measured at the Barstow monitoring station have been relatively flat or very slowly decreasing over time and continue to exceed the CAAQS and NAAQS. The collected air quality data (not shown) indicate that the ozone violations occurred primarily during the sunny and hot periods typical during June through August.

Nitrogen Dioxide

The entire air basin is classified as attainment for the state 1-hour and annual NO_2 standards and the federal annual NO_2 standard. The nitrogen dioxide attainment status could change due to the new federal 1-hour standard, although a review of the air basin wide monitoring data suggest this would not occur for the MDAB.

Approximately 90% of the NOx emitted from combustion sources is nitric oxide (NO), while the balance is NO_2. NO is oxidized in the atmosphere to NO_2, but some level of photochemical activity is needed for this conversion. The highest concentrations of NO_2

typically occur during the fall. The winter atmospheric conditions can trap emissions near the ground level, but lacking significant photochemical activity (sun light), NO_2 levels are relatively low. In the summer the conversion rates of NO to NO_2 are high, but the relatively high temperatures and windy conditions disperse pollutants, preventing the accumulation of NO_2. The NO_2 concentrations in the project area are well below the state and federal ambient air quality standards.

Carbon Monoxide

The area is classified as attainment for the state 1-hour and 8-hour CO standards. The highest concentrations of CO occur when low wind speeds and a stable atmosphere trap the pollution emitted at or near ground. These conditions occur frequently in the wintertime late in the afternoon, persist during the night and may extend 1 or 2 hours after sunrise. The project area has a lack of significant mobile source emissions and has CO concentrations that are well below the state and federal ambient air quality standards.

Particulate Matter (PM10) and Fine Particulate Matter (PM2.5)

PM10 can be emitted directly or it can be formed many miles downwind from emission sources when various precursor pollutants interact in the atmosphere.

The area is non-attainment for the federal and state PM10 standards. **Air Quality Table 4** and **Air Quality Figure 1** shows recent PM10/PM2.5 concentrations. The figure shows fluctuating concentrations patterns, and shows clear exceedances of the state 24-hour PM10 standard. It should be noted that exceedance does not necessarily mean violation or nonattainment, as exceptional events do occur and some of those events, which do not count as violations, may be included in the **Air Quality Table 4** data. The MDAB in the site area is designated as nonattainment for both the state and federal PM10 standards.

Fine particulate matter, or PM2.5, is derived mainly from either the combustion of materials, or from precursor gases (SOx, NOx, and VOC) through complex reactions in the atmosphere. PM2.5 consists mostly of sulfates, nitrates, ammonium, elemental carbon, and a small portion of organic and inorganic compounds.

San Bernardino County in the site area is classified as nonattainment for the state PM2.5 standard, and attainment for the federal PM2.5 standard. This divergence between the federal PM10 and PM2.5 attainment status indicates that a substantial fraction of the ambient particulate matter levels are most likely due to localized fugitive dust sources, such as vehicles travel on unpaved roads, agricultural operations, or wind-blown dust[6].

[6] Fugitive dust, unlike combustion source particulate and secondary particulate, is composed of a much higher fraction of larger particles on than smaller particles, so the PM2.5 fraction of fugitive dust is much smaller than the PM10 fraction. Therefore, when PM10 ambient concentrations are significantly higher than PM2.5 ambient concentrations this tends to indicate that a large proportion of the PM10 are from fugitive dust emission sources, rather than from combustion particulate or secondary particulate emission sources.

Sulfur Dioxide

The entire air basin is classified as attainment for the state and federal SO_2 standards.

Sulfur dioxide is typically emitted as a result of the combustion of a fuel containing sulfur. Sources of SO_2 emissions within the Mojave Desert Air Basin (MDAB) come from a wide variety of fuels: gaseous, liquid and solid; however, the total SO_2 emissions within the western MDAB are limited due to the limited number of major stationary sources and California's significant reduction in motor vehicle fuel sulfur content. The project area's SO_2 concentrations are well below the state and federal ambient air quality standards.

Summary

In summary, staff recommends the background ambient air concentrations in **Air Quality Table 5** for use in the modeling and impacts analysis. The maximum criteria pollutant concentrations from the past 3 years of available data collected at the monitoring stations within the San Bernardino County are used to determine the recommended background values.

Air Quality Table 5
Staff Recommended Background Concentrations (µg/m^3)

Pollutant	Averaging Time	Recommended Background	Limiting AAQS[b]	Percent of Standard
NO_2	1 hour	154.4	339	46%
	1 hour Fed	129.6[c]	188	69%
	Annual	41.8	57	73%
PM10	24 hour	80	50	160%
	Annual	29.8	20	149%
PM2.5	24 hour [a]	28.0	35	80%
	Annual	10.3	12	86%
CO	1 hour	4,025	23,000	18%
	8 hour	1,367	10,000	14%
SO_2	1 hour	47.2	655	7%
	3 hour	42.4	1,300	3%
	24 hour	13.1	105	13%
	Annual	2.7	80	3%

Source: ARB 2008, ARB 2009b, U.S. EPA 2009b, and Energy Commission Staff Analysis
Note:
[a] PM 2.5 24-hour data shown in **Air Quality Table 4** are 98th percentile values which is the basis of the ambient air quality standard and the basis for determination of the recommended background concentration.
[b] The limiting AAQS is the most stringent of the CAAQS or NAAQS for that pollutant and averaging period.
[c] - This background level is the three year average of the 98th percentile of maximum daily 1-hour concentrations.

Where possible, staff prefers that the recommended background concentration measurements come from nearby monitoring stations with similar characteristics. For this proposed project, the closest monitoring station is the Barstow monitoring station (ozone, PM10, CO, NO_2) that is located approximately 30 miles west northwest of the project site's western border. The Victorville monitoring station, the closest monitoring station that monitors PM2.5 and SO_2, is located approximately 51-miles west southwest of the project site's western border.

The background concentrations for PM10 are above the most restrictive existing ambient air quality standards, while the background concentrations for the other pollutants are all well below the most restrictive existing ambient air quality standards.

The pollutant modeling analysis was limited to the pollutants listed above in **Air Quality Table 5**; therefore, recommended background concentrations were not determined for the other criteria pollutants (ozone, lead, visibility, etc.)[7].

C.1.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff provided a number of data requests regarding the construction and operations emission estimates and air dispersion modeling analysis (CEC 2009f and CEC 2009m), which the applicant responded to by providing revised emissions estimates with significantly revised mitigation and maintenance equipment use assumptions (SES 2009t and SES 2009ee) and significantly revised and more robust dispersion modeling analysis (SES 2009v). Staff has reviewed the revised emission estimates and air dispersion modeling analysis[8] and finds them to be reasonable considering the level of emissions mitigation now stipulated by the applicant. The applicant also provided additional modeling analysis to show compliance with the new federal 1-hour NO2 standard (TS 2010y). Staff has reviewed this analysis and has determined that it provides conservative impact results.

Project Description

The proposed project would be located on approximately 6,215[9] acres, and would include the installation of 34,000 SunCatchers, operation of Solar Stirling Engine Power Conversion Units (PCUs), administration building, the maintenance building, and the substation building. The majority of the project site is located on public land administered by the Bureau of Land Management (BLM) California Desert District (CDD). Current land use for the project site is mainly undeveloped desert land. The closest main access to the site is from Interstate 40 (I-40).

The proposed project also includes the construction of a project substation, water treatment infrastructure, and onsite road construction. The proposed project would haul water from a well located at Cadiz, approximately 64 miles east southeast of the project site, by train to the project site (TS 2010g).During the construction period, untreated water from the Cadiz well will be used for fugitive dust control and other construction

[7] The proposed project's lead emissions are negligible, do not require air dispersion modeling, and are not discussed further in this section. Ozone and visibility are complex basin-wide phenomena that are not modeled for project specific impacts, but the proposed project's indirect impacts secondary pollutants including ozone are analyzed in this section.

[8] This includes a review of the emission source inputs, including the type of source (point, volume, area) and the variables used to describe each source (emissions, height, location, temperature, etc. as appropriate).

[9] After this analysis was completed, on May 5, 2010 the applicant has modified the boundary of the facility by moving the northern project boundary south by a little more than one-half mile and providing a 4,000 foot wildlife corridor between the project and the Cady Mountains, reducing the project footprint from 8,230 acres to 6,215 acres. This smaller project site and shorter access roads should reduce overall average on-site construction vehicle mileage and thus reduce construction emissions.

water uses; and during operation this water would be treated and stored on-site for all operational needs. Operational water storage/use would include SunCatcher mirror washing, potable water use, dust control, and fire protection.

The proposed project would be constructed in two phases[10]. Phase 1 of the proposed project would consist of up to 11,000 SunCatchers configured in approximately 183 solar groups of 60 SunCatchers per group on 2,327-acres of land. SunCatchers constructed during Phase 1 would have a net nominal generating capacity of 275 MW. Phase 2 of the proposed project would build an additional 23,000 SunCatchers configured in approximately 383 solar groups on 3,888-acres of land, expanding total net generating capacity to 850 MW. In order to deliver produced electricity, the proposed project would require the proposed SCE expansion and upgrade of the 220 kV SCE Pisgah Substation. The proposed SCE Lugo-Pisgah transmission line expansion is described in detail in Section C.1.8.

The applicant has proposed minor modifications to the originally proposed project description noted above (TS 2010ab, TS 2010am), including:

- Alternative Water Supply
- Project Boundary Modification
- Hydrogen System Alternatives

The alternative water supply impacts the air quality discussion since this modified water source does not require truck or train delivery of water, reducing air quality emissions and impacts relative to the original project. The alternative water supply would come from the Well #3 on private lands immediately adjacent to the Project. The operating boundary modifications reduce the project footprint by approximately 2,015 acres by moving the northern project boundary south by a little more than one half mile and providing a 4,000 foot wildlife corridor between the project and the base of the Cady Mountains.

The hydrogen system was original described as a centralized system with onsite hydrogen generation. The applicant has identified that an alternative non-centralized distribution system, which retains the onsite hydrogen generation, may be used. The hydrogen would be distributed using the mirror washing trucks, so no additional maintenance trips/emissions are forecast to occur.

Project Emissions

Project Construction

The total duration of project construction for Calico Solar is estimated to be approximately 59 months[11] (TS 2010g). The construction duration would depend on the

[10] The two project phases were originally proposed as a 500 MW Phase 1 and 350 MW Phase 2. The project phases have recently been revised by the project applicant as noted above per information provided from the applicant through the BLM.

[11] The air quality assessment is based on a construction schedule of 41 months. It is unclear if the total construction emissions would increase due to the lengthening of the construction schedule, but the worst case daily and annual emissions evaluated for a 41 month construction schedule should be conservative and would not be expected to increase for a 59 month construction schedule.

availability of transmission upgrades by SCE and the build rate of SunCatchers. Different areas within the project site and the construction laydown areas would be disturbed at different times over the period.

Combustion emissions would result from the off-road construction equipment, including diesel construction equipment used for site grading, excavation, and construction of onsite structure, substation, transmission line, bridge, roads, and water/polymeric sealant trucks used to control construction dust emissions. Fuel combustion emissions also would result from exhaust from on road construction vehicles, including pickup trucks and diesel trucks used to transport workers and materials around the construction site, from diesel trucks used to deliver concrete, equipment, general materials and construction supplies to the construction site, and from the exhaust from commuter vehicles. Fugitive dust emissions would also result from site grading/excavation activities, installation of new transmission lines, onsite water distribution lines, and SunCatcher foundations, construction of power plant facilities, roads, and substations, and vehicle travel on paved/unpaved roads. Project construction emissions are based on 7 construction days per week, a 12-hour workday from 7 AM to 7 PM, and 26 construction days per month.

The project construction emissions have not been updated by the applicant; however, on balance the construction emissions are expected to be minimally reduced due to the proposed modifications/alternatives since:

1) The rail delivery of water provided in the SA/DEIS is not longer required. Instead, water from Well #3 would be transported through an underground pipeline, which would be approximately 0.51 miles long.

2) The smaller project site and shorter access roads should reduce the overall average onsite construction vehicle mileage reducing construction emissions.

3) The hydrogen distribution system would no longer be constructed if the non-centralized distribution system alternative is used.

While there would be a minor increase in onsite construction emissions from the construction of the water pipeline, the overall construction emissions on balance are assumed to be minimally reduced by the elimination of water transportation and the effects of the smaller site footprint.

Maximum daily emissions would occur during Month 6. During Month 6 construction would focus on the bridge, main service complex, and portions of the Phase 1 SunCatcher construction area. The applicant's maximum short-term construction emission estimates are provided in **Air Quality Table 6**. The emission estimates include the applicant's stipulated fugitive dust controls, including the use of soil binders to seal roads as soon as practical during construction.

Air Quality Table 6
Calico Solar Construction - Maximum Daily Emissions (lbs/day)

	NOx	SOx	CO	VOC	PM10	PM2.5
Onsite Construction Emissions						
Onsite Combustion Emissions	337.35	0.43	334.70	58.92	20.30	18.53
Onsite Fugitive Dust Emissions	---	---	---	---	539.93	79.30
Subtotal of Onsite Emissions	337.35	0.43	334.70	58.92	560.23	97.84
Offsite Construction Emissions						
Offsite Combustion Emissions	471.61	1.02	584.76	117.39	31.64	27.64
Offsite Fugitive Dust Emissions	---	---	---	---	105.25	13.83
Subtotal of Offsite Emissions	471.61	1.02	584.76	117.39	136.89	41.47
Total Maximum Daily Emissions	808.96	1.45	919.46	176.31	697.12	139.30

Source: TS 2010q

The estimated maximum annual emissions are the highest emissions during any consecutive 12-month period. The applicant's maximum annual construction emission estimates are provided in **Air Quality Table 7**.

Air Quality Table 7 shows that the maximum annual (12-month) emissions are below the General Conformity Rule applicability thresholds for Ozone Precursors, NOx (100 tons) and VOC (100 tons); and PM10 (100 tons).

Air Quality Table 7
Calico Solar Construction - Maximum Annual (12-Month) Emissions (tons/yr)

	NOx	SOx	CO	VOC	PM10	PM2.5
Onsite Combustion Emissions	37.73	0.05	36.69	6.89	2.38	2.18
Onsite Fugitive Dust Emissions	---	---	---	---	71.72	10.39
Subtotal of Onsite Emissions	37.73	0.05	36.69	6.89	74.10	12.57
Offsite Combustion Emissions	57.83	0.12	64.48	13.97	3.80	3.33
Offsite Fugitive Dust Emissions	---	---	---	---	12.67	1.66
Subtotal of Offsite Emissions	57.83	0.12	64.48	13.97	16.47	4.99
Total Maximum Annual Emissions	95.55	0.16	101.17	20.86	90.57	17.56

Source: TS 2010q

Project Operation

The Calico Solar facility would be a nominal 850 Megawatt (MW) solar electrical generating facility. The direct air pollutant emissions from power generation are negligible; however, there are required auxiliary equipment and maintenance activities necessary to operate and maintain the facility.

Mirror washing would be required approximately once every month, requiring 14 gallons of water per dish with an average washing rate of 20 minutes per washed dish pair, or 10 minutes per dish, since each wash vehicle is able to wash two SunCatchers simultaneously. Assuming travel time to the next pair of dishes would be less than 5 minutes, two dishes would be washed within 25 minutes. In addition to monthly washing, a special mechanical scrubbing is anticipated once every 14 months. Scrubbing would require approximately 20-22 gallons of water per dish and about 30 minutes per dish to complete. Another source of onsite maintenance vehicle traffic is the maintenance of the power conversion units (PCUs), primarily due the replacement of

the main piston seals ("CGC seals"), would be required every 6,000 hours of running time, which is about 20 months of solar operation.

To minimize operating emissions, the applicant has proposed mitigation measures to minimize the operating and maintenance vehicles emissions. Following are the proposed mitigation measures.

- Maintenance vehicles measures:
    - All wash vehicles and other maintenance trucks would be gasoline fueled vehicles that meet California vehicle emissions standards for the model year when obtained.
    - Propane-fuel fork lift and man lifts would be used for maintenance activities requiring such equipment.
    - All security vehicles for site inspection would be hybrid-electric vehicles.
- Travel demand for operation and maintenance would be optimized to minimize vehicle miles traveled (VMT).
- Polymer based soil binders would be applied on the unpaved road to create stabilized surfaces and all vehicles would travel only on these stabilized roads to reduce particulate emissions.
- Paved and sealed roads would be cleaned with vacuum-sweeping and/or water-flushing as necessary.
- Van-pooling of employees from Barstow during operations would be provided.
- Stationary and mobile source emissions would be reduced:
    - An electric fire water pump would be used instead of a diesel-fueled pump.
    - A 5,000 gallon regular gasoline storage tank would be used and truck refueling would be kept to minimum.

The following are the stationary and mobile emission source operating assumptions that were used to develop the operation emissions estimates for Calico Solar:

Stationary Emission Source

- The 335 brake-horsepower (bhp) backup diesel generator: testing 20 min/month, 4 hr/yr.
- The 5,000 gallon gasoline tank: 120,000 gallons per year tank throughput. Staff's revised maximum daily throughput basis includes one 4,000 gallon storage tank filling event and maximum daily vehicle refueling of 500 gallons. Emission estimate revised by staff to use ARB emission factors for Phase I and II compliant aboveground tank with vent valves.

Mobile Emissions Source

- Mobile emissions sources required for operation and maintenance, including onsite mirror washing, PCU maintenance, and trucking of replacement hydrogen to the PCUs and offsite water, hydrogen, and other materials delivery and employee commuting trips, are estimated based on vehicle miles traveled (VMT) and operating hours. Each mobile source has different basis for emissions estimates as provided in the applicant's revised emission estimate attachment (TS 2010q).

The project operation emissions have not been updated by the applicant; however, the operation emissions are expected to be minimally reduced due to the proposed modifications/alternatives since:

1) The rail delivery of water provided in the SA/DEIS is not longer required.

2) The smaller project site and shorter access roads should reduce the overall average onsite operation vehicle mileage reducing operation emissions.

The non-centralized hydrogen system would not increase vehicle trips/vehicle mileage and resulting operating emissions as it is proposed that the hydrogen cylinders be distributed by the mirror washing trucks. The estimated Calico Solar onsite and offsite stationary and mobile source emissions are summarized in **Air Quality Tables 8** and **9**.

Air Quality Table 8
Calico Solar Operations - Maximum Daily Emissions (lbs/day)

	NOx	SOx	CO	VOC	PM10	PM2.5
Onsite Operation Emissions						
Onsite Combustion Emissions	20.93	0.13	157.70	20.32	0.73	0.62
Onsite Gasoline Tank Emissions	---	---	---	2.63	---	---
Onsite Fugitive Dust Emissions	---	---	---	---	225.60	33.30
Subtotal of Onsite Emissions	20.93	0.13	155.70	22.95	226.33	33.95
Offsite Emissions						
Offsite Combustion Emissions	17.29	0.11	37.88	1.91	1.24	0.83
Offsite Fugitive Dust	---	---	---	---	71.07	7.62
Subtotal of Offsite Emissions	17.29	0.11	37.88	1.91	72.30	8.44
Total Maximum Annual Emissions	38.22	0.23	193.58	24.86	298.63	42.39

Source: TS 2010q and staff estimates for the gasoline tank.

Air Quality Table 9
Calico Solar Operations - Maximum Annual Emissions (tons/yr)

	NOx	SOx	CO	VOC	PM10	PM2.5
Onsite Operation Emissions						
Onsite Combustion Emissions	2.89	0.02	27.71	3.55	0.10	0.08
Onsite Gasoline Tank Emissions	---	---	---	0.09	---	---
Onsite Fugitive Dust Emissions	---	---	---	---	35.11	5.14
Subtotal of Onsite Emissions	2.89	0.02	27.71	3.64	35.21	5.23
Offsite Emissions						
Offsite Combustion Emissions	1.14	0.01	6.20	0.21	0.14	0.08
Offsite Fugitive Dust	---	---	---	---	5.37	0.30
Subtotal of Offsite Emissions	1.14	0.01	6.20	0.21	5.51	0.38
Total Maximum Annual Emissions	4.03	0.03	33.91	3.85	40.72	5.61

Source: TS 2010q and staff estimates for the gasoline tank.

Air Quality Table 9 shows that the maximum annual operation emissions are well below the General Conformity Rule applicability thresholds for PM10 (100 tons) and Ozone Precursors, NOx (100 tons) and VOC (100 tons).

Project Construction and Operation Overlap

The applicant plans to start operation of SunCatchers as they are ready; therefore it is anticipated that starting at Month 7 in the construction schedule, the first SunCatchers would be ready to operate and produce electricity. It is anticipated that in this first month 18 MW of generation capacity would be available, then 18 MW would be added every month through Month 15, and 27 MW of capacity would be added every month thereafter until the completion by Month 41. Maximum short-term emissions during overlap periods would occur in the first overlap Month 7, since construction elements would decline as more SunCatchers are available online. Maximum annual (12-month) overlap emissions would occur during Months 7-18 for all criteria pollutants. Maximum overlap construction/operation emissions in any averaging period are estimated by the applicant to be somewhat lower than the maximum construction emissions.

The applicant's estimated maximum daily and annual (12-month) emissions during the maximum construction/operation overlap periods are presented in **Air Quality Tables 10** and **11.** The emission estimates in these two tables include the same mitigation measures as described for the construction and operation phase emissions.

Air Quality Table 10
Maximum Daily Construction/Operation Overlap Emissions (lbs/day)

Construction						
	NOx	**SOx**	**CO**	**VOC**	**PM10**	**PM2.5**
Onsite Emissions						
Onsite Combustion Emissions	311.96	0.40	315.73	55.54	19.04	17.37
Onsite Fugitive Dust Emissions	--	--	--	--	503.00	73.94
Subtotal of Onsite Emissions	**311.96**	**0.40**	**315.73**	**55.54**	**522.03**	**91.31**
Offsite Emissions						
Offsite Combustion Emissions	408.63	0.96	562.81	104.37	27.87	24.24
Offsite Fugitive Dust	--	--	--	--	97.67	12.86
Subtotal of Offsite Emissions	**408.63**	**0.96**	**562.81**	**104.37**	**119.78**	**36.36**
Total Maximum Daily Emissions	**720.59**	**1.36**	**878.54**	**159.91**	**641.81**	**127.68**
Operation						
	NOx	**SOx**	**CO**	**VOC**	**PM10**	**PM2.5**
Onsite Emissions						
Onsite Combustion Emissions	1.56	0.03	3.39	0.47	0.03	0.03
Onsite Gasoline Tank Emissions	--	--	--	2.63	--	--
Onsite Fugitive Dust Emissions	--	--	--	--	4.78	0.71
Subtotal of Onsite Emissions	**1.56**	**0.03**	**3.39**	**3.10**	**4.81**	**0.73**
Offsite Emissions						
Offsite Combustion Emissions	0.37	0.00	0.80	0.04	0.03	0.02
Offsite Fugitive Dust	--	--	--	--	1.50	0.16
Subtotal of Offsite Emissions	**0.37**	**0.00**	**0.80**	**0.04**	**1.53**	**0.18**
Total Maximum Hourly Emissions	**1.92**	**0.03**	**4.19**	**3.14**	**6.34**	**0.91**
Construction/Operation Overlap Totals						
	NOx	**SOx**	**CO**	**VOC**	**PM10**	**PM2.5**
Construction/Operation Overlap Total	**722.51**	**1.40**	**882.73**	**163.05**	**648.15**	**128.59**

Source: TS 2010e, Table 2.2-5a, and staff estimates for the gasoline tank.

Air Quality Table 11
Maximum Annual Construction/Operation Overlap Emissions (tons/year)

Construction						
	NOx	**SOx**	**CO**	**VOC**	**PM10**	**PM2.5**
Onsite Emissions						
Onsite Combustion Emissions	31.74	0.04	36.78	6.39	2.11	1.92
Onsite Fugitive Dust Emissions	--	--	--	--	65.55	9.72
Subtotal of Onsite Emissions	**31.74**	**0.04**	**36.78**	**6.39**	**67.65**	**11.64**
Offsite Emissions						
Offsite Combustion Emissions	53.36	0.12	65.33	13.17	3.56	3.11
Offsite Fugitive Dust	--	--	--	--	11.77	1.55
Subtotal of Offsite Emissions	**53.36**	**0.12**	**65.33**	**13.17**	**15.33**	**4.65**
Total Maximum Hourly Emissions	**85.11**	**0.16**	**102.11**	**19.56**	**82.98**	**16.30**
Operation						
	NOx	**SOx**	**CO**	**VOC**	**PM10**	**PM2.5**
Onsite Emissions						
Onsite Combustion Emissions	0.42	0.00	3.96	0.51	0.01	0.01
Onsite Gasoline Tank Emissions	--	--	--	0.09	--	--
Onsite Fugitive Dust Emissions	--	--	--	--	5.02	0.74
Subtotal of Onsite Emissions	**0.42**	**0.00**	**3.96**	**0.60**	**5.03**	**0.75**
Offsite Emissions						
Offsite Combustion Emissions	0.16	0.00	0.89	0.03	0.02	0.01
Offsite Fugitive Dust	--	--	--	--	0.77	0.04
Subtotal of Offsite Emissions	**0.16**	**0.00**	**0.89**	**0.03**	**0.79**	**0.05**
Total Maximum Hourly Emissions	**0.58**	**0.00**	**4.85**	**0.63**	**5.82**	**0.80**
Construction/Operation Overlap Totals						
	NOx	**SOx**	**CO**	**VOC**	**PM10**	**PM2.5**
Construction/Operation Overlap Total	**85.69**	**0.16**	**106.96**	**20.19**	**88.80**	**17.10**

Source: TS 2010e, Table 2.2-6a, and staff estimates for the gasoline tank.

Air Quality Table 11 shows that the maximum annual (12-month) construction/operation overlap emissions are below the General Conformity Rule applicability thresholds for Ozone Precursors, NOx (100 tons) and VOC (100 tons); and PM10 (100 tons).

As project construction and operational emissions are expected to be minimally reduced due to the latest proposed modifications/alternatives (TS 2010am), the worst-case overlapping construction/operation emissions are also expected to be minimally reduced.

Initial Commissioning

Initial commissioning refers to a period prior to beginning commercial operation when the equipment undergoes initial tests. For the proposed project initial commission would occur throughout the construction period when each installed SunCatcher becomes operational. Because of the proposed project's use of a non-fuel fired generating technology, staff does not expect significant changes in emissions from the facility commissioning activities compared to that of normal operation.

Dispersion Modeling Assessment

While the emissions are the actual mass of pollutants emitted from the proposed project, the impacts are due to the concentration of pollutants from the proposed project that reach the ground level. When emissions are expelled at a high temperature and velocity through a relatively tall stack, the pollutants would be significantly diluted by the time they reach ground level. For this proposed project there are no tall emission stacks, but the construction and maintenance vehicles and emergency engine do have high temperature exhausts, which would contribute to plume rise. The emissions from the proposed project are analyzed through the use of air dispersion models to determine the probable impacts at ground level.

Air dispersion models provide a means of predicting the location and ground level magnitude of the impacts of a new emissions source. These models consist of several complex series of mathematical equations, which are repeatedly calculated by a computer for many ambient conditions to provide theoretical maximum offsite pollutant concentrations for short-term (1-hour, 3-hour, 8-hour, and 24-hour) and annual periods. The model results are generally described as maximum concentrations, often described as a unit of mass per volume of air, such as micrograms per cubic meter ($\mu g/m^3$).

The applicant used the U.S.EPA guideline ARMS/EPA Regulatory Model (AERMOD) to estimate ambient impacts from project construction and operation. The construction emission sources for the site were grouped into two categories: equipment (off-road equipment); and vehicles (on-road equipment), where the exhaust and fugitive dust emissions for each type were calculated for particulate matter modeling. Emissions from onsite equipment engines were modeled as point sources and fugitive emission sources were modeled as area sources. Similar modeling procedures were used by the applicant to determine impacts from the operating stationary source (emergency engine) and the maintenance vehicle exhaust and fugitive dust emissions.

The inputs for the air dispersion models include stack information (exhaust flow rate, temperature, and stack dimensions), specific engine and vehicle emission data and meteorological data, such as wind speed, atmospheric conditions, and site elevation. For the proposed project, the meteorological data used as inputs to the model included hourly wind speeds and directions measured at the Barstow Daggett Airport meteorological station during 2003 through 2007. Hourly meteorological data for year 2005 was selected as a period with high data capture currently available for this station. Additionally, the applicant obtained hourly ozone and NO_2 ambient data from the Barstow monitoring station for the year 2005 that was used in a more refined NO_2 impact modeling analysis using the Ozone Limiting Method (OLM) option that is available with AERMOD.

For the determination of one-hour average and annual average construction NOx concentrations the Ozone Limiting Method (OLM) was used to determine worst-case near field NO_2 impacts. The NOx emissions from internal combustion sources, such as diesel engines, are primarily in the form of nitric oxide (NO) rather than NO_2. The NO converts into NO_2 in the atmosphere, primarily through the reaction with ambient ozone, and NOx OLM assumes full conversion of stack or tailpipe NO emission with the available ambient ozone. The NOx OLM method used assumed an initial NO_2/NOx ratio of 0.1 for diesel equipment. Actual monitored hourly background ozone concentration data (2005 Barstow monitoring station data that corresponds with the meteorological files) were used by this modeling method to calculate maximum potential NO to NO_2 conversion to determine the maximum hourly NO_2 impacts.

Staff revised the background concentrations provided by the applicant, replacing them with the available highest ambient background concentrations as shown in **Air Quality Table 5**. Staff added the modeled impacts to these background concentrations, and then compared the results with the ambient air quality standards for each respective air contaminant to determine whether the proposed project's emission impacts would cause a new exceedance of the ambient air quality standards or would contribute to an existing exceedance.

The revisions to the project do not substantially change the worst-case onsite construction emissions that were modeled and would actually reduce the onsite operation emissions due to the reduction in facility size and vehicle travel requirements. Therefore, the modeling assessment provided in the SA/DEIS remains valid. However, the applicant did provide an additional modeling analysis to show compliance with the new federal 1-hour NO_2 standard (TS 2010y). Staff has reviewed this analysis and has determined that it provides conservative impact results.

This new modeling analysis was conducted for operation[12]. The applicant remodeled operations 1-hour NOx emissions using a five year meteorological (Daggett Airport) and hourly ozone (Barstow) datasets, and added the maximum 1-hour modeled concentration (51.8 $\mu g/m^3$) with the three-year average 98th percentile background value (129.6 $\mu g/m^3$) determined for Barstow from 2006 to 2008. This maximum combined concentration (181.3 $\mu g/m^3$) was found to be below the new federal standard (188

[12] Staff is only reviewing compliance with this standard for operations per discussion with U.S. EPA Region 9 staff.

µg/m^3). This analysis used the first Tier, most conservative tier, of a four tier modeling approach that could have been used to show compliance with this standard.

The following sections discuss the proposed project's short-term direct construction and operation ambient air quality impacts, as estimated by the applicant, and provide a discussion of appropriate mitigation.

Construction Impacts and Mitigation

Construction Modeling Analysis

Using estimated peak hourly, daily and annual construction equipment exhaust emissions, the applicant modeled the proposed project's construction emissions to determine impacts (SES 2009t and SES 2009v). To determine the construction impacts on ambient standards (i.e. 1-hour through annual) the on-site construction emission levels were modeled conservatively assuming that the emissions would occur for 24 hours a day. The impact would likely be lower than the modeling results, since most of construction activities would occur during daytime when emissions are better dispersed. In addition, the applicant modeled emission rates that were higher than what they estimated for the worst case emissions. Therefore, the modeling results predicted by the applicant are considered to be conservative. The predicted proposed project pollutant concentration levels were added to staff's conservatively estimated worst-case maximum background emission concentration levels (**Air Quality Table 5**) to determine the cumulative effect. The results of the applicant's modeling analysis are presented in **Air Quality Table 12**. The construction emissions modeling analysis, including both the onsite fugitive dust and vehicle tailpipe emission sources (with applicant-proposed control measures) are summarized in **Air Quality Tables 6** and **7**.

Air Quality Table 12
Calico Solar Maximum Project Construction Impacts

Pollutants	Avg. Period	Impacts (µg/m^3)	Background (µg/m^3)	Total Impact (µg/m^3)	Standard (µg/m^3)	Percent of Standard
NO_2	1-hr.	68.1	154.4	222.5	339	66%
	Annual	3.9	41.8	45.7	57	80%
PM10	24-hr	26.5	80	106.5	50	213%
	Annual	3.2	29.8	33.0	20	165%
PM2.5	24-hr	4.1	28	32.1	35	92%
	Annual	0.6	10.3	10.9	12	91%
CO	1-hr	61	4,025	4,086	23,000	18%
	8-hr	32	1,367	1,399	10,000	14%
SO_2	1-hr	0.07	47.2	47.3	665	7%
	3-hr	0.05	42.4	42.5	1300	3%
	24-hr	0.02	13.1	13.1	105	12%
	Annual	0.004	2.7	2.7	80	3%

Source: SES 2009t, Table 5.2-19 Revised.

This modeling analysis indicates, with the exception of 24-hour and annual PM10 impacts, that the proposed project would not create new exceedances or contribute to existing exceedances for any of the modeled air pollutants. The conditions that would create worst-case project modeled impacts (low wind speeds) are not the same conditions when worst-case background is expected. Additionally, the worst-case PM10

impacts occur at the fence line and drop off quickly with distance from the fence line. In light of the existing PM10 non-attainment status for the project site area, staff considers the construction PM10 emissions to be potentially CEQA significant and recommends that the off-road equipment and fugitive dust emissions both be mitigated pursuant to CEQA.

In light of the existing ozone non-attainment status for the project site area, staff considers the construction NOx and VOC emissions to be potentially CEQA significant and recommends that the off-road equipment NOx and VOC emissions be mitigated pursuant to CEQA.

Staff concludes that with implementation of staff-proposed mitigation measures the construction impacts would not contribute substantially to exceedances of PM10 or ozone standards.

The modeling analysis shows that, after implementation of the recommended emission mitigation measures, the proposed project's construction is not predicted to cause new exceedances of the NAAQS for attainment pollutants, but we note that PM10 already exceeds the NAAQS. Therefore, staff determined that no adverse NEPA impacts would occur after implementation of the recommended mitigation measures.

Construction Mitigation

To mitigate the impacts due to construction of the facility, the applicant has committed to the following mitigation measures (SES 2009t):

For exhaust emissions control:

- Low-emitting gasoline and diesel engines meeting state and federal emissions standards (Tiers I, II and III) would be used for construction equipment, including, but not limited to catalytic converter systems and particulate filter systems.
- All vehicles would be required to shut down when idling for more than 5 minutes, or as required by ARB.
- Regular preventive maintenance would be implemented to prevent equipment engine emission increases due to inefficient fuel combustion.
- Diesel fueled motor vehicle would use low sulfur and low aromatic fuel meeting California standards.
- Review availability of alternatively fueled pickups and personnel transport buses and at a minimum use gasoline fueled vehicles.

For fugitive dust emissions control:

- Chemical dust suppressant[13] Soiltac™ or a product with same or better performance would be applied to all on-site unpaved roads and unpaved parking areas which would also be maintained or resealed as needed to minimize dust emissions.
- Construction grading requirements for the maintenance roads will be limited to surface scraping of topsoil.

[13] The soil stabilizer product used would require prior approval by the Energy Commission.

- Water application, chemical dust suppressant or other suppressant technique would be used to control fugitive dust emissions from wind erosion of areas disturbed from construction activities (including storage piles).
- Paved road surfaces would be vacuum-swept and/or water-flushed to remove buildup of loose material to control dust emissions from travel on the paved access road (including adjacent public streets affected by construction activities) and paved parking areas.
- All trucks hauling soil, sand, and other loose materials would be covered, or all trucks would be required to maintain at least 2 feet of freeboard.
- Traffic speed on all unpaved site areas and sealed roads would be limited to 15 miles per hour.[14]
- Sandbags or other erosion control measures would be installed to prevent silt runoff to roadways.
- Disturbed areas would be revegetated as quickly as possible.
- Tires of all trucks would be washed off exiting construction site.
- Construction workers would be required to park in sealed laydown areas and would be transported to worksites in buses.
- Vehicles, including SunCatcher material delivery trucks, would be required to travel on paved or sealed roads only.
- All vehicles, such as material delivery trucks, would be required to travel on sealed roads only.

Staff recommends the implementation of mitigation measures contained in Conditions of Certification **AQ-SC1** to **AQ-SC5**, which incorporate the applicant's proposed measures with minor revisions and additions recommended by staff to reduce the impacts from the construction of the proposed project. Specific recommendations from staff include requiring the use of Tier 3 off-road equipment where available.

The construction of the proposed project would cause particulate matter emissions that would add to the existing exceedances of the ambient PM10 air quality standards. Therefore, if unmitigated, the proposed project's construction PM10 emission impacts would be significant under CEQA. Additionally, unmitigated PM10 emissions could exceed General Conformity applicability thresholds, and could potentially cause adverse impacts pursuant to NEPA. However, staff concludes that the implementation of proposed specific mitigation measures during construction of the facility as identified in the conditions of certification would reduce the short-term PM10 impacts to a level that is less than significant pursuant to CEQA, and would mitigate the potential for adverse NEPA impacts.

[14] Staff recommends speeds no greater than 10 miles per hour on unpaved areas and up to 25 miles per hour on stabilized, unpaved roads as long as there are no visible dust emissions (see condition AQ-SC3).

Operation Impacts and Mitigation

The following section discusses the proposed project's direct and cumulative ambient air quality impacts, as estimated by the applicant, and evaluated by staff. Additionally, this section discusses the recommended mitigation measures.

Operation Modeling Analysis

The applicant has provided a modeling analysis using the EPA-approved AERMOD model to estimate the impacts of the proposed project's operation NOx, PM10, CO, and SOx emissions resulting from project operation (SES 2009t). The maintenance emissions and stationary source emissions were modeled using the emissions data presented in **Air Quality Tables 8** and **9.** The emergency diesel generator is the only stationary emission source modeled. Unlike traditional fossil fueled power plants, most operating emissions from Calico Solar would occur from maintenance activities which require the use of mobile emissions sources. Similar to the assessment of construction impacts, staff added the modeled impacts to the available highest ambient background concentrations recorded during the previous 3 years from nearby monitoring stations to assess the proposed project's operation impacts. **Air Quality Table 13** presents the results of the applicant's modeling analysis.

Air Quality Table 13
Calico Solar Operation Emission Impacts

Pollutants	Avg. Period	Impacts ($\mu g/m^3$)	Background [1] ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	Standard ($\mu g/m^3$)	Percent of Standard
NO_2	1-hr.	51.8	154.4	206.2	339	61%
	1-hr Fed	51.8	129.6	181.3	188	96%
	Annual	0.3	41.8	42.1	57	74%
PM10	24-hr	2.8	80	82.8	50	166%
	Annual	0.6	29.8	30.4	20	152%
PM2.5	24-hr	0.4	28	28.4	35	81%
	Annual	0.1	10.3	10.4	12	87%
CO	1-hr	166	4,025	4,191	23,000	18%
	8-hr	72	1,367	1,439	10,000	14%
SO_2	1-hr	0.62	47.2	47.8	665	7%
	3-hr	0.22	42.4	42.6	1300	3%
	24-hr	0.07	13.1	13.2	105	13%
	Annual	0.001	2.7	2.7	80	3%

Source: SES 2009t, Table 5.2-20 Revised; and TS 2010y.

This modeling analysis indicates, with the exception of PM10 impacts, that the proposed project would not create new exceedances or contribute to existing exceedances for any of the modeled air pollutants. The conditions that would create worst-case project modeled impacts (low wind speeds) are not the same conditions when worst-case background is expected for PM10/PM2.5. Additionally, the worst-case PM2.5 and PM10 impacts occur at the fence line and drop off quickly with distance from the fence line. Therefore, staff concludes that the operation impacts, when considering staff's mitigation measures, would not contribute substantially to exceedances of the PM10 CAAQS.

However, in light of the existing PM10 and ozone non-attainment status for the project site area, staff considers the operation NOx, VOC, and PM emissions to be potentially CEQA significant and recommends that the off-road equipment and fugitive dust emissions be mitigated pursuant to CEQA.

The modeling analysis shows that, after implementation of the recommended emission mitigation measures, the proposed project's operation is not predicted to cause new exceedances of the NAAQS for attainment pollutants, but note that PM10 already exceeds the NAAQS. Therefore, staff determined that no adverse NEPA impacts would occur after implementation of the recommended mitigation measures.

Construction/Operation Overlap Impacts

The applicant has provided an emission analysis, summarized in **Air Quality Tables 9** and **10**, that indicates that the mitigated construction/operation overlap emissions would be no higher than those determined for the worst-case project construction period. Therefore, as was determined for project construction, no significant CEQA or adverse NEPA impacts would occur after implementation of the recommended construction and operation mitigation measures.

Operation Mitigation

Applicant's Proposed Mitigation

Emission Controls

As discussed in the air quality section of the AFC and Data Reponses (SES 2009t), the applicant has committed to the following emission controls on the stationary equipment associated with the Calico Solar operation:

Emergency Generator

The applicant has proposed an ARB/EPA Tier 3 engine, compliant with the New Source Performance Standards, Subpart IIII Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, to meet Best Available Control Technology (BACT) requirements for the emergency generator engine. The proposed ARB/EPA Tier 3 engine would have the following emission guarantees:

- NOx: 4.61 gram/bhp-hour, 3.41 lbs/hour
- CO: 0.39 gram/bhp-hour, 0.29 lbs/hour
- VOC: 0.15 gram/bhp-hour, 0.11 lbs/hour
- PM10: 0.06 gram/bhp-hour, 0.04 lbs/hour
- PM2.5: 0.06 gram/bhp-hour, 0.04 lbs/hour
- SO_2: 0.12 gram/bhp- hour, 0.09 lbs/hour

Gasoline Tank

The applicant proposes to use a 5,000 gallon regular gasoline storage tank that incorporates ARB-certified Phase I (tank filling) & Phase II (vehicle refueling) vapor recovery systems. The tank would be filled only when necessary to reduce turnover and

truck refueling would be kept to a minimum. The maximum annual tank throughput is expected to be 120,000 gallons.

Operation and Maintenance Vehicles

- Chemical dust suppressant Soiltac™ or a product with same or better performance would be applied to all maintenance roads.
- All maintenance vehicles would be required to travel only on chemically-sealed or paved roads.
- Mirror washing maintenance would be done efficiently. Each wash vehicle would wash two SunCatchers at the same time to reduce the amount of time wash vehicles operate, and therefore reduce their emissions.
- New gasoline fueled vehicles will be used in place of diesel vehicles to reduce ozone precursor and diesel particulate matter emissions.
- Hybrid-electric vehicles would be used for all security vehicles.
- To reduce emissions from commuting, van pools would be provided from Barstow.
- Paved road surfaces would be vacuum-swept and/or water-flushed to remove buildup of loose material to control dust emissions from travel on the paved access road (including adjacent public streets affected by construction activities) and paved parking areas.
- To reduce exhaust emission, propane-fueled fork lift and man lifts would be used for maintenance.
- Calico Solar, LLC is committed to a better travel demand management to reduce VMTs whenever and wherever possible and to using alternatively fueled vehicles.

Emission Offsets

The applicant has not proposed any emission offsets and the stationary source and operating fugitive dust emissions for Calico Solar as currently proposed by the applicant would be below District offset thresholds.

Adequacy of Proposed Mitigation

Staff concurs with the District's determination that the proposed project's stationary source proposed emission controls for criteria pollutants currently meet regulatory requirements and that the proposed stationary source emission levels are reduced adequately, but recommends that a condition needs to be added to ensure that the emergency engine emission controls/emission levels meet potential future requirements as this source may not be purchased and installed for several years. Additionally, staff generally agrees that the applicant's proposed fugitive dust mitigation measures would provide adequate fugitive dust emission control, but has recommended minor changes and additions to the applicant's proposed measures.

Staff Proposed Mitigation

As mentioned earlier in the discussions of the ozone and PM10 impacts, staff concludes that the proposed project's direct stationary source ozone precursor and PM10 emissions are minimal, but when combined with the maintenance vehicles' emissions

could be significant per CEQA. Additionally, staff believes a solar renewable project, which would have a 30 to 40-year life in a setting likely to continue to be impacted by both local and upwind emission sources, should address its contribution to the potentially ongoing nonattainment of the PM10 and ozone standards. Staff concludes that the applicant's proposed mitigation measures would generally mitigate these emissions adequately, so staff recommends formalizing the applicant's stipulated onsite vehicle emission mitigation measures and fugitive dust mitigation measures, with minor revisions and additions, in Conditions of Certification **AQ-SC6** and **AQ-SC-7**, respectively.

Staff is also proposing Condition of Certification **AQ-SC8** to ensure that the Energy Commission license is amended as necessary to incorporate changes to the air quality permits.

Staff concludes that the implementation of its recommended operations mitigation measures would reduce the potential CEQA emission impacts from the facility on ozone and PM10 to a level of less than significant. Additionally, staff concludes that the implementation of its recommended operations fugitive dust mitigation measures would mitigate the potential for NEPA adverse impacts.

Staff has considered the minority population surrounding the site (see Socioeconomics Figure 1). Since the proposed project's direct CEQA air quality impacts have been reduced to a less than significant level, there is no environmental justice issue for air quality.

Indirect Pollutant and Secondary Pollutant Impacts

The proposed project would have direct emissions of chemically reactive pollutants (NOx, SOx, and VOC), but would also have indirect emission reductions associated with the reduction of fossil-fuel fired power plant emissions due to the proposed project displacing the need for their operation, since solar renewable energy facilities would operate on a must-take basis[15]. However, the exact nature and location of such reductions is not known, so the discussion below focuses on the direct emissions from the proposed project within the San Bernardino County portion of the Mojave Desert Air Basin.

Ozone Impacts

There are air dispersion models that can be used to quantify ozone impacts, but they are used for regional planning efforts where hundreds or even thousands of sources are input into the model to determine ozone impacts. There are no regulatory agency models approved for assessing single source ozone impacts. However, because of the known relationship of NOx and VOC emissions to ozone formation, it can be said that the emissions of NOx and VOC from the Calico Solar Project do have the potential (if left unmitigated) to contribute to higher ozone levels in the region. These impacts would be cumulatively significant under CEQA because they would contribute to ongoing violations of the state and federal ozone ambient air quality standards.

[15] This refers to the fact that the contract between the owner of this solar power facility and the utility will require that the utility take all generation from this facility with little or no provisions for the utility to direct turn down of generation from the facility.

PM2.5 Impacts

Secondary particulate formation, which staff assumes to be 100% PM2.5, is the process of conversion from gaseous reactants to particulate products. The process of gas-to-particulate conversion, which occurs downwind from the point of emission, is complex and depends on many factors, including local humidity and the presence of air pollutants. The basic process assumes that the SOx and NOx emissions are converted into sulfuric acid and nitric acid first and then react with ambient ammonia to form sulfate and nitrate. The sulfuric acid reacts with ammonia much faster than nitric acid and converts completely and irreversibly to particulate form. Nitric acid reacts with ammonia to form both a particulate and a gas phase of ammonium nitrate. The particulate phase will tend to fall out; however, the gas phase can revert back to ammonia and nitric acid. Thus, under the right conditions, ammonium nitrate and nitric acid establish a balance of concentrations in the ambient air. There are two conditions that are of interest, described as *ammonia rich* and *ammonia poor*. The term ammonia rich indicates that there is more than enough ammonia to react with all the sulfuric acid and to establish a balance of nitric acid-ammonium nitrate. Further ammonia emissions in this case would not necessarily lead to increases in ambient PM2.5 concentrations. In the case of an ammonia poor environment, there is insufficient ammonia to establish a balance and thus additional ammonia would tend to increase PM2.5 concentrations.

The San Bernardino County portion of the Mojave Desert Air Basin has not undergone the rigorous secondary particulate studies that have been performed in other areas of California, such as the San Joaquin Valley, that have more serious fine particulate pollution problems. However, the available chemical characterization data shows that the ammonium nitrate and ammonium sulfate fine particulate concentrations in China Lake, Edwards Air Force Base, and Mojave in 2000 were 40% of the to the PM2.5 on an annual average (ARB 2005). Because of the known relationship of NOx and SOx emissions to PM2.5 formation it can be said that the emissions of NOx and SOx from Calico Solar do have the potential (if left unmitigated) to contribute to higher PM2.5 levels in the region.

Impact Summary

The applicant is proposing to mitigate the proposed project's stationary source NOx, VOC, SO_2, and PM10/PM2.5 emissions through the use of BACT. Additionally, staff recommends additional mitigation to reduce maintenance vehicle emissions, both tailpipe emission and fugitive dust emissions that could contribute to further ozone and PM10 violations. With the applicant proposed and staff recommended emission mitigation, staff concludes that the proposed project would not cause significant secondary pollutant impacts.

C.1.4.3 CEQA LEVEL OF SIGNIFICANCE

Project Construction

Staff considers the unmitigated construction NOx, VOC, and PM emissions to be potentially CEQA significant and, therefore, staff is recommending that the NOx, VOC, and PM emission be mitigated pursuant to CEQA. Staff is recommending several mitigation measures (**AQ-SC1** through **AQ-SC5**), that also include the applicant's

stipulated construction mitigation measures, to limit exhaust emissions and fugitive dust emissions during project construction to the extent feasible.

Therefore, while there would be adverse CEQA air quality impacts during construction they are expected to be less than significant after implementation of the applicant's stipulated and staff's recommended mitigation measures.

Project Operation

Staff considers the unmitigated operation and maintenance NOx, VOC, and PM emissions to be potentially CEQA significant and, therefore, staff is recommending that the NOx, VOC, and PM emissions be mitigated pursuant to CEQA. Staff is recommending two mitigation measures (**AQ-SC6** and **AQ-SC7**), that also include the applicant's stipulated operations emission mitigation, to limit exhaust emissions and fugitive dust emissions during project operation to the extent feasible.

Therefore, while there would be adverse CEQA air quality impacts during operation, they are expected to be less than significant after implementation of the applicant's stipulated and staff's recommended mitigation measures.

Closure and Decommissioning

Eventually the facility would close, either at the end of its useful life or due to some unexpected situation such as a natural disaster or catastrophic facility breakdown. When the facility closes, all sources of air emissions would cease to operate and thus impacts associated with those emissions would no longer occur. The only other expected emissions would be equipment exhaust and fugitive particulate emissions from the dismantling activities. These activities would be of much a shorter duration than construction of the proposed project, equipment are assumed to have much lower comparative emissions due to technology advancement, and fugitive dust emissions would be required to be controlled in a manner at least equivalent to that required during construction. Therefore, while there would be adverse CEQA air quality impacts during decommissioning, they are expected to be less than significant.

C.1.5 REDUCE ACREAGE ALTERNATIVE

The Reduced Acreage alternative would essentially be a 275 MW solar facility located within the central portion of the proposed 850 MW project. It was developed because it can be constructed without upgrading the SCE Lugo-Pisgah transmission line. This alternative's boundaries and the revised locations of the transmission line, substation, laydown, and control facilities are shown in **Alternatives Figure 1**.

C.1.5.1 SETTING AND EXISTING CONDITIONS

The setting and existing conditions for this alternative are the same as the proposed project. The existing ambient air quality does not change and the facility would still be within the same air basin and subject to the same air quality LORS.

C.1.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Reduced Acreage Alternative would consist of 11,000 SunCatchers with a net generating capacity of approximately 275 MW occupying approximately 2,600 acres of land. The Reduced Acreage Alternative would transmit power to the grid through the SCE Pisgah Substation and would require infrastructure similar to the entire proposed 850 MW project, including water storage tank, transmission line, road access, main services complex, and substation. However, the Reduced Acreage Alternative would not require the 65-mile upgrade to the SCE Lugo-Pisgah transmission line.

The Reduced Acreage Alternative would use approximately 32% of the SunCatchers, provide 32% of the power generating potential, and would affect approximately 32% of the land of the land of the proposed 850 MW project. The applicant did not provide criteria pollutant emission estimates for the construction and operation of this alternative but did provide estimates for the applicant proposed Phase 1 (500 MW) and Phase 2 (350 MW) alternatives (SES 2009ee), which use the same emission control assumptions as those used for the proposed project. The information provided by the applicant for these two alternatives only provide consolidated emission summaries and tables for the total construction period emissions and the maximum annual operating emissions.

The construction and operation criteria pollutant emission estimates for the Reduced Acreage Alternative, presented in terms of total construction period emissions and maximum annual operation emissions, are estimated based on linear extrapolation of the applicant's Phase 2 Alternative emission estimates and are provided in **Air Quality Tables 14** and **15**, respectively.

Air Quality Table 14
Calico Solar Construction – Reduced Acreage Alternative
Total Construction Period Emissions (tons)[a]

	NOx	SOx	CO	VOC	PM10	PM2.5
Onsite Combustion Emissions	19.38	0.02	22.90	3.50	1.19	1.08
Onsite Fugitive Dust Emissions	---	---	---	---	64.34	9.18
Subtotal of Onsite Emissions	**19.38**	**0.02**	**22.90**	**3.50**	**65.54**	**10.26**
Offsite Combustion Emissions	46.97	0.09	46.48	11.26	3.09	2.72
Offsite Fugitive Dust Emissions	---	---	---	---	10.51	1.37
Subtotal of Offsite Emissions	**46.97**	**0.09**	**46.48**	**11.26**	**13.60**	**4.09**
Total Emissions	**66.35**	**0.11**	**69.38**	**14.76**	**79.14**	**14.35**

Source: SES 2009ee, Table DR-136c, extrapolated by staff.
Note:
[a] The small amount of train haul water delivery emissions are not included in this table.

Air Quality Table 15
Calico Solar Operations - Reduced Acreage Alternative
Maximum Annual Emissions (tons/yr)[a]

	NOx	SOx	CO	VOC	PM10	PM2.5
Onsite Operation Emissions						
Onsite Combustion Emissions	0.68	0.00	2.51	0.05	0.02	0.02
Onsite Gasoline Tank Emissions	--	--	--	0.07	--	--
Onsite Fugitive Dust Emissions	--	--	--	--	11.97	1.76
Subtotal of Onsite Emissions	**0.68**	**0.00**	**2.51**	**0.12**	**11.99**	**1.78**
Offsite Emissions						
Offsite Combustion Emissions	0.28	1.93	1.93	0.06	0.04	0.02
Offsite Fugitive Dust	--	--	--	--	1.56	0.07
Subtotal of Offsite Emissions	**0.28**	**1.93**	**1.93**	**0.06**	**1.60**	**0.09**
Total Maximum Annual Emissions	**0.96**	**1.93**	**4.43**	**0.18**	**13.59**	**1.88**

Source: SES 2009ee, Table DR-136g, extrapolated by staff.
Note:
[a] The small amount of train haul water delivery emissions are not included in this table.

The maximum daily construction emissions for the Reduced Acreage Alternative might be as high as that estimated for the proposed project, assuming the same maximum daily construction activities, but the maximum annual emissions are not expected to be as high as the proposed project due to the overall reduction in construction activity requirements for this much smaller project alternative. Therefore, the worst-case short-term and annual construction emissions and construction pollutant concentration impacts for this alternative would be no worse than those shown in **Air Quality Table 12**.

The maximum short-term and annual operation emissions for the Reduced Acreage Alternative are expected to decrease from that of the proposed project due to its smaller size. Therefore, the worst-case short-term and annual operation pollutant concentration impacts for this alternative would be less than those shown previously in **Air Quality Table 13**.

Air Quality Tables 14 and **15** also show that the maximum annual construction and operation emissions from the Reduced Acreage Alternative would remain below the General Conformity Rule applicability thresholds for PM10 (100 tons) and Ozone Precursors, (NOx [100 tons] and VOC [100 tons]).

The results of the Reduced Acreage Alternative would be the following:

- The worst-case short-term construction emissions and ground level pollutant concentration impacts would be similar to the proposed project and would require the same level of mitigation. The total construction period and total construction emissions and long-term ground level pollutant concentration impacts would be reduced from those required to construct the proposed project.
- The benefits of the proposed project in displacing fossil fuel fired generation and reducing associated, but mainly out of air basin, criteria pollutant emissions would be reduced.
- The impacts of the proposed project would not occur on the lands not used due to the smaller project size. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project.

If the Reduced Acreage Alternative were approved, other renewable projects would likely be developed on other sites in the in San Bernardino County, the Mojave Desert, or in adjacent states to fill the 575 MW gap not supplied by the proposed project as developers strive to provide renewable power that complies with utility requirements and State/Federal mandates[16].

C.1.5.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for the Reduced Acreage Alternative would be the same as for the proposed project, with the same significance rationale, where if left unmitigated there is the potential for significant NOx and PM emission impacts during the Alternative project's construction and operation. The mitigation that would be proposed for the Reduced Acreage Alternative would be the same as that proposed for the proposed project (staff recommended conditions **AQ-SC1** to **AQ-SC8**).

C.1.6 AVOIDANCE OF DONATED AND ACQUIRED LANDS ALTERNATIVE

This alternative is analyzed Alternative Section B.2 of this Supplemental Staff Assessment.

C.1.7 NO PROJECT / NO ACTION ALTERNATIVE

There are three No Project / No Action Alternatives evaluated as follows:

No Project / No Action Alternative #1: No Action on the Calico Solar Project application and on CDCA land use plan amendment

Under this alternative, the proposed Calico Solar Project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would

[16] Such as the State of California 33 percent Renewable Portfolio Standard (RPS) mandated under Executive Order S-14-08.

continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

The results of No Project / No Action Alternative #1 would be the following:

- The impacts of the proposed project would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another renewable energy project.
- The benefits of the proposed project in displacing fossil fuel fired generation and reducing associated greenhouse gas emissions from gas-fired generation would not occur. Both State and Federal law support the increased use of renewable power generation.

In No Project / No Action Alternative #1, the proposed action would not be undertaken. Unless BLM implements an amendment to the California Desert Conservation Area plan, the BLM land on which the project is proposed would continue to be managed within BLM's framework of a program of multiple use and sustained yield, and the maintenance of environmental quality [43 U.S.C. 1781 (b)] in conformance with applicable statutes, regulations, policy and land use plan.

The results of No Project / No Action Alternative #1 would be the following:

- The impacts of the proposed project would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another renewable energy project.
- The benefits of the proposed project in reducing fossil fuel use and greenhouse gas emissions from gas-fired generation would not occur (see **Appendix Air-1 - Greenhouse Gas Emissions**). Both State and Federal law support the increased use of renewable power generation.

If the proposed project is not approved, renewable projects would likely be developed on other sites in San Bernardino County, the Mojave Desert, or in adjacent states as developers strive to provide renewable power that complies with utility requirements and State/Federal mandates. For example, there are several pending solar and wind projects in the Newberry Springs/Ludlow Area that would be located within a few miles of the Calico Solar Project site, and there are dozens of other wind and solar projects that have applications pending with BLM in the California Desert District.

No Project / No Action Alternative #2: No Action on the Calico Solar Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed Calico Solar Project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. As a result, GHG emissions would result from the construction and operation of the solar technology and would

likely be similar to the GHG emissions from the proposed project. Different solar technologies require different amounts of construction and operations maintenance; however, it is expected that all the technologies would provide the more significant benefit, like the proposed project, of displacing fossil fuel fired generation and reducing associated GHG emissions. As such, this No Project/No Action Alternative could result in GHG benefits similar to those of the proposed project.

No Project / No Action Alternative #3: No Action on the Calico Solar Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed Calico Solar Project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the greenhouse gas emissions from the site, including carbon uptake, is not expected to change noticeably from existing conditions and, as such, this No Project/No Action Alternative would not result in the GHG benefits from the proposed project. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.1.8 PROJECT-RELATED FUTURE ACTIONS - AIR QUALITY

This section examines the potential impacts of future transmission line construction, line removal, substation expansion, and other upgrades that may be required by Southern California Edison Company (SCE) as a result of the Calico Solar Project. The SCE upgrades are a reasonably foreseeable event if the Calico Solar Project is approved and constructed as proposed.

The SCE project will be fully evaluated in a future EIR/EIS prepared by the BLM and the California Public Utilities Commission. Because no application has yet been submitted and the SCE project is still in the planning stages, the level of impact analysis presented is based on available information. The purpose of this analysis is to inform the Energy Commission and BLM, interested parties, and the general public of the potential environmental and public health effects that may result from other actions related to the Calico Solar Project.

The project components and construction activities associated with these future actions are described in detail in Section B.3 of this Staff Assessment/DEIS. This analysis examines the construction and operation impacts of two upgrade scenarios

- The **275 MW Early Interconnection Option** would include upgrades to the existing SCE system that would result in 275 MW of additional latent system capacity. Under

the 275 MW Early Interconnection option, Pisgah Substation would be expanded adjacent to the existing substation, one to two new 220 kV structures would be constructed to support the transmissions interconnection (gen-tie) from the Calico Solar Project into Pisgah Substation, and new telecommunication facilities would be installed within existing SCE Right of Ways (ROWs).

- The **850 MW Full Build-Out Option** would include replacement of a 67-mile 220 kV SCE transmission line with a new 500 kV line, expansion of the Pisgah Substation at a new location and other telecommunication upgrades to allow for additional transmission system capacity to support the operation of the full Calico Solar Project.

C.1.8.1 ENVIRONMENTAL SETTING

The environmental setting described herein incorporates both the 275 MW Early Interconnection and the 850 MW Full Build-Out options. The setting for the 275 MW Early Interconnection upgrades at the Pisgah Substation and along the telecomm corridors is included within the larger setting for the project area under the 850 MW Full Build-Out option, which also includes the Lugo-Pisgah transmission corridor.

The 275 MW Early Interconnection upgrades and the Lugo-Pisgah No. 2 500 kV transmission line fall within the Mojave Desert Air Basin (MDAB) and within the Mojave Desert Air Quality Management District (MDAQMD).

Air Quality Overview. The vicinity surrounding the Lugo-Pisgah transmission corridor has an identical CAAQS and NAAQS attainment status as the Calico Solar site (see **Air Quality Table 3**). The specific pollutant levels would vary along the Lugo-Pisgah transmission corridor, where the areas closer to the Lugo substation would experience greater impacts from pollutant transport from the South Coast Air Basin (Los Angeles Metropolitan Area).

Climate and Meteorology Overview. The Lugo-Pisgah transmission corridor is entirely within the Mojave Desert and would experience climate and meteorological conditions that are very similar to the Calico Solar site. However, there would be some minor variability in temperatures, rainfall amounts, wind directions, etc. due to changes in topography along and surrounding the transmission route. For example, hourly meteorological data obtained from the MDAQMD monitoring site in Victorville shows that wind blows primarily from the south or south-southwest, while winds near Barstow show a more dominate westerly flow; and rainfall in Hesperia is approximately 2 inches a year greater than in Barstow.

C.1.8.2 ENVIRONMENTAL IMPACTS

The construction activities caused by the SCE upgrades would generate emissions at the locations of the work along the transmission line and telecommunication ROWs and at the Pisgah Substation site. The impacts from both the 275 MW Early Interconnection and the 850 MW Full Build-Out options within the ROWs would principally consist of exhaust emissions from heavy-duty diesel and gasoline-powered construction equipment use, diesel and gasoline fueled on-road delivery trucks, and helicopter use for line stringing or structure construction; and fugitive dust (particulate matter) emissions from construction activities and from vehicle travel on unpaved surfaces.

Beyond the boundaries of the ROW and substations, exhaust and paved road fugitive dust emissions would also be caused by workers commuting to and from the work sites, from trucks hauling conductor, pole segments, and other materials to the sites, and crew trucks (*e.g.,* derrick trucks, bucket trucks, pickups).

Due to the reduced construction scope of the 275 MW Early Interconnection upgrades, which would not require construction of the new 500 kV line and removal of the existing 220 kV structures, emissions and other air quality impacts would be less than for the construction of the 850 MW Full Build-Out Option. Under the 850 MW Full Build-Out option, the Lugo-Pisgah No. 2 500 kV transmission line upgrades would consist of constructing 66.9 miles of a single circuit 500 kV transmission line. Construction would include approximately 10 miles of new ROW along the Lugo-Pisgah and El Dorado-Lugo lines, rehabilitation and extension of existing access and spur roads, removal of existing 220 kV structures and two 500 kV structures, construction of approximately 258 single-circuit 500 kV towers, and stringing of approximately 420 miles of conductor (+2.5 miles for El Dorado-Lugo).

Odors of diesel exhaust from construction equipment would be reduced by the California's requirements for mandatory use of either low-sulfur or ultra-low-sulfur fuel. No substances used or activities involved with the SCE project would have the capability to produce offensive odors. As such, the impacts of odors would be less than significant for both options.

Once construction and structure removal is complete, operation emissions for both options would result from vehicle and helicopter use for periodic maintenance, repair, and inspection of the system components. These mobile source emissions would be the only direct source of emissions related to SCE project operation, and they would be minor. System monitoring, control, and inspections would induce light and medium-heavy duty truck traffic and periodic helicopter use. The air quality impact caused by emissions from SCE project vehicular traffic for maintenance activities would be less than significant.

C.1.8.3 MITIGATION

The SCE project would be required to comply with all MDAQMD rules, including portable equipment rules, which would dictate how the equipment could be operated. Mitigation measures would be implemented in compliance with the MDAQMD Ozone State Implementation Plan (SIP) to reduce the emissions generated during project construction and operation.

Construction phase emissions are generally short-term in duration. Effective and comprehensive control measures would be needed to reduce equipment and fugitive dust emissions to the extent feasible. For the proposed project staff has recommended control measures in condition of certification **AQ-SC5** to reduce construction equipment exhaust emissions, which would reduce emissions by requiring the use of newer and cleaner engines and other various control measures such as engine idle time restrictions, engine maintenance, and others. Staff has recommended control measures in condition of certification **AQ-SC3** to reduce fugitive dust emissions by requiring the use of soil binders on unpaved roads, watering active construction areas, trackout controls, and many others. Construction equipment exhaust emissions are controlled

through the use of newer cleaner engines and other various control measures such as idle time restrictions, engine maintenance, and others. Recent transmission line projects, such as the Tehachapi Renewable Transmission Project included control measures similar to those proposed in **AQ-SC3** and **AQ-SC5**.

With effective and comprehensive control measures such as those recommended in this section for the proposed Calico Solar Project, dust and equipment exhaust impacts would be reduced to a less than significant level.

C.1.8.4 CONCLUSION

The construction and structure removal activities associated with the SCE Lugo-Pisgah transmission line upgrades would cause emissions due to heavy-duty diesel and gasoline-powered construction equipment use, diesel and gasoline fueled on-road trucks and employee vehicle travel, helicopter use for line stringing or structure construction, and fugitive dust emissions from construction activities and from vehicle travel on unpaved and paved surfaces. With effective and comprehensive control measures such as those recommended in this SA/DEIS for the proposed Calico Solar Project, fugitive dust and equipment exhaust impacts would likely be reduced to a less than significant level under CEQA and there would likely be less than adverse impacts under NEPA.

C.1.9 CUMULATIVE IMPACTS

Cumulative impacts are defined by CEQA as “two or more individual effects which, when considered together, are considerable or . . . compound or increase other environmental impacts.” (CEQA Guidelines, § 15355.) A cumulative impact consists of an impact that is created as a result of a combination of the project evaluated in the EIR together with other projects causing related impacts.” (CEQA Guidelines, § 15130(a)(1).) Such impacts may be relatively minor and incremental, yet still be significant because of the existing environmental background, particularly when one considers other closely related past, present, and reasonably foreseeable future projects.

Cumulative effects are defined by the Council on Environmental Quality NEPA regulations as “…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions” (40 CFR 1508.7).

This analysis is concerned with criteria air pollutants. Such pollutants have impacts that are usually (though not always) cumulative by nature. Rarely would a project by itself cause a violation of a federal or state criteria pollutant standard. However, a new source of pollution may contribute to violations of criteria pollutant standards because of the existing background sources or foreseeable future projects. Air districts attempt to attain the criteria pollutant standards by adopting attainment plans, which comprise a multi-faceted programmatic approach to such attainment. Depending on the air district, these plans typically include requirements for air offsets and the use of Best Available Control

Technology (BACT) for new sources of emissions, and restrictions of emissions from existing sources of air pollution.

Thus, much of the preceding discussion is concerned with cumulative impacts. The "Existing Ambient Air Quality" subsection describes the air quality background in the San Bernardino County portion of the Mojave Desert Air Basin, including a discussion of historical ambient levels for each of the significant criteria pollutants. The "Construction Impacts and Mitigation" subsection discusses the proposed project's contribution to the local existing background caused by project construction. The "Operation Impacts and Mitigation" subsection discusses the proposed project's contribution to the local existing background caused by project operation. The following subsection includes two additional analyses:

- a summary of projections for criteria pollutants by the air district and the air district's programmatic efforts to abate such pollution; and
- an analysis of the proposed project's *localized cumulative impacts*, the proposed project's direct operating emissions combined with other local major emission sources.

C.1.9.1 SUMMARY OF PROJECTIONS

The San Bernardino County portion of the MDAB is designated as non-attainment for both federal (8-hour) and State (1-hour) ozone and state PM10 standards, and for state PM2.5 standard. NO_2 and SO_2 are considered to be attainment by both federal and State standards, and PM2.5 are considered to be attainment by federal standard only.

Ozone

Since the San Bernardino County portion of Mojave Desert is currently classified as non-attainment for the federal 8-hour ozone standard, the District is required to prepare and adopt an ozone attainment plan for submittal to the U.S.EPA describing how it will attain the federal 8-hour standard. The MDAQMD has adopted State and Federal attainment plans for the region within its jurisdiction. The MDAQMD adopted the MDAQMD 2004 Ozone Attainment Plan (approved by U.S.EPA), and has updated it with the MDAQMD Federal 8-hour Ozone Attainment Plan 2008 to demonstrate that the MDAQMD will meet the required Federal ozone planning milestones and attain the 8-hour ozone NAAQS by June 2021. There are no additional control measures for direct ozone precursor reductions required as part of the update. However, the MDAQMD is committed to have all applicable Federal RACT rules as proposed in 8-hour Reasonably Available Control Technology – State Implementation Plan Analysis (RACT SIP Analysis) adopted in 2006. In addition, the MDAQMD updated and indentified new measures in 2007, which will be adopted through 2014, as the State of California mandates including all feasible ozone precursor control measures. The enhanced vapor recovery for fuel storage tanks measure would be applicable to the proposed project's gasoline tank.

Particulate Matter

The District is currently classified as nonattainment for the state and the federal 24-hour PM10 air quality standard. The District first adopted a Federal Particulate Matter (PM10)Attainment Plan (PMAP) in July 31, 1995. However, some experts are critical of

the federal standards as not being sufficiently health protective. California has adopted far more stringent standards for PM10. Currently, virtually all air districts in the state (the lone exception being Lake County) are designated nonattainment of the state PM10 standard. There is no legal requirement for air districts to provide plans to attain the state PM10 standard, so air districts have not developed such plans.

In 1997 the federal government adopted PM2.5 standards, as did the state in 2003. The EPA has determined that the area is unclassified, or attainment for both the annual and the 24-hour federal PM2.5 standard. However, the ARB classifies the area as nonattainment of the annual state PM2.5 air quality standard.

The PMAP states that "(t)he air quality of the MDAQMD is impacted by both fugitive dust from local sources and occasionally by region-wide windblown dust during moderate to high wind episodes. This region-wide or “regional” event includes contributions from both local and distant dust sources which frequently result in violations of the NAAQS that are multi-district and interstate in scope." It also states that "(i)t is not feasible to implement control measures to reduce dust from regional wind events." Therefore, the District would have put considerable effort to reduce the emissions from "…unpaved road travel, construction, and local disturbed areas in the populated areas, and certain stationary sources operating in the rural Lucerne Valley*."*

As a solar power generation facility, the direct air pollutant emissions from power generation are negligible and the emission source would be limited to auxiliary equipment and maintenance activities. The emissions from the proposed project would be minimal compared to the other power generation facilities, and it is unlikely that the proposed project would have significant impact on particulate matter emissions.

Summary of Conformance with Applicable Air Quality Plans

The applicable air quality plans do not outline any new control measures applicable to the proposed project’s operating emission sources. Therefore, compliance with existing District rules and regulations would ensure compliance with those air quality plans.

C.1.9.2 LOCALIZED CUMULATIVE IMPACTS

Since the power plant air quality impacts can be reasonably estimated through air dispersion modeling (see the “Operation Modeling Analysis” subsection) the proposed project contributions to localized cumulative impacts can be estimated. To represent *past* and, to an extent, *present projects* that contribute to ambient air quality conditions, the Energy Commission staff recommends the use of ambient air quality monitoring data (see the “Existing Ambient Air Quality” subsection), referred to as the *background*. The staff takes the following steps to estimate what are additional appropriate “present projects” that are not represented in the background and “reasonably foreseeable projects”:

- First, the Energy Commission staff (or the applicant) works with the air district to identify all projects that have submitted, within the last year of monitoring data, new applications for an authority to construct (ATC) or permit to operate (PTO) and applications to modify an existing PTO within 6 miles of the project site. Based on staff’s modeling experience, beyond 6 miles there is no statistically significant

concentration overlap for non-reactive pollutant concentrations between 2 stationary emission sources.

- Second, the Energy Commission staff (or the applicant) works with the air district and local counties to identify any new area sources within 6 miles of the project site. As opposed to point sources, area sources include sources like agricultural fields, residential developments or other such sources that do not have a distinct point of emission. New area sources are typically identified through draft or final Environmental Impact Reports (EIRs) that are prepared for those sources. The initiation of the EIR process is a reasonable basis on which to determine what is "reasonably foreseeable" for new area sources.
- The data submitted, or generated from the applications with the air district for point sources or initiating the EIR process for area sources, provides enough information to include these new emission sources in air dispersion modeling. Thus, the next step is to review the available EIR(s) and permit application(s), determine what sources must be modeled and how they must be modeled.
- Sources that are not new, but may not be represented in ambient air quality monitoring are also identified and included in the analysis. These sources include existing sources that are co-located with or adjacent to the proposed source (such as an existing power plant). In most cases, the ambient air quality measurements are not recorded close to the proposed project, thus a local major source might not be well represented by the background air monitoring. When these sources are included, it is typically a result of there being an existing source on the project site and the ambient air quality monitoring station being more than 2 miles away.
- The modeling results must be carefully interpreted so that they are not skewed towards a single source, in high impact areas near that source's fence line. It is not truly a cumulative impact of the Calico Solar Project if the high impact area is the result of high fence line concentrations from another stationary source and Calico Solar is not providing a substantial contribution to the determined high impact area.

Once the modeling results are interpreted, they are added to the background ambient air quality monitoring data and thus the modeling portion of the cumulative assessment is complete. Due to the use of air dispersion modeling programs in staff's cumulative impacts analysis, the applicant must submit a modeling protocol, based on information requirements for an application, prior to beginning the investigation of the sources to be modeled in the cumulative analysis. The modeling protocol is typically reviewed, commented on, and eventually approved in the Data Adequacy phase of the licensing procedure. Staff typically assists the applicant in finding sources (as described above), characterizing those sources, and interpreting the results of the modeling. However, the actual modeling runs are usually left to the applicant to complete. There are several reasons for this: modeling analyses take time to perform and require significant expertise, the applicant has already performed a modeling analysis of the proposed project alone (see the "Operation Modeling Analysis" subsection), and the applicant can act on its own to reduce stipulated emission rates and/or increase emission control requirements as the results warrant. Once the cumulative project emission impacts are determined, the necessity to mitigate the proposed project emissions can be evaluated, and the mitigation itself can be proposed by staff and/or the applicant (see the "Operation Mitigation" subsection).

The applicant, in consultation with MDAQMD and San Bernardino County Land Use Service Department, confirmed that there are no projects within a 6 miles radius from the Calico Solar Project site that are under construction or have received permits to be built or operate in the foreseeable future. Therefore, it has been determined that no stationary sources requiring a cumulative modeling analysis exist within a 6 mile radius of the proposed project site.

In addition to the projects determined through consultation with the District, there are several pending solar and wind projects in the Newberry Springs/Ludlow Area that would be located within a few miles of the Calico Solar Project site, and there are dozens of other wind and solar projects that have applications pending with BLM in the California Desert District. This potential for significant additional development within the air basin and corresponding increase in air basin emissions is a major part of staff's rationale for recommending Conditions of Certification **AQ-SC6** and **AQ-SC7** that are designed to mitigate the proposed project's cumulative impacts by reducing the dedicated on-site vehicle emissions and fugitive dust emissions during site operation.

Staff has considered the minority population surrounding the site (see **Socioeconomics Figure 1**). Since the project's cumulative air quality impacts have been mitigated to less than significant, there is no environmental justice issue for air quality.

C.1.10 COMPLIANCE WITH LORS

The Mojave Desert Air Quality Control District issued a Preliminary Determination of Compliance (PDOC) for the Calico Solar Project on June 4, 2009 (MDAQMD 2009b) and a Final Determination of Compliance on January 27, 2010 (MDAQMD 2010a). Compliance with all District rules and regulations was demonstrated to the District's satisfaction in the FDOC. The District's FDOC conditions are presented in the Conditions of Certification (**AQ-1** to **AQ-15**).

C.1.10.1 FEDERAL

The District is responsible for issuing the federal New Source Review (NSR) permit and has been delegated enforcement of the applicable New Source Performance Standard (Subpart IIII). However, this project does not require a federal NSR or Title V permit and this project would not require a PSD permit from U.S.EPA prior to initiating construction.

The proposed project is located in a federal nonattainment area and requires the approval of a federal agency (BLM). Therefore, the proposed project is subject to the general conformity regulations (40 CFR Part 93). The project area is classified as moderate nonattainment of the federal ozone ambient air quality standards and moderate nonattainment of the federal PM10 ambient air quality standards, and the General Conformity emissions applicability thresholds for these nonattainment classifications is 100 tons/year of direct and indirect ozone precursor emissions (NOx and VOC), 100 tons/year of direct and indirect PM10 emissions, and 100 tons/year of direct and indirect PM10 precursors identified as major PM10 contributors in the SIP. The currently applicable PM10 SIP does not identify secondary pollutants (NOx, SOx, and VOC) as major contributors to ambient PM10 concentrations.

Without appropriate mitigation, the proposed project's maximum annual direct and indirect emissions of PM10 during construction and operation would have the potential to exceed 100 tons per year, and the NOx emissions during construction would have the potential to exceed 100 tons per year. However, with the applicant-proposed and staff recommended mitigation the PM10, NOx and VOC emissions during construction and operation would all remain below their General Conformity applicability thresholds, as shown in **Air Quality Tables 7**, **9** and **11**. Therefore, the proposed project's mitigated emissions have been determined to be below the applicable General Conformity applicability thresholds, the proposed project is not required to complete a conformity analysis, and conformance with the State Implementation Plan is assumed.

C.1.10.2 STATE

The project owner will demonstrate that the proposed project will comply with Section 41700 of the California State Health and Safety Code, which restricts emissions that would cause nuisance or injury, with the issuance of the District's Final Determination of Compliance and the Energy Commission's affirmative finding for the project.

The emergency generator is also subject to the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines. This measure limits the types of fuels allowed, establishes maximum emission rates, establishes recordkeeping requirements. The proposed Tier 3 engine meets the current emission limit requirements of this measure. This measure would also limit the engine's testing and maintenance operation to no more than 50 hours per year.

C.1.10.3 LOCAL

The District rules and regulations specify the emissions control and offset requirements for new sources such as the Calico Solar. Best Available Control Technology would be implemented, and emission reduction credits (ERCs) are not required to offset the proposed project's emissions by District rules and regulations based on the permitted stationary source emission levels for the proposed project. Compliance with the District's new source requirements would ensure that the proposed project would be consistent with the strategies and future emissions anticipated under the District's air quality attainment and maintenance plans.

The applicant provided an air quality permit application to the MDAQMD and the District issued a PDOC (MDAQMD 2009b) on June 4, 2009 and a FDOC (MDAQMD 2010a) on January 27, 2009. The FDOC states that the proposed project is expected to comply with all applicable District rules and regulations. The DOC evaluates whether and under what conditions the proposed project would comply with the District's applicable rules and regulations, as described below.

<u>Regulation II – Permits</u>

Rule 201 and 203 – Permit to Construct and Permit to Operate

Rule 201 establishes the emission source requirements that must be met to obtain a Permit to Construct. Rule 203 prohibits use of any equipment the use of which may emit

air contaminants without obtaining Permit to Operate. The applicant has complied with this rule by submitting the AFC and District permit applications materials.

Regulation IV – Prohibitions

Rule 401 - Visible Emissions

This rule limits visible emissions from emissions sources, including stationary source exhausts and fugitive dust emission sources. Compliance with this rule is expected. In the PDOC, the District has determined that the facility is expected to comply with this rule.

Rule 402 - Nuisance

This rule restricts discharge of emissions that would cause injury, detriment, annoyance, or public nuisance. The facility is expected to comply with this rule (identical to California Health and Safety Code 41700).

Rule 403 - Fugitive Dust

This rule limits fugitive emissions from certain bulk storage, earthmoving, construction and demolition, and manmade conditions resulting in wind erosion. With the implementation of recommended staff conditions **AQ-SC3**, **AQ-SC4**, and **AQ-SC7** the facility is expected to comply with this rule.

Rule 403.2 - Fugitive Dust Control for the Mojave Desert Planning Area

Rule 403.2 limits fugitive dust emissions and requires implementation of the control measures contained in the Mojave Desert Planning Area Federal PM10 Attainment Plan to prevent exceedance of the NAAQS for PM10 within the Mojave Desert Planning Area. The project site is located just east of the Rule-defined Mojave Desert Planning Area, so this regulation is not applicable; however, the staff recommended fugitive dust control conditions would meet or exceed the control requirements of this rule.

Rule 404 - Particulate Matter Concentration

The rule limits particulate matter (PM) emissions to less than 0.05 grains per standard cubic foot of gas discharged at standard conditions. In the PDOC, the District has determined that the applicable equipment's (emergency engine) PM emission concentration are less than the limits established by this rule.

Rule 406 - Specific Contaminants

The rule prohibits sulfur emissions, calculated as SO_2, in excess of 500 ppmv. Compliance with this rule is assured with the required use of California low sulfur diesel fuel for the emergency engine.

Rule 407 - Liquid and Gaseous Air Contaminants

The rule prohibits carbon monoxide emissions in excess of 2,000 ppmv. The emergency engine would have CO emissions well below this concentration limit. Compliance with this rule is expected.

Rule 409 - Fuel Burning Equipment - Combustion Contaminants

This rule limits discharge into the atmosphere from fuel burning equipment combustion contaminants exceeding in concentration at the point of discharge, 0.1 grain per cubic foot of gas calculated to 12% of carbon dioxide (CO_2) at standard conditions. In the FDOC, the District has determined that the emergency generator PM emission concentration are less than 0.05 gr/scf and so would be below the limit established by this rule.

Rule 431 - Sulfur Content of Fuels

The rule prohibits the burning of gaseous fuel with a sulfur content of more than 800 ppm and liquid fuel with a sulfur content of more than 0.5% sulfur by weight. Compliance with this rule is assured with the required use of California low sulfur diesel fuel for the emergency engine.

Rule 461 – Gasoline Transfer and Dispensing

This rule is to limit the emissions of volatile organic compounds (VOC) and toxic compounds during the storage, transfer and dispensing of gasoline. The FDOC includes conditions to assure compliance with this rule.

Regulation IX – Standards of Performance for New Stationary Sources

Rule 900 – Standard of Performance For New Stationary Source (NSPS)

This rule incorporates the Federal NSPS (40 CFR 60) rules by reference. The proposed Tier 3 engine meets the current emission limit requirements of the only NSPS ((Subpart IIII) that applies to the proposed Calico Solar equipment. The exact model and size of the engine is only estimated at this time and has variously been noted as 335 hp or 345 hp in submittals from the applicant and is noted as 399 hp in the FDOC. Additionally, it is uncertain exactly when the emergency engine would be purchased and whether Tier 4 engine emission limits may apply at that time, so staff has added a requirement in the verification of District Condition of Certification (**AQ-7**) to ensure that the engine purchased meets the appropriate NSPS standards for new engines at the time of purchase and to provide information on the final engine parameters.

Regulation XIII – New Source Review

Rule 1303 – New Source Review

This rule requires implementation of BACT for any emission source unit which emits or has the potential to emit 25 lbs/day or more and requires offsets if specific annual emission limits are exceeded. The FDOC concluded that the emergency engine triggered BACT and the engine complies. The gasoline tank did not trigger BACT but nevertheless the tank would comply with BACT requirements. The FDOC concluded that offsets were not required for the proposed project.

Rule 1306 – Electric Energy Generating Facilities

This rule describes actions to be taken for permitting of power plants. Compliance with this rule was achieved with the completion of the FDOC.

C.1.11. NOTEWORTHY PUBLIC BENEFITS

Renewable energy facilities, such as Calico Solar, are needed to meet California's mandated renewable energy goals. While there are no local area air quality public benefits[17] resulting from the proposed project, it would indirectly reduce criteria pollutant emissions within the Southwestern U.S. by reducing fossil fuel fired generation.

C.1.12 RESPONSE TO PUBLIC AND AGENCY COMMENTS

No public or agency comments have been received to date on the Air Quality Section of the SA/DEIS.

C.1.13 MITIGATION MEASURES/ PROPOSED CONDITIONS OF CERTIFICATION

C.1.13.1 STAFF CONDITIONS OF CERTIFICATION

Staff conditions **AQ-SC1** through **AQ-SC4** and **AQ-SC7** are both CEQA and NEPA mitigation conditions. Staff conditions **AQ-SC5**, **AQ-SC6**, and **AQ-SC8** are CEQA-only conditions. Note that the term "CPM" refers to the Energy Commission's Compliance Project Manager.

AQ-SC1 Air Quality Construction Mitigation Manager (AQCMM): The project owner shall designate and retain an on-site AQCMM who shall be responsible for directing and documenting compliance with Conditions of Certification **AQ-SC3**, **AQ-SC4** and **AQ-SC5** for the entire project site and linear facility construction. The on-site AQCMM may delegate responsibilities to one or more AQCMM Delegates. The AQCMM and AQCMM Delegates shall have full access to all areas of construction on the project site and linear facilities, and shall have the authority to stop any or all construction activities as warranted by applicable construction mitigation conditions. The AQCMM and AQCMM Delegates may have other responsibilities in addition to those described in this condition. The AQCMM shall not be terminated without written consent of the Compliance Project Manager (CPM).

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit to the CPM for approval, the name, resume, qualifications, and contact information for the on-site AQCMM and all AQCMM Delegates.

AQ-SC2 Air Quality Construction Mitigation Plan (AQCMP): The project owner shall provide an AQCMP, for approval, which details the steps that will be taken and the reporting requirements necessary to ensure compliance with Conditions of Certification **AQ-SC3**, **AQ-SC4,** and **AQ-SC5**.

Verification: At least 30 days prior to the start of any ground disturbance, the project owner shall submit the AQCMP to the CPM for approval. The AQCMP shall include effectiveness and environmental data for the proposed soil stabilizer. The CPM will

[17] Air quality benefits should not be confused with greenhouse gas/climate change benefits, which are discussed in Appendix AIR-1.

notify the project owner of any necessary modifications to the plan within 15 days from the date of receipt.

AQ-SC3 Construction Fugitive Dust Control: The AQCMM shall submit documentation to the CPM in each Monthly Compliance Report that demonstrates compliance with the Air Quality Construction Mitigation Plan (AQCMP) mitigation measures for the purposes of minimizing fugitive dust emission creation from construction activities and preventing all fugitive dust plumes that would not comply with the performance standards identified in **AQ-SC4** from leaving the project site. The following fugitive dust mitigation measures shall be included in the Air Quality Construction Mitigation Plan (AQCMP) required by **AQ-SC2**, and any deviation from the AQCMP mitigation measures shall require prior CPM notification and approval.

a. The main access roads through the facility to the power block areas will be either paved or stabilized using soil binders, or equivalent methods, to provide a stabilized surface that is similar for the purposes of dust control to paving, that may or may not include a crushed rock (gravel or similar material with fines removed) top layer, prior to initiating construction in the main power block area, and delivery areas for operations materials (chemicals, replacement parts, etc.) will be paved or treated prior to taking initial deliveries.

b. All unpaved construction roads and unpaved operation and maintenance site roads, as they are being constructed, shall be stabilized with a non-toxic soil stabilizer or soil weighting agent that can be determined to be both as efficient or more efficient for fugitive dust control as ARB approved soil stabilizers, and shall not increase any other environmental impacts including loss of vegetation to areas beyond where the soil stabilizers are being applied for dust control. All other disturbed areas in the project and linear construction sites shall be watered as frequently as necessary during grading (consistent with **BIO-7**); and after active construction activities shall be stabilized with a non-toxic soil stabilizer or soil weighting agent, or alternative approved soil stabilizing methods, in order to comply with the dust mitigation objectives of Condition of Certification **AQ-SC4**. The frequency of watering can be reduced or eliminated during periods of precipitation.

c. No vehicle shall exceed 10 miles per hour on unpaved areas within the construction site, with the exception that vehicles may travel up to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions.

d. Visible speed limit signs shall be posted at the construction site entrances.

e. All construction equipment vehicle tires shall be inspected and washed as necessary to be cleaned free of dirt prior to entering paved roadways.

f. Gravel ramps of at least 20 feet in length must be provided at the tire washing/cleaning station.

g. All unpaved exits from the construction site shall be graveled or treated to prevent track-out to public roadways.

h. All construction vehicles shall enter the construction site through the treated entrance roadways, unless an alternative route has been submitted to and approved by the CPM.

i. Construction areas adjacent to any paved roadway below the grade of the surrounding construction area or otherwise directly impacted by sediment from site drainage shall be provided with sandbags or other equivalently effective measures to prevent run-off to roadways, or other similar run-off control measures as specified in the Storm Water Pollution Prevention Plan (SWPPP), only when such SWPPP measures are necessary so that this condition does not conflict with the requirements of the SWPPP.

j. All paved roads within the construction site shall be swept daily or as needed (less during periods of precipitation) on days when construction activity occurs to prevent the accumulation of dirt and debris.

k. At least the first 500 feet of any paved public roadway exiting the construction site or exiting other unpaved roads en route from the construction site or construction staging areas shall be swept as needed (less during periods of precipitation) on days when construction activity occurs or on any other day when dirt or runoff resulting from the construction site activities is visible on the public paved roadways.

l. All soil storage piles and disturbed areas that remain inactive for longer than 10 days shall be covered, or shall be treated with appropriate dust suppressant compounds.

m. All vehicles that are used to transport solid bulk material on public roadways and that have potential to cause visible emissions shall be provided with a cover, or the materials shall be sufficiently wetted and loaded onto the trucks in a manner to provide at least 2 feet of freeboard.

n. Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) shall be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition shall remain in place until the soil is stabilized or permanently covered with vegetation.

Verification: The AQCMM shall provide the CPM a Monthly Compliance Report to include the following to demonstrate control of fugitive dust emissions:

A. A summary of all actions taken to maintain compliance with this condition;

B. Copies of any complaints filed with the District in relation to project construction; and

C. Any other documentation deemed necessary by the CPM or AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC4 Dust Plume Response Requirement: The AQCMM or an AQCMM Delegate shall monitor all construction activities for visible dust plumes. Observations of visible dust plumes that have the potential to be transported (A) off the project site and within 400 feet upwind of any regularly occupied structures not owned by the project owner or (B) 200 feet beyond the centerline of the construction of linear facilities indicate that existing mitigation measures are not resulting in effective mitigation. The AQCMP shall include a section detailing how the additional mitigation measures will be accomplished within the time limits specified. The AQCMM or Delegate shall implement the following procedures for additional mitigation measures in the event that such visible dust plumes are observed:

Step 1: The AQCMM or Delegate shall direct more intensive application of the existing mitigation methods within 15 minutes of making such a determination.

Step 2: The AQCMM or Delegate shall direct implementation of additional methods of dust suppression if Step 1, specified above, fails to result in adequate mitigation within 30 minutes of the original determination.

Step 3: The AQCMM or Delegate shall direct a temporary shutdown of the activity causing the emissions if Step 2, specified above, fails to result in effective mitigation within one hour of the original determination. The activity shall not restart until the AQCMM or Delegate is satisfied that appropriate additional mitigation or other site conditions have changed so that visual dust plumes will not result upon restarting the shutdown source. The owner/operator may appeal to the CPM any directive from the AQCMM or Delegate to shut down an activity, if the shutdown shall go into effect within one hour of the original determination, unless overruled by the CPM before that time.

Verification: The AQCMM shall provide the CPM a Monthly Compliance Report to include:

A. a summary of all actions taken to maintain compliance with this condition;

B. copies of any complaints filed with the District in relation to project construction; and

C. any other documentation deemed necessary by the CPM or AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC5 Diesel-Fueled Engine Control: The AQCMM shall submit to the CPM, in the Monthly Compliance Report, a construction mitigation report that

demonstrates compliance with the AQCMP mitigation measures for purposes of controlling diesel construction-related emissions. The following off-road diesel construction equipment mitigation measures shall be included in the Air Quality Construction Mitigation Plan (AQCMP) required by **AQ-SC2**, and any deviation from the following mitigation measures shall require prior CPM notification and approval.

a. All diesel-fueled engines used in the construction of the facility shall have clearly visible tags issued by the on-site AQCMM showing that the engine meets the conditions set forth herein.

b. All construction diesel engines with a rating of 50 hp or higher shall meet, at a minimum, the Tier 3 California Emission Standards for Off-Road Compression-Ignition Engines, as specified in California Code of Regulations, Title 13, section 2423(b)(1), unless a good faith effort to the satisfaction of the CPM that is certified by the on-site AQCMM demonstrates that such engine is not available for a particular item of equipment. In the event that a Tier 3 engine is not available for any off-road equipment larger than 50 hp, that equipment shall be equipped with a Tier 2 engine, or an engine that is equipped with retrofit controls to reduce exhaust emissions of nitrogen oxides (NOx) and diesel particulate matter (DPM) to no more than Tier 2 levels unless certified by engine manufacturers or the on-site AQCMM that the use of such devices is not practical for specific engine types. For purposes of this condition, the use of such devices is “not practical” for the following, as well as other, reasons.

    1. There is no available retrofit control device that has been verified by either the California Air Resources Board or U.S. Environmental Protection Agency to control the engine in question to Tier 2 equivalent emission levels and the highest level of available control using retrofit or Tier 1 engines is being used for the engine in question; or

    2. The construction equipment is intended to be on site for 10 days or less.

    3. The CPM may grant relief from this requirement if the AQCMM can demonstrate a good faith effort to comply with this requirement and that compliance is not practical.

c. The use of a retrofit control device may be terminated immediately, provided that the CPM is informed within 10 working days of the termination and that a replacement for the equipment item in question meeting the controls required in item “b” occurs within 10 days of termination of the use, if the equipment would be needed to continue working at this site for more than 15 days after the use of the retrofit control device is terminated, if one of the following conditions exists :

    1. The use of the retrofit control device is excessively reducing the normal availability of the construction equipment due to increased down time

for maintenance, and/or reduced power output due to an excessive increase in back pressure.

2. The retrofit control device is causing or is reasonably expected to cause engine damage.

3. The retrofit control device is causing or is reasonably expected to cause a substantial risk to workers or the public.

4. Any other seriously detrimental cause which has the approval of the CPM prior to implementation of the termination.

d. All heavy earth-moving equipment and heavy duty construction-related trucks with engines meeting the requirements of (b) above shall be properly maintained and the engines tuned to the engine manufacturer's specifications.

e. All diesel heavy construction equipment shall not idle for more than 5 minutes. Vehicles that need to idle as part of their normal operation (such as concrete trucks) are exempted from this requirement.

f. Construction equipment will employ electric motors when feasible.

Verification: The AQCMM shall include in the Monthly Compliance Report the following to demonstrate control of diesel construction-related emissions:

A. A summary of all actions taken to control diesel construction related emissions;

B. A list of all heavy equipment used on site during that month, including the owner of that equipment and a letter from each owner indicating that equipment has been properly maintained; and

C. Any other documentation deemed necessary by the CPM or AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC6 The project owner, when obtaining dedicated on-road or off-road vehicles for mirror washing activities and other facility maintenance activities, shall only obtain vehicles that meet California on-road vehicle emission standards or appropriate U.S.EPA/California off-road engine emission standards for the latest model year available when obtained.

Verification: At least 30 days prior to the start commercial operation, the project owner shall submit to the CPM a copy of the plan that identifies the size and type of the on-site vehicle and equipment fleet and the vehicle and equipment purchase orders and contracts and/or purchase schedule. The plan shall be updated every other year and submitted in the Annual Compliance Report.

AQ-SC7 The project owner shall provide a site Operations Dust Control Plan, including all applicable fugitive dust control measures identified in the verification of

AQ-SC3 that would be applicable to minimizing fugitive dust emission creation from operation and maintenance activities and preventing all fugitive dust plumes that would not comply with the performance standards identified in **AQ-SC4** from leaving the project site; that:

A. describes the active operations and wind erosion control techniques such as windbreaks and chemical dust suppressants, including their ongoing maintenance procedures, that shall be used on areas that could be disturbed by vehicles or wind anywhere within the project boundaries; and

B. identifies the location of signs throughout the facility that will limit traveling on unpaved portion of roadways to solar equipment maintenance vehicles only. In addition, vehicle speed shall be limited to no more than 10 miles per hour on these unpaved roadways, with the exception that vehicles may travel up to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions.

The site operations fugitive dust control plan shall include the use of durable non-toxic soil stabilizers on all regularly used unpaved roads and disturbed off-road areas, or alternative methods for stabilizing disturbed off-road areas, within the project boundaries, and shall include the inspection and maintenance procedures that will be undertaken to ensure that the unpaved roads remain stabilized. The soil stabilizer used shall be a non-toxic soil stabilizer or soil weighting agent that can be determined to be either as efficient or more efficient for fugitive dust control as ARB approved soil stabilizers, and shall not increase any other environmental impacts including loss of vegetation to areas beyond where the soil stabilizers are being applied for dust control.

The performance and application of the fugitive dust controls shall also be measured against and meet the performance requirements of condition **AQ-SC4**. The measures and performance requirements of **AQ-SC4** shall also be included in the operations dust control plan.

Verification: At least 30 days prior to start of commercial operation, the project owner shall submit to the CPM for review and approval a copy of the site Operations Dust Control Plan that identifies the dust and erosion control procedures, including effectiveness and environmental data for the proposed soil stabilizer, that will be used during operation of the project and that identifies all locations of the speed limit signs. Within 60 days after commercial operation, the project owner shall provide to the CPM a report identifying the locations of all speed limit signs, and a copy of the project employee and contractor training manual that clearly identifies that project employees and contractors are required to comply with the dust and erosion control procedures and on-site speed limits.

AQ-SC8 The project owner shall provide the CPM copies of all District issued Authority-to-Construct (ATC) and Permit-to-Operate (PTO) documents for the facility.

The project owner shall submit to the CPM for review and approval any modification proposed by the project owner to any project federal air permit.

The project owner shall submit to the CPM any modification to any federal permit proposed by the District or U.S. Environmental Protection Agency (U.S. EPA), and any revised federal permit issued by the District or U.S. EPA, for the project.

Verification: The project owner shall submit any ATC, PTO, and proposed federal air permit modifications to the CPM within 5 working days of its submittal either by 1) the project owner to an agency, or 2) receipt of proposed modifications from an agency. The project owner shall submit all modified ATC/PTO documents and all federal air permits to the CPM within 15 days of receipt.

C.1.13.2 DISTRICT CONDITIONS

DISTRICT FINAL DETERMINATION OF COMPLIANCE CONDITIONS (MDAQMD 2010a)

District conditions **AQ-1** through **AQ-15** are CEQA-only required conditions.

Application No. 00010423 (Emergency Generator)

EQUIPMENT DESCRIPTION:

ARB Certified Tier III engine, 399 bhp, fueled on ARB diesel, powering an electrical generator.

AQ-1 Engine may operate in response to notification of impending rotating outage if the area utility has ordered rotating outages in the area where the engine is located or expects to order such outages at a particular time, the engine is located in the area subject to the rotating outage, the engine is operated no more than 30 minutes prior to the forecasted outage, and the engine is shut down immediately after the utility advises that the outage is no longer imminent or in effect.

Verification: The project owner shall maintain engine operating records as required in **AQ-6** and shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-2 This unit shall only be fired on ultra-low sulfur diesel fuel, whose sulfur concentration is less than or equal to 0.0015% (15 ppm) on a weight per weight basis per ARB Diesel or equivalent requirements.

Verification: The project owner shall maintain the fuel sulfur content records for diesel fuel deliveries on site as required in **AQ-6** and shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-3 This equipment shall be installed, operated and maintained in strict accord with those recommendations of the manufacturer/supplier and/or sound engineering principles which produce the minimum emissions of contaminants. Unless otherwise noted, this equipment shall also be operated in accordance with all data and specifications submitted with the application for this permit.

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-4 A non-resettable four-digit (9,999) hour timer shall be installed and maintained on this unit to indicate elapsed engine operating time.

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Energy Commission.

AQ-5 This unit shall be limited to use for emergency power, defined as in response to a fire or when commercially available power has been interrupted. In addition, this unit shall be operated no more than 50 hours per year, and no more than 0.5 hours per day for testing and maintenance, excluding compliance source testing. Time required for source testing will not be counted toward the 50 hour per year limit.

Verification: The project owner shall maintain engine use records on site as required in **AQ-6** and shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-6 The project owner shall maintain an operations log for this unit current and on-site (or at a central location) for a minimum of five (5) years, and this log shall be provided to District, State and Federal personnel upon request. The log shall include, at a minimum, the information specified below:

a. Date of each use and duration of each use (in hours);

b. Reason for use (testing & maintenance, emergency, required emission testing);

c. Calendar year operation in terms of fuel consumption (in gallons) and total hours; and,

d. Fuel sulfur concentration (the project owner may use the supplier's certification of sulfur content if it is maintained as part of this log).

Verification: The project owner shall submit records required by this condition that demonstrating compliance with the sulfur content and engine use limitations of conditions **AQ-2** and **AQ-5** in the Annual Compliance Report including a photograph showing the annual reading of engine hours. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-7 This genset is subject to the requirements of the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines (Title 17 CCR 93115). In the event of conflict between these conditions and the ATCM, the more stringent requirements shall govern.

Verification: The project owner shall submit the engine specifications at least 30 days prior to purchasing the engines for review and approval demonstrating that the engines meet both ATCM and New Source Performance Standard (NSPS) subpart IIII emission limit requirements at the time of engine purchase. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-8 This unit shall not be used to provide power during a voluntary agreed to power outage and/or power reduction initiated under an Interruptible Service Contract (ISC); Demand Response Program (DRP); Load Reduction Program (LRP) and/or similar arrangement(s) with the electrical power supplier.

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

Application No. 00010422 (5,000 gallon Above Ground Non-Retail Gasoline Dispensing Facility)

EQUIPMENT DESCRIPTION:

5,000 gallon capacity gasoline tank with Phase I and Phase II vapor recovery.

AQ-9 The toll-free telephone number that must be posted is 1-800-635-4617.

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-10 The project owner shall maintain a log of all inspections, repairs, and maintenance on equipment subject to Rule 461. Such logs or records shall be maintained at the facility for at least two (2) years and shall be available to the District upon request.

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-11 Any modifications or changes to the piping or control fitting of the vapor recovery system require prior approval from the District.

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-12 The vapor vent pipes are to be equipped with pressure relief valves.

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-13 The project owner shall perform the following tests within 60 days of construction completion and annually thereafter in accord with the following test procedures:

a. Static Pressure Decay Test per ARB test method TP-201.3B (2-inch test);

b. Dynamic Back Pressure test per TP-201.4;

c. Liquid Removal Test (if applicable) per TP-201.6;

d. Fuel dispensing rate not to exceed 10 gpm, verified per EO G-70-200-C Exhibit 4, and;

e. Emergency vents and manways shall be leak free when tested at the operating pressure of the tank in accordance with ARB test methods, as specified in Title 17, California Code of Regulations.

The District shall be notified a minimum of 10 days prior to performing the required tests with the final results submitted to the District within 30 days of completion of the tests.

The District shall receive passing test reports no later than six (6) weeks prior to the expiration date of this permit.

Verification: The project owner shall notify the District at least 10 days prior to performing the required tests. The test results shall be submitted to the District within 30 days of completion of the tests and shall be made available to the CPM if requested.

AQ-14 The annual throughput of gasoline shall not exceed 500,000 gallons per year. Throughput Records shall be kept on site and available to District personnel upon request. Before this annual throughput can be increased the facility may be required to submit to the District a site specific Health Risk Assessment in accord with a District approved plan. In addition public notice and/or comment period may be required.

Verification: The project owner shall submit to the CPM gasoline throughput records demonstrating compliance with this condition as part of the Annual Compliance Report. The project owner shall maintain on site the annual gasoline throughput records and shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-15 The project owner shall; install, maintain, and operate this equipment in compliance with ARB Executive Order G-70-200-C or Enhanced Vapor Recovery (EVR) Phase I and EVR Phase II, and Standing Loss requirements in affect at the time of construction.

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

C.1.14 CONCLUSIONS

Staff has made the following conclusions about the Calico Solar Project:

- The proposed project would not have the potential to exceed PSD emission levels during direct source operation and the facility is not considered a major stationary source with potential to cause adverse NEPA air quality impacts. However, without adequate fugitive dust mitigation, the proposed project would have the potential to exceed the General Conformity PM10 applicability threshold during construction and operation and the NOx applicability threshold during construction, and could cause potential localized exceedances of the PM10 NAAQS during construction and operation. Recommended Conditions of Certification **AQ-SC1** through **AQ-SC4**, for construction, and **AQ-SC7**, for operation, will adequately mitigate these potentially adverse NEPA impacts.
- The proposed project would comply with applicable District Rules and Regulations and staff recommends the inclusion of the District's FDOC conditions as Conditions of Certification **AQ-1** through **AQ-15.**

- Without adequate mitigation, the proposed project's construction activities would likely contribute to significant CEQA adverse PM10 and ozone impacts. Staff recommends **AQ-SC1** to **AQ-SC5** to mitigate the potential impacts.
- The proposed project's operation would not cause new violations of any NO_2, SO_2, PM2.5 or CO ambient air quality standards. Therefore, the project-direct operation NOx, SOx, PM2.5 and CO emission impacts are not CEQA significant. However, the analyses did not include the new federal 1-hour NO_2 ambient air quality standard.
- The proposed project's direct and indirect, or secondary emissions contribution to existing violations of the ozone and PM10 ambient air quality standards are likely CEQA significant if unmitigated. Therefore, staff recommends **AQ-SC6** to mitigate the onsite maintenance vehicle emissions and **AQ-SC7** to mitigate the operating fugitive dust emissions to ensure that the potential ozone and PM10 CEQA impacts are mitigated to less than significant over the life of the project.
- The proposed project would be consistent with the requirements of SB 1368 and the Emission Performance Standard for greenhouse gases (see **Appendix Air-1**).

C.1.15 REFERENCES

ARB 2005 (California Air Resources Board). Characterization of Ambient PM10 and PM2.5 in California, Technical Report. http://www.arb.ca.gov/pm/pmmeasures/pmch05/pmch05.htm. June 2005.

ARB 2008 (California Air Resources Board). California Ambient Air Quality Data 1980-2006 on CD ROM. February, 2008.

ARB 2009a (California Air Resources Board). California Ambient Air Quality Standards available on ARB Website. http://www.arb.ca.gov/research/aaqs/aaqs2.pdf. Accessed November 2009.

ARB 2009b (California Air Resources Board). Air Designation Maps available on ARB website. http://www.arb.ca.gov/desig/adm/adm.htm. Accessed November 2009.

ARB 2009c (California Air Resources Board). California Ambient Air Quality Data Statistics available on ARB website. http://www.arb.ca.gov/adam/ welcome.html. Accessed October 2008.

CCR 2006. California Code of Regulations, Chapter 3 (CEQA Guidelines), Article 17, §§15250—15253 as amended on July 11, 2006.

CEC 2009f – California Energy Commission/C. Meyer (tn 52052). CEC and BLM Staff Data Requests Set 1, dated June 17, 2009. Submitted to CEC/Docket Unit on June 17, 2009.

CEC 2009m – California Energy Commission/C. Meyer (tn 53729). CEC and BLM Staff Data Requests Set 2, Part 1 (#s 128-141), dated October 22, 2009. Submitted to CEC/Docket Unit on October 22, 2009.

FR 2004 (Federal Register). Office of the Federal Register, National Archives and Records Administration. Vol. 69, No. 78, pg. 21800. April 22.

MDAQMD 2009b – Mojave Desert Air Quality Management District/A. De Salvio (tn 52078). Mojave Desert AQMD Preliminary Decision / Determination, dated June 18, 2009. Submitted to CEC/Docket Unit on June 18, 2009.

MDAQMD 2010a – Mojave Desert Air Quality Management District/A. De Salvio (tn 55110). Mojave Desert AQMD Final Decision/Determination on the Proposed Project, dated January 27, 2010. Submitted to CEC/Docket Unit on February 1, 2010.

SES 2008a – Stirling Energy Systems/R. Liden (tn 49181). Application for Certification, dated December 1, 2008. Submitted to CEC/Docket Unit on December 1, 2008.

SES 2009t - Stirling Energy Systems/C. Champion (tn 53093). Applicant's Responses to Energy Commission and Bureau of Land Management's Data Requests 1-48, 81, and 109-112 of Set 1 Parts 1 and 2, dated August 31, 2009. Submitted to CEC/Docket Unit August 31, 2009.

SES 2009v - URS/C. Lytle (tn 53096). Applicant's Air Quality and Public Health & Safety Modeling Files, dated August 31, 2009. Submitted to CEC/Docket Unit on August 31, 2009.

SES 2009ee - Stirling Energy Systems/C. Champion (tn 54272). Applicant's Response to Energy Commission & Bureau of Land Management's Data Requests Set 1, Part 1 & Set 2, Part 1 Data Requests 71-73, 76-79, 85 & 128-141, dated November 23, 2009. Submitted to CEC/Docket Unit on November 24, 2009.

TS 2010e - Tessera Solar/F. Bellows (tn 55182). Supplemental Information Regarding Proposed Project Description Changes, dated February 3, 2010. Submitted to CEC/Docket Unit on February 4, 2010.

TS 2010g - Tessera Solar/F. Bellows (tn 55390). Construction Milestone Schedule & Project Layout Figure, dated February 12, 2010. Submitted to CEC/Docket Unit on February 16, 2010.

TS 2010q – Tessera Solar. Applicant’s Revised Construction and Operation Emission Estimates for the Train Water Hauling Option. March 2010.

TS 2010am - Tessera Solar/ F. Bellows (tn 56700). Applicant's Submittal of a Supplement to the AFC, dated May 14, 2010. Submitted to CEC/Docket Unit on May 18, 2010.

TS 2010y - Tessera Solar/ F. Bellows (tn 56501). Applicant’s Federal N02 1 Hour Standard Modeling Analysis, dated April 30, 2010. Submitted to CEC/Docket Unit on April 30, 2010.

TS 2010ag - Tessera Solar/ F. Bellows (tn 57018). Applicant's Submittal of Alternative Site Layout #2 - Engineering Figure with SunCatcher Layout, and Revised

Project Boundary with 4000' Desert Tortoise Corridor Figure, dated June 2, 2010. Submitted to CEC/Docket Unit on June 2, 2010.

U.S.EPA 2009a - United States Environmental Protection Agency. The Green Book Nonattainment Areas for Criteria Pollutants. http://www.epa.gov/oar/oaqps/greenbk/index.html. Accessed November 2009.

U.S.EPA 2009b. - United States Environmental Protection Agency. AirData database ambient air quality data for Barstow and Trona, California. http://www.epa.gov/aqspubl1/annual_summary.html. Accessed October 2009.

WC (Weather Channel) 2009. Averages and records for Barstow, California. website: http://www.weather.com. Accessed November 2009.

APPENDIX AIR-1 - GREENHOUSE GAS EMISSIONS

Testimony of William Walters, P.E.

SUMMARY OF CONCLUSIONS[18]

The Calico Solar Project is a proposed addition to the state's electricity system. Calico Solar is a solar concentrating thermal power plant, which is comprised of 34,000 solar dish Stirling systems (referred to as SunCatchers) that focus solar energy that power a 25-kilowatt Stirling engine. As a solar project its greenhouse gas (GHG) emissions would be considerably less than the existing statewide average GHG emissions per unit of generation and considerably less than the GHG emissions from existing fossil fuel fired power plants providing generation to California, and thus would contribute to continued reduction of GHG emissions in the interconnected California and the western United States electricity systems.

While Calico Solar would emit some GHG emissions, the contribution to the system build-out of renewable resources to meet the goals of the Renewable Portfolio Standard (RPS) in California would result in a net cumulative reduction of energy generation and GHG emissions from new and existing fossil-fired electricity resources. Electricity is produced by operation of inter-connected generation resources. Operation of one power plant, like Calico Solar, affects all other power plants in the interconnected system. Calico Solar would be a must-take facility and its operation would affect the overall electricity system operation and GHG emissions in several ways:

- Calico Solar would provide low-GHG, renewable generation.
- Calico Solar would facilitate to some degree the replacement of high GHG emitting (e.g., out-of-state coal) electricity generation that must be phased out to meet the State's 2006 Emissions Performance Standard.
- Calico Solar could facilitate to some extent the replacement of generation provided by aging fossil-fired power plants that use once-through cooling.

These system impacts would result in a net reduction in GHG emissions across the electricity system providing energy and capacity to California. Thus, staff concludes that the proposed project would result in a cumulative overall reduction in GHG emissions from power plants, does not worsen current conditions, and would not result in impacts that are cumulatively CEQA significant.

Staff concludes that the short-term minor emission of greenhouse gases during construction that are necessary to create this new, low GHG-emitting power generating facility would be sufficiently reduced by "best practices" and would be more than offset by GHG emission reductions during operation. Thus, construction GHG emissions would not be CEQA significant.

[18] Staff's conclusions provided in the SA/DEIS have not changed. This Supplemental Staff Assessment (SSA) includes information regarding minor changes to the project description (TS 2010ag and TS 2010am).

The Calico Solar Project, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]).

The California Air Resources Board (ARB) has promulgated regulations for mandatory GHG emission reporting to comply with the California Global Warming Solutions Act of 2006 (AB 32 Núñez, Statutes of 2006, Chapter 488, Health and Safety Code sections 38500 et seq.) (ARB 2008a). The Calico Solar Project, which solely generates electricity from solar power, is exempt from the mandatory GHG emission reporting requirements for electricity generating facilities [CCR Title 17 §95101(c)(1)]. However, the proposed project may be subject to future reporting requirements and GHG reductions or trading requirements as additional state or federal GHG regulations are developed and implemented.

INTRODUCTION

Greenhouse gas (GHG) emissions are not criteria pollutants, but they are discussed in the context of cumulative impacts. However, on April 2, 2007, the U.S. Supreme Court found that GHGs are pollutants that must be covered by the federal Clean Air Act. In response, on September 30, 2009, the U.S. Environmental Protection Agency (U.S. EPA) proposed to apply Prevention of Significant Deterioration (PSD) requirements to facilities whose carbon dioxide-equivalent emissions exceed 25,000 tons per year (U.S.EPA 2009c). On May 13, 2010, U.S. EPA announced a final rule “tailoring” GHG emissions to Prevention of Significant Deterioration (PSD) requirements (U.S.EPA 2010) and raised the emissions threshold for rule applicability to 100,000 tons per year of carbon dioxide equivalent emissions.

The state has demonstrated a clear willingness to address global climate change through research, adaptation and inventory reductions. In that context, staff evaluates the GHG emissions from the proposed project, presents information on GHG emissions related to electricity generation, and describes the applicable GHG standards and requirements.

Generation of electricity can produce greenhouse gases with the criteria air pollutants that have been traditionally regulated under the federal and state Clean Air Acts. For fossil fuel-fired power plants, the GHG emissions include primarily carbon dioxide, with much smaller amounts of nitrous oxide (N_2O, not NO or NO_2, which are commonly known as NOx or oxides of nitrogen), and methane (CH_4 – often from unburned natural gas). For solar energy generation projects the stationary source GHG emissions are much smaller than fossil fuel-fired power plants, but the associated maintenance vehicle emissions are higher. Other sources of GHG emissions include sulfur hexafluoride (SF_6) from high voltage equipment and hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) from refrigeration/chiller equipment. GHG emissions from the electricity sector are dominated by CO_2 emissions from carbon-based fuels; other sources of GHG emissions are small and also are more likely to be easily controlled or reused or recycled, but are nevertheless documented here as some of the compounds have very high global warming potentials.

Global warming potential is a relative measure, compared to carbon dioxide, of a compound's residence time in the atmosphere and ability to warm the planet. Mass emissions of GHGs are converted into carbon dioxide equivalent (CO2E) metric tonnes (MT) for ease of comparison.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local laws and policies in **Greenhouse Gas Table** 1 pertain to the control and mitigation of greenhouse gas emissions. Staff's analysis examines the proposed project's compliance with these requirements.

GLOBAL CLIMATE CHANGE AND ELECTRICITY PRODUCTION

There is general scientific consensus that climate change is occurring and that human activity contributes in some measure (perhaps substantially) to that change. Man-made emissions of greenhouse gases, if not sufficiently curtailed, are likely to contribute further to continued increases in global temperatures. Indeed, the California Legislature finds that "[g]lobal warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California" (Cal. Health & Safety Code, sec. 38500, division 25.5, part 1).

Greenhouse Gas Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
40 Code of Federal Regulations (CFR) Part 98	This rule requires mandatory reporting of GHG emissions for facilities that emit more than 25,000 metric tons of CO_2 equivalent emissions per year.
40 CFR Parts 51, 52, 70 and 71.	This rule "tailors" GHG emissions to PSD and Title V permitting applicability criteria.
State	
California Global Warming Solutions Act of 2006, AB 32 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.)	This act requires the California Air Resources Board (ARB) to enact standards that will reduce GHG emission to 1990 levels by 2020. Electricity production facilities will be regulated by the ARB.
California Code of Regulations, tit. 17, Subchapter 10, Article 2, sections 95100 et. seq.	These ARB regulations implement mandatory GHG emissions reporting as part of the California Global Warming Solutions Act of 2006 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.)
Title 20, California Code of Regulations, section 2900 et seq.; CPUC Decision D0701039 in proceeding R0604009	The regulations prohibit utilities from entering into long-term contracts with any base load facility that does not meet a greenhouse gas emission standard of 0.5 metric tonnes carbon dioxide per megawatt-hour (0.5 $MTCO_2$/MWh) or 1,100 pounds carbon dioxide per megawatt-hour (1,100 lbs CO_2/MWh).

In 1998, the Energy Commission identified a range of strategies to prepare for an uncertain climate future, including a need to account for the environmental impacts associated with energy production, planning, and procurement (CEC 1998, p.5). In 2003, the Energy Commission recommended that the state require reporting of

greenhouse gases (GHG) or global climate change[19] emissions as a condition of state licensing of new electric generating facilities (CEC 2003, IEPR p. 42). In 2006, California enacted the California Global Warming Solutions Act of 2006 (AB 32). It requires the California Air Resources Board (ARB) to adopt standards that will reduce statewide GHG emissions to statewide GHG emissions levels in 1990, with such reductions to be achieved by 2020.[20] To achieve this, ARB has a mandate to define the 1990 emissions level and achieve the maximum technologically feasible and cost-effective GHG emission reductions.

The ARB adopted early action GHG reduction measures in October 2007, adopted mandatory reporting requirements and the 2020 statewide target in December 2007, and adopted a statewide scoping plan in December 2008 to identify how emission reductions will be achieved from major sources of GHG via regulations, market mechanisms, and other actions. ARB staff is developing regulatory language to implement its plan and holds ongoing public workshops on key elements of the recommended GHG reduction measures, including market mechanisms (ARB 2006). The regulations must be effective by January 1, 2011 and mandatory compliance commences on January 1, 2012. The mandatory reporting requirements are effective for electric generating facilities with a nameplate capacity equal or greater than 1 megawatt (MW) capacity if their emissions exceed 2,500 metric tonnes per year. The due date for initial reports by existing facilities was June 1, 2009.

Examples of strategies that the state might pursue for managing GHG emissions in California, in addition to those recommended by the Energy Commission and the Public Utilities Commission, were identified in the California Climate Action Team's Report to the Governor (CalEPA 2006). The scoping plan approved by ARB in December 2008 builds upon the overall climate policies of the Climate Action Team report and shows the recommended strategies to achieve the goals for 2020 and beyond. Some strategies focus on reducing consumption of petroleum across all areas of the California economy. Improvements in transportation energy efficiency (fuel economy), land use planning, and alternatives to petroleum-based fuels are slated to provide substantial reductions by 2020 (CalEPA 2006). The scoping plan includes a requirement for 33% of California's electrical energy to be provided from renewable sources by 2020 (implementing California's 33% RPS goal), aggressive energy efficiency targets, and a cap-and-trade system that includes the electricity sector (ARB 2008b).

It is likely that GHG reductions mandated by ARB will not be uniform across emitting sectors, in that reductions will be based on cost-effectiveness (i.e., the greatest effect for the least cost). For example, the ARB proposes a 40% reduction in GHG from the electricity sector, even though that sector currently only produces about 25% of the state's GHG emissions. In response, in September 2008 the Energy Commission and the Public Utilities Commission provided recommendations (CPUC 2008) to ARB on how to achieve such reductions through both programmatic and regulatory approaches,

[19] Global climate change is the result of greenhouse gases, or air emissions with global warming potentials, affecting the global energy balance, and thereby, climate of the planet. The term greenhouse gases (GHG) and global climate change (GCC) gases are used interchangeably.

[20] Governor Schwarzenegger has also issued Executive Order S-3-05 establishing a goal of 80% below 1990 levels by 2050.

and identified regulation points should ARB decide that a multi-sector cap and trade system is warranted.

The Energy Commission's *2007 Integrated Energy Policy Report* (IEPR) also addressed climate change within the electricity, natural gas, and transportation sectors (CEC 2007). For the electricity sector, it recommended such approaches as pursuing all cost-effective energy efficiency measures and meeting the Governor's stated goal of a 33% renewable portfolio standard. The Energy Commission's *2009 Integrated Energy Policy Report* continues to emphasize the important of meeting greenhouse gas emissions reduction goals along with other important statewide issues such as backing out use of once-through cooling in coastal California power plants (CEC 2009d).

SB 1368[21], enacted in 2006, and regulations adopted by the Energy Commission and the Public Utilities Commission pursuant to the bill, prohibits California utilities from entering into long-term commitments with any base load facilities that exceed the Emission Performance Standard of 0.500 metric tonnes CO_2 per megawatt-hour[22] (1,100 pounds CO_2/MWh). Specifically, the SB 1368 Emission Performance Standard (EPS) applies to base load power from new power plants, new investments in existing power plants, and new or renewed contracts with terms of 5 years or more, including contracts with power plants located outside of California.[23] If a project, instate or out of state, plans to sell base load electricity to a California utility that utility will have to demonstrate that the project meets the EPS. *Base load* units are defined as units that operate at a capacity factor higher than 60%. As a renewable electricity generating facility, Calico Solar is determined by rule to be compliant with the SB 1368 EPS.

In addition to these programs, California is involved in the Western Climate Initiative, a multi-state and international effort to establish a cap and trade market to reduce greenhouse gas emissions in the Western United States and the Western Electricity Coordinating Council (WECC). The timelines for the implementation of this program are similar to those of AB 32, with full roll-out beginning in 2012. And as with AB 32, the electricity sector has been a major focus of attention.

ELECTRICITY PROJECT GREENHOUSE GAS EMISSIONS

Electricity use can be as simple as turning on a switch to operate a light or fan. The system to deliver adequate and reliable electricity supply is complex and variable. But it operates as an integrated whole to meet demand, such that the dispatch of a new source of generation generally curtails or displaces one or more less efficient or less competitive existing sources. Within the system, generation resources provide electricity, or energy, generating capacity, and ancillary services to stabilize the system and facilitate electricity delivery, or movement, over the grid. *Capacity* is the instantaneous output of a resource, in megawatts. *Energy* is the capacity output over a unit of time, for example an hour or year, generally reported as megawatt-hours or gigawatt-hours (GWh). Ancillary services[24] include regulation, spinning reserve, non-

[21] Public Utilities Code § 8340 et seq.

[22] The Emission Performance Standard only applies to carbon dioxide, and does not include emissions of other greenhouse gases converted to carbon dioxide equivalent.

[23] See Rule at http://www.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/64072.htm

[24] See CEC 2009b, page 95.

spinning reserve, voltage support, and black start capability. Individual generation resources can be built and operated to provide only one specific service. Alternatively, a resource may be able to provide one or all of these services, depending on its design and constantly changing system needs and operations.

California is actively pursuing policies to reduce GHG emissions that include adding non-GHG emitting renewable generation resources to the system mix. The generation of electricity using fossil fuels, even in a back-up generator at a thermal solar plant, produces air emissions known as greenhouse gases in addition to the criteria air pollutants that have been traditionally regulated under the federal and state Clean Air Acts. Greenhouse gas emissions contribute to the warming of the earth's atmosphere, leading to climate change.

PROJECT CONSTRUCTION

Construction of industrial facilities such as power plants requires coordination of numerous equipment and personnel. The concentrated on-site activities result in short-term, unavoidable increases in vehicle and equipment emissions that include greenhouse gases. The greenhouse gas emissions estimate, determined for the entire construction period[25], is presented below in **Greenhouse Gas Table 2,** where the GHG emissions were converted by staff into MTCO2E and totaled.

Greenhouse Gas Table 2
Estimated Calico Solar Potential Construction Greenhouse Gas Emissions

Construction Element	CO2-Equivalent (MTCO2E) [a,b]
On-Site Construction Equipment	4,988.20
On-Site Delivery Trucks	1,678.36
On-Site Construction/Worker/Security Vehicles	1,805.69
Off-Site Worker/Security Vehicles	13,954.82
Off-Site Delivery Trucks	17,028.23
On-site/Off-site Train for Water Delivery	2,115.71
Construction Total	41,571.01

Source: TS 2010q
[A] **One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms**
[b] The vast majority of the CO2E emissions, over 99%, are CO_2 from these combustion sources.

The project construction GHG emissions have not been updated by the applicant, however the GHG emissions are expected to minimally decrease due to the proposed project modifications/alternatives (TS 2010am) for the same reasons as identified previously in the Air Quality discussion.

PROJECT OPERATIONS

Operations GHG emissions are shown in **Greenhouse Gas Table 3**. Operation of the proposed Calico Solar Project would cause GHG emissions from the facility

[25] The construction period originally evaluated was 41 months in duration. The applicant has revised the construction period duration to 59 months (TS 2010g). The project construction requirements have not increased from those evaluated, but it is not clear whether the total GHG emissions would be impacted by this assumed lengthening of the construction schedule.

maintenance fleet and employee trips, emergency generator engine, and sulfur hexafluoride emissions from new electrical component equipment.

Greenhouse Gas Table 3
Estimated Calico Solar Potential Operating Greenhouse Gas Emissions

Operating Element	Annual CO_2-Equivalent (MTCO2E)[a]
On-site Stationary Equipment Combustion [b]	0.82
On-site Vehicle Combustion [b]	1,634.51
On-site Train for Water Delivery [b]	153.75
Off-site Vehicle Combustion [b]	1,174.54
Off-site Train for Water Delivery [b]	140.19
Equipment Leakage (SF_6)	384.42
Total Project GHG Emissions – MTCO2E [b]	**3,488.22**
Facility MWh per year [c]	1,840,000
Facility GHG Performance (MTCO2E/MWh)	0.00190

Source: TS 2010q
[a] One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.
[b] the vast majority of the co2e emissions, over 99%, are co_2 from these emission sources.
[c] Approximately a 25% capacity factor.

The project operation GHG emissions have not been updated by the applicant, however the GHG emissions are expected to minimally decrease due to the proposed project modifications/alternatives (TS 2010am) for the same reasons as identified previously in the Air Quality discussion.

Greenhouse Gas Table 3 shows what the proposed project, as permitted, could potentially emit in greenhouse gases on an annual basis. All emissions are converted to CO_2-equivalent and totaled. Electricity generation GHG emissions are generally dominated by CO_2 emissions from the carbon-based fuels; other sources of GHG are typically small and also are more likely to be easily controlled or reused/recycled. For this solar project the primary fuel, solar energy, is greenhouse gas free, but there is direct and indirect gasoline and diesel fuel use in the maintenance vehicles, offsite delivery vehicles, staff and employee vehicles, and a 335-hp diesel-fueled emergency engine. Another GHG emission source for the proposed project is the SF_6 equipment leakage.

The proposed project is estimated to emit, directly from primary and secondary emission sources on an annual basis, nearly 3,500 metric tonnes of CO_2-equivalent GHG emissions per year. The Calico Solar Project, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]). Regardless, Calico Solar has an estimated GHG emission rate of 0.00190 MTCO2E/MWh, well below the Greenhouse Gas Emission Performance Standard of 0.500 MTCO2/MWh.

Solar Project Energy Payback Time

The beneficial energy and greenhouse gas impacts of renewable energy projects can also be measured by the *energy payback time*[26]. **Greenhouse Gas Tables 2** and **3** provide an estimate of the onsite construction and operation emissions, employee transportation emissions, and the final segment of offsite materials and consumables transportation. However, there are additional direct transportation and indirect manufacturing GHG emissions associated with the construction and operation of the proposed project, which are all considered in the determination of the energy payback time. A document sponsored by Greenpeace estimates that the energy payback time for concentrating solar power plants, such as Calico Solar, to be on the order of 5 months (Greenpeace 2005, Page 9); and the project life for Calico Solar is estimated to be 40 years (SES 2008a, p. 3-77). Therefore, the proposed project's GHG emissions reduction potential from energy displacement would be substantial[27].

Natural Carbon Uptake Reduction

This proposed project would cause the clearing of land and removal of vegetation, which would reduce the ongoing natural carbon uptake by vegetation. A study of the Mojave Desert indicated that the desert may uptake carbon in amounts as high as 100 grams per square meter per year (Wohlfahrt et. al. 2008). This would equate to a maximum reduction in carbon uptake, calculated as CO_2, of 1.48 MT of CO_2 per acre per year for areas with complete vegetation removal. For this 6,215 acre proposed project (TS 2010ag), which actually does not require the complete removal of vegetation over most of the project site, the maximum equivalent loss in carbon uptake assuming complete vegetation removal would be 9,198 MT of CO_2 per year, which would correspond to 0.005 MT of CO_2 per MWh generated. Therefore, the natural carbon uptake loss is negligible in comparison with the reduction in fossil fuel CO_2 emissions, which can range from 0.35 to 1.0 MT of CO_2 per MWh depending on the fuel and technology, that is enabled by this proposed project.

CLOSURE AND DECOMMISSIONING

Closure and decommissioning, as a one-time limited duration event, would have emissions that are similar in type and magnitude, but likely lower than, the construction emissions as discussed above.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff assesses four kinds of impacts: construction, operation, closure and decommissioning, and cumulative effects. As the name implies, construction impacts

[26] The energy payback time is the time required to produce an amount of energy as great as what was consumed during production, which in the context of a solar power plant includes all of the energy required during construction and operation.

[27] The GHG displacement for the project would be similar to, but not exactly the same as, the amount of energy produced after energy payback is achieved multiplied by the average GHG emissions per unit of energy displaced. The average GHG emissions for the displaced energy over the project life is not known but currently fossil fuel fired power plants have GHG emissions that range from 0.35 MT/MWh CO2E for the most efficient combined cycle gas turbine power plants to over 1.0 MT/MWh for coal fired power plants.

result from the emissions occurring during the construction of the proposed project. The operation impacts result from the emissions of the proposed project during operation. Cumulative impacts analysis assesses the impacts that result from the proposed project's incremental effect viewed over time. The impact of GHG emissions caused by this solar facility is characterized by considering how the power plant would affect the overall electricity system. The integrated electricity system depends on non-fossil and fossil-fueled generation resources to provide energy and satisfy local capacity needs. As directed by the Energy Commission's adopted order initiating an informational (OII) proceeding (08-GHG OII-1) (CEC 2009a), staff is refining and implementing the concept of a "blueprint" that describes the long-term roles (i.e., retirements and displacement) of fossil-fueled power plants in California's electricity system as we move to a high-renewable, low-GHG electricity system, which would include projects like Calico Solar.

PROPOSED PROJECT

Construction Impacts

Staff concludes that the GHG emission increases from construction activities would not be CEQA significant for several reasons. First, the period of construction would be short-term and the emissions intermittent during that period, not ongoing during the life of the proposed project. Second, best practices control measures that staff recommends, such as limiting idling times and requiring, as appropriate, equipment that meet the latest emissions standards, would further minimize greenhouse gas emissions since the use of newer equipment would increase efficiency and reduce GHG emissions and be compatible with low-carbon fuel (e.g., bio-diesel and ethanol) mandates that will likely be part of the ARB regulations to reduce GHG from construction vehicles and equipment. And lastly, these temporary GHG emissions are necessary to create this renewable energy source that would provide power with a very low GHG emissions profile, and the construction emissions would be more than offset by the reduction in fossil fuel fired generation that would be enabled by this proposed project. If the proposed project construction emissions were distributed over the 40 year life of the proposed project they would only increase the project life time annual facility GHG emissions rate by 0.00056 MT CO_2-eq per MW.

Direct/Indirect Operation Impacts and Mitigation

The proposed Calico Solar Project promotes the state's efforts to move towards a high-renewable, low-GHG electricity system, and, therefore, reduces both the amount of natural gas used by electricity generation and greenhouse gas emissions.

Net GHG emissions for the integrated electric system will decline when new renewable power plants are added to: 1) move renewable generation towards the 33% target; 2) improve the overall efficiency, or GHG emission rate, of the electric system; or 3) serve load growth or capacity needs more efficiently, or with fewer GHG emissions.

The Role of Calico Solar in Renewables Goals/Load Growth

As California moves towards an increased reliance on renewable energy by implementing the Renewables Portfolio Standard (RPS), non-renewable energy resources will be displaced. These reductions in non-renewable energy, shown in **Greenhouse Gas Table 4**, could be as much as 36,500 GWh. These assumptions are

conservative in that the forecasted growth in electricity retail sales assumes that the impacts of planned increases in expenditures on (uncommitted) energy efficiency are already embodied in the current retail sales forecast[28]. Energy Commission staff estimates that as much as 18,000 GWh of additional savings due to uncommitted energy efficiency programs may be forthcoming.[29] This would reduce non-renewable energy needs by a further 12,000 GWh given a 33% RPS.

Greenhouse Gas Table 4
Estimated Changes in Non-Renewable Energy Potentially Needed to Meet California Loads, 2008-2020

California Electricity Supply	**Annual GWh**	
Statewide Retail Sales, 2008, estimated [a]	264,794	
Statewide Retail Sales, 2020, forecast [a]	289,697	
Growth in Retail Sales, 2008-20	24,903	
Growth in Net Energy for Load [b]	29,840	
California Renewable Electricity	**GWh @ 20% RPS**	**GWh @ 33% RPS**
Renewable Energy Requirements, 2020 [c]	57,939	95,600
Current Renewable Energy, 2008	29,174	
Change in Renewable Energy-2008 to 2020 [c]	28,765	66,426
Resulting Change in Non-Renewable Energy [d]	176	(36,586)

Source: Energy Commission staff 2010.
Notes:
a. 2009 IPER Demand Forecast, Form 1.1c. Excludes pumping loads for entities that do not have an RPS.
b. 2009 IEPR Demand Forecast, Form 1.5a.
c. RPS requirements are a percentage of retail sales.

The Role of Calico Solar in Retirements/Replacements

Calico Solar would be capable of annually providing 1,840 GWh of renewable generation energy to replace resources that are or will likely be precluded from serving California loads. State policies, including GHG goals, are discouraging or prohibiting new contracts and new investments in high GHG-emitting facilities such as coal-fired, generation, generation that relies on water for once-through cooling, and aging power plants (CEC 2007). Some of the existing plants that are likely to require substantial capital investments to continue operation in light of these policies may be unlikely to undertake the investments and will retire or be replaced.

[28] Energy efficiency savings are already represented in the current Energy Commission demand forecast adopted December 2009 (CEC 2009c).

[29] See *Incremental Impacts of Energy Efficiency Policy Initiatives Relative to the 2009 Integrated Energy Policy Report Adopted Demand Forecast* (CEC-200-2010-001-D, January, 2010), page 2. Table 1 indicates that additional conservation for the three investor-owned utilities may be as high as 14,374 GWh. Increasing this value by 25 percent to account for the state's publicly-owned utilities yields a total reduction of 17,967 GWh.

Replacement of High GHG-Emitting Generation

High GHG-emitting resources, such as coal, are effectively prohibited from entering into new long-term contracts for California electricity deliveries as a result of the Emissions Performance Standard adopted in 2007 pursuant to SB 1368. Between now and 2020, more than 18,000 GWh of energy procured by California utilities under these contracts will have to reduce GHG emissions or be replaced; these contracts are presented in **Greenhouse Gas Table 5**.

Greenhouse Gas Table 5
Expiring Long-term Contracts with Coal-fired Generation 2009 – 2020

Utility	Facility [a]	Contract Expiration	Annual GWh Delivered to CA
PG&E, SCE	Misc In-state Qual. Facilities [a]	2009-2019	4,086
LADWP	Intermountain	2009-2013	3,163 [b]
City of Riverside	Bonanza, Hunter	2010	385
Department of Water Resources	Reid Gardner	2013 [c]	1,211
SDG&E	Boardman	2013	555
SCE	Four Corners	2016	4,920
Turlock Irrigation District	Boardman	2018	370
LADWP	Navajo	2019	3,832
		TOTAL	**18,522**

Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER) filings.
Notes:
a. All facilities are located out-of-state except for the Miscellaneous In-state Qualifying Facilities.
b. Estimated annual reduction in energy provided to LADWP by Utah utilities from their entitlement by 2013.
c. Contract not subject to Emission Performance Standard, but the Department of Water Resources has stated its intention not to renew or extend.

This represents almost half of the energy associated with California utility contracts with coal-fired resources that will expire by 2030. If the State enacts a carbon adder[30], all the coal contracts (including those in **Greenhouse Gas Table 5**, which expire by 2020 and, other contracts that expire beyond 2020 and are not shown in the table) may be retired at an accelerated rate as coal-fired energy becomes uncompetitive due to the carbon adder or the capital needed to capture and sequester the carbon emissions. Also shown are the approximate 500 MW of in-state coal and petroleum coke-fired capacity that may be unlikely to contract with California utilities for baseload energy due to the SB1368 Emission Performance Standard. As these contracts expire, new and existing generation resources will replace the lost energy and capacity. Some will come from renewable generation such as the proposed project; some will come from new and existing natural gas fired generation. All of these new facilities will have substantially lower GHG emissions rates than coal and petroleum coke-fired facilities, which typically averages about 1.0 $MTCO_2$/MWh without carbon capture and sequestration. Thus, new

[30] A carbon adder or carbon tax is a specific value added to the cost of a project for per ton of associated carbon or carbon dioxide emissions. Because it is based on, but not limited to, actual operations and emission and can be trued up at year end, it is considered a simple mechanism to assign environmental costs to a project.

renewable facilities will result in a net reduction in GHG emissions from the California electricity sector.

Retirement of Generation Using Once-Through Cooling

The State Water Resource Control Board (SWRCB) has proposed major changes to once-through cooling (OTC) units, shown in **Greenhouse Gas Table 6**, which would likely require extensive capital to retrofit, or retirement, or substantial curtailment of dozens of generating units. In 2008, these units collectively produced almost 58,000 GWh. While the more recently built OTC facilities may well install dry or wet cooling towers and continue to operate, the aging OTC plants are not likely to be retrofit to use dry or wet cooling towers without the power generation also being retrofit or replaced to use a more efficient and lower GHG emitting combined cycle gas turbine technology. Most of these existing OTC units operate at low capacity factors, suggesting a limited ability to compete in the current electricity market. Although the timing would be uncertain, new resources would out-compete aging plants and would displace the energy provided by OTC facilities and likely accelerate their retirements.

Any additional costs associated with complying with the SWRCB regulation would be amortized over a limited revenue stream today and into the foreseeable future. Their energy and much of their dispatchable, load-following capability will have to be replaced. These units constitute over 15,000 MW of merchant capacity and 17,800 GWh of merchant energy. Of this, much but not all of the capacity and energy are in local reliability areas, requiring a large share of replacement capacity – absent transmission upgrades – to locations in the same local reliability area. **Greenhouse Gas Table 6** provides a summary of the utility and merchant energy supplies affected by the OTC regulations.

New renewable generation resources will emit substantially less GHG emissions on average than other energy generation sources. Existing aging and OTC natural gas facility generation typically averages 0.6 to 0.7 MTCO2/MWh, which is much less efficient, higher GHG emitting than a renewable energy project like Calico Solar. A project like Calico Solar, located far from the coastal load pockets like the Los Angeles Local Reliability Area (LRA), would more likely provide energy support to facilitate the retirement of some aging and/or OTC power plants, but would not likely provide any local capacity support at or near the coastal OTC units. Regardless, due to its low greenhouse gas emissions, Calico Solar would serve to reduce GHG emissions from the electricity sector.

Closure and Decommissioning

Eventually the facility would close, either at the end of its useful life or due to some unexpected situation such as a natural disaster or catastrophic facility breakdown. When the facility closes, all sources of air emissions would cease to operate and thus impacts associated with those greenhouse gas emissions would no longer occur. The only other expected, albeit temporary, GHG emissions would be equipment exhaust (off-road and on-road) from dismantling activities. These activities would be of much a shorter duration than construction of the proposed project, equipment used to dismantle the facility are assumed to have lower comparative GHG emissions due to technology advancement, and would be required to be controlled in a manner at least equivalent to

that required during construction. It is assumed that the beneficial GHG impacts of this facility, displacement of fossil fuel fired generation, would be replaced by the construction of newer more efficiency renewable energy or other low GHG generating technology facilities. Also, the recycling of the facility components (steel, concrete, etc.) could indirectly reduce GHG emissions from decommissioning activities. Therefore, while there would be temporary adverse greenhouse gas CEQA impacts during decommissioning they are determined to be less than significant.

Greenhouse Gas Table 6
Aging and Once-Through Cooling Units: 2008 Capacity and Energy Output [a]

Plant, Unit Name	Owner	Local Reliability Area	Aging Plant?	Capacity (MW)	2008 Energy Output (GWh)	GHG Emission Rate(MTCO2/MWh)
Diablo Canyon 1, 2	Utility	None	No	2,232	17,091	Nuclear
San Onofre 2, 3	Utility	L.A. Basin	No	2,246	15,392	Nuclear
Broadway 3 [b]	Utility	L.A. Basin	Yes	75	90	0.648
El Centro 3, 4 [b]	Utility	None	Yes	132	238	0.814
Grayson 3-5 [b]	Utility	LADWP	Yes	108	150	0.799
Grayson CC [b]	Utility	LADWP	Yes	130	27	0.896
Harbor CC	Utility	LADWP	No	227	203	0.509
Haynes 1, 2, 5, 6	Utility	LADWP	Yes	1,046	1,529	0.578
Haynes CC	Utility	LADWP	No	560	3,423	0.376
Humboldt Bay 1, 2 [a]	Utility	Humboldt	Yes	107	507	0.683
Olive 1, 2 [b]	Utility	LADWP	Yes	110	11	1.008
Scattergood 1-3	Utility	LADWP	Yes	803	1,327	0.618
Utility-Owned				**7,776**	**39,988**	**0.693**
Alamitos 1-6	Merchant	L.A. Basin	Yes	1,970	2,533	0.661
Contra Costa 6, 7	Merchant	S.F. Bay	Yes	680	160	0.615
Coolwater 1-4 [b]	Merchant	None	Yes	727	576	0.633
El Segundo 3, 4	Merchant	L.A. Basin	Yes	670	508	0.576
Encina 1-5	Merchant	San Diego	Yes	951	997	0.674
Etiwanda 3, 4 [b]	Merchant	L.A. Basin	Yes	666	848	0.631
Huntington Beach 1, 2	Merchant	L.A. Basin	Yes	430	916	0.591
Huntington Beach 3, 4	Merchant	L.A. Basin	No	450	620	0.563
Mandalay 1, 2	Merchant	Ventura	Yes	436	597	0.528
Morro Bay 3, 4	Merchant	None	Yes	600	83	0.524
Moss Landing 6, 7	Merchant	None	Yes	1,404	1,375	0.661
Moss Landing 1, 2	Merchant	None	No	1,080	5,791	0.378
Ormond Beach 1, 2	Merchant	Ventura	Yes	1,612	783	0.573
Pittsburg 5-7	Merchant	S.F. Bay	Yes	1,332	180	0.673
Potrero 3	Merchant	S.F. Bay	Yes	207	530	0.587
Redondo Beach 5-8	Merchant	L.A. Basin	Yes	1,343	317	0.810
South Bay 1-4	Merchant	San Diego	Yes	696	1,015	0.611
Merchant-Owned				**15,254**	**17,828**	**0.605**
Total In-State OTC				**23,030**	**57,817**	

Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER) filings.
a. OTC Humboldt Bay Units 1 and 2 are included in this list. They must retire in 2010 when the new Humboldt Bay Generating Station (not ocean-cooled), currently under construction, enters commercial operation.
b. Units are aging but are not OTC.

REDUCED ACREAGE ALTERNATIVE

The Reduced Acreage Alternative would consist of 11,000 SunCatchers with a net generating capacity of approximately 275 MW occupying approximately 2,600 acres of land (see Alternatives Figure 1). The Reduced Acreage Alternative would transmit power to the grid through the SCE Pisgah Substation and would require infrastructure similar to the proposed 850 MW project, including water storage tanks, road access, and main services complex. However, the Reduced Acreage Alternative would not require the 65-mile upgrade to the 220 kV SCE Pisgah-Lugo SCE transmission line.

The Reduced Acreage Alternative would retain 32% of the SunCatchers and power generating potential of the proposed 850 MW project, and would affect 32% of the land of the proposed project. In terms of GHG emissions, the Reduced Acreage Alternative is estimated to create an approximately linear amount of construction emissions based on size (32% of proposed project construction GHG emissions) and less than linear operation GHG emissions[31] (20% of proposed project operation GHG emissions) due to the elimination of the sulfur hexafluoride containing equipment. While there may be inefficiencies regarding scale and staffing, the more compact and less complex nature of this alternative's project site boundaries are assumed to compensate for the loss of efficiencies due to economy of scale.

The results of the Reduced Acreage Alternative would be the following:

- The impacts of the proposed project would not occur on the lands not used due to the smaller project size. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project.
- The benefits of the proposed project in displacing fossil fuel fired generation and reducing associated greenhouse gas emissions from gas-fired generation would be reduced. The overall efficiency would increase slightly, or the GHG emission rate per unit of generation would increase slightly, due to reduction operating emissions due to the more compact site. Both State and Federal law support the increased use of renewable power generation.

If the Reduced Acreage Alternative were approved, other renewable projects would likely be developed that would compensate for the loss of generation compared to the proposed project on other sites in San Bernardino County, the Mojave Desert, or in adjacent states as developers strive to provide renewable power that complies with utility requirements and State/Federal mandates. For example, there are several pending solar and wind projects in the Newberry Springs/Ludlow Area that would be located within a few miles of the Calico Solar Project site, and there are dozens of other wind and solar projects that have applications pending with BLM in the California Desert District.

[31] The applicant estimated GHG construction and operation emissions for two alternatives, the original Phase 1 (500 MW) only, and original Phase 2 (350 MW) only, that were not analyzed as project alternatives. The GHG emission estimates from for those two alternatives (SES 2009ee) were interpolated or extrapolated and interpreted by staff to determine the GHG emissions estimates for the project alternatives analyzed.

AVOIDANCE OF DONATED AND ACQUIRED LANDS ALTERNATIVE

This alternative is analyzed is the Alternative Section of this Supplemental Staff Assessment.

NO PROJECT / NO ACTION ALTERNATIVE

There are three No Project / No Action Alternatives evaluated as follows:

No Project / No Action Alternative #1: No Action on the Calico Solar Project application and on CDCA land use plan amendment

Under this alternative, the proposed project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

The results of this alternative would be the following:

- The impacts of the proposed project would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another renewable energy project.
- The benefits of the proposed project in displacing fossil fuel fired generation and reducing associated greenhouse gas emissions from gas-fired generation would not occur. Both State and Federal law support the increased use of renewable power generation.

If the proposed project is not approved, renewable energy projects would likely be developed on other sites in San Bernardino County, the Mojave Desert, or in adjacent states as developers strive to provide renewable power that complies with utility requirements and State/Federal mandates. For example, there are several pending solar and wind projects in the Newberry Springs/Ludlow Area that would be located within a few miles of the Calico Solar Project site, and there are dozens of other wind and solar projects that have applications pending with BLM in the California Desert District.

No Project / No Action Alternative #2: No Action on the Calico Solar Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. As a result, GHG emissions would result from the construction and operation of the solar technology and would likely be similar to the GHG emissions from the proposed project. Different solar technologies require different amounts of construction and operations maintenance;

however, it is expected that all the technologies would provide the more significant benefit, like the proposed project, of displacing fossil fuel fired generation and reducing associated GHG emissions. As such, this No Project/No Action Alternative could result in GHG benefits similar to those of the proposed project.

No Project / No Action Alternative #3: No Action on the Calico Solar Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the greenhouse gas emissions from the site, including carbon uptake, is not expected to change noticeably from existing conditions and, as such, this No Project/No Action Alternative would not result in the GHG benefits from the proposed project. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

PROJECT-RELATED FUTURE ACTIONS

The proposed project and the Avoidance of Donated and Acquired Lands Alternative would both require that major upgrades be performed to the existing 220 kV SCE Pisgah-Lugo SCE transmission line. The Reduced Acreage Alternative and No Project / No Action Alternative would not require any upgrades to the existing Pisgah-Lugo transmission line.

Upgrades to the SCE Pisgah-Lugo SCE transmission line would cause construction related GHG emissions and may marginally increase the inspection and maintenance emission from the transmission corridor. However, the magnitude of these construction and operation emissions are minimal in comparison to the increased GHG emissions reductions that would be caused by the two larger project alternatives, so this project-related future action does not affect staff's greenhouse gas significance impact findings for the proposed project.

CUMULATIVE IMPACTS

Cumulative impacts are defined as "two or more individual effects which, when considered together, are considerable or . . . compound or increase other environmental impacts" (CEQA Guidelines § 15355). "A cumulative impact consists of an impact that is created as a result of a combination of the project evaluated in the EIR together with other projects causing related impacts" (CEQA Guidelines § 15130[a][1]). Such impacts may be relatively minor and incremental, yet still be significant because of the existing environmental background, particularly when one considers other closely related past,

present, and reasonably foreseeable future projects. This definition is consistent with NEPA cumulative impact assessment requirements/guidance.

This entire GHG assessment is a cumulative impact assessment and the findings described elsewhere in this section are cumulative impact findings. The proposed project alone would not be sufficient to change global climate, but would emit greenhouse gases and therefore has been analyzed as a potential cumulative impact in the context of existing GHG regulatory requirements and GHG energy policies.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Calico Solar, as a solar energy generation project, is exempt from the mandatory GHG emission reporting requirements for electricity generating facilities as currently required by the California Air Resources Board (ARB) for compliance with the California Global Warming Solutions Act of 2006 (AB 32 Núñez, Statutes of 2006, Chapter 488, Health and Safety Code sections 38500 et seq.) (ARB 2008a).

The Calico Solar Project, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]).

Since the proposed project would have emissions that are below 25,000 MT/year of CO2E, it would not be subject to federal mandatory reporting of greenhouse gases. The proposed project would also not be subject to the federal air quality permitting requirements of the new PSD and Title V Tailoring Rule that has a CO2E emissions trigger of 100,000 tons per year. Additionally, it would also be exempt from the state's greenhouse gas reporting requirements.

NOTEWORTHY PUBLIC BENEFITS

Greenhouse gas related noteworthy public benefits include the construction of renewable and low-GHG emitting generation technologies and the potential for successful integration into the California and greater WECC electricity systems. Additionally, the project would contribute to meeting the state's AB 32 goals.

RESPONSE TO PUBLIC AND AGENCY COMMENTS

No public or agency comments have been received to date on the Greenhouse Gas Section of the SA/DEIS.

CONCLUSIONS

The Calico Solar Project would emit considerably less greenhouse gases (GHG) than existing power plants and most other generation technologies, and thus would contribute to continued improvement of the overall western United States, and specifically California, electricity system GHG emission rate average. The proposed

project would lead to a net reduction in GHG emissions across the electricity system that provides energy and capacity to California. Thus, staff concludes that the proposed project's operation would result in a cumulative overall reduction in GHG emissions from the state's power plants that would create a beneficial effect under both CEQA and NEPA, would not worsen current conditions, and would thus not result in CEQA impacts that are cumulatively significant or adverse NEPA impacts.

Staff concludes that the GHG emission increases typical from construction and decommissioning activities would not be CEQA significant for several reasons. First, the periods of construction and decommissioning would be short-term and not ongoing during the life of the proposed project. Second, the best practices control measures that staff recommends, such as limiting idling times and requiring, as appropriate, equipment that meets the latest emissions standards, would further minimize greenhouse gas emissions since the use of newer equipment would increase efficiency and reduce GHG emissions and be compatible with low-carbon fuel (e.g., bio-diesel and ethanol) mandates that will likely be part of the ARB regulations to reduce GHG from construction vehicles and equipment. Finally, the construction and decommissioning emissions are miniscule when compared to the reduction in fossil-fuel power plant greenhouse gas emissions during project operation. For all these reasons, staff would conclude that the short-term emission of greenhouse gases during construction would be sufficiently reduced and would be offset during proposed project operations and would, therefore, not be CEQA significant.

The Calico Solar Project, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]).

MITIGATION MEASURES/PROPOSED CONDITIONS OF CERTIFICATION

No Conditions of Certification related to project greenhouse gas emissions are proposed because the proposed project would create beneficial GHG impacts. The project owner would have to comply with any future applicable GHG regulations formulated by the ARB or the U.S.EPA, such as GHG reporting or emissions cap and trade markets.

REFERENCES

ARB 2006 – Air Resources Board. AB 32 Fact Sheets, California Global Warming Solutions Act of 2006 and Timeline. www.arb.ca.gov/cc/cc.htm. September 2006.

ARB 2008a – Air Resources Board. Instructional Guidance for Mandatory GHG Emissions Reporting. http://www.arb.ca.gov/cc/reporting/ghg-rep/ghg-rep-guid/ghg-rep-guid.htm. December 2008

ARB 2008b – California Air Resource Board. Climate Change, Proposed Scoping Plan a Framework for Change, Pursuant to AB 32. Released October 2008, approved

December 2008. <http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm>.

CalEPA 2006 – California Environmental Protection Agency. Climate Action Team Report to Governor Schwarzenegger and the Legislature. March, 2006. http://www.climatechange.ca.gov/climate_action_team/reports/2006report/2006-04-03_FINAL_CAT_REPORT.PDF

CEC 1998 – California Energy Commission. 1997 Global Climate Change, Greenhouse Gas Emissions Reduction Strategies for California, Vol. 2, Staff Report. 1998. http://www.climatechange.ca.gov/publications/97GLOBALVOL2.pdf

CEC 2003 – California Energy Commission. 2003 Integrated Energy Policy Report. December 2003. http://www.energy.ca.gov/reports/100-03-019F.pdf

CEC 2007 – California Energy Commission. 2007 Integrated Energy Policy Report – Scenario Analysis of California's Electricity System. http://www.energy.ca.gov/2007_energypolicy/documents/index.html. 2007.

CEC 2009a – California Energy Commission. Committee Report (08-GHG OII-01). Committee Guidance On Fulfilling California Environmental Quality Act Responsibilities For Greenhouse Gas Impacts In Power Plant Siting Applications. March 2009. http://www.energy.ca.gov/ghg_powerplants/documents/index.html.

CEC 2009b – California Energy Commission. Framework for Evaluating Greenhouse Gas Implications of Natural Gas-Fired Power Plants in California, CEC-700-2009-009, MRW and Associates. May 27, 2009. http://www.energy.ca.gov/2009publications/CEC-700-2009-009/CEC-700-2009-009.PDF

CEC 2009c – California Energy Commission, California Energy Demand 2010-2020 Adopted Forecast. December 2009. http://www.energy.ca.gov/2009publications/CEC-200-2009-012/CEC-200-2009-012-CMF.PDF

CEC 2009d – California Energy Commission, 2009 Integrated Energy Policy Report. December 16, 2009. http://www.energy.ca.gov/2009publications/CEC-100-2009-003/CEC-100-2009-003-CMF.PDF

CEC 2010 – California Energy Commission, Incremental Impacts of Energy Efficiency Policy Initiatives Relative to the 2009 Integrated Energy Policy Report Adopted Demand Forecast (CEC-200-2010-001-D, January, 2010), http://www.energy.ca.gov/2010publications/CEC-200-2010-001/index.html

CPUC 2008 – California Public Utilities Commission. Final Opinion on Greenhouse Gas Regulatory Strategies, Joint Agency proposed final opinion, publication # CEC-100-2008-007-D. Posted: September 12, 2008. http://www.energy.ca.gov/2008publications/CEC-100-2008-007/CEC-100-2008-007-D.PDF

Greenpeace 2005. Concentrated Solar Thermal Power – Now! Authors: Rainer Aringhoff and Georg Brakmann ESTIA, Dr. Michael Geyer (IEA SolarPACES), and Sven Teske Greenpeace International. September 2005. http://www.greenpeace.org/raw/content/international/press/reports/Concentrated-Solar-Thermal-Power.pdf.

SES 2008a – Stirling Energy Systems/R. Liden (tn 49181). Application for Certification, dated December 1, 2008. Submitted to CEC/Docket Unit on December 1, 2008.

SES 2009ee - Stirling Energy Systems/C. Champion (tn 54272). Applicant's Response to Energy Commission & Bureau of Land Management's Data Requests Set 1, Part 1 & Set 2, Part 1 Data Requests 71-73, 76-79, 85 & 128-141, dated November 23, 2009. Submitted to CEC/Docket Unit on November 24, 2009.

SES 2010i – Stirling Energy Systems (tn 55067). Applicant's Submittal of the Hydraulic and Hydrologic Study, dated January 23, 2010. Submitted to CEC/Docket Unit on January 28, 2010.

TS 2010g - Tessera Solar/F. Bellows (tn 55390). Construction Milestone Schedule & Project Layout Figure, dated February 12, 2010. Submitted to CEC/Docket Unit on February 16, 2010.

TS 2010am - Tessera Solar/ F. Bellows (tn 56700). Applicant's Submittal of a Supplement to the AFC, dated May 14, 2010. Submitted to CEC/Docket Unit on May 18, 2010.

TS 2010ag - Tessera Solar/ F. Bellows (tn 57018). Applicant's Submittal of Alternative Site Layout #2 - Engineering Figure with SunCatcher Layout, and Revised Project Boundary with 4000' Desert Tortoise Corridor Figure, dated June 2, 2010. Submitted to CEC/Docket Unit on June 2, 2010.

Wohlfahrt. et. al. 2008. Georg Wohlfahrt, Lynn F. Fenstermaker, and John A. Arnone III. Large annual net ecosystem CO_2 uptake of a Mojave Desert ecosystem. Global Change Biology, 2008 (14).

U.S.EPA 2009c - United States Environmental Protection Agency. Mandatory Reporting of Greenhouse Gases Rule. http://www.epa.gov/climatechange/emissions/ghgrulemaking. 2009.

U.S.EPA 2010 - United States Environmental Protection Agency. Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule. http://www.epa.gov/NSR/documents/20100413final.pdf. Accessed June 2010.

ACRONYMS

Acronym	Definition
AAQS	Ambient Air Quality Standard
AERMOD	ARMS/EPA Regulatory Model
AFC	Application for Certification
AQCMM	Air Quality Construction Mitigation Manager
AQCMP	Air Quality Construction Mitigation Plan
AQMD	Air Quality Management District
ARB	California Air Resources Board
ATC	Authority to Construct
ATCM	Airborne Toxic Control Measure
BACT	Best Available Control Technology
bhp	brake horsepower
BLM	Bureau of Land Management
CAAQS	California Ambient Air Quality Standard
CalEPA	California Environmental Protection Agency
CCR	California Code of Regulations
CDD	California Desert District
CEC	California Energy Commission (or Energy Commission)
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CPM	(CEC) Compliance Project Manager
CPUC	California Public Utilities Commission
EIR	Environmental Impact Report (CEQA)
EIS	Environmental Impact Statement (NEPA)
EPS	Emission Performance Standard
ERC	Emission Reduction Credit
FDOC	Final Determination Of Compliance
GHG	Greenhouse Gas
gr	Grains (1 gr ≅ 0.0648 grams, 7000 gr = 1 pound)
GSU	Generator Set-up Unit
GWh	Gigawatt-hour
H_2S	Hydrogen Sulfide
HFCs	Hydrofluorocarbons

Acronym	Definition
hp	horsepower
HSC	Health and Safety Code
IEPR	Integrated Energy Policy Report
kV	KiloVolt
LADWP	Los Angeles Department of Water and Power
lbs	Pounds
LORS	Laws, Ordinances, Regulations and Standards
LRAs	Local Reliability Areas
MCR	Monthly Compliance Report
MDAB	Mojave Desert Air Basin
MDAQMD	Mojave Desert Air Quality Management District
$\mu g/m^3$	Microgram per cubic meter
mg/m^3	milligrams per cubic meter
MTCO2E	Carbon dioxide equivalent metric tonnes
MW	Megawatts (1,000,000 Watts)
MWh	Megawatt-hour
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standard
NEPA	National Environmental Policy Act
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen *or* Nitrogen Oxides
NSPS	New Source Performance Standard
NSR	New Source Review
NWS	National Weather Service
O_2	Oxygen
O_3	Ozone
OII	Order Initiating an Informational
OLM	Ozone Limiting Method
OTC	Once-Through Cooling
PCU	Power Conversion Unit
PDOC	Preliminary Determination Of Compliance
PFCs	Perfluorocarbons
PG&E	Pacific Gas and Electric Company
PM	Particulate Matter
PM10	Particulate Matter less than 10 microns in diameter

Acronym	Definition
PM2.5	Particulate Matter less than 2.5 microns in diameter
PMAP	Particulate Matter Attainment Plan
ppm	Parts Per Million
ppmv	Parts Per Million by Volume
ppmvd	Parts Per Million by Volume, Dry
PSA	Preliminary Staff Assessment (this document)
PSD	Prevention of Significant Deterioration
PTO	Permit to Operate
QFER	Quarterly Fuel and Energy Report
RPS	Renewables Portfolio Standard
SCE	Southern California Edison
scf	Standard Cubic Feet
SDG&E	San Diego Gas and Electric
SF_6	Sulfur hexafluoride
SO_2	Sulfur Dioxide
SO_4	Sulfate
SOx	Oxides of Sulfur
SWRCB	State Water Resource Control Board
tpy	tons per year
U.S.EPA	United States Environmental Protection Agency
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds
WECC	Western Electricity Coordinating Council

C.2 – BIOLOGICAL RESOURCES

Testimony of Chris Huntley, Scott D. White, and Carolyn Chainey-Davis

C.2.1 SUMMARY OF CONCLUSIONS

This section summarizes the Energy Commission staff's analysis and conclusions about the impacts of the Calico Solar Project (formerly the Stirling Energy Systems Solar One Project) and describes feasible mitigation measures for those impacts in accordance with the requirements of the California Environmental Quality Act (CEQA).

The summary provides a general overview of the project impacts to each of the biological resources that are present on the project site, have the potential to be present on the site, or are present off-site and have potential to be indirectly affected by the proposed project. This summary also describes potential mitigation measures that may be employed to avoid or reduce or potentially significant project impacts.

Vegetation and Rare Plants: The Calico Solar Project would have major impacts to the biological resources of the Newberry Springs/Ludlow area of the Mojave Desert, eliminating a broad expanse of relatively undisturbed Mojave Desert habitat and affecting all plant and wildlife species on the site, including special status species. Construction of the project would result in the permanent land use conversion of approximately 6,215 acres of the Mojave Desert to support operation of the solar field and appurtenant structures. The applicant has indicated that the project site includes 5,946 acres of creosote bush scrub (88.6 acres of this has been previously disturbed; this total also includes 3.3 acres of microphyll woodland described below); 242 acres of salt bush scrub; and 28 acres of developed areas (e.g., linear facilities such as unpaved roads).

Although construction would not result in the complete loss of vegetation, staff considers the construction of exclusion fencing (designed to prevent desert tortoise from entering the project site), vegetation mowing, introduction of shade and added moisture from mirror washing, noise from individual SunCatcher engines (i.e., each engine would have a noise level of approximately 84 dBA Leq at 50 feet, which is equivalent to a compressor), power plant maintenance activity, and risk of invasion by weedy annuals to effectively eliminate the functional use of the site for all but the most disturbance-tolerant native species. To reduce project effects on vegetation communities, staff has proposed Conditions of Certification **BIO-1** through **BIO-9** (Designated Biologist Selection, Designated Biologist Duties, Biological Monitor Qualifications, Biological Monitor Duties, Designated Biologist and Biological Monitor Authority, Worker Environmental Awareness Program, Biological Resources Mitigation Implementation and Monitoring Plan, Impact Avoidance and Minimization Measures, and Compliance Verification), **BIO-10** (Revegetation and Compensation for Impacts to Native Vegetation), and **BIO-11** (Weed Management Plan). To address specific construction-related impacts to native vegetation communities and habitat loss, staff has incorporated measures proposed by the applicant and has proposed supplemental measures in Condition of Certification **BIO-17** (Desert Tortoise Habitat Compensation).

The Calico Solar Project site supports several special-status plant species. Nine special-status plant species, one of which is also considered sensitive by the Bureau of

Land Management (BLM), but none of which are listed under the federal Endangered Species Act, were identified on or near the proposed project site. Three of these species would be directly impacted by construction of the Calico Solar Project. Two others occur north of the proposed site boundary, within the previously-proposed project footprint. Staff concludes that the project as analyzed in this SSA would not affect those locations. Several of the special-status plant species reported in 2007 and 2008 were not found on the site during more thorough field surveys in 2010, and the earlier reports may have been based on misidentifications. Staff believes that impacts to small-flowered androstephium and Utah vine milkweed would be less than significant under CEQA, and that potentially significant impacts to white-margined beardtongue can be reduced below a level of significance with the implementation of staff's proposed impact avoidance and minimization measures. These measures are detailed in staff's proposed Conditions of Certification **BIO-1** through **BIO-11, BIO-12** (Special-Status Plant Impact Avoidance and Minimization)**,** and **BIO-17**.

Common Wildlife and Nesting Birds: Construction of the Calico Solar Project would adversely affect common wildlife and nesting birds due to ground disturbance, operation, and the placement of permanent exclusion fencing around the perimeter of the site. Species that are not capable of dispersing to surrounding areas will be confined within the project boundaries by the exclusionary fencing, and would be subject to increased risks of road kill and repeated disturbance from human activities during construction and operation. The project exclusion fencing would also exclude many species from the entire 9.7 square mile site, resulting in loss of habitat and disruption of wildlife movement through the area. Noise levels would attenuate to approximately 60 dBA Leq at approximately 850 feet from the project fence line. Staff believes that noise may adversely affect wildlife, on the desert bajada at distance less than 850 feet from the project boundary. To reduce project effects on wildlife, staff has proposed Conditions of Certification **BIO-1** through **BIO-11**. Impacts to habitat loss would be compensated by the application of Condition of Certification **BIO-17** (Tortoise Habitat Compensation), and impacts to nesting birds would be avoided by the application of **BIO-19** (Pre-Construction Nest Surveys and Impact Avoidance Measures for Migratory Birds). However, overall effects to wildlife within the project perimeter are expected to be severe.

Construction of the project is expected to result in adverse effects on bird species. It is unknown how birds will respond to the project once operational, due to the fact that SunCatcher technology has not been implemented and studied on a large scale. Therefore, staff cannot assess the potential for bird collisions and mortality associated with these structures. Staff has proposed Condition of Certification **BIO-22** (Avian Protection Plan / Monitoring Bird Impacts from Solar Technology), which would require the applicant to prepare and implement an Avian Protection Plan, including a Bird Monitoring Study to monitor the death and injury of birds from collisions with facility features such as reflective mirror-like surfaces and from heat, and bright light from concentrating sunlight. In addition, while some disturbance-tolerant birds are expected to continue foraging on the project site once it is developed, it is unknown the degree to which the site may be used by native birds. The noise levels within the proposed project site would be in excess of 85 dBA Leq at each SunCatcher, and would be expected to adversely affect birds. Many avian species avoid developed areas within urban settings; these species would likely also avoid the SunCatchers.

Desert Tortoise: Implementation of the Calico Solar Project will result in adverse effects to desert tortoise (federally and State listed as a threatened species). Construction of the proposed project would result in the permanent loss of approximately 6215 acres of occupied desert tortoise habitat (4,075 acres of good quality habitat north of the Burlington Northern Santa Fe (BNSF) Railroad and 2,140 acres of less suitable habitat south of the BNSF tracks). In addition, the applicant has indicated that approximately 57 desert tortoises would need to be translocated outside of the Calico Solar Project site. Currently staff, CDFG, and USFWS are working with the applicant to develop a Desert Tortoise Translocation Plan for the project. The translocation of tortoises and other construction related impacts of the proposed project pose substantial effects to this species. To reduce these effects staff has proposed Conditions of Certification **BIO-1** through **BIO-9**, which apply to protection of desert tortoise and other biological resources in and near the Calico Solar Project area, and Conditions of Certification **BIO-15** through **BIO-17**, which are specific to desert tortoise. To reduce effects of the large scale land use conversion, staff, CDFG, and USFWS are requiring compensatory mitigation. This compensatory mitigation is designed to fully mitigate impacts as required under the California Endangered Species Act (CESA), and requires a full mitigation finding, which usually contemplates a mitigation ratio greater than 1:1 to compensate for loss of high-value habitat (i.e., acquisition or preservation of more than one acre of compensation lands for every acre lost). On past energy projects considered by the Energy Commission, the California Department of Fish and Game (CDFG) has required a 3:1 compensation ratio to meet the CESA full mitigation standard for good quality habitat such as that found on much of the Calico Solar Project site. The higher ratio reflects the limits to increases in carrying capacity that can be achieved on the acquired lands, even with implementation of all possible protection and enhancement measures. The BLM typically applies a 1:1 compensation requirement and pursues desert tortoise recovery goals through implementation of region-wide management plans and land use planning as described in the West Mojave Plan (BLM et al. 2005; BLM 2006) and the Desert Tortoise Recovery Plan (USFWS 1994b).

Energy Commission staff proposes compensation at a 3:1 ratio for loss of desert tortoise habitat north of the BNSF Railroad, and at a 1:1 ratio for habitat south of the railroad, to achieve full mitigation under CESA and to mitigate under CEQA for habitat loss and other significant impacts to desert tortoises. These mitigation ratios include the 1:1 mitigation ratio proposed by the BLM for impacts to desert tortoise habitat as well as additional mitigation proposed by the Energy Commission staff for impacts to the species. Staff has proposed that impacts to the area south of the BNSF Railroad be mitigated at a 1:1 ratio, because this area supports lower-quality habitat for the desert tortoise, and is enclosed to the north and south by the BNFS Railroad and the I-40, respectively. These barriers to tortoise movement in this area reduce effective habitat value.

Based on these ratios, the total acreage of desert tortoise compensation land acquisition and protection would be 14,365 acres. BLM's requirement for mitigation at a 1:1 ratio, which will include funding for BLM to implement desert tortoise habitat enhancement projects on BLM land, will also serve to satisfy a portion of the Energy Commission's compensation lands requirement. However, even with credit for mitigation provided to BLM, no fewer than 8,150 acres of compensation land will be

acquired, permanently protected and managed. Staff estimates total cost of acquisition, protection, and enhancement at $49,223,057.50.

Mojave Fringe-Toed Lizard: The Mojave fringe-toed lizard, a BLM sensitive species and California Species of Special Concern, occurs on the proposed project site, in areas of fine wind-blown (aeolian) sand deposits such as dunes and sandy patches within scrubby vegetation. Mojave fringe-toed lizards can also utilize sandy washes. The project would interfere with both aeolian and fluvial sand deposits on and near the site, which would result in habitat loss and degradation for this and other sand-associated species and would result in direct impacts to occupied habitat. The applicant reported approximately 16.9 acres of Mojave fringe-toed lizard habitat onsite, which is concentrated in a small dune complex in the southern portion of the site. However, during site visits conducted January and May 2010, staff noted that suitable habitat for this species was more extensive, and in May, observed several Mojave fringe-toed lizards outside the habitat area as originally reported. Staff estimates total acreage of suitable habitat, including sandy drainages and small patches of aeolian sand deposits and micro-dunes scattered throughout the southern portion of the site, as 164.7 acres. Staff believes that avoidance of habitat on-site would not prevent adverse impacts to Mojave fringe-toed lizards, due to habitat fragmentation, road kill, and increased predation (project facilities would serve as perch sites for foraging raptors, facilitating their ability to find and capture lizards and other ground-dwelling species). Staff has proposed Condition of Certification **BIO-13** (Mojave Fringe-Toed Lizard Mitigation)**,** which requires the acquisition of suitable dune/sand habitat at a 3:1 ratio to mitigate loss of suitable breeding habitat and at a 1:1 ratio for surrounding habitat suitable for foraging and cover. While this mitigation would reduce the project's impacts below a level of significance, a residual adverse impact remains, including a net loss of habitat and interruption of suitable east-west movement habitat.

Burrowing Owl: Construction of the proposed Calico Solar Project would result in direct loss of foraging habitat for the burrowing owl (a BLM sensitive species and a California Species of Special Concern). Two burrowing owls and eleven active burrows were recorded by the applicant north of the project boundary, near the toe of the Cady Mountains. Numerous additional burrows that could support burrowing owls were noted during desert tortoise surveys. Staff's proposed Condition of Certification **BIO-21** (Burrowing Owl Impact Avoidance and Minimization Measures) provides minimization and avoidance measures for this species, and prescribes that the applicant must establish the breeding status of the owls onsite. Depending on how owls use the site (i.e., breeding vs. wintering), relocation methods would be implemented to accommodate the full life cycle of the species. Staff's proposed Condition of Certification **BIO-17**, the compensatory mitigation plan for desert tortoise, would likely also offset burrowing owl habitat loss provided the species occurs on the potential relocation sites.

Golden Eagle: Golden eagle, a BLM sensitive and California Fully Protected species (i.e., may not be taken or possessed as defined under State law), nests within 5 miles of the project site and has been observed foraging over the project area. The large scale land use conversion for the Calico Solar Project would in essence remove approximately 6,215 acres of foraging habitat in the region. This loss could substantially interfere with normal breeding, feeding, or sheltering behavior, by causing golden

eagles to forage more widely and therefore spend less time at or near their nests. This effect could be considered a “take,” pursuant to the federal Bald and Golden Eagle Protection Act. Staff has proposed Conditions of Certification **BIO-20** (Pre- Construction Surveys for Golden Eagles) to avoid impacts to nesting golden eagles and ensure project compliance with federal requirements. The USFWS has also raised concerns regarding potential collision threats associated with solar and renewable technologies. To address potential collision concerns (discussed below under operational effects) staff has proposed Condition of Certification **BIO-22** (Avian Protection Plan / Monitoring Bird Impacts from Solar Technology). This condition requires a monitoring and reporting program that would document and report potential collision mortality from the proposed solar fields, and implementation of adaptive management measures as determined necessary.

Nelson’s Bighorn Sheep: Nelson’s bighorn sheep, a BLM sensitive species, is well known from the Cady Mountains, where its population consists of at least 300 animals (SES 2009aa; DW 2010). During surveys conducted in winter 2010 for golden eagles, the applicant detected 62 sheep within 10 miles of the proposed project. The northern boundary of the project area is on the upper bajada of the Cady Mountains, an area generally considered potential spring foraging habitat. The project area as analyzed in this SSA does not include year-around occupied habitat (DW 2010). Direct effects to Nelson’s bighorn sheep would include the loss of approximately 1,078 acres of spring foraging habitat. Indirect effects to habitat would include roughly 400 additional acres of spring foraging habitat that may be within the 850-foot 60 dB noise contour around the northern project boundary. Staff notes, however, that project flood control structures would be sited in this area and that significant noise sources (SunCatchers) may be several hundred feet south of the boundary, thus reducing the potential for off-site noise impacts. Additional indirect project effects would include avoidance of manmade structures and activity and surrounding habitat; increased disturbance from public traffic on a new northern boundary road ; and the introduction or spread of non-native, invasive plants. The project could also act as a barrier to movement for sheep using the south side of the Cady Mountains or their foothills to traverse to winter ranges in the Bristol Mountains. The applicant has also proposed general monitoring of sheep behavior if Nelson’s bighorn sheep are seen within 200 feet of construction activities. Staff has incorporated the applicant’s proposal into staff’s proposed Condition of Certification **BIO-23** (Nelson’s Bighorn Sheep Mitigation) and recommended additional measures to require construction monitoring and the potential cessation of construction activities should sheep be present within 500 feet of the project area.

American Badger and Kit Fox: American badgers and kit fox were detected on the Calico Solar Project site and the area supports suitable foraging and denning habitat for these species. Construction of the proposed project would cause direct effects to badgers and kit fox. Because of the large size of the project, numerous badgers or kit foxes may be affected. Animals confined within the exclusionary fence would be subject to ongoing long-term impacts that may result in mortality from road kill, loss or alteration of foraging habitat, overlapping territories and barriers to dispersal. Staff believes that avoidance of badgers and kit fox alone will not mitigate the direct, indirect, and operational effects of the Calico Solar Project. Staff’s proposed Condition of Certification **BIO-24** (American Badger and Desert Kit Fox Impact Avoidance and Minimization Measures) requires that prior to ground disturbance, a qualified biologist perform a

preconstruction survey for badger and kit fox dens in the project area, including areas within 250 feet of all project facilities, utility corridors, and access roads. If present, the applicant will flag and avoid occupied badger and kit fox dens during ground-disturbing activities and establish a buffer to avoid loss of maternity dens. Should the applicant need to work in an area with occupied badger dens, the applicant will slowly excavate the den in accordance with Condition of Certification **BIO-24**. Staff's proposed Condition of Certification **BIO-17**, the compensatory mitigation plan for desert tortoise habitat, would also offset the loss of habitat for these species and reduce the impact from habitat loss to less-than-significant levels under CEQA.

Jurisdictional Waters: The project would directly or indirectly affect numerous ephemeral washes on the Calico Solar Project site. There are 282.2 acres of State jurisdictional streambeds on the site. All of these streambeds would be directly or indirectly affected by project construction and operation, including upstream interruption and redirection of natural flows. In addition, washes downstream of the project would be subject to impacts from the modification of drainage patterns onsite. The attenuation of peak storm flows and the subsequent loss of sediment to the system from the detention basins can adversely affect biological resources dependent on these features.

Staff has proposed Condition of Certification **BIO-26** (Streambed Impact Minimization and Compensation Measures), and has provided additional recommendations and guidance consistent with typical CDFG Streambed Alteration Agreement requirements. These include the acquisition of offsite habitat, the implementation of Best Management Practices, and the replacement of lost smoke tree and catclaw acacia habitats at a 3:1 ratio. It is possible that the applicant could meet the compensatory requirements, including replacement of smoke tree and catclaw acacia habitat, with the implementation of Condition of Certification **BIO-17,** which requires compensatory mitigation lands for desert tortoise. With implementation of staff's proposed Condition of Certification **BIO-26**, impacts to State jurisdictional waters associated with the desert washes would be mitigated to less-than-significant levels under CEQA. In addition, staff has identified Condition of Certification **BIO-28** (Channel Decommissioning and Reclamation Plan), to be implemented upon project termination.

Cumulative Impacts: Staff concludes that without mitigation, the Calico Solar Project will contribute to the cumulatively significant loss of the Mojave Desert's biological resources, including the State and federally threatened desert tortoise and other special status species. Impact avoidance and minimization measures described in staff's analysis and included in the conditions of certification would help reduce impacts to these resources. These compensatory measures are necessary to offset project-related losses, and to assure compliance with State and federal laws such as the federal and State Endangered Species Acts. Even with the implementation of these measures, the project's contribution to cumulative significant impacts to Mojave fringe-toed lizard would be considerable because of the project's effect on habitat isolation and fragmentation, even after implementing staff's recommended conditions of certification.

Staff concludes that, with the incorporation of recommended Conditions of Certification **BIO-1** through **BIO-30**, the proposed Calico Solar Project would be in compliance with applicable Laws, Ordinances, Regulations, and Standards (LORS).

C.2.2 INTRODUCTION

This section of the Supplemental Staff Assessment (SSA) provides the California Energy Commission (Energy Commission) staff analysis of potential impacts to biological resources from the construction and operation of the proposed Calico Solar Project. Information provided in this document addresses potential impacts to vegetation communities, areas of critical biological concern, and special-status species. This analysis describes the biological resources at the project site and at the locations of ancillary facilities. This document identifies potentially significant impacts to biological resources, evaluates the adequacy of mitigation proposed by the applicant to address those impacts, and specifies additional mitigation measures designed to reduce impacts. It also describes compliance with applicable laws, ordinances, regulations, and standards (LORS) and includes staff's proposed conditions of certification.

This analysis is based, in part, upon information provided in the Calico Solar Project Application for Certification (SES 2008), Biological Resources Technical Report (SES 2009aa) and other submittals; responses to staff data requests (SES 2009b; 2009c; 2009d; 2009g; 2009h; 2009j; 2009p; 2009q; 2009r; 2009s; 2009v; 2009y), and staff workshops and informational hearings (SES 2009n; 2009t); responses to interveners' data requests (SES 2009e; 2009f; 2009i; 2009m; 2009o; 2009u; 2009w; 2009x); scoping comments (DW 2009a; SCBS 2009; WC 2009a; WS 2009; USEPA 2009; WWP 2009); site visits by staff in January 2010; communications with representatives from the California Department of Fish and Game (CDFG) and the U. S. Fish and Wildlife Service (USFWS); and staff's independent research. Subsequent to the publication of the SA/DEIS, the applicant submitted additional information that staff has used for the analysis contained within this SSA. This additional information includes a revised project description (Lill 2010; TS 2010d; 2010j), comments on the SA/DEIS (TS 2010h), and the results of 2010 surveys (TS 2010e; 2010f; 2010g; 2010i). In addition, the Energy Commission has completed a sand transport study for the proposed project, included as Appendix A to this SSA.

Changes from Staff Assessment/Draft Environmental Impact Statement:

While much of this section of the SSA is identical to that published in the March 2010 Staff Assessment/Draft Environmental Impact Statement (SA/DEIS), some revisions have been made that reflect changed circumstances and new information. These changes have been made by the Applicant for a variety of reasons including to reduce or avoid impacts to biological resources. **Biological Resources Table 1** provides a summary of the impacts to biological resources identified during the SA/DEIS associated with the original project footprint defined in the AFC; identifies impacts from the project description presented in the SSA; and provides the rationale for modifications. Other project modifications are summarized below:

- Separate CEQA/NEPA Documents. The SA/DEIS was a joint California Environmental Quality Act (CEQA) /National Environmental Policy Act (NEPA) document. The BLM's final NEPA analysis, the Final Environmental Impact Statement, will be published separately from the SSA. The NEPA-specific language from the SA/DEIS has generally been retained in this section. The **Introduction** section of the SSA provides a detailed discussion of the separation of the CEQA and NEPA documents.

- 2010 Survey Results: The SSA incorporates a variety of supplemental data requested by staff in the SA/DEIS. This includes preliminary botany surveys conducted in the spring and early summer of 2010; golden eagle surveys; protocol surveys for desert tortoise of the entire project footprint; and preliminary data of protocol desert tortoise surveys of the proposed translocation sites. The botanical surveys were floristic in nature and followed a wet winter and spring. As a result of these surveys several new rare plant locations were detected in the project footprint.
- Additional biological data was also provided by staff who conducted supplemental surveys of the project site on May 25 and 26, 2010. These surveys resulted in the detection of new Mohave fringe-toed lizard locations and further data that indicate the use of the site by Nelson's bighorn sheep. Staff also developed new data on the fluvial and hydrogeomorphic transport of sediment and fine sands on the project site and a determination of the project's potential to disrupt sand transport to offsite locations.
- New Project Features and Modifications: Major Project changes have been made since the Calico Solar Project SA/DEIS was published (March 2010). Staff has analyzed the impacts of these Project modifications in subsection C.2.4.2. The modifications include:
    - A substantial reduction in the total project footprint area. Most of this reduction is at the northern boundary, where the revised project boundary as analyzed in this SSA is about 4,000 feet south of the toe slopes of the Cady Mountains; and
    - The proposed project water supply has been changed from an off-site source, to be delivered by rail or truck, to an adjacent off-site well and associated pipeline.
- Additional Mitigation Options: Discussion of mitigation options has been added to reflect recent establishment of a Renewable Energy Action Team Account with the National Fish and Wildlife Foundation that may be used by the Applicant to deposit mitigation funding, as well as SBX8 34, legislation recently signed by the Governor that allows qualifying projects like the Calico Solar Project to make use of a new in-lieu fee program.
- New and revised Conditions of Certification: The SSA includes one new condition of certification: **BIO-30** In-Lieu Fee Mitigation Option. Conditions of Certification **BIO-12**, Special-Status Plant Impact Avoidance and Minimization, **BIO-13**, Mojave Fringe-toed Lizard Mitigation, **BIO-17**, Desert Tortoise Compensatory Mitigation, **BIO-18**, Raven Monitoring, Management, and Control Plan, **BIO-20**, Pre-construction Surveys for Golden Eagles, and **BIO-22**, Avian Protection Plan / Monitoring Bird Impacts from Solar Technology, have been extensively revised and expanded to reflect changes to the project design, new information on special-status species occurrence, and updated resource agency guidelines or policies. Revisions have been made in most other conditions of certification to address comments from the applicant and other parties.

Biological Resources Table 1
Comparison of SA/DEIS AND SSA

Impact Type/ Project Feature	SA/DEIS	SSA	Rationale for Change
Project Footprint	8,230 acres	6,215 acres	Reduction based on agency and staff feedback. Reduces impacts to biological resources and increases east-west linkage for wildlife movement (incl. desert tortoises and Nelson's bighorn sheep) north of the project boundary.
Project Water Supply	Cadiz Burlington Northern Santa Fe (BNSF) well, located approximately 64 miles southeast of the Calico Solar site. Brought to the project site via truck or rail.	Water to be obtained from a well adjacent to the Calico Solar Project site; transported to site via a new 0.51-mile water pipeline.	Reduces emissions from rail and/or truck transport of water to site, eliminates need to unload the water at the rail siding, and uses water of a lower quality for plant operations. Adjacent well is also more accessible and less expensive.
Desert Tortoise	Minimum 100 tortoises occur in project footprint and would require relocation/translocation Approximately 8,230 acres of habitat would be directly impacted within the project footprint Linkage along the northern border of the project would be impeded by rough terrain of the Cady Mountain foothills.	Minimum 57 tortoises occur in revised project footprint and would require translocation Approximately 6,215 acres of habitat would be directly impacted within the project footprint Linkage along the northern border of the project would roughly follow 4,000-foot contour interval, below rough terrain of the foothills, and would allow greater movement and use by desert tortoises.	Reduced project footprint and relocation of northern project boundary
Mojave Fringe-Toed Lizard (MFTL)	Applicant mapped 16.9 acres of habitat. Staff believed this was an underestimate of actual habitat on site; recommended mitigation at 5:1 ratio.	Staff estimates that 164.7 acres of MFTL would be directly impacted within the project footprint; recommends mitigation at 3:1 ratio for breeding habitat, 1:1 for surrounding forage/cover habit.	Additional MFTL observations by staff and the applicant after the release of the SA/DEIS and staff's estimated extent of suitable habitat
Nelson's Bighorn Sheep	Original project footprint included year-around bighorn sheep habitat, spring foraging habitat, and restricted movement in the southern Cady Mountains foothills.	Revised project footprint would eliminate impacts to year-around bighorn sheep habitat; reduce impacts to spring foraging habitat and movement	Reduction of project footprint and relocation of northern project boundary based on feedback by staff and the wildlife agencies to reduce impacts to habitat and to provide a linkage above the northern boundary of the site.

Impact Type/ Project Feature	SA/DEIS	SSA	Rationale for Change
Burrowing Owl	Loss of approximately 8,230 acres of habitat	Loss of approximately 6,215 acres of habitat	Revision of project footprint as described above
Golden Eagle	Loss of approximately 8,230 acres of foraging habitat	Loss of approximately 6,215 acres of foraging habitat	Revision of project footprint as described above
Special-Status Plants	Direct and indirect impacts to white-margined beardtongue, Emory's crucifixion thorn; additional unknown impacts due to limited field survey data	Indirect impacts to white-margined beardtongue locations to be protected and designated Environmentally Sensitive Areas; no impacts to Emory's crucifixion thorn	Results of additional botanical surveys Revision of project footprint as described above

Laws, Ordinances, Regulations, and Standards (LORS)

The applicant will need to abide by the laws, ordinances, regulations, and standards (LORS) during project construction and operation, as listed in **Biological Resources Table 2**.

Biological Resources Table 2
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
FEDERAL	
Federal Endangered Species Act (Title 16, United States Code, section 1531 et seq., and Title 50, Code of Federal Regulations, part 17.1 et seq.)	Designates and provides for protection of threatened and endangered plant and animal species and their critical habitat. "Take" of a federally-listed species is prohibited without an incidental take permit issued under Section 10 or an incidental take statement, obtained through a Section 7 consultation (between federal agencies).
Migratory Bird Treaty Act (Title 16, United States Code, sections 703 through 711)	Makes it unlawful to take or possess any migratory bird (or any part of such migratory bird including active nests) as designated in the Migratory Bird Treaty Act unless permitted by regulation (e.g., duck hunting).
Clean Water Act (Title 33, United States Code, sections 1251 through 1376, and Code of Federal Regulations, part 30, section 330.5(a)(26))	Requires the permitting and monitoring of all discharges to surface water bodies. Section 404 requires a permit from the U.S. Army Corps of Engineers (USACE) for a discharge from dredged or fill materials into waters of the U.S., including wetlands. Section 401 requires a permit from a regional water quality control board (RWQCB) for the discharge of pollutants. By federal law, every applicant for a federal permit or license for an activity that may result in a discharge into a California water body, including wetlands, must request State certification that the proposed activity will not violate State and federal water quality standards.
Bald and Golden Eagle Protection Act (Title 16, United States Code section 668)	Provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the take, possession, and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the act.

Applicable Law	Description
California Desert Conservation Area Plan 1980, as amended (reprinted in 1999)	Administered by the BLM, the CDCA Plan requires that proposed development projects are compatible with policies that provide for the protection, enhancement, and sustainability of fish and wildlife species, wildlife corridors, riparian and wetland habitats, and native vegetation resources.
California Desert Protection Act of 1994	An Act of Congress which established 69 wilderness areas, the Mojave National Preserve, expanded Joshua Tree and Death Valley National Monuments and redefined them as National Parks. Lands transferred to the National Park Service were formerly administered by the BLM and included significant portions of grazing allotments, wild horse and burro Herd Management Areas, and Herd Areas.
West Mojave Plan	As an amendment to the CDCA Plan, the BLM produced the West Mojave Plan (WEMO) (BLM 2006). The WEMO is a federal land use plan amendment that (1) presents a comprehensive strategy to conserve and protect the desert tortoise, the Mohave ground squirrel (MGS) and nearly 100 other plants and animals and the natural communities of which they are part, and (2) provides a streamlined program for complying with the requirements of the California and federal Endangered Species Acts (BLM et al. 2005).
STATE	
California Endangered Species Act of 1984 (Fish and Game Code, sections 2050 through 2098)	Protects California's listed threatened, and endangered species, and candidate species. "Take" of a State-listed species is prohibited without an Incidental Take Permit, a Consistency Determination issued under Fish and Game Code, section 2080.1, or coverage in a plan approved under the Natural Community Conservation Planning Act, Fish and Game Code, sections 2800-2835.
California Code of Regulations (Title 14, sections 670.2 and 670.5)	Lists the plants and animals of California that are declared rare, threatened, or endangered.
Fully Protected Species (Fish and Game Code, sections 3511, 4700, 5050, and 5515)	Designates certain species as fully protected and prohibits the take of such species unless authorized for scientific purposes or other specific purposes (see also California Code of Regulations, Title 14, section 670.7).
Nest or Eggs (Fish and Game Code section 3503)	Protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird.
Birds of prey (Fish and Game Code section 3503.5)	Birds of prey are protected in California making it unlawful to take, possess, or destroy any birds of prey (in the order Falconiformes or Strigiformes) or the nest or eggs of those birds.
Migratory Birds (Fish and Game Code section 3513)	Protects California's migratory birds by making it unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame birds except as provided in federal rules and regulations.
Significant Natural Areas (Fish and Game Code section 1930 et seq.)	Designates certain areas such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitat.
California Environmental Quality Act (CEQA), CEQA Guidelines section 15380	CEQA defines rare species more broadly than the definitions for species listed under the State and federal Endangered Species Acts. Under section 15830, species not protected through State or federal listing but nonetheless demonstrable as "endangered" or "rare" under CEQA should also receive consideration in environmental analyses.

Applicable Law	Description
Streambed Alteration Agreement (Fish and Game Code sections 1600 et seq.)	Regulates activities that may substantially divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake in California. Impacts to vegetation and wildlife resulting from disturbances to waterways are also reviewed and regulated during the permitting process.
California Native Plant Protection Act of 1977 (Fish and Game Code section 1900 et seq.)	Provides for the protection of State-listed rare, threatened, and endangered plants.
California Desert Native Plants Act of 1981 (Food and Agricultural Code section 80001 et seq. and California Fish and Game Code sections 1925-1926)	Protects non-listed California desert native plants from unlawful harvesting on both public and private lands in Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego Counties. Unless issued a valid permit, wood receipt, tag, and seal by the commissioner or sheriff, harvesting, transporting, selling, or possessing specific desert plants is prohibited.

Desert Renewable Energy Conservation Plan – Interim Planning

In addition to the federal, state, and local LORS summarized above, federal and state agencies are currently collaborating to establish joint policies and plans to facilitate development of California's utility-scale renewable energy projects while conserving the State's biological resources. On October 12, 2009, the State of California and the U.S. Department of Interior entered into a Memorandum of Understanding (MOU) on renewable energy, building on existing efforts by California and its federal partners to facilitate renewable energy development in the state. The MOU stems from California and Department of Interior energy policy directives, California's legislative mandate to reduce greenhouse gases to 1990 levels by 2020, and Governor Arnold Schwarzenegger's goal in Executive Order # S-14-08 that 33% of California's electricity production come from renewable energy sources by 2020.

The California-Department of Interior MOU expands on several MOUs issued in 2008 to establish the activities of the California Renewable Energy Action Team (REAT). The REAT was initially formed with California Executive Order S-14-08 (issued November 18, 2008), to "*establish a more cohesive and integrated statewide strategy, including greater coordination and streamlining of the siting, permitting, and procurement processes for renewable generation* …."

The Energy Commission and CDFG are the primary state collaborators in the REAT, operating under a November 18, 2008 MOU between the two agencies to create a "one-stop process" for permitting renewable energy projects under their joint permitting authority. The BLM and the USFWS also participate in the REAT under a separate MOU signed in November 2008, which outlines the state and federal cooperation of the group. The October 12, 2009 MOU between California and the Department of Interior reiterates several tasks of the REAT provided for in S-14-08 and the Energy Commission-Fish and Game MOU.

The REAT's primary mission is to streamline and expedite the permitting processes for renewable energy projects in the Mojave and Colorado Desert ecoregions within the State of California, while conserving endangered species and natural communities at

the ecosystem scale. To accomplish this goal the REAT Agencies are developing a Desert Renewable Energy Conservation Plan (DRECP), a science-based process for reviewing, approving, and permitting renewable energy applications in California. Once the DRECP is complete, anticipated in late 2012, the plan will provide tools to expedite coordination of federal and state endangered species act permitting. The DRECP will also offer a unified framework for state and federal agencies to oversee mitigation actions, including land acquisitions, for listed species.

The REAT Agencies approved a Planning Agreement to guide preparation of the DRECP on May 17, 2010. Section 8.9 of the Planning Agreement http://energy.ca.gov/2009publications/REAT-1000-2009-034/REAT-1000-2009-034-F.PDF provides that the REAT Agencies will work to ensure that permitting for interim projects: be consistent with the preliminary conservation objectives for the DRECP; not compromise successful completion and implementation of the DRECP; facilitate Federal Endangered Species Act, California Endangered Species Act, National Environmental Policy Act, and California Environmental Quality Act compliance; and not be unduly delayed during preparation of the DRECP.

REAT Account

The REAT agencies signed a Memorandum of Agreement (MOA) with the National Fish and Wildlife Foundation (NFWF) to establish a REAT Account managed by NFWF that may be used by project developers as a tool to help implement t specified mitigation for approved renewable energy projects in the Mojave and Colorado Desert region of southern California (the MOA is available at www.energy.ca.gov/33by2020). For each project using the REAT Account an individual subaccount would be established for project specific tracking, compliance and accounting purposes. The subaccount would identify a list of the specific mitigation actions, the cost, and a timeframe for carrying out the actions. NFWF would manage the subaccount on behalf of the REAT agencies, and at their direction would disburse mitigation funding to satisfy mitigation requirements for impacts to biological resources. NFWF is a charitable non-profit corporation established in 1984 by the federal government to accept and administer funds to further the conservation and management of fish, wildlife, plants and other natural resources (http://www.nfwf.org). Use of the REAT Account would not change any of the requirements a project proponent must fulfill in order to comply with applicable State and Federal environmental laws governing the permitting of the projects, but provides the project developer with an option for utilizing NFWF for carrying out the required mitigation. Staff's proposed Conditions of Certification **BIO-12, BIO-13, and BIO-17** would provide the project owner with the option of implementing certain mitigation requirements through use of the REAT Account.

Senate Bill X8 34

Separate from the NFWF MOA, legislation was enacted this year providing a mitigation fee option for qualifying renewable energy projects to meet certain State mitigation obligations, Senate Bill X8 34 (SBX8 34) includes a $10 million State loan that CDFG can use for advanced mitigation habitat purchases. This advanced mitigation can be used by a qualifying solar renewable energy project to receive credit for implemented mitigation in exchange for payments into the Renewable Energy Development Fee

Trust Fund to reimburse the State the cost of the advance purchases. In addition, the legislation establishes a separate mitigation fee program for eligible projects that gives project developers the option of paying fees to have CDFG implement certain project mitigation required under CESA and CEQA. Condition of Certification **BIO-30** is included to reflect the SBX8 34 fee option. At the time the SSA was prepared, advance habitat acquisitions had not occurred and the interim mitigation strategy needed to implement an in-lieu fee program was still under development.

C.2.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

The determination of whether a project has a significant effect on biological resources is based on the best scientific and factual data that staff could review for the project. Significance criteria are defined in the general context of the California Environmental Quality Act (CEQA) and other relevant federal and State laws, ordinances, regulations, and standards. To satisfy CEQA requirements, conclusions are made regarding the significance of each identified impact that would result from the proposed project and alternatives. Significance criteria have been identified and utilized to make these significance conclusions. In comparison, NEPA states that "'Significantly' as used in NEPA requires considerations of both context and intensity…" (40 CFR 1508.27). Therefore, thresholds serve as a benchmark for determining if a project action will result in a significant adverse environmental impact when evaluated against the baseline. NEPA requires that an Environmental Impact Statement (EIS) is prepared when the proposed federal action (project) as a whole has the potential to "significantly affect the quality of the human environment."

The following significance criteria for biological resources were derived from the CEQA Guidelines (Appendix G, Environmental Checklist Form). Impacts of the proposed project or alternatives would be considered significant and would require mitigation if the project would:

- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the BLM, CDFG, or USFWS.
- Have an adverse effect, either directly or through habitat modifications, on any species listed as endangered, threatened, or proposed for listing or critical habitat for these species.
- Have a substantial adverse effect, either directly or through habitat modifications on any species identified as a candidate for listing, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFG, BLM, or USFWS.
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinances.
- Conflict with the provisions of an adopted Habitat Conservation Plan (HCP), Natural Communities Conservation Plan (NCCP), or other approved local, regional, Federal, or State HCP.

Significance conclusions for individual impacts are not required for compliance with NEPA. However, the SA/DEIS considers the context and intensity of the impacts, as defined in the NEPA implementing regulations 40 CFR Part 1508.27. Therefore, conclusions presented in the following analysis regarding the significance of identified impacts are provided for the purposes of CEQA only.

C.2.4 PROPOSED PROJECT

C.2.4.1 SETTING AND EXISTING CONDITIONS

Regional Setting

Calico Solar, LLC proposes to construct an 850-megawatt (MW) solar power generation facility on public land administered by the BLM in the Mojave Desert in San Bernardino County, California. The project site is located approximately 37 miles east of the city of Barstow, just north of Interstate 40 (I-40). The Cady Mountain Wilderness Study Area (WSA) is located north of the Calico Solar Project site. The Pisgah Crater, within the BLM-designated Pisgah Area of Critical Environmental Concern (ACEC), is located south and east of the project (south of I-40 by several miles). Several underground and above ground utilities traverse the area.

The Mojave Desert is located between the Great Basin Desert to the north and the Colorado Desert to the south, and lies in the rain shadow of the Sierra Nevada and Transverse Mountain ranges. It is generally a large alluvial-filled basin with many isolated mountain ranges scattered throughout. The Mojave receives most precipitation during winter months, although summer thunderstorms also occur (Schoenherr 1992). The average annual precipitation at Daggett Airport, approximately 23 miles east of the project site, is approximately 3.8 inches, and average monthly temperatures at this location generally range between 36 and 104°F (WRCC 2010).

The project site is located northwest of the Pisgah Crater, also known as Pisgah Volcano. The volcano is the youngest vent in the Lavic Lake volcanic field. It is speculated that there may have been activity at this site as recently as 2,000 years ago, though more likely 20,000 to 50,000 years ago. The lava flows extend over 10 miles from the cone and are visible at the ground surface at some locations within the project boundary (SES 2008).

The Pisgah Area of Critical Environmental Concern (ACEC) is located adjacent to the southeast boundary of the Calico Solar Project site. This ACEC contains the Pisgah Crater and lava flow, and supports several sensitive species including Mojave fringe-toed lizard (*Uma scoparia*), desert tortoise (*Gopherus agassizii*), crucifixion thorn (*Castela emoryi*), white-margined beardtongue (*Penstemon albomarginatus*), and sand linanthus (*Linanthus arenicola*) (BLM et al. 2005). The ACEC designation is used by the

BLM to identify areas with special management issues and priorities related to the conservation of important natural, cultural, and scenic resources, and to identify natural hazards. While no direct project impacts would occur to this ACEC, indirect impacts may occur as discussed below.

The Cady Mountains north of the project site have been designated as a Wilderness Study Area by the BLM. Wilderness Study Areas meet the criteria to be considered Wilderness Areas, but have not been designated as such by Congress. BLM is required to maintain the wilderness characteristics of a Wilderness Study Area until a final decision is made by Congress as to whether or not to include the area as part of the National Wilderness Preservation System (NWPS). A herd of Nelson's bighorn sheep inhabit the Cady Mountains Wilderness Study Area. While no direct project impacts would occur to this area, indirect impacts may occur as discussed below.

The Ord-Rodman Desert Wildlife Management Area (DWMA) is located adjacent to the southwest portion of the project site. This DWMA, which includes federally designated critical habitat for desert tortoise, was established by the West Mojave Plan for the conservation and recovery of the desert tortoise. Public lands within DWMAs are designated as ACECs (BLM et al. 2005). While no direct project impacts would occur to this DWMA, indirect impacts may occur as discussed below. The project site is located entirely within designated Solar Energy Study Areas (SESA), which the BLM has identified as areas where sensitive lands, wilderness, and other high-conservation-value lands were excluded (BLM News Release, July 27, 2009). A recent study completed in cooperation between Caltrans and the CDFG has also identified the project area as an essential biological connectivity area between the Bristol and Ord Mountains (Spencer et al. 2010).

Project Area

The project area consists of the proposed Calico Solar Project solar fields and all associated buildings, substation, and linear facilities within the solar field footprint. The project area does not include any transmission upgrades, which would be permitted under a joint EIS/EIR prepared by the BLM and California Public Utilities Commission. The transmission upgrades are discussed as future connected actions below in Section C.2.8. The project area is primarily open, undeveloped land within the Mojave Desert. The site encompasses approximately 6,215 acres and ranges in elevation from approximately 1,925 to 3,050 feet (587 to 930 m) above mean sea level. The proposed project area is bordered by the Cady Mountains to the north, the Newberry Mountains to the west, an existing Southern California Edison (SCE) transmission line to the east, and I-40 to the south (SES 2008).

The project site lies within a broad alluvial floodplain that transports runoff from the Cady Mountains to the north. In addition, a collection of small to medium channels intersects the project from the south and east. All of these drainages generally collect and flow in a westerly direction.

Proposed Project

The proposed project consists of an 850-MW facility occupying 6,215 acres of land. This current project design has a smaller footprint than previously identified in the SA/DEIS

and was modified in response to concerns regarding project size, location, and wildlife movement raised by agency and staff. For further clarification regarding the changes to the proposed project, see Section C.2.2 (**Introduction**). The project would be constructed in two phases and would align the output of Phase I with the capacity of the Southern California Edison (SCE) transmission system early interconnect upgrade prior to the completion of a 500-kV upgrade to the Lugo-Pisgah Transmission line. The new Phase I would be limited to 275 MW, with the remaining 575 MW as part of Phase II. Each phase would be configured in 1.5-MW solar groups of 60 SunCatchers and Phase II would expand the project to a total of 34,000 SunCatchers configured in 567 (1.5-MW) solar groups with a total net generating capacity of 850 MW.

The total area within the project boundary that would be required for both phases, including the area for the operation and administration building, the maintenance building, and the onsite substation, is approximately 6,215 acres. This entire acreage is located on public lands administered by the BLM. The project would be connected to the SCE Pisgah Substation via an approximate 2-mile, single-circuit, 220-kV transmission line (SES 2008). **Biological Resources Figure 1** shows the revised site layout and boundary.

Major components of the proposed project include the following:

- Installation of 34,000, 38-foot solar dish Stirling systems (i.e., SunCatchers) and associated equipment;
- Onsite access and maintenance roads (both paved and unpaved), with a combination of roadway dips and elevated sections across drainage features;
- Water supply and treatment system, including two 175,000-gallon water storage tanks (40 feet in diameter) and two 17,000-gallon water storage tanks (18 feet in diameter);
- A buried septic tank system with a dual sanitary leach field;
- Main Services Complex;
- Hydrogen system;
- Electrical collection system (both underground and overhead);
- Calico Solar Substation (approximately 3 acres);
- Approximately 2-mile single-circuit 220-kV transmission line;
- Railroad overpass to cross the existing BNSF tracks;
- Two 3,000,000 gallon evaporation ponds;
- Stormwater detention basins, debris basins, and diversion channels; and
- Perimeter fencing

Water Supply and Discharge

The applicant previously proposed to obtain water for project use from the Cadiz Burlington Northern Santa Fe (BNSF) well, located approximately 64 miles southeast of the Calico Solar site. However, subsequent to the release of the SA/DEIS, the applicant

changed the proposed primary water supply to a well adjacent to the project site. Water from the well will be supplied to the Main Services Complex via a 0.51-mile pipeline. Once operational, project water demand is estimated to be approximately 20.4 acre-feet per year (**Soil & Water Table 5**).

Drainage, Erosion, and Sediment Control

The Calico Solar Project would require the construction of a water diversion and sediment control facility to divert water and limit scour on the project site. This would involve the construction of debris and retention basins, and a linear storm water diversion system to transport water to approximately seven primary drainages that occur on the site. For a detailed description of the proposed drainage layout please see the **Soil and Water Resources** section in this document.

Evaporation Ponds

To support the routine washing requirements of the SunCatcher units a reverse osmosis system would be constructed on the site. Blow down water from this facility would be discharged into two 3,000,000 gallon evaporation ponds. Each pond would be approximately 1.0 acre in size (pers. comm., Matt Moore, URS).

Construction Schedule, Workforce, Access, and Laydown Areas

Construction of the Calico Solar Project from site preparation and grading to commercial operation is expected to require approximately 41 months, with the overall project schedule lasting approximately 48 months (SES 2008). Heavy construction would be scheduled to occur between 0700 and 1900 Monday through Friday. Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. Some activities would continue 24 hours per day, 7 days per week. These activities include, but are not limited to, SunCatcher assembly, refueling of equipment, staging of materials for the next day's construction activities, quality assurance/control, and commissioning. The size of the onsite workforce will range from a minimum of 131 to a maximum of 703 (SES 2008).

The project would have four laydown areas, two for each Phase. The southeast corner of Phase I would have a laydown area on approximately 26 acres and the other laydown area would be located on approximately 14 acres adjacent to the Main Services Complex. Phase II would have a laydown area on approximately 26 acres located just north of I-40 and immediately east of Hector Road and the other laydown area would be located on approximately 11 acres adjacent to the Satellite Services Complex. (SES 2008)

Operations/Maintenance Activities

The Calico Solar Project is designed for an operating life of 40 years and is expected to operate 7 days a week, generating electricity during normal daylight hours when solar energy is available. It is expected that the project would be operated with a staff of approximately 180 full-time employees. Maintenance activities would occur 7 days a week, 24 hours a day to ensure SunCatcher availability when solar energy is available.

The SunCatchers will be regularly washed to keep mirror surfaces free of dust buildup to optimize solar energy potential. It is assumed that each SunCatcher would receive a

“normal” wash using 14 gallons of demineralized water on a monthly basis. During a 3-month period each year, every SunCatcher would receive a “scrub” wash that would require up to 42 gallons of water. (SES 2008)

Water consumption is estimated at an average of 20 acre-feet [6,517,020 gallons] of well water per year, with an annual maximum of 40 acre-feet [13,034,040 gallons], and would mainly be used to provide water for washing SunCatchers, for dust control, and for water treatment system discharge. (SES 2010)

The Calico Solar Project site would require routine inspections and maintenance which would be conducted nightly at various locations.

Vegetation and Wildlife

Plant Communities

The project site as analyzed in this RSA would impact three vegetation communities: desert saltbush scrub, Mojave creosote bush scrub, and desert microphyll woodland. In addition, the applicant has identified 28 acres of developed land uses (e.g., roads, railroads, transmission lines, and underground gas pipelines) on the proposed project site These vegetation types (excluding desert microphyll woodland) and land uses were described in the AFC and Biological Resources Technical Report (SES 2008; SES 2009aa), though the acreages have been adjusted to reflect revised project design. The Mojave creosote bush scrub and desert saltbush scrub descriptions correspond to natural communities described by Holland (1986). The applicant did not indicate vegetation mapping methodology or minimum mapping units.

Thomas et al. (2004) mapped and described vegetation throughout the central Mojave Desert, including the proposed project site. Their vegetation map generally corresponds to the vegetation map developed by the applicant (SES 2009aa). However, the Thomas et al. mapping of the project area is relatively coarse, combining several vegetation alliances into the broader category, creosote bush mixed scrub. The authors point out that they “did not find it possible to map most vegetation types directly to the alliance level.” Neither the applicant’s (SES 2009aa) nor the Thomas et al. (2004) vegetation maps are at a fine enough scale to identify small patches of other alliances within the mapped creosote bush or saltbush categories. The primary differences between the two maps is that the applicant (2009) mapped an area of saltbush scrub in the southwestern part of the proposed project site, not mapped by Thomas et al. (2004); and that Thomas et al. mapped a small area of desert wash in the south-central part of the project site and a small area of lava beds and cinder cone in the southeast corner of the site not mapped by the applicant. Staff noted both of these areas on the site during site visits in January 2010, and the analysis below incorporates staff’s observations and the applicant’s additional mapping of microphyllous plant species (URS 2010). The mapped lava beds and cinder cone area as mapped by Thomas et al. (2004) are sparsely vegetated shrubland generally similar to the Saltbush (*Atriplex hymenelytra*) shrubland alliance (Thomas et al. 2004: Figure A7).

Staff’s observations of the project site in January 2010 are generally consistent with mapping by the applicant (SES 2009aa) and Thomas et al. (2004) in broad descriptions and mapping units. However, staff also found numerous smaller patches of vegetation

associations not shown in either prior vegetation map. Staff did not quantify species composition or map these smaller associations. Instead, these smaller units are named and described briefly below as subcategories within descriptions of the larger vegetation units.

Mojave creosote bush scrub: The majority of the project site (approximately 5,946 acres) is mapped as Mojave creosote bush scrub (C. Lill, pers. comm.; Thomas et al. 2004). Over most of the proposed project area, the dominant shrub species are creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*). The applicant reports that other common shrubs include desert senna (*Senna armata*), Nevada ephedra (*Ephedra nevadensis*), encelia (*Encelia farinosa, E. actoni, E. frutescens*), and range ratany (*Krameria erecta, K. grayii*) (SES 2009aa). Shrubs are typically widely spaced and support a diverse assemblage of annual and perennial herbs in years of adequate seasonal precipitation.

Thomas et al. (2004) combine several alliances in the creosote bush mapping units. Depending on cover of other shrubs, the mapping units include the following shrubland alliances: *Larrea tridentata*; *Larrea tridentata-Ambrosia dumosa*; *Larrea tridentata-Encelia farinosa*; and occasionally *Ambrosia dumosa* or *Encelia farinosa*. These creosote bush shrublands have been described in other classification systems as Mojave creosote bush scrub (Cheatham and Haller 1975; Holland 1986; Thorne 1982). None of these alliances have special conservation status ranking (CDFG 2003; 2007).

Creosote bush is well known for forming “creosote rings,” which are very old plants growing from slowly-spreading root crowns. Creosote rings are protected under the San Bernardino County Plant Protection and Management Ordinance and were not evaluated in the Biological Resources Technical Report or the AFC (SES 2009aa; SES 2008). In some cases, these rings are more than 10,000 years old and apparently develop on the surfaces of very old bajadas (Vasek 1980).

Staff did not observe creosote rings at the project site and the project appears to be situated on younger alluvial surface than the sites where creosote rings have been recorded. Staff also reviewed aerial images of the proposed project site and did not observe any indication of creosote rings. Catclaw acacia thorn scrub (desert microphyll woodland): Within the mapped creosote bush scrub, dry desert washes in the northern portion of the proposed project site (i.e., foothills of the Cady Mountains and the upper bajada) support catclaw acacia (*Acacia greggii*) at various densities, sometimes in equal or greater cover and density than creosote bush. Scattered blue palo verde (*Parkinsonia florida*) and smoke tree (*Psorothamnus spinosus*) are also found in these washes. These stands match the Catclaw acacia thorn scrub (*Acacia greggii* shrubland alliance) described by Thomas et al. (2004) and Sawyer et al. (2009). The applicant has provided field data (URS 2010 xx) indicating that 3.3 acres of mapped creosote bush scrub supports catclaw acacia or other microphyllous species in high enough density to warrant mapping and analysis as desert microphyll woodland.

Catclaw acacia thorn scrub is synonymous, in part, with “Mojave wash scrub” and “Mojave desert wash scrub” as described by Holland (1986); “Desert dry wash woodland” described by Cheatham and Haller (1975); and “Desert microphyll woodland” described by Thorne (1982). Catclaw acacia is a large, deep-rooted shrub or small tree,

characteristic of desert washes, occurring in habitats similar to other desert microphyllous wash woodland species. It resprouts rapidly following disturbance by floods, and seed dispersal and germination are apparently initiated by flooding. The seeds are apparently important to small mammals and, historically, to Native Americans (Turner et al. 1995). Catclaw acacia thorn scrub has no special conservation status ranking (CDFG 2003; 2007).

Lower elevation wash and sandfield vegetation: Areas mapped as creosote bush scrub in the southern part of the project area, generally from about 0.25 mile north of the BNSF railroad tracks and southward to the southern project area boundary, include scattered smoke trees. These areas are characterized by sandy soils, in deep sandy washes, open sandfields, and active windblown sandfields.

Sand transport from desert mountain ranges downslope to bajadas and, in some cases, dunelands, occurs throughout the deserts by fluvial and aeolian (i.e., water and wind) processes. Infrequent flooding transports sand downslope along desert washes. Prevailing winds sort sands according to grain size and further transport them downwind. Sediments from the Cady Mountains, upslope, are transported by fluvial processes toward the southern part of the project site, and redistributed by wind, particularly the southeastern part of the site, where fine windblown sands spread across the lower bajada and small hills in a small dune system, associated with active channels and partially stabilized sandfields.

Smoke tree is a shrub or small tree characteristic of desert washes and arroyos. In some areas it may be the dominant or co-dominant species, often occurring with other desert wash species (see catclaw acacia thorn scrub, above). Mixed stands, where smoke trees occur with smaller creosote bush or white bursage, may be classified as smoke tree woodland, even where smaller shrubs constitute as much as twice the overall cover (Thomas et al. 2004; Sawyer et al. 2009). On the project site, a few small smoke trees occur in washes of the upper bajadas, and they are more common in lower washes where they are conspicuous, but do not make up a substantial proportion of total cover. Smoke tree is relatively short lived (to approximately 50 years), and is strongly tied to active washes. Its stands regenerate following floods, which abrade dormant seeds, permitting them to germinate (Sawyer et al. 2009). Smoke trees are protected under the San Bernardino County Plant Protection and Management Ordinance.

Big galleta shrub-steppe (*Pleuraphis rigida* herbaceous alliance): On the proposed project site, big galleta (*Pleuraphis rigid* = *Hilaria rigida*) occurs in low sandy areas and around the margins of dunes in the southeastern portion of the site. These areas are too small to map as separate units. In dune areas, it is often interspersed with small stands of the desert sand verbena (*Abronia villosa*) or desert panic grass (*Panicum urvilleanum*). Throughout the Mojave Desert, it commonly occurs in patches within creosote bush shrublands and has often been included within that vegetation description (Thomas et al. 2004). In some areas at higher elevations, big galleta shrub-steppe occurs in closed stands, but the occurrences on the project site match the description by Sawyer et al. (2009), as “open stands around dune margins and other sandy areas at low elevations.” Staff distinguishes it from the broader creosote bush scrub description due to its occurrence on sandy substrates which provide a unique

habitat type and support special-status species, particularly Mojave fringe-toed lizard, on the site. Some vegetation associations of sandy substrates dominated or co-dominated by big galleta are ranked as special-status vegetation types (CDFG 2003; 2007).

Desert saltbush scrub: The applicant mapped 242 acres of desert saltbush scrub on the project site (SES 2009aa). They compared this desert saltbush scrub to Holland's (1986) description of this vegetation, as strongly dominated by desert saltbush (*Atriplex polycarpa*) with white burrobush (*Hymenoclea salsola*) and inkweed (*Suadea moquinii*) at lower cover; generally occurring on fine-textured, poorly drained saline or alkaline soils. Thomas et al. (2004) and Sawyer et al. (2009) subdivide desert saltbush scrub further, recognizing several saltbush dominated alliances. On the project site, staff noted at least two *Atriplex*-dominated shrubland types in relictual wash or bajada surfaces in the southwestern part of the project site. These appeared to match the *Atriplex canescens* and *Atriplex polycarpa* Shrubland Alliances described by Sawyer et al. (2009), but plant identifications could not be confirmed in January. Staff noted that desert saltbush scrub grades into creosote bush scrub over a wide area in this part of the project site. Fourwing saltbush (*A. canescens*) is generally an indicator of deep fluvial or aeolian sand, whereas desert saltbush (*A. polycarpa*) is typical of playa/upland transition areas on granitic alluvium (Keeler-Wolf 2007). None of the Mojave desert saltbush shrublands have special conservation status (CDFG 2003; 2007).

Jurisdictional Waters

The project site is located on a large alluvial fan that supports numerous drainages that flow from the Cady Mountains. This watershed consists of 43 square miles and is capable of producing substantial flood flows during the 100-year storm event (SES 2009s). Because of the historic flow patterns, arid climate, and various levels of soil development desert washes can vary substantially in their characteristics.

Due to the arid conditions of the area, most of the surface waters that exist in the region are ephemeral streams. The ephemeral streams in the project site are typically dry washes that only flow in response to precipitation. Regional storms, which generally occur in the winter months, are typically of low intensity, but can create short-lived ephemeral streams and cause significant flooding on the playa lake beds. Alternatively, intense summer thunderstorms within the mountainous portions of the area can produce flooding in the low-lying valleys. During summer months, ephemeral streams may only last for a couple of hours. Conversely during the winter, flow within portions of these drainages has the potential to last up to several days. The West Mojave Plan (WMP) indicates the most important hydrologic features of these basins are the alluvial fans.

The AFC indicated that streams that would meet the criteria as Waters of the State or Waters of the United States were not present on the site. However, a site investigation conducted by staff identified numerous drainages with well-defined banks, and in some areas, vegetation characteristic of desert washes. This included catclaw acacia thorn scrub, smoke tree woodland, and big galleta shrub-steppe. In response to staff and agency comments, a formal jurisdictional delineation for regulated waters was conducted by the applicant to determine the extent of potential jurisdictional waters of the U.S. and/or waters of the State within the project (2010). This includes waters (and/or wetlands) regulated under the federal Clean Water Act and/or streams and

associated habitat regulated under the California Fish and Game Code. The delineation identified a total of 282.8 acres of State Jurisdictional Waters within the Project Disturbance Area.

All of these drainages are ephemeral and are largely characterized by sparse creosote bush scrub with small associations of microphyll woodland species such as catclaw acacia thorn scrub, smoke tree woodland, and big galleta shrub-steppe. In many locations the channels are largely devoid of vegetation or support scattered populations of annual wildflowers and grasses. The US Army Corps of Engineers has determined that the site does not support waters meeting the definition of Waters of the United States (SES 2009j). Wetlands are not present in the project footprint.

Wildlife

The project area supports a broad diversity of wildlife species. With the exception of the areas surrounding the BNSF railroad and existing roads the majority of the site consists of relatively undisturbed desert scrub communities. While the site primarily supports creosote bush scrub, a number of unique features occur throughout the site, including outcrops of black volcanic rock associated with lava flows from Pisgah Crater and wind-blown sand dune habitats. Numerous sandy washes also occur throughout the site. These types of features increases the biodiversity of the site, as some habitat specialists use these areas exclusively, while other generalist species are more wide-ranging in the region. For example, the Mojave fringe-toed lizard is closely associated with sand dunes, sand sheets, and sandy soils in the Mojave Desert. In addition, genetic variants of several reptile and small mammal species have been recorded in association with the dark substrates from the Pisgah lava flows, including melanistic (e.g., darker colored) forms of desert horned lizard (*Phrynosoma platyrhinos*), side-blotched lizard (*Uta stansburiana*), and long-nosed leopard lizard (*Gambelia wislizenii*). In addition, some mammal variation has been documented in this region including coat color variation in desert woodrats (*Neotoma lepida*) (Lieberman and Lieberman 1969; Rosenblum et al. 2004; SES 2009aa).

Some of the species detected by the applicant during surveys conducted between 2007 and 2010 include desert tortoise (*Gopherus agassizii*), Mojave fringe-toed lizard (*Uma scoparia*), side-blotched lizard, desert iguana (*Dipsosaurus dorsalis*), western whiptail (*Aspidoscelis tigris*), zebra-tailed lizard (*Callisaurus draconoides*), desert horned lizard, western banded gecko (*Coleonyx variegatus*), long-nosed leopard lizard, and sidewinder (*Crotalus cerastes*). Mammals recorded during the surveys include black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), round-tailed ground squirrel (*Spermophilus tereticaudus*), coyote (*Canis latrans*), American badger (*Taxidea taxus*), bobcat (*Lynx rufus*), and desert kit fox (*Vulpes macrotis*) (SES 2009aa; TS 2010d; TS 2010e).

Despite the moderate to low shrub density that occurs on the site the project area provides forage, cover, roosting, and nesting habitat for a variety of bird species. In addition, many species, such as golden eagle (*Aquila chrysaetos*), are known to nest in the adjacent Cady Mountains and have been observed over the project area. Common resident and migratory birds detected in and near the Calico Solar Project site between 2007 and 2010 by the applicant include common nighthawk (*Chordeiles minor*), mourning dove (*Zenaida macroura*), white-crowned sparrow (*Zonotrichia leucophrys*),

horned lark (*Eremophila alpestris*), black-throated sparrow (*Amphispiza bilineata*), and yellow-rumped warbler (*Dendroica coronata*). Common raven (*Corvus corax*), house finch (*Carpodacus mexicanus*), California quail (*Callipepla californica*), northern mockingbird (*Mimus polyglottos*), sage sparrow (*A. belli*), western kingbird (*Tyrannus verticalis*), western meadowlark (*Sturnella neglecta*), and violet-green swallow (*Tachycineta thalassina*) were also observed. Raptors and owls detected at or near the site include red-tailed hawk (*Buteo jamaicensis*), golden eagle, burrowing owl (*Athene cunnicularia*), Swainson's hawk (*Buteo swainsoni*), prairie falcon (*Falco mexicanus*), and turkey vulture (*Cathartes aura*). (SES 2009aa; TS 2010d; TS 2010e; TS 2010f)

Special-Status Species

The project area is known to support a variety of sensitive plant and wildlife species. **Biological Resources Table 3** lists all special-status species evaluated during the analysis that are known to occur or could potentially occur in the project area and vicinity. Special-status species detected or considered possible or likely to occur based on known occurrences in the vicinity and suitable habitat present within the project area are discussed in more detail below. Sensitive plants considered possible or likely to occur were also evaluated from habitat descriptions and geographic ranges as summarized by Baldwin et al. (2001), Munz (1974), the California Native Plant Society (2010), the Consortium of California Herbaria (2010), and the California Natural Diversity Database (CDFG 2010a). Special-status species observed on the project site are indicated by bold-face type. Potential for occurrence is defined as follows:

Present: Species or sign of their presence observed on the site during surveys conducted for the proposed project (species that are present are noted in **bold text** in **Biological Resources Table 3**).

High: Species or sign not observed on the site, but reasonably certain to occur on the site based on conditions, species ranges, and recent records (within approximately 20 years and 10 miles of project site).

Moderate: Species or sign not observed on the site, but conditions suitable for occurrence and/or an historical record (greater than 20 years old) exists in the vicinity (within approximately 10 miles of project site).

Low: Species or sign not observed on the site, and conditions marginal for occurrence.

Not likely to occur: Species or sign not observed on the site, outside of the known range, and conditions unsuitable for occurrence.

Biological Resources Table 3
Special-Status Species, Their Status, and Potential Occurrence at the Calico Solar Project Site

Scientific Name	Common Name	Status	Potential For Occurrence On-Site
PLANTS			
Androstephium breviflorum	Pink funnel-lily, Small-flowered androstephium	CNPS 2.2	Present
Astragalus jaegerianus	Lane Mountain milk-vetch	FE, CNPS:1B.1	Not likely to occur
Astragalus lentiginosus var. *borreganus*	Borrego milk-vetch	CNPS: 4.3	Low
Blepharidachne kingii	King's eyelash grass	CNPS: 2.3	Low
Calochortus striatus	Alkali mariposa lily	BLM S, CNPS: 1B.2	Not likely to occur
Camissonia boothii var. *boothii*	Booth's evening primrose	CNPS: 2.3	Moderate
Cassia – see *Senna*			
Castela emoryi	Emory's crucifixion thorn	CNPS: 2.3	Low
Cleomella brevipes	Short-pedicelled cleomella	CNPS: 4.2	Low
Coryphantha alversonii [*Escobaria vivipara* var. *alversonii*]	Foxtail cactus	CNPS: 4.3	Present
Coryphantha chlorantha [*Escobaria vivipara* var. *deserti*]	Desert pincushion	CNPS: 2.1	Low
Coryphantha vivipara var. *rosea* [*Escobaria vivipara* var. *rosea*]	Viviparous foxtail cactus	CNPS: 2.2	Low
Cryptantha holoptera	Winged cryptantha	CNPS: 4.3	Present (unconfirmed)
Cymopterus deserticola	Desert cymopterus	BLM S, CNPS: 1B.2	Low
Cymopterus multinervatus	Purple-nerve cymopterus	CNPS: 2.2	Low
Cynanchum utahense	Utah vine milkweed	CNPS: 4.2	Present
Eriophyllum mohavense	Barstow woolly-sunflower	BLM S, CNPS: 1B.2	Low
Escobaria – see *Coryphantha*			
Gilia – see *Linanthus*			
Linanthus maculatus	Little San Bernardino Mountains linanthus	BLM S, CNPS: 1B.2	Not likely to occur
Loeflingia squarrosa var. *artemisiarum*	Sagebrush loeflingia	CNPS: 2.2	Not likely to occur
Lupinus sp.	Undescribed lupine	n/a	Low
Mentzelia eremophila	Solitary blazing-star	CNPS: 4.2	High
Mentzelia tridentata	Creamy blazing-star	BLM S, CNPS: 1B.3	Low
Mimulus mohavensis	Mojave monkeyflower	BLM S, CNPS: 1B.2	Low
Muilla coronata	Crowned muilla	CNPS: 4.2	Present (unconfirmed)
Nemacaulis denudata var. *gracilis*	Slender woolly-heads	CNPS: 2.2	Low
Pediomelum castoreum	Beaver Dam breadroot	CNPS: 4.3	Low

Scientific Name	Common Name	Status	Potential For Occurrence On-Site
Penstemon albomarginatus	White-margined beardtongue	BLM S, CNPS: 1B.1	Present
Phacelia coerulea	Sky-blue phacelia	CNPS: 2.3	Not likely to occur
Polygala acanthoclada	Thorny milkwort	CNPS: 2.3	Low
Senna covesii [*Cassia covesii*]	Coves' cassia	CNPS: 2.2	Present (unconfirmed)
Sphaeralcea rusbyi var. *eremicola*	Rusby's desert mallow	BLM S, CNPS: 1B.2	Low
Tripterocalyx micranthus	Small-flowered sand-verbena	CNPS: 2.3	Present (unconfirmed)
Wislizenia refracta ssp. *refracta*	Jackass-clover	CNPS: 2.2	Moderate
REPTILES			
Anniella pulchra pulchra	Silvery legless lizard	CSSC	Low
Gopherus agassizii	Desert tortoise	FT, ST	Present
Heloderma suspectum cinctum	Banded gila monster	BLM S, CSSC	Low
Lichanura trivirgata	Rosy boa	n/a	Moderate
Uma scoparia	Mojave fringe-toed lizard	BLM S, CSSC	Present
BIRDS			
Accipiter cooperii	Cooper's hawk	CDFG WL	Low
Aquila chrysaetos	Golden eagle	BLM S, SP, CDFG WL	Present
Asio otus	Long-eared owl	CSSC	High
Athene cunicularia	Western burrowing owl	BLM S, CSSC	Present
Buteo regalis	Ferruginous hawk	CDFG WL	High
Buteo swainsoni	Swainson's hawk	BLM S, ST	Present (not nesting)
Chaetura vauxi	Vaux's swift	CSSC	Low
Charadrius montanus	Mountain plover	BLM S, CSSC	Moderate
Circus cyaneus	Northern harrier	CSSC	Low
Eremophila alpestris actia	California horned lark	CDFG WL	Low
Falco columbarius	Merlin	CDFG WL	High
Falco mexicanus	Prairie falcon	CDFG WL	Present (not nesting)
Lanius ludovicianus	Loggerhead shrike	FBCC, CSSC	Present
Polioptila melanura	Black-tailed gnatcatcher	n/a	High
Toxostoma bendirei	Bendire's thrasher	BLM S, CSSC	Present
Toxostoma lecontei	LeConte's thrasher	BLM S, CDFG WL	Present
MAMMALS			
Antrozous pallidus	Pallid bat	BLM S, CSSC	Moderate
Corynorhinus townsendii	Townsend's big-eared bat	BLM S, CSSC	Present
Euderma maculatum	Spotted bat	BLM S, CSSC	Low
Eumops perotis	Western mastiff bat	BLM S, CSSC	High
Ovis Canadensis nelsoni	Nelson's bighorn sheep	BLM S, SP	Present
Spermophilus mohavensis	Mohave ground squirrel	BLM S, ST	Not Likely to Occur
Taxidea taxus	American badger	CSSC	Present
Vulpes macrotis arsipus	Desert kit fox	n/a	Present

Scientific Name	Common Name	Status	Potential For Occurrence On-Site

FE = Federally listed Endangered
FT = Federally listed Threatened
FD = Federally Delisted
FC = Federal Candidate
FBCC = Federal Bird of Conservation Concern
BLM S = BLM Sensitive
SE = State listed Endangered
ST = State listed Threatened (wildlife)
SR = State listed Rare (plants)
CSSC = California Species of Special Concern (wildlife)
SP = State Fully Protected Species
CDFG WL = California Department of Fish and Game Watch List species

CNPS (California Native Plant Society) Designations:

List 1A = Plants presumed extinct in California
List 1B = Plants considered by CNPS to be rare, threatened, or endangered in California, and throughout their range
List 2 = Plants rare, threatened, or endangered in California, but more common elsewhere in their range
List 3 = Plants about which we need more information – a review list.
List 4 = Plants of limited distribution – a watch list

CNPS Threat Rank:

.1 = Seriously endangered in California (over 80% of occurrences threatened/high degree and immediacy of threat)
.2 = Fairly endangered in California (20-80% occurrences threatened)
.3 = Not very endangered in California (<20% of occurrences threatened or no current threats known)

Special-Status Plants

Appendix A of the applicant's Biological Resources Technical Report (SES 2009aa) indicates that five special-status plant species occur on the proposed project site: small-flowered androstephium, Emory's crucifixion-thorn, foxtail cactus, Utah vine milkweed, and white-margined beard-tongue. In addition to these five species, Appendix D of the Biological Resources Technical Report (SES 2009aa) indicates that four additional special-status plants occur on the project site: winged cryptantha, crowned muilla, Coves's cassia, and small-flowered sand verbena.

Biological Resources Figure 2 identifies the locations of rare plants confirmed during the 2010 botanical surveys conducted by the applicant (TS 2010i).

Small-Flowered Androstephium (*Androstephium breviflorum*)

This species is ranked on CNPS List 2.2 (i.e., rare, threatened or endangered in California but more common elsewhere) and as S2.1 by CDFG (2010b; i.e., fewer than 1000 known individuals or fewer than 2000 acres of occupied habitat). Small-flowered androstephium is a bulb, generally occurring in sandy or rocky soil, in open desert shrublands of eastern California, through the Great Basin, to western Colorado (Cronquist et al. 1977; Keator 2001). As of 1993, formal documentation of small-flowered androstephium occurrence in California was still needed (Keator 1993) and as of 1996 it was known in California from only four herbarium specimens and a photograph (White et al.1996). Since then, botanical field surveys conducted to compile baseline data for numerous new land use proposals (e.g., Fort Irwin Land Expansion Project and various energy projects) have discovered numerous additional occurrences, documented in part by CNPS (2010) and the Consortium of California Herbaria (2010). The documentation of many new occurrences indicates that small-flowered androstephium is more common in California than previously thought. However, staff has noted that a large percentage (85%) of the occurrences documented in the CDFG's California Natural Diversity Database (CNDDB) is threatened by development (solar energy projects and Fort Irwin expansion).

Small-flowered androstephium was reported from 52 locations on the project site and 14 additional occurrences within a 1000-foot buffer surrounding the site (SES 2009aa). Numerous additional occurrences were documented on public lands to the west and east, including many in the Pisgah ACEC. In 2010, more than 1,500 locations were documented on the site and it was reported as “ubiquitous” throughout the southern part of the project site (TS 2010i).

Lane Mountain Milk-Vetch (*Astragalus jaegerianus*)

This species is the only listed (endangered) plant species with potential to occur in the project area. It was not found in or near the project site (SES 2009aa; TS 2010i). Lane Mountain milk-vetch is locally endemic in the central Mojave Desert, generally on and near Fort Irwin. All known occurrences are about 25 miles northwest of the proposed project site, and at higher elevations (3100-4200 feet; USFWS 2004; Charlton 2007) than occur on the site.

The Calico Solar Project site is not within designated critical habitat or areas formerly proposed for designation as Lane Mountain milk-vetch critical habitat. The USFWS (2004) proposed four Critical Habitat Units, all to the north of the proposed project site. In 2005, the USFWS finalized its critical habitat designation rule, designating 0 acres of critical habitat (USFWS 2005).

Lane Mountain milk-vetch is a perennial herb that climbs up through desert shrubs. It flowers during spring and dies back during summer. It almost always occurs on shallow soils on low ridges or hills of granitic outcrops rather than bajadas (BLM 2001; USFWS 2004; Charlton 2007). Staff concludes that Lane Mountain milk vetch is unlikely to occur on the project site because of its distance from known occurrences and poorly suitable bajada habitat that occurs throughout most of the project site.

Emory’s Crucifixion Thorn (*Castela emoryi*)

Crucifixion thorn is known from only a few widely scattered occurrences in the Sonoran Desert and southern Mojave Desert in eastern California, southwestern Arizona, northern Baja California, and western Sonora (Mexico). Most populations are fairly small, though one occurrence in Imperial County near the Mexican border includes about a thousand plants. That site is managed by the BLM as “Crucifixion Thorn Natural Area” (Turner et al. 1995). Crucifixion thorn is a leafless, densely spiny shrub, about 6 to 20 ft. tall. It occurs along washes or other places where water may accumulate on plains and bajadas. Its fruits are held on the plant for several years, and the seeds are surrounded by a thick carpel wall which must be eroded before germination occurs. Sanders (no date) speculated that seeds may have historically been dispersed by now-extinct Pleistocene grazing animals. The common name “crucifixion thorn” is also used for two unrelated plant species, *Koeberlinia spinosa* and *Canotia holacantha*.

Emory’s crucifixion thorn was found at three locations on the formerly-proposed project site (SES 2009aa; TS 2010i). All three locations are near the toe slopes of the Cady Mountains, outside the project footprint as addressed in this SSA.

Foxtail Cactus (*Coryphantha alversonii = Escobaria vivipara* var. *alversonii*)

Foxtail cactus is typically found in sandy and rocky areas consisting of granitic soils within Mojavean desert scrub habitat from 245-5000 feet in elevation (CNPS 2010). It is recorded from the eastern Mojave and Colorado Deserts in Imperial, Riverside, and San Bernardino Counties, California. It is a stem succulent that is a CNPS List 4.3 species. It flowers from April through June (CNPS 2010). It was reported on the Calico Solar Project site at one location during the 2008 surveys for the proposed project, though the occurrence was not mapped in the applicant's Biological Resources Technical Report (SES 2009aa). It was not relocated on-site during the follow-up surveys (TS 2010i). Suitable desert shrubland habitat occurs throughout site.

Winged Cryptantha (*Cryptantha holoptera*)

Winged cryptantha occurs on gravelly or rocky substrates in desert scrub communities at elevations of 328 to 5545 feet (CNPS 2010). It is known in California from the eastern Mojave Desert and Colorado Desert, and also occurs in Nevada, Arizona, Baja California, and Sonora (Mexico) (CNPS 2010). It is an annual herb with grayish foliage that blooms between March and April. It is on CNPS List 4.3. Winged cryptantha was reported in the applicant's list of plant species identified during surveys (SES 2009aa – Appendix D), though its locations were not mapped or quantified in the applicant's Biological Resources Technical Report (SES 2009aa). It was not relocated on-site during the follow-up surveys (TS 2010i). Suitable desert shrubland habitat occurs throughout much of the project site.

Utah Vine Milkweed (*Cynanchum utahense*)

Utah vine milkweed is a perennial herb found in the Mojave Desert in San Bernardino County and in the Colorado Desert in Riverside, Imperial, and San Diego Counties. This species also occurs in Arizona, Nevada, and Utah (CDFG 2010a). In California its habitat is sandy and gravelly soils, often in washes, where it climbing up through shrubs. Utah vine milkweed is on CNPS List 4.2. It in present on the Calico Solar Project site, as the applicant reported one location onsite near I-40 (SES 2009aa). It was also reported in 2010 (TS 2010i) though its locations were not mapped or quantified. Additional suitable habitat is found in washes throughout the project area.

Undescribed Lupine (*Lupinus* spec. nov.)

Several lupine specimens collected near the base of the Cady Mountains, north of the present project boundary, do not appear to match any known species. They are similar to bajada lupine (*Lupinus concinnus*) though they do not match any of the several described varieties of that species. This is an annual species with blue flowers. They are apparently distinct in several characters, particularly the leaflet shape and width. James Andre (pers. comm.) has noted similar plants elsewhere in the central Mojave Desert. In Andre's experience, the plant appears to be sufficiently rare and geographically restricted to warrant inclusion in either CNPS List 1B or List 4, though he has not researched it enough to recommend such listing. During 2010 field surveys (TS 2010i), locations of the undescribed lupine species were mapped throughout the survey area (which corresponded to the project area as proposed in the AFC). All of these locations are north of the project boundary as analyzed in this SSA, and no occurrences were found within the revised project area.

Crowned Muilla (*Muilla coronata*)

Crowned muilla is on CNPS List 4.2. It occurs in Inyo, Kern, Los Angeles, San Bernardino and Tulare Counties, and east into Nevada. It can be found in chenopod scrub, Joshua tree woodland, Mojavean desert scrub, and pinyon and juniper woodlands at elevations of about 2500-6400 feet. It is a bulbiferous herb that blooms between March and April (CNPS 2010). Crowned muilla it was reported in the applicant's list of plant species identified during surveys (SES 2009aa – Appendix D), though it was not mapped or quantified in the applicant's Biological Resources Technical Report and was not relocated during 2010 field surveys (TS 2010i)

White-Margined Beardtongue (*Penstemon albomarginatus*)

White-margined beardtongue is the only CNPS List 1B species documented within the proposed project area (SES 2009aa). It is also managed by the BLM as a sensitive species. White-margined beardtongue occurs in the central Mojave Desert, in and around the Pisgah lava flow, in stabilized or drifting aeolian sand habitat (Jaeger 1941; Munz 1974; The Nature Conservancy 2007; CNPS 2010). It is a perennial herb, flowering in spring (between March and May) and dying back to the ground in summer. White-margined beardtongue is a locally endemic species in three widely disjunct locations in California, Nevada, and Arizona. In California, its known range is limited to the valley south of the Cady Mountains, near Hector, Lavic, and Ludlow (MacKay 2003; MacKay no date). The Consortium of California Herbaria (2010) reports 40 specimens, all from the same general area. There also is a report from Fenner Valley in California (Nature Conservancy 2007) though that occurrence apparently is not supported by an herbarium specimen and has not been relocated in numerous follow-up field surveys (J. Andre pers. comm.; C. Rutherford pers. comm.). Within California, most of its geographic range is within the BLM Pisgah ACEC. There is also one report from the "Baghdad Chase Mine," which was south of Ludlow on or near what is now 29 Palms Marine Base, and another from Lavic Lake on the Marine Base. But white-margined beardtongue was not reported on the 29 Palms Marine Base in the inventory of its natural resources which included extensive botanical surveys (Minnich et al. 1993). In Nevada, it is known only from several populations southeast of the I-15 Freeway, between Stateline and Las Vegas. These occurrences are threatened by a proposed new construction project (Christina Lund, BLM, pers. comm.). In Arizona, white-margined beardtongue occurs at Dutch Flat (Arizona Rare Plant Committee 2004), described as "a large plain extending west of the Hualapai Mtns." (i.e., east or southeast of Needles) (MacKay 2003). In Arizona, as in California, it is regarded it is "a rare species throughout its range" (Arizona Rare Plant Committee 2004).

White-margined beardtongue habitat is similar in the three disjunct areas where it is found. Its habitat, including soil characteristics, has been described in general by the Nature Conservancy (2007) and in greater detail for the Arizona and Nevada populations (Anderson 2001; Etymesian et al. 2010). In Nevada, it is found in sandy soils, most often in deep, loose to stabilized sand, sometimes on dunes or in washes or alluvium, and often near small dry drainages or wash margins. Scogin (1989) described its habitat similarly for California occurrences east of the project site, though J. Andre (pers. comm.) notes that it also is found away from washes, in open sandfields. In Nevada, there generally is an upwind sand source, though the amounts of sand transported onto occupied habitat is very low (Etymesian et al. 2010). Its occurrences

are consistently on mapped Quaternary alluvial deposits (Nature Conservancy 2007), where windblown sand may overlie bajada or alluvial fan surfaces. In Arizona, it is found on sandy loam alluvial terraces or on sandy wash bottoms (Anderson 2001).

White-margined beardtongue is present at several locations on the Calico Solar Project site (TS 2010i; Figure 2) and numerous other occurrences off-site to the southeast (on lands managed by BLM as the Pisgah Area of Critical Environmental Concern) (SES 2009aa; CDFG 2010a). Staff observed several of the white-margined beardtongue locations on the proposed project site in May 2010. These plants were in stabilized sandy soils along minor dry drainages, consistent with reports of its habitat in Nevada.

White-margined beardtongue appears to require several years of above-average rainfall to become established from seed, and cross-sections of stem bases suggest that individual plants may survive for several decades (Etymesian et al. 2010). There is no known feasible horticultural method to propagate white-margined beardtongue. Scogin (1989) was unable to successfully to transplant it or to propagate it from cuttings. He did not attempt to propagate it from seed, or to use cuttings taken from the bases of plants (i.e., to include part of the original taproot). Further horticultural research may provide a feasible propagation method.

Staff is not aware of long-term white-margined beardtongue population monitoring research. James Andre (pers. comm.) has revisited known locations and noted localized extirpations during or shortly after drought years in the early 2000s. Windblown sand and its associated habitats are naturally variable over time. Habitats include actively moving dunes; relatively stabilized sand flats; areas of sand depletion (deflation plains) and sand sheets overlying other substrates (Danin 1996). Due to varying habitat and rainfall, white-margined beardtongue may exist as “metapopulations,” where local occurrences are extirpated by poor conditions but are replaced by new occurrences when seedlings become established at new sites during favorable conditions. in future years, white-margined beardtongue may have the potential to occur anywhere in the lower elevation wash and sandfield vegetation on the Calico project site. .

Coves’ Cassia (*Senna covesii =Cassia covesii*)

Coves’ cassia, a CNPS List 2.2 species, occurs in scattered California locations along the desert margin of the Peninsular ranges, interior desert ranges in Riverside County, and in extreme southeastern San Bernardino County. It is more common and widespread in Arizona and Baja California, and also occurs in Nevada and mainland Mexico (McMinn 1939; Shreve and Wiggins 1964; CNPS 2010). It occurs in desert washes, below about 2000 ft. elevation. It is a low shrub with velvety leaves and stems which distinguish it from the more common *Cassia armata*. The flowers are yellow, appearing in spring in racemes of few flowers each. Coves’ cassia has been reported from surveys of the project site in the Biological Resources Technical Report (SES 2009aa – Appendix D), though the locations are not mapped and there is no indication of numbers of plants or extent of distribution across the project site. The 2009 report, if valid, would be the first record of Coves’ cassia in the central Mojave Desert. It was not relocated on the site during 2010 field surveys (TS 2010i), and the original report was apparently due to misidentification. Staff concludes that Coves’ cassia is unlikely to occur on the site.

Small-Flowered Sand-Verbena (*Tripterocalyx micranthus*)

This CNPS List 2.3 species is a taprooted perennial herb of desert dunes and sandy sites. It occurs in the eastern California deserts (where it has been reported from only two locations), eastward to the Rocky Mountain States. Its elevational range is approximately 1,800 to 2,800 feet. The only reliable prior reports in California are from the Kelso area (Spellenberg 2002; CNPS 2010) and Eureka Valley in Inyo County (Consortium of California Herbaria 2010). Small-flowered sand-verbena was reported on the Calico Solar Project site in the applicant's Biological Resources Technical Report (SES 2009aa – Appendix D), though the locations were not mapped, nor was there an indication of numbers of plants or extent of distribution across the project site. If valid, this report would be the first record of small-flowered sand-verbena in the central Mojave Desert. It was not relocated on the site during 2010 field surveys (TS 2010i), and the original report was apparently due to misidentification. Staff concludes that small-flowered sand verbena is unlikely to occur on the site.

Reptiles

Desert Tortoise (*Gopherus agassizii*)

The desert tortoise is an herbivore that may attain a carapace length of 9 to 15 inches. The tortoise is able to live where ground temperature may exceed 140° F because of its ability to dig burrows and escape intense solar radiation. At least 95% of its life is spent in burrows. The tortoise enters brumation (the reptilian form of hibernation) during the period from September to November and leaves the burrow during the period from February to April. In the spring this species becomes most active above ground from March through May when foraging opportunities are optimal. Tortoises remain active — though to a lesser extent — between June and October. During the active period in the warmer months of the year, tortoises retreat to burrows during periods of intense heat, to rest at night, and to aestivate during extended periods of heat and dryness. Tortoises may also utilize shady areas underneath bushes or rocks during the hottest parts of the day. A single tortoise may have a dozen or more burrows within its home range, and different tortoises may use these burrows at different times.

Range wide, occupied habitats include desert alluvial fans, washes, canyon bottoms, rocky hillsides, and other steep terrain. Tortoises are most common in desert scrub, desert wash, and Joshua tree habitats, but occur in almost every desert habitat except on the most precipitous slopes. Friable soils, such as sand and fine gravel, are an important habitat component, particularly for burrow excavation and nesting. The presence of soil suitable for digging burrows is a limiting factor to desert tortoise distribution (USFWS 1994a).

Plant species play a major role in defining desert tortoise habitat. Creosote bush, burrobush (*Ambrosia dumosa*), Mojave yucca (*Yucca schidigera*), and blackbrush (*Coleogyne ramosissima*) generally distinguish desert tortoise habitat. At higher elevations, Joshua tree and galleta grass are common plant indicators (USFWS 1994a).

The desert tortoise's range includes the Mojave Desert region of Nevada, southern California, and the southwest corner of Utah and the Sonoran Desert region of Arizona and northern Mexico. The desert tortoise range is divided into Mojave and Sonoran

populations. The desert tortoise in the vicinity of the Calico Solar Project is part of the Mojave population, which is primarily found in creosote bush-dominated valleys with adequate annual forbs for forage.

Desert tortoises occur in the project area and are broadly distributed across the proposed project site. Most of the desert tortoises detected during project surveys were noted north of the BNSF railroad, primarily in the bajada near the toe of the Cady Mountains. This area contains good quality habitat for desert tortoise and has less obstructed connectivity to adjacent natural lands. The area between the BNSF railroad and I-40 is isolated by the highway and railroad and portions of the site have been subject to repeated disturbance from pipeline development. Nonetheless, two tortoises were detected in this area and tortoise sign was observed in low density near the center of this area by staff and the applicant. While the railroad poses a substantial barrier to movement, access is available through the many railroad trestles that span the drainages that flow across the site.

The results of the 2010 protocol surveys conducted by the applicant detected 104 tortoises within the original 8,230 acres project footprint (TS 2010e). In response to staff and agency feedback, the applicant reduced the size of the footprint to minimize impacts to desert tortoise linkages. The redesigned project footprint consists of approximately 6,215 acres and avoids large areas of occupied tortoise habitat. Fifty-seven (57) tortoises have been documented within the new proposed project footprint. **Biological Resources Figure 3** shows the locations of desert tortoises detected during the 2010 surveys.

Critical Habitat

The nearest designated critical habitat for this species is located approximately 0.5 mile south of the project site within the Ord-Rodman Desert Wildlife Management Area (DWMA). Interstate 40 and the BNSF Railroad pose barriers to movement between this critical habitat and the Calico Solar Project area.

Banded Gila Monster *(Heloderma suspectum cinctum)*

The banded gila monster is considered rare in California with only 26 credible records of the species documented within the past 153 years (Lovich and Beaman 2007). This large and distinct lizard is difficult to observe even in areas where they have been recently recorded. As a result, little is known about this species' distribution, population status, and life history in California. Most of the historical observations in California occurred in mountainous areas of moderate elevations with rocky, incised topography, in large and relatively high ranges as well as riparian areas (Lovich and Beaman 2007). Despite the widespread distribution of potential habitat throughout the California desert, the few documented observations suggest the California populations may be confined to the eastern portion of the California desert (Lovich and Beaman 2007), and the current distribution is apparently a function of summer rainfall. As reported by Lovich and Beaman (2007), all California gila monster observations except one (Mojave River) occurred east of the 116° longitude in areas that received at least 25% of their annual precipitation during the summer months. Throughout their range, gila monsters appear to be most active during or following summer rain events.

Banded gila monsters were not detected onsite during surveys and the project is avoiding many of the rocky outcrops and lava flows present onsite that could provide habitat. Although this species is not known from the area and the closest known sighting is an historic record from the Providence Mountains approximately 50 miles to the east of the project site (Lovich and Beaman 2007), this species is difficult to detect due to its secretive nature and tendency to remain in underground burrows for extended periods of time. Therefore, there is a low potential for this species to inhabit the project area.

Mojave Fringe-Toed Lizard *(Uma scoparia)*

Mojave fringe-toed lizards are known almost exclusively from California, primarily in San Bernardino and eastern Riverside Counties, but are also found to the north in southeastern Inyo County and historically to the west in eastern Los Angeles County (Jennings and Hayes 1994). Murphy et al. (2006) identified two maternal lineages of this species; the northern lineage is associated with the Amargosa River drainage system, and the southern with the Mojave River drainage system, Bristol Trough, Clark's Pass (including Palen Lake and Pinto Wash), and the Colorado River sand transport systems.

The Mojave fringe-toed lizard is a BLM sensitive species that is found in arid, sandy, sparsely vegetated habitats, within the broader matrix of creosote bush scrub, throughout much of its range (Norris 1958; Jennings and Hayes 1994). It is restricted to habitats where fine, loose, aeolian sand, typically with sand grain size no coarser than 0.375 mm in diameter is available (Turner et al. 1984; Jennings and Hayes 1994; Stebbins 1944). It burrows in the sand to avoid predators and to thermoregulate (Stebbins 1944), though it will also seek shelter in rodent burrows. Sand dunes provide its primary habitat, although it can also be found in the margins of dry lakebeds, washes, and isolated sand habitat, such as scattered hummocks or wind-deposited "sand ramps" against hillsides (BLM et al. 2005).

The most important factor in the Mojave fringe-toed lizard's habitat is the presence of fine sands, but it also uses surrounding desert habitat. For example, while Mojave fringe-toed lizard is the only diurnal lizard in North America that occurs in unvegetated dunes, it also occurs where vegetation is present, including creosote bush scrub (Murphy et al. 2006). A study by Cablk and Heaton (2002) at Marine Corps Air Ground Combat Center at Twentynine Palms (Twentynine Palms) documented Mojave fringe-toed lizard populations in a broader area than expected and concluded that more than just the locally suitable habitat must be identified for management. The species was also found in what was termed "medium-pack sand" in Lead Mountain during a 2001 survey of Twentynine Palms. The study further indicated that suitable habitat exists within a matrix of heterogeneous conditions such as hummocks or pockets of soft sand with few annual species interspersed with hard packed sand and less suitable levels of vegetation and vegetation composition. Windblown (aeolian) sand originates from hydrological processes (i.e., fluvial transport and sorting from desert mountains onto valley floors) (Lancaster and Tchakerian, 2003). Thus, fine sandy washes also serve as Mojave fringe-toed lizard habitat.

The Mojave fringe-toed lizard is primarily insectivorous, but also eats plant food including leaves, seeds, and buds (Stebbins 1944). It normally hibernates from November to February, and emerges from hibernacula from March to April. The breeding season is April to July, and adult Mojave fringe-toed lizards reach sexual

maturity two summers after hatching. Females deposit 2-5 eggs in sandy hills or hummocks May through July (Mayhew 1964; Jennings and Hayes 1994). From April to May, while temperatures are relatively cool, it is active during mid-day; from May to September, it is active in mornings and late afternoon, but seeks cover during the hottest parts of the day. Common predators of the Mojave fringe-toed lizard include burrowing owls, leopard lizards, badgers, loggerhead shrikes, roadrunners, various snakes, and coyotes (Jennings and Hayes 1994).

The Mojave fringe-toed lizard is widespread geographically across the Mojave and northern Colorado deserts, but its distribution is highly fragmented because it is restricted to habitats containing loose sand, which is patchily distributed (Murphy et al. 2007). Many local populations occur on small or isolated patches of sand and are quite small. This fragmented pattern of distribution leaves the species vulnerable to local extirpations from additional habitat disturbance and fragmentation as well as stochastic events (Murphy et al. 2007). The loose wind-blown sand habitat, upon which the Mojave fringe-toed lizard is dependent, is a fragile ecosystem requiring the protection against both direct and indirect disturbances (Weaver 1981; Beatley 1994; Barrows 1996). Environmental changes that stabilize sand, affect sand sources, or block sand movement corridors will also affect this species (Turner et al. 1984; Jennings and Hayes 1994). Threats to Mojave fringe-toed lizard and its habitat include land use conversion for agriculture or urban development, off-highway vehicles (OHV),and other direct and indirect impacts of regional development.. Aside from the direct loss of land, development can also affect Mojave fringe-toed lizards by increasing access by predators, such as the common raven and small raptors, to their habitat. Raven numbers tend to increase around developed facilities due to increased availability of water and trash; other predators may increase in numbers due to availability of new perch sites (e.g., fence posts, sign posts, structures) which allow them to hunt for lizards in areas where no perches were previously available. Potential indirect disturbances are associated with the disruption of the dune ecosystem source sand, wind transport, and sand transport corridors

The applicant reported that the Mojave fringe-toed lizard is present on the Calico Solar Project site, and has been documented in a partially stabilized dune complex located between the BNSF Railroad and I-40 (SES 2008). The applicant identified this site, approximately 16.9 acres, as Mojave fringe-toed lizard habitat. However, staff conducted reconnaissance surveys of the site in January and May 2010, during which times staff inspected the dune complex and adjacent habitats. Four Mojave fringe-toed lizards were detected by staff during the May surveys. These included one lizard within the dune area identified by the applicant; one in soft windblown sand along the large primary drainage west of the delineated habitat; and two in fine accumulated sands on the vegetated windrow that borders the north side of the BNSF railroad. Mojave fringe-toed lizard was also detected along a wash north of the BNSF railroad during the applicant's 2010 desert tortoise surveys. Fine-grained friable sand occurs in many other areas adjacent to the identified dune complex, both within the numerous drainages that cross the project site and in small patches of windblown sand. Similarly, soft friable sands with small patches of micro dunes occur within the creosote bush scrub habitat across much of the lower project site. It is likely that Mojave fringe-toed lizard occurs in low densities across much of the project site south of the BNSR railroad and within and around soft sands associated with the drainages north of the BNSF railroad.

Staff concluded that the 16.9 acres of Mojave fringe-toed lizard habitat on-site as originally reported by the applicant was underestimated. That conclusion was based on observations by staff and the applicant of the animal beyond the habitat originally delineated; the species' known use of heterogeneous soils within and around windblown and fine fluvial sand deposits; and staff's observations of habitat and soils more widely throughout the site. In order to more accurately reflect the extent of occupied and suitable habitat on the site, staff mapped habitat along the primary washes and the BNSF railroad where fine-textured fluvial and windblown sand deposits were observed. Staff surrounded these areas with a 45-meter buffer, based in part on Norris (1958) which indicated that Mojave fringe-toed lizards may be found within 45 meters of their primary aeolian sand habitat. Staff notes that recent work described above (Cablk and Heaton 2002) suggests that the 45-meter buffer area may be an underestimate of this animal's usage of surrounding habitat. Based on this analysis, staff concludes that a minimum of 164.7 acres of suitable and at least partially occupied habitat for Mojave fringe-toed lizard is found on the proposed project site. This estimate includes 21.4 acres of good quality dune or fine sandy wash habitat, and 143.3 acres or surrounding lower-quality habitat (i.e., the 45-meter buffer area described above). **Biological Resources Figure 4** identifies potential habitat on site, as well as recorded observations of individual Mojave fringe-toed lizards on-site.

Birds

Western Burrowing Owl *(Athene cunicularia)*

The burrowing owl is a small, terrestrial owl of open country. Burrowing owls favor flat, open grassland or gentle slopes and sparse shrubland ecosystems. These owls prefer annual and perennial grasslands, typically with sparse, or nonexistent, tree or shrub canopies (Clark and Plumpton 2005). In California, burrowing owls are found in close association with California ground squirrels (Coulombe 1971). Owls use the burrows of ground squirrels and other rodents for shelter and nesting (Martin 1973). Ground squirrels provide nesting and refuge burrows, and maintain areas of short vegetation height, which provide foraging habitat and allow for visual detection of avian predators by burrowing owls (Haug et al. 1993). Habitats lacking ground squirrel populations are usually unsuitable for occupancy by owls, although owls can also use man-made features as burrows (such as drain pipes, debris piles, etc). Burrowing owls are semi-colonial nesters, and group size is one of the most significant factors contributing to site constancy by breeding burrowing owls (Haug et al. 1993). The nesting season, as recognized by the California Burrowing Owl Consortium (CBOC 1993), runs from 1 February through 31 August.

In the Mojave Desert, burrowing owls generally occur at low densities in scattered populations, but they can be found in much higher densities near agricultural lands where rodent and insect prey tend to be more abundant (Gervais et al. 2008). The project area contains suitable foraging habitat and California ground squirrel burrows that could provide breeding habitat. This species is present on the project site, as one individual was observed in the north-central portion of the project site and another individual was observed in the Pisgah ACEC adjacent to the southeast of the project site during field surveys in 2008 (SES 2009aa). Protocol surveys for this species were conducted in January 2010, and two burrowing owls and eleven burrows with sign were

identified approximately 0.5 miles north of the project boundary near the toe of the Cady Mountains (TS 2010g).

Swainson's Hawk *(Buteo swainsoni)*

The Swainson's hawk was once one of the most common birds of prey in the grasslands of California and nested in the majority of the lowland areas of the state. Currently, the nesting range is primarily restricted to portions of the Sacramento and San Joaquin valleys, northeast California, and the Western Mojave, including the Antelope Valley (Bloom 1980). The Swainson's hawk requires large amounts of foraging habitat, preferably grassland or pasture habitats. Its preferred prey includes voles (*Microtus* spp.), gophers, birds, and insects such as grasshoppers (Estep 1989). It has adapted to the use of some croplands, particularly alfalfa, as well as grain, tomatoes, and beets (Estep 1989). Crops such as cotton, corn, rice, orchards, and vineyards are not suitable because they either lack suitable prey, or prey is unavailable to the hawks due to crop structure. Swainson's hawks often establish territories in riparian systems adjacent to suitable foraging habitats as well as utilizing lone trees or groves of trees in agricultural fields.

Within the West Mojave Plan area, the nearest documented nesting attempts have been recorded in Victorville, approximately 50 miles southwest of the project site (BLM et al. 2005); nesting is not known from east of this location within the planning area. Two Swainson's hawks were observed by the applicant during project surveys on March 30, 2008; thus the species is considered present within the project area, though it is not expected to nest there.

Prairie Falcon *(Falco mexicanus)*

Prairie falcons breed throughout California, with the exception of the northwest corner and along the immediate coast (Steenhoff 1998). This species is an uncommon resident that ranges from the southeastern deserts northwest through the Central Valley and along the inner Coast Ranges and Sierra Nevada. It is primarily associated with perennial grasslands, savannahs, rangeland, some agricultural fields, and desert scrub areas (Polite and Pratt 2005). Prairie falcons were observed on the project site during surveys conducted in 2010 and in off-site areas during helicopter surveys for golden eagles (TS 2010f). Nesting habitat for this species does not occur onsite; however, suitable foraging habitat for this species occurs within the project site. This species likely nests in the nearby Cady Mountains. Thus, the potential for occurrence of this species within the project area has been determined to be high, though it is not expected to nest there.

Golden Eagle *(Aquila chrysaetos)*

Golden eagles are typically year-round residents throughout most of their western United States range. They breed from late January through August with peak activity March through July (Kochert et al. 2002). Migratory patterns are usually fairly local in California where adults are relatively sedentary, but dispersing juveniles sometimes migrate south in the fall. This species is generally considered to be more common in southern California than in the northern part of the state (USFS 2008).

Habitats for this species typically include rolling foothills, mountain areas, and deserts. Golden eagles need open terrain for hunting and prefer grasslands, deserts, savanna, and early successional stages of forest and shrub habitats. Golden eagles primarily prey on lagomorphs and rodents but will also take other mammals, birds, reptiles, and some carrion (Kochert et al. 2002). This species prefers to nest in rugged, open habitats with canyons and escarpments, with overhanging ledges and cliffs and large trees used as cover.

Absent interference from humans, breeding density is determined by either prey density or nest site availability, depending upon which is more limiting (USFWS 2009a). A compilation in Kochert et al. (2002) of breeding season home ranges from several western United States studies showed an average home range of 20–33 square kilometers (7.7 to 12.7 square miles) that ranged from 1.9 to 83.3 square kilometers (0.7 to 32.2 square miles). In San Diego, a study of 27 nesting pairs found breeding ranges to be an average of 36 square miles with a range from 19 to 59 square miles (Dixon 1937). Other studies from within and outside the United States include ranges from 9 to 74.2 square miles (McGahan 1968; Watson et al. 1992). U.S. Fish and Wildlife Service recommendations include a 0.5-mile nest protection buffer and evaluating an area of 4 miles from nests as foraging habitat (Strassburger, pers. comm.)

Golden eagles were observed flying over the project site during both the 2007 and 2008 surveys conducted by the applicant. (SES 2009aa). Staff also observed a golden eagle above the project site during a reconnaissance survey conducted on May 25, 2010. This species is considered present within the project area and nesting was documented by the applicant in the vicinity of the project (within a 10-mile buffer area). Nesting habitat does not occur onsite, and the observed birds likely nest in the nearby Cady Mountains and forage over the project area. Information provided by the BLM and the applicant indicate that up to six potential nesting sites occur within a 10-mile radius of the site. To document potential nest sites for golden eagles, the applicant conducted helicopter surveys for this species on March 11th and 12th, 2010. This survey detected approximately 22 stick nests including eight inactive, but potential golden eagle nests, and one active nest that contained an incubating adult golden eagle. Surveys also detected a variety of other birds including an incubating adult red-tailed hawk (TS 2010f). The active nest is located approximately 3.5 miles east of the proposed project area. **Biological Resources Figure 5** shows the locations of potential and active golden eagle nests identified during the 2010 helicopter survey.

Loggerhead Shrike *(Lanius ludovicianus)*

Loggerhead shrikes are uncommon residents throughout most of the southern portion of their range, including southern California. In southern California they are generally much more common in interior desert regions than along the coast (Humple 2008). In the Mojave Desert this species appears to be most numerous in flat or gently sloping deserts and desert/scrub edges, especially along the eastern slopes of mountainous areas (Humple 2008). Loggerhead shrikes initiate their breeding season in February and may continue with raising a second brood as late as July; they often re-nest if their first nest fails or to raise a second brood (Yosef 1996).

This species can be found within lowland, open habitat types, including creosote scrub and other desert habitats, sage scrub, non-native grasslands, chaparral, riparian,

croplands, and areas characterized by open scattered trees and shrubs. Fences, posts, or other potential perches are typically present. In general, loggerhead shrikes prey upon large insects, small birds, amphibians, reptiles, and small rodents over open ground within areas of short vegetation, usually impaling prey on thorns, wire barbs, or sharp twigs to cache for later feeding (Yosef 1996).

Suitable habitat for loggerhead shrike occurs throughout the scrub habitats within the project area and loggerhead shrikes were observed in the project area between the BNSF Railroad and the I-40 during the 2008 surveys and near the BNSF railroad during the 2010 surveys (SES 2009aa, TS 2010d). Thus, this species is considered present, and it likely nests and forages onsite.

Bendire's Thrasher (*Toxostoma bendirei)*

Bendire's thrashers are known in California from scattered locations in Kern, Inyo, San Bernardino, and Riverside Counties, and one documented outlier in San Diego County (Sterling 2008). This species is a summer resident in California from March to late August, breeds from late March through July, and departs by mid- to late August. In the Mojave Desert, this species favors Mojave desert scrub, primarily in areas that contain large cholla, Joshua tree, Spanish bayonet, Mojave yucca, or other succulents (Sterling 2008). The status of populations of this species is poorly understood, but threats are believed to be loss of habitat due to urbanization and agricultural development, harvesting of yuccas and cholla cacti, and off-road vehicle activity (Sterling 2008).

Bendire's thrasher is present on the project site, as this species was observed during surveys in an area adjacent to the project site (SES 2009aa), and suitable nesting and foraging habitat occurs throughout the project area.

Le Conte's Thrasher (*Toxostoma lecontei*)

This species inhabits some of the hottest and driest habitats in the arid southwest, including the deserts of southeastern California where they occur year-round. Preferred habitats include sparse desert scrub, alkali desert scrub, and desert succulent scrub habitats with open desert washes. They seek gentle to rolling slopes associated with dry desert washes, conditions found on alluvial fans that are found in the project area. Nests are typically placed in prickly vegetation such as cacti or thorny shrubs (Sheppard 1996). The Le Conte's thrasher population densities are among the lowest of passerine (perching) birds, estimated at less than five birds per square kilometer in optimal habitats (Fitton 2008). This low population density decreases the probability of their detection during field surveys. The population decline is due in part to the conversion of habitat to agriculture and urbanization (Laudenslayer et al. 1992). Le Conte's thrashers are also affected by off-highway use during nesting season (Remsen 1978), which occurs on numerous unimproved roads throughout the project site. This species requires areas with an accumulated leaf litter under most plants as cover for its preferred arthropod prey; they also feed on seeds, insects, small lizards, and other small vertebrates.

Le Conte's thrasher is present on the project site. One individual was observed within the project boundary during the 2008 surveys, and three were observed in 2010 (SES 2009aa, TS 2010d). This species may nest and forage on the project site.

Mammals

Nelson's Bighorn Sheep *(Ovis canadensis nelsoni)*

Bighorn sheep are typically found on open, rocky, steep areas used for escape cover and shelter, with available water and herbaceous vegetation for forage. Bighorn sheep are agile in steep, rocky terrain, allowing them to escape predators such as coyotes (*Canis latrans*), golden eagles (*Aquila chrysaetos*), and cougars (*Felis concolor*) (Wehausen 1992). Most of the bighorn sheep live between 300–4,000 feet in elevation where the annual precipitation is less than 4 inches and daily high temperatures average 104°F in the summer (Beacham 2000).

Bighorn sheep primarily browse shrubs and graze on native grasses throughout the year. The pulp and fruits of various cacti are eaten during the dry season (Beacham 2000). Bighorn sheep have a large rumen, relative to body size, which allows digestion of grasses, even in a dry state (Hanly 1982). This gives them flexibility to select diets that optimize nutrient content from available forage. Consequently, bighorn sheep feed on a large variety of plant species and diet composition varies seasonally and among locations. While diet quality varies greatly among years, it is most predictably high in late winter and spring (Wehausen 1992), and this period coincides with the peak of lambing. The lambing season of Nelson's bighorn sheep in the Mojave Desert is typically between December and June (BLM et al. 2005).

Surface water is another element of desert bighorn habitat considered important to population health. Bighorn sheep congregate near dependable water sources from May through October. These population aggregations during this period are due to a combination of breeding activities and diminishing water sources (Beacham 2000). It is common for males and females to segregate and occupy different habitats outside the breeding season (Bleich et al. 1997). Females tend to choose particularly steep, safe areas for bearing and initial rearing of lambs. Areas associated with ridge benches or canyon rims adjacent to steep slopes or escarpments are commonly preferred lambing areas if available. Males frequently occupy much less precipitous habitat during the lamb-rearing season (Bleich et al. 1997). Alluvial fan areas are also used for breeding and feeding activities (Beacham 2000).

The population of bighorn sheep in the Cady Mountains just north of the project area is a native population (not reintroduced or augmented), and was estimated to contain approximately 25 to 50 individuals in 1995 (Torres et al. 1994, 1996; BLM et al. 2005). By 2007, this population had grown to approximately 300 individuals (DW 2010). No Nelson's bighorn sheep were observed during the 2007 or 2008 Calico Solar Project surveys; however, surveys conducted by helicopter in March 2010 observed 62 bighorn sheep (12 rams, 38 ewes, and 12 lambs) within 10 miles of the project site (TS 2010f). In addition, two bighorn sheep horns, two bighorn sheep skeletons and one occurrence of bighorn sheep scat were detected during surveys conducted for desert tortoises and botanical resources between April 5 and April 15, 2010. These occurrences were observed north of the project detention basins between the Cady Mountains and the proposed project. In addition, staff observed bighorn sheep scat on the top of one of the large volcanic rock outcroppings that occur adjacent to the proposed detention basin at the north boundary of the project. It is likely that bighorn sheep use portions of the site for foraging and possibly inter-mountain movement to some degree. **Biological**

Resources Figure 6 shows the locations of bighorn sheep observed during the 2010 helicopter surveys.

Pallid Bat *(Antrozous pallidus)*

The pallid bat is a light brown or sandy colored, long-eared, moderate-sized bat that occurs throughout California with the exception of the northwest corner of the state and the high Sierra Nevada (Zeiner et al. 1990). Pallid bats are most commonly found in oak savannah and in open dry habitats with rocky areas, trees, buildings, or bridges for roosting. Coastal colonies commonly roost in deep crevices in rocky outcroppings, in buildings, under bridges, and in the crevices, hollows, and exfoliating bark of trees. Colonies can range from a few individuals to over a hundred (Barbour and Davis 1969) and usually this species occurs in groups larger than 20 individuals (Wilson and Ruff 1999). Although crevices are important for day roosts, night roosts often include open buildings, porches, garages, highway bridges, and mines. Pallid bats may travel up to several miles for water or foraging sites if roosting sites are limited. This bat prefers foraging on terrestrial arthropods in open habitats and regional populations and individuals may show selective prey preferences (Johnston and Fenton 2001). They may also occur in open coniferous forests. Pallid bat roosts are very susceptible to human disturbance, and urban development has been cited as the most significant factor contributing to their regional decline (Miner and Stokes 2005).

Although roosting habitat does not appear to exist onsite, there is a moderate potential for pallid bats to forage over the entire project area. Roosting habitat occurs nearby in the Cady Mountains and lava tubes associated with the Pisgah Crater.

Townsend's Big-Eared Bat *(Corynorhinus townsendii)*

The Townsend's big-eared bat is a colonial species that feeds primarily on moths and other soft-bodied insects. Females aggregate in the spring at nursery sites known as maternity colonies. Although the Townsend's big-eared bat is usually a cave-dwelling species, many colonies are found in anthropogenic structures such as the attics of buildings or old, abandoned mines. Roost sites in California include limestone caves, lava tubes, mine tunnels, buildings, and other structures (Williams 1986). Radiotracking studies suggest that movement from a colonial roost during the maternity season is confined to within 9 miles of the nursery. Townsend's big-eared bats are very susceptible to human disturbance, and females are known to completely abandon their young when disturbed. The loss of maternity and hibernation roosts has been cited as the most significant factor contributing to their decline throughout their range (Miner and Stokes 2005). In Southern California, Townsend's big-eared bat was once common in the coastal plains of Southern California where mines or caves were prevalent (Krutzsch 1948). However, this species has declined substantially in the region and is now primarily limited to the foothill and mountain regions of Southern California (Miner and Stokes 2005). Townsend's big-eared bat is present on the project site, as this species was detected onsite during surveys in 2008. Although roosting habitat does not appear to exist onsite, Townsend's big-eared bats are expected to forage over the entire project area. Roosting habitat occurs nearby in the Cady Mountains and lava tubes associated with the Pisgah Crater.

American Badger *(Taxidea taxus)*

American badgers were once fairly widespread throughout open grassland habitats of California. They are now uncommon, permanent residents throughout most of the state, with the exception of the northern North Coast area. Known to occur in the Mojave Desert, they are most abundant in the drier open stages of most shrub, forest, and herbaceous habitats with friable soils. In the southwest, badgers are typically associated with Mojave creosote bush scrub and sagebrush. Mating occurs in late summer or early fall and two to three young are born in March or April (Long 1973). Badgers are fossorial, digging large burrows in dry, friable soils and will use multiple dens/cover burrows within their home range. They typically use a different den every day, although they can use a den for a few days at a time (Sullivan 1996). Cover burrows are an average of 30 feet in length and are approximately 3 feet in depth. Natal dens are larger and more complex than cover dens. In undisturbed, high-quality habitat, badger dens can average 0.64 dens per acre, but are usually at much lower density in highly disturbed areas (Sullivan 1996).

American badger is present within the project area, and three burrows were detected in 2010 (TS 2010d). Suitable foraging habitat and prey items for this species are broadly distributed across the project site.

Desert Kit Fox *(Vulpes macrotis arsipus)*

The desert kit fox can be found in much of the same habitat as the badger in the Mojave Desert. While the desert kit fox is not listed as a special-status species by the State of California or the USFWS, it is protected under Title 14, California Code of Regulations (Title 14, Section 460) from trapping and hunting. Kit foxes are primarily nocturnal, and inhabit open level areas with patchy shrubs. Friable soils are necessary for the construction of dens, which are used throughout the year for cover, thermoregulation, water conservation, and rearing pups. Kit foxes typically produce one litter of about four pups per year, with most pups born February through April (Ahlborn 2000). Desert kit fox is present within the project site, as this species was detected onsite during surveys. Surveys conducted by the applicant for burrowing owls detected approximately 36 potential kit fox dens within the proposed project area (TS 2010d).

C.2.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

<u>Direct and Indirect Impacts and Mitigation</u>

The CEQA Guidelines define *direct impacts* as those impacts that result from the project and occur at the same time and place. *Indirect impacts* are caused by the project, but can occur later in time or farther removed in distance while still reasonably foreseeable and related to the project. The potential impacts discussed in this analysis are those most likely to be associated with construction and operation of the project.

Operational impacts would include both *direct* and *indirect* impacts to biological resources. Ongoing operations and maintenance impacts would occur during routine inspection and maintenance of the proposed project facilities and would include such activities as mirror washing, SunCatcher maintenance, vegetation mowing, and routine inspection. Operational impacts would remain an ongoing source of disturbance for

many plants and wildlife species that occur within the fenced facility perimeter and in and adjacent habitat. For example, the AFC indicated that the proposed facility would operate 7 days per week with a staff of approximately 180 full-time employees. Maintenance activities will occur 7 days a week, 24 hours a day to ensure SunCatcher availability when solar energy is available (SES 2008). Operational impacts within the facility would include lighting effects from night time maintenance activities, trampling or crushing of native vegetation and wildlife by vehicular or foot traffic, alterations in topography and hydrology, increased erosion and sedimentation, and the introduction of non-native, invasive plants due to increased human presence and excess water from SunCatcher rinsing. These effects are discussed further below.

Impact analyses typically characterize effects to plant communities as temporary or permanent, with a permanent impact referring to areas that are paved or otherwise precluded from restoration to a pre-project state. In the desert ecosystems the definition of permanent impacts needs to reflect the slow recovery rates of its plant communities. Natural recovery rates from disturbance in these systems depend on the nature and severity of the impact. For example, creosote bushes can re-sprout a full canopy within five years after damage from heavy vehicle traffic (Gibson et al. 2004), but more severe damage involving vegetation removal and soil disturbance can take from 50 to 300 years for partial recovery; complete ecosystem recovery may require over 3,000 years (Lovich and Bainbridge 1999). For example, soil disturbance from military exercises conducted in the Mojave Desert during the Second World War remains visible in many locations to this day.

In this analysis, an impact to vegetation is considered temporary only where staff has concluded that pre-disturbance levels of biomass, cover, density, community structure, and soil characteristics could be achieved within five years. Otherwise, an impact is considered permanent. For example, ongoing vegetation mowing of creosote bush scrub on the project area is considered a permanent impact because it may take decades to functionally recover to pre-construction conditions after mowing ceases. **Biological Resources Table 4** summarizes the impacts to biological resources resulting from Calico Solar Project construction and operation and provides conditions of certification to mitigate these impacts. Staff's recommended conditions of certification are discussed in more detail later in this analysis.

Biological Resources Table 4
Summary of Impacts/Mitigation

Biological Resource	Impact/Mitigation
Mojave Desert Plant Communities and Wildlife Habitat	**Impacts:** Permanent loss and fragmentation of a total of approximately 6,215 acres of native vegetation; potential direct impacts to terrestrial wildlife by heavy equipment and grading; increased risk of road kill; increased disturbance/dust to nearby vegetation and wildlife; spread of non-native invasive weeds. **Mitigation:** Avoidance and minimization measures (**BIO-1** through **BIO-9**); restoration/compensation (**BIO-10**); weed management (**BIO-11**); desert tortoise compensatory mitigation (**BIO-17**).

Biological Resource	Impact/Mitigation
Special-Status Plants	**Impacts:** Potential loss and fragmentation of habitat, potential loss of individuals or populations. **Mitigation:** Avoidance and minimization measures (**BIO-1** through **BIO-9**); restoration/compensation (**BIO-10**); weed management (**BIO-11**); surveys for rare plants prior to ground disturbance and avoidance of rare plants (**BIO-12**); desert tortoise compensatory mitigation (**BIO-17**).
Common Wildlife	**Impacts:** Potential mortality or disturbance during construction and operation, loss or fragmentation of habitat, displacement, disruption of movement. **Mitigation:** Avoidance and minimization measures (**BIO-1** through **BIO-9**); desert tortoise compensatory mitigation (**BIO-17**).
Horses and Burros	**Impacts:** Loss or fragmentation of habitat, displacement, disruption of movement if these species occur in project area. **Mitigation:** Avoidance and minimization measures (**BIO-1** through **BIO-9**).
Waters of the State	**Impacts:** Permanent impacts to 282.8 acres of waters of the State from the modification of attenuation of flows, sediment disruption and the installation of permanent project components. **Mitigation:** Avoidance and minimization measures (**BIO-1** through **BIO-9**); acquisition of offsite State jurisdictional waters, the implementation of Best Management Practices to protect drainages, and nonnative vegetation removal (**BIO-26**); removal of engineered diversion channels upon project closure (**BIO-28**).
Special-Status Wildlife	
Mojave Fringe-Toed Lizard	**Impacts:** Potential mortality and disturbance, loss of habitat, and habitat fragmentation, disruption of movement corridors. **Mitigation:** Avoidance and minimization measures (**BIO-1** through **BIO-9**); specific Mojave fringe-toed lizard avoidance and minimization measures (**BIO-13**).
Gila Monster	**Impact:** Potential mortality and disturbance, loss of habitat, and habitat fragmentation, if present. **Mitigation:** General avoidance and minimization measures (**BIO-1** through **BIO-9**); specific gila monster avoidance and minimization measures (**BIO-14**).
Desert Tortoise	**Impacts:** Habitat loss and fragmentation, disruption of movement corridors, potential take of individuals during operation and construction; increased risk of predation from ravens and other predators; increased road kill hazard from construction and operations traffic. **Mitigation:** Avoidance and minimization measures (**BIO-1** through **BIO-9**); clearance surveys and exclusion fencing (**BIO-15**); Relocation/Translocation Plan (**BIO-16**); off-site habitat acquisition of 23,417 acres (**BIO-17**); Raven Monitoring, Management, And Control Plan (**BIO-18**).
Swainson's Hawk	**Impact:** Potential loss of foraging habitat. **Mitigation:** Desert tortoise compensatory mitigation (**BIO-17**).

Biological Resource	Impact/Mitigation
Golden Eagle	**Impacts:** Loss of foraging habitat; disruption of foraging activities; degradation and alteration of habitat adjacent to the project. **Mitigation:** General avoidance and minimization measures (**BIO-1** through **BIO-9**); preconstruction surveys for golden eagles and establishment of no-disturbance buffer zones around active nests (**BIO-20**.
Burrowing Owl	**Impacts:** Potential loss of nest, eggs, or young; loss of breeding and foraging habitat; disturbance of nesting and foraging activities for populations on and near the project site and/or exposure to toxins in the evaporation ponds **Mitigation:** Implement burrowing owl impact avoidance and mitigation measures; pre-construction surveys; detection and avoidance of active burrows and, if necessary, the acquisition of mitigation lands; and the creation of artificial burrows for displaced individuals (**BIO-21**).
Other Migratory/Special-Status Birds • Loggerhead Shrike • Le Conte's Thrasher • Bendire's Thrasher	**Impacts:** Disturbance of nesting activities; potential loss of nest, eggs, or young; loss of breeding and foraging habitat; potential mortality due to collisions with solar infrastructure and/or exposure to toxins in the evaporation ponds. **Mitigation:** Off-site habitat acquisition and enhancement (**BIO-17**); conduct pre-construction nesting surveys, implement avoidance measures (**BIO-19**); avian protection plan / monitoring bird impacts from solar technology (**BIO-22**); Evaporation Pond Design, Monitoring, and Management Plan (**BIO-27**).
Bird Collisions and Electrocution	**Impacts:** Avian species, including special-status species, could be subject to mortality due to collisions and/or electrocution on project transmission lines and collisions with SunCatchers. **Mitigation:** Transmission lines and all electrical components shall be designed, installed, and maintained in accordance with the Avian Power Line Interaction Committee's (APLIC's) *Suggested Practices for Avian Protection on Power Lines* (APLIC 2006) and *Mitigating Bird Collisions with Power Lines* (APLIC 2004) (**BIO-8**); avian protection plan / monitoring bird impacts from solar technology (**BIO-22**).
Nelson's Bighorn Sheep	**Impact:** Disruption of intermountain movement, loss of foraging habitat; disturbance from construction activities, noise, and lighting; interference with movement and behavioral modifications due to human presence. **Mitigation:** Avoidance and minimization measures (**BIO-1** through **BIO-9**); work stoppage if bighorn sheep detected within 500 feet of project activities (**BIO-23**)
American Badger and Kit Fox	**Impacts:** Potential loss and fragmentation of habitat, loss of foraging grounds, crushing or entombing of animals during construction. **Mitigation:** Conduct pre-construction surveys and implement avoidance measures (**BIO-24**).

Biological Resource	Impact/Mitigation
Special-Status Bats	**Impacts:** Potential loss and fragmentation of habitat, potential mortality and disturbance of animals during construction and operation. Bats may also be subject to collision with SunCatchers and/or exposure to toxins in the evaporation ponds **Mitigation:** Avoidance and minimization measures, including pre-construction surveys, avoidance of maternity colonies, provision of substitute roosting habitat, and exclusion of bats prior to demolition of roosts (**BIO-25**).
Wildlife Movement Corridors	**Impacts:** Interference with wildlife movement across project site due to permanent exclusion fencing. **Mitigation:** Avoidance and minimization measures (**BIO-1** through **BIO-9**).

Four of staff's recommended Conditions of Certification would require the Project owner to acquire compensation lands to mitigate the Project's impacts to biological resources. The most significant of these is **BIO-17**, Desert Tortoise Compensatory Mitigation. **BIO-12** (Special-Status Plant Impact Avoidance and Minimization) provides the option of mitigating impacts to rare plants that may be discovered on the site during late-season botanical surveys. **BIO-13** (Mojave Fringe-Toed Lizard Mitigation) would require compensation for Project impacts to this animal. **BIO-26** (Streambed Impact Minimization and Compensation Measures) would require compensation for jurisdictional streambed acreage impacted by the project. Staff recognizes that some potential compensation lands may support more than one of these resources, and staff recommends that, wherever applicable, the Project owner should seek compensation lands meeting selection criteria for more than one of these resources, as described in these Conditions of Certification, below.

Staff has calculated the acreage and estimated costs for desert tortoise compensation lands, as described in Condition of Certification **BIO-17**. Staff provides estimates of acreage and costs for Mojave fringe-toed lizard compensation, pending expert verification of on-site habitat acreage, in **BIO-13**. Any potential compensation acreage for rare plants, pursuant to **BIO-12**, would be determined upon completion of late-season field surveys and cannot be estimated at this time. Staff anticipated that all compensation lands for state-jurisdictional streambeds as required under **BIO-26** would be "nested" within desert tortoise compensation lands, avoiding necessity for additional compensation lands. However, as described in **BIO-26**, further compensation lands may be required dependent upon the extent of state jurisdictional waters on the desert tortoise compensation lands.

Biological Resources Table 5
Summary of Compensation Lands Costs[1]

	Desert Tortoise Compensation	Mojave Fringe-Toed Lizard Compensation	Rare Plant Compensation	Streambed Compensation
Number of acres	14,365	207.5	undetermined	undetermined
Estimated number of parcels to be acquired, at	360	6	n/a	n/a

40 acres per parcel[2]				
Land cost at $1000/acre[3]	$14,365,000.00	$207,500.00	n/a	n/a
Level 1 Environmental Site Assessment at $3000/parcel	$1,080,000.00	$18,000.00	n/a	n/a
Appraisal at no less than $5,000/parcel	$1,800,000.00	$30,000.00	n/a	n/a
Initial site clean-up, restoration or enhancement, at $250/acre[4]	$3,591,250.00	$51,875.00	n/a	n/a
Closing and Escrow Cost at $5000/parcel[5]	$1,800,000.00	$30,000.00	n/a	n/a
Biological survey for determining mitigation value of land (habitat based with species specific augmentation) at $5000/parcel	$1,800,000.00	$30,000.00	n/a	n/a
3rd Party Administrative Costs (Land Cost x 10%)[6]	$1,436,500.00	$20,750.00	n/a	n/a
Agency cost to accept land[7] [(Land Cost x 15%) x 1.17] (17% of the 15% for overhead)	$2,521,057.50	$36,416.25	n/a	n/a
Subtotal – Acquisition and Initial Site Work	$28,393,807.50	$424,541.25	n/a	n/a
Long-term Management and Maintenance Fund (LTMM) fee at $1450/acre[8]	$20,829,250.00	$300,875.00	n/a	n/a
NFWF Fees				
Establish Project Specific Account	$12,000.00			
NFWF Management fee For Acquisition and Enhancement Actions (Subtotal x 3%)	$851,814.23	$12,736.24	n/a	n/a
NWFW Management Fee for LTMM account (LTMM x 1%)	$208,292.50	$3,008.75	n/a	n/a
Subtotal of NFWF Fees	$1,072,106.73	$15,744.99	n/a	n/a
TOTAL Estimated cost for deposit in project specific REAT-NFWF Account	**$50,295,164.23**	**$741,161.24**	n/a	n/a

1 - Estimates prepared in consultation with CDFG, USFWS, and BLM. All costs are best estimates as of summer 2010. Actual costs will be determined at the time of the transactions and may change the funding needed to implement the required mitigation obligation.

2 - For the purposes of determining costs, a parcel is defined at 40 acres, recognizing that some will be larger and some will be smaller, but that 40 acres provides a good estimate for the number of transactions anticipated (based on input from CDD).

3 - Generalized estimate taking into consideration a likely jump in land costs due to demand, and an 18-24 month window to acquire the land after agency decisions are made. If the agencies, developer, or 3rd party has better information on land costs in the specific area where project-specific mitigation lands are likely to be purchased, that data overrides this general estimate. Note: regardless of the estimates, the developer is responsible for providing adequate funding to implement the required mitigation.
4 - Based on information from CDFG.
5 - Two transactions: landowner to 3rd party; 3rd party to agency.
6 - Includes staff time to work with agencies and landowners; develop management plan; oversee land transaction; organizational reporting and due diligence; review of acquisition documents; assembling acquisition acreage, and related tasks)
7 - This amount covers the estimate of BLM's cost to accept the land into the public management system and costs associated with tracking/managing the costs associated with the donation acceptance, includes two physical inspections; review and approval of the Level 1 ESA assessment; review of all title documents; drafting deed restrictions; issue escrow instructions; mapping the parcels, and related tasks.
8 - Estimate for purposes of calculating general costs. The actual long term management costs will be determined using a PAR (Property Assessment Report) tailored to the specific acquisition. Includes land management; enforcement and defense of easement or title [short and long term]; and monitoring.

Overview of Impacts to Vegetation and Wildlife

Construction of the Calico Solar Project would result in the permanent land use conversion of native vegetation communities and the loss of special-status plant and animal species. Permanent loss as defined by staff involves impacts that would not recover within 5 years (above). The Calico Solar Project would have long-term impacts associated with project features (e.g., SunCatchers, expansion of the Pisgah Substation, new transmission line towers, new access roads, altered drainage features, evaporation ponds, and required maintenance activities that would routinely disturb wildlife and vegetation) that would continue throughout the life of the project, as well as habitat degradation that would persist for decades following project closure.

Vegetation Impacts

Construction of the Calico Solar Project and associated facilities would result in the permanent loss of native vegetation from the construction of new access roads, SunCatcher footings, stormwater facilities, and various appurtenant structures to support the project. In addition, the project would result in disturbance to vegetation from mowing. The applicant indicated that prior to SunCatcher installation, the SunCatcher Array area will be mowed to about 3 inches. During SunCatcher operation, if vegetation within the path of SunCatcher movement reaches a height of 8 inches, it will likely be re-mowed to 3 inches. The applicant indicates that re-mowing treatment would be applied to about 5% of the SunCatcher array area (TS 2010h). Vegetation not within the path of SunCatcher movement or within the access road footprints would be allowed to re-generate. Staff considers mowing to be a permanent impact to native vegetation as mowing would likely result in type conversion of re-mowed areas from creosote bush scrub to more herbaceous vegetation, and degradation of untreated or once-treated vegetation by introduction of new edge effects to remnant desert shrubland throughout the proposed project site.

Direct mortality to vegetation could occur from construction activities that remove vegetation, grade soils, or cause sedimentation or erosion. Clearing and grading may also result in the alteration of soil conditions, including the loss of native seed banks and changes to the topography and drainage of a site such that the capability of the habitat to support native vegetation is impaired. Indirect effects could include soil compaction, disruption of the native seed bank, increased dust, sediment transport, or colonization by invasive non-native species. These actions may result in reduced habitat quality for upland plants. In addition, the removal of vegetation cover and the disruption of soil

crusts create possibilities for erosion, dust, and weed invasion that can affect habitat in adjacent areas.

Currently the vegetation present on the Calico Solar project site supports a diversity of common and sensitive wildlife. This includes a large assemblage of birds, reptiles, and small mammals. The loss of existing vegetation and expected level of disturbance from weeds and human disturbance (described below) will alter the functional use of the remaining habitat. Staff considers the direct and indirect construction impacts to vegetation to be significant under CEQA.

Although specific mitigation to reduce impacts of the proposed project to native vegetation has not been proposed by the applicant, this impact would be reduced to less-than-significant levels with implementation of impact avoidance and minimization measures described in staff's proposed Conditions of Certification **BIO-1** through **BIO-9, BIO-10** (Revegetation and Compensation for Impacts to Native Vegetation), and **BIO-11** (Weed Management Plan). These measures include but are not limited to the designation of a Designated Biologist to oversee construction, monitor sensitive resource areas, provide worker training, prepare and implement a Biological Resources Mitigation Implementation and Monitoring Plan, restoration of disturbed areas, and the management of noxious and invasive weeds. To address specific construction-related impacts to native vegetation communities and habitat loss, staff has incorporated existing measures provided by the applicant and proposed supplemental measures into the following Condition of Certification **BIO-17** (Tortoise Habitat Compensation). Staff concludes that implementation of these measures would reduce impacts to native plant communities to less-than-significant levels under CEQA by minimizing vegetation impacts to the extent practicable; revegetating temporarily disturbed areas; controlling invasive weeds and preventing infestations by newly introduced weeds; and providing for long-term conservation and management of native vegetation on desert tortoise compensation lands.

Invasive, Non-Native, and Noxious Weeds

Weeds are defined here to include species of non-native, invasive plants included on the weed lists of the California Department of Food and Agriculture (CDFA 2007), the California Invasive Plant Council, or federally listed noxious weeds. The spread of invasive plants is a major threat to biological resources in the Mojave Desert because these invasive non-native plants can displace native plants, increase the threat of wildfire, supplant wildlife foods that are important to herbivorous species, alter the habitat structure and ecological function of wetland, riparian, and desert wash communities, and invade or threaten special-status plant occurrences and habitat (Zouhar et al. 2008; Lovich 1998; Lovich et al. 1997, Lovich et al. 1996).

Invasive plants, noxious weeds, and other invasive species on BLM lands will be prevented, controlled, treated, and restored through an Integrated Pest Management approach per the Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States, and the National Invasive Species Management Plan 2009.

Construction activities and soil disturbance tend to introduce non-native invasive plant species into new areas and to facilitate their proliferation and spread. New introductions occur when seed are inadvertently introduced to a site, most often with mulch, hay

bales, or wattles used for erosion control, or when they are transported on construction equipment or their tires from off-site areas. Many invasive non-native species are adapted to and promoted by soil disturbance (Lathrop & Archibald 1980). Once introduced, they can out-compete native species because of minimal water requirements, high germination potential and high seed production (Beatley 1966); can outcompete native annuals where nitrogen deposition (near major highways such as I-40) and precipitation rates are higher, leading to higher risk of wildfire (Allen et al. 2010), and can become locally dominant, representing a serious threat to native desert ecosystems (Abella et al. 2008). Invasive weeds generally spread most readily in disturbed, graded, or cultivated soils, including disturbance by construction equipment. Thus, the proposed Calico Solar project, including the solar generator construction and associated Transmission line and other facilities, would be expected to introduce or facilitate the spread of invasive non-native plants. Without control, staff anticipates that weeds already present in the area would increase their abundance in soils disturbed by project construction throughout the project site and along the linear facilities, especially where nitrogen deposition is an issue, and that construction equipment could accidentally import new invasive species from off-site.

Undisturbed desert habitat has been less vulnerable to invasion by weedy species and only a limited suite of invasive non-native plant species are capable of invading natural desert areas. The hot and arid environment, undependable timing and amount of annual precipitation, and often saline or alkaline soils limit the range of invasive species capable of naturalization in desert areas (Mack 2002). However, certain aspects of the proposed project would change those conditions, creating habitat more suited to a wider variety of invasive plants and to greater abundance of the invasive species already present in the area. Initial mowing and construction disturbance will disrupt soil conditions that favor the colonization by weedy species. Shade beneath the SunCatchers would then alter the micro-environments, favoring weedy ephemerals. Studies conducted in the Sonoran and Mojave Deserts have demonstrated that shading resulted in a cooler, moister microhabitat below and near structures (Smith 1984; Smith et al. 1987). Shading and wind deflection caused by the structures decrease soil temperature extremes and decrease evaporation from soil surfaces. The addition of water due to a regular mirror washing schedule also increases the humidity of the microhabitat around the solar structures. This change from the normal arid desert environment does not favor the native arid-adapted species and allows the weedy ephemerals to colonize (Smith 1984).

Numerous invasive non-native weeds have already become widespread throughout the Mojave Desert and for some invasive species the prevention of further spread is impracticable. Examples of these species include red brome, cheat grass, Mediterranean grass, red-stemmed filaree, and Russian thistle. Other invasive species, particularly Sahara mustard, can substantially alter native habitats if left uncontrolled, but to date, have not become pervasive within or adjacent to the project area. Still others (e.g., saltcedar, *Tamarix ramosissima*) are damaging to specific habitat types but pose little or no threat to widespread upland desert habitat.

Invasive non-native weeds were relatively low in abundance and diversity throughout the Calico Solar Project area. Seven species of invasive weeds were detected during the applicant's 2007/2008 floristic surveys (SES 2009aa), as described below.

- **Sahara mustard** (*Brassica tournefortii*) occurs throughout the general area; reported as “abundant throughout the site” (SES 2009aa) though staff noted it only occasionally. Sahara mustard is of high concern; Cal-IPC has declared this plant highly invasive (Cal-IPC 2006) and recommends that it should be eradicated whenever encountered.
- **Red brome** (*Bromus madritensis* ssp. *rubens*) is widespread and patchy in the project area, “often at the bases of shrubs” and “too extensive to control” (SES 2009aa). It is an introduced Eurasian grass adapted to microhabitats that, in desert environments, can be found in partial shade (e.g., at the bases of desert shrubs or near structures). It can also form carpet cover in pockets of fine grained soils in rough terrain off the bajada. It is widespread and abundant in the Mojave Desert. Its seeds can disperse readily and across large distances. Cal-IPC has declared this plant highly invasive (Cal-IPC 2006). Because of its widespread distribution, red brome is not considered feasible for general control. Cheat grass (*Bromus tectorum*) is a closely related species, not reported by the applicant, but undoubtedly common on the project site. It is also highly invasive (Cal-IPC 2006) but also not considered feasible for general control.
- **Mediterranean grass** (*Schismus* spp.) was observed patchily distributed throughout the project site. Cal-IPC has determined that this plant has a limited invasiveness rating in California (Cal-IPC 2006). BLM and other agencies recognize that because of the widespread distribution of Mediterranean grass, this species is not considered feasible to control.
- **Russian thistle, tumbleweed** (*Salsola* spp.) was reported as widespread with a patchy distribution throughout the project area. More so than most other invasive species, Russian thistle tends to be restricted to roadway shoulders and other sites where the soil has been recently disturbed (i.e., within a few years). Cal-IPC has determined that this plant has a limited invasiveness rating in California (Cal-IPC 2006). There is a high potential that Russian thistle could become established in the construction area and it should be eradicated if observed.
- **London rocket** (*Sisymbrium irio*) is widespread throughout the warm deserts of North America. It was reported as widespread with a patchy distribution throughout the project area. Cal-IPC has declared this plant moderately invasive (Cal-IPC 2006). More so than the other invasive herbs, it tends to be in slightly mesic or shaded sites around structures, and monitoring for this species should particularly focus on moist and shaded areas around the solar generators.
- **Mediterranean tamarisk, saltcedar** (*Tamarix ramosissima*) is present in two windrows that parallel the BNSF Railroad. This species was planted on site and evidence of an abandoned irrigation system was observed by staff. This species is primarily associated with mesic and hydric areas and is therefore restricted to habitats where there is perennial soil water availability (though often no surface water). Cal-IPC has declared this plant highly invasive (Cal-IPC 2006).
- **Filaree or storksbill** (*Erodium cicutarium*) is a widespread annual species common in disturbed habitats and often on undisturbed desert uplands. It was reported as “widespread and abundant” and “too extensive to be controlled” on the project site (SES 2009aa). It has a limited overall rating by Cal-IPC, generally because the

ecological impacts of the species are minor. Because of its widespread distribution, eradication of filaree is not considered feasible.

To avoid and minimize the spread of existing weeds and the introduction of new ones, an active weed management strategy and control methods must be implemented. The applicant has proposed a Noxious Weed Management Plan (SES 2009aa) to avoid and minimize the spread of weeds. Staff generally concurs with the recommendations in the applicant's weed management plan and has incorporated them into staff's proposed Condition of Certification **BIO-11** (Weed Management Plan). Staff also has provided the applicant with recommended revisions to the Weed Management Plan, to be incorporated before final approval.

The applicant's Noxious Weed Management Plan includes a discussion of weeds targeted for eradication or control and a variety of weed control measures to be implemented during operation, such as establishing weed wash stations for construction vehicles, weed monitoring and management, weed control in areas where irrigation and mirror washing take place, revegetation of disturbed areas with native seed mix, and long-term reporting requirements.

Implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-10** and **BIO-11** (Weed Management Plan) would avoid, minimize, and compensate for these indirect impacts to special-status plant species on/near the site and would lessen the impact of weeds to less-than-significant levels under CEQA by limiting ground disturbance to the minimum extent necessary for project implementation; controlling invasive weed species on the site; preventing new infestations of invasive species; and preventing weeds from spreading from the project site into the surrounding land.

Dust

Disturbance of the soil's surface caused by construction traffic, operations traffic, and other activities such as mirror washing would result in increased wind erosion of the soil. Aeolian transport of dust and sand can result in the degradation of soil and vegetation over a widening area (Okin et al. 2001). Dust can have deleterious physiological effects on plants and may affect their productivity and nutritional qualities (Sharifi et al. 1997; 1999). Aeolian transport of dust and sand can kill plants by burial and abrasion, interrupting natural processes of nutrient accumulation, and allowing the loss of soil resources. The destruction of plants and soil crusts by windblown sand and dust exacerbates the erodibility of the soil and accelerates the loss of nutrients (Okin et al. 2001).

While dust and the aeolian transport of particulate matter remains an integral and natural part of the desert ecosystem, construction can result in excessive levels of dust. To reduce these effects the applicant has proposed the use of soil stabilizers such as Soiltac™ in areas where vehicular traffic is anticipated. Staff has included the recommended measures from the applicant and considers that the impacts of increased dust and other construction impacts can be minimized with implementation of staff's proposed Condition of Certification **BIO-7** (Biological Resource Mitigation Implementation and Monitoring Plan) **BIO-8** (Impact Avoidance and Minimization Measures) and Air Quality Conditions of Certification **AQ-SC3** and **AQ-SC-7** and **Soil and Water-1**. Implementation of these measures would reduce impacts of dust from the proposed

project to biological resources to less than significant levels under CEQA by minimizing and controlling project-related dust sources during construction and operation.

Impacts to Special-Status Plants

Project construction and operation have the potential to cause a variety of direct or indirect effects to special-status plants within or near the project boundary. These include crushing or removing the plants or their habitat during construction or operation of the facility; effects of erosion or sedimentation that could result from altered hydrology on the site (i.e., plants, their habitat, or their seed banks occurring down slope of disturbed soils could be eroded away or could be covered in sediment); changes in the hydrology from alterations in the drainage patterns of the site (several special-status plant species are associated with desert washes); the introduction of new weeds or spread of weeds already present in the area from the solar fields into the surrounding habitat; greater than normal dust levels; effects of herbicide drift on special-status plants and their pollinators; and an increased risk of fire. Weeds, dust, and hydrology are discussed elsewhere in this SSA. Staff anticipates that the use of polymer-based chemicals for fugitive dust control would require product selection and application methods to avoid adverse effects to sensitive plant species within the avoidance areas or impacts to vegetation overall. Staff believes it is impractical to use water for dust control after site grading is completed over such a broad area, considering the rapid evaporation rate in the desert environment and limitations in water supply. Therefore, Conditions of Certification **AQ-SC-3** and **AQ-SC-7** and **Soil and Water-1** would require selective application of chemical dust suppressants that would not adversely affect vegetation.

Based on an analysis by the Conservation Biology Institute (2000) of indirect impacts to a rare plant species in southern California, staff recommends presuming that the project would cause adverse indirect effects to any rare plant occurrences within a 250-foot radius of project activities. Therefore, staff's proposed Condition of Certification **BIO-12** (Special Status Plant Impact Avoidance and Minimization) requires avoiding project activities within 250 feet of any protected plant occurrences within project boundaries or adjacent to the site. Plant occurrences that are not protected from project activities by a 250-foot buffer will not be considered "protected."

Eight special-status plant species have been reported as present on the proposed project site, and 19 additional special-status plant species of the region have some potential for occurrence but have not been observed during field surveys; see **Biological Resources Table 3** (SES 2009aa; TS 2010i). Four of the special-status plants reported in the Biological Resources Technical Report (SES 2009aa) species list for the project surveys (Appendix D), were not relocated during more thorough 2010 field surveys (TS 2010i) and may have been misidentified during the earlier work. Staff considers these four species as "unconfirmed" on the site (addressed above, Special-Status Species, Section C.2.4.1).

Staff note that the seasonal and irregular nature of most plants' life histories, and below-average rainfall during the 2006-07 and 2007-08 seasons limit staff's ability to interpret the data as submitted. Numbers and locations of special-status plant occurrences reported on-site to date are a minimum estimate of total numbers of occurrences on the site. Botanical field surveys as conducted for CEQA and NEPA review cannot serve as

formal censuses of rare plants. At best, a plant census in any given year can only provide the minimum number of living plants on the survey date. A census can only detect individual plants whose above-ground growth is large or conspicuous enough to be noted by field personnel. An ideally-designed census would be (1) scheduled at the height of the plant's growth season; (2) use a technique to ensure that field personnel walked transect lines close enough to every plant to assure its detection; and (3) field personnel would be well-trained, well-rested, and would have consistently high mental and visual acuity throughout each field day and throughout the field survey period. Even under these ideal conditions, some living plants may not have emerged above ground or may be too small for detection by field crews.

Staff have concluded that, absent mitigation, proposed construction of the Calico Solar Project as analyzed in this SSA would directly or indirectly impact at least three special-status plant species (white-margined beardtongue, small-flowered androstephium, and Utah vine milkweed; see **Biological Resources Table 3**), and that impacts to one of these —white-margined beardtongue— would be considered significant under CEQA guidelines for reasons explained below. Several other special-status plants were reported on-site during 2008 field surveys, including Coves' cassia and small-flowered sand verbena. Staff now believes that those reports may have been mistaken, and occurrence likelihood is considered low. Staff considers project impacts to the other five special-status species occurring or potentially occurring on-site as many as three of these —small-flowered androstephium, foxtail cactus, Utah vine milkweed, winged cryptantha, and crowned muilla — to be less than significant, as explained below. Four of these five species are ranked as "watch list" by CNPS and CDFG's CNDDB and as such are generally considered more regionally common than plants on higher priority lists. The fifth species, small-flowered androstephium, discussed further below, is known from numerous occurrences in the area, including protected occurrences within the adjacent BLM ACEC.

Six additional CNPS List 1B and six additional CNPS List 2 plants have some potential to occur on-site, but have not been detected during field surveys to date. In general, these plants are spring-blooming species and would likely have been detected. However, due to limitations of field surveys and unpredictable variations in annual flowering, some species may have gone undetected during field work. Further, some special-status plants flower exclusively or primarily in summer or early fall, and would not have been detected during field surveys conducted to date. If any of these species occur on the site, it would be adversely affected by project development. These species are listed above in **Biological Resources Table 3** (Special-Status Species, Their Status, and Potential Occurrence at the Calico Solar Project Site).

Energy Commission staff's conclusion of CEQA significance was based on an analysis of impacts to these species in light of the following variables:

- Proportion of occurrences that may be lost and/or indirectly affected by the project relative to the documented occurrences and distribution of these species in California;
- Extent of occurrence on-site (i.e., number of documented locations);
- Habitat quality;

- Cumulative effects and indirect threats to remaining occurrences; and
- Peripheral population status.

Proportion of Occurrences Affected and Occurrence Size:

Plants and other sessile organisms are particularly vulnerable to the effects of habitat fragmentation. Small habitat patches ("fragments") can support only small populations which are more vulnerable to extinction. Even minor fluctuations in climate can cause local extinction of a small population. For two CNPS List 2 species reported, but unconfirmed on the proposed project site (Coves' cassia and small-flowered sand-verbena), the California populations are already geographically marginal relative to their core populations outside the state. For these species, the central Mojave Desert populations represent a substantial portion of their total known distribution within California. Loss of even a few plants could amount to a substantial portion of their regional populations and make them more vulnerable to extirpation within the state.

Numerous new occurrences of small-flowered androstephium (also a CNPS List 2 species) have been found in recent years during surveys conducted for other development projects. In the vicinity of the proposed project site, numerous new occurrences are known to the east and west, including occurrences protected within the Pisgah ACEC. For this reason the project's effects to small-flowered androstephium were not considered significant in a CEQA context.

Habitat Quality

Staff notes that the habitat in the project area is generally undisturbed. Invasive weeds occur in disturbed soils such as roadsides throughout the area, but have not substantially altered native vegetation and habitat as they have elsewhere in the Mojave Desert (especially the western Mojave Desert).

Threats

Threats to special-status plant occurrences outside the project area include land use changes including energy projects, grazing, transmission projects, ORV use, and non-native plants (CDFG 2010a). The project site includes several substantial alterations to native habitat, including the BNSF rail line, I-40, and several other linear features (unpaved roads, underground pipelines, fiber optic lines, and transmission lines). Yet most of the project area is distant from these features and relatively undisturbed by the threats listed above. There appears to have been little habitat damage by grazing, cross-country ORVs, or weed invasions.

Status as Peripheral Populations

California occupies an important biogeographic location and zone of ecological transition on the Pacific coast of North America, and so its floristic diversity includes many widespread taxa at the edges of their geographic ranges. The CNPS List 2 designation identifies species which are rare in California but more common elsewhere in their geographic ranges. That is, these are species whose California occurrences are at the geographic limits of their ranges. The CNPS List 2 species occurring in the project area are at the western limits of geographic distributions centered in Arizona, Nevada, or farther east.

Plant populations at the peripheries of their geographic ranges, as the CNPS List 2 species are, may have special conservation and biodiversity values. They tend to be more genetically and ecologically divergent than core populations, and often are ecologically distinctive (Leppig & White 2006). Peripheral populations may serve to increase or maintain genetic variation for the species as a whole, and contribute to long-term species survival and adaptation, especially in changing environments (Channel and Lomolino 2000; Leppig & White 2006). Yet peripheral plant populations are at greater risk of extirpation than core populations because they are smaller in areal extent, smaller in numbers of plants, and often occur in locations where habitat conditions are at the margins of their physiological limits.

CEQA Significance and CNPS Status

White-margined beardtongue, Coves' cassia, and small-flowered sand verbena are not listed under the California or federal Endangered Species Acts. However, under significance criteria adopted by staff in this Supplemental Staff Assessment (see Section C.2.3), project impacts to these species, if not mitigated, will be considered significant pursuant to CEQA. The Energy Commission and other State agencies such as CDFG, have a history of requiring mitigation for impacts to special-status plants such as these.

Under Section 15380 of the CEQA guidelines, a species may be considered endangered, rare or threatened, if it can be shown to meet the criteria for State or federal listing. "CEQA Section 15380 provides that a plant or animal species may be treated as 'rare or endangered' even if not on one of the official lists if, for example, it is likely to become endangered in the foreseeable future."

Under Section 15380 of the CEQA guidelines, a species may be considered endangered, rare or threatened, if it can be shown to meet the criteria for State or federal listing. "CEQA Section 15380 provides that a plant or animal species may be treated as 'rare or endangered' even if not on one of the official lists if, for example, it is likely to become endangered in the foreseeable future."

The California Native Plant Society (CNPS) cooperates under a memorandum of understanding with CDFG to identify which plants may be rare or threatened, evaluate threats to them, share occurrence data, and plan protective measures. In this role, CNPS evaluates plant taxa according to abundance, distribution, and threats, and it ranks rare species on a series of lists. The joint CNPS Rare Plant Program and CDFG's CNDDB Plant Status Review Process for CNPS List and CDFG Special Plants List status is a rigorous review process that evaluates existing literature, reviews herbarium collections, and communicates with experts before making a recommendation for listing. A summary of information on each candidate taxon is reviewed by a network of California botanists, representing State and federal agencies, environmental consulting firms, academic institutions, CNPS, and other conservation organizations.

All of the CNPS List 1B and List 2 plants potentially occurring in the project area are also included in the CDFG Special Plants List (CDFG 2010b) and are tracked by CDFG's CNDDB. The *CNPS Inventory* (2010) has been a broadly recognized and accepted source of science-based information on the rarity, endangerment, and distribution of California special-status plants since its first edition in 1974. The Energy

Commission's regulations reference CNPS Lists in the definition of "species of special concern" (California Code of Regulations, Title 20, section 1702 (q) and (v)), and the BLM has a policy of designating all CNPS List 1B plants, unless specifically excluded by the BLM State Director, as BLM Sensitive (BLM 2009). By CNPS's standards, the plants on CNPS Lists 1A, 1B and 2 meet the definitions of Sections 2062 and 2067 (CESA) of the California Fish and Game Code, and are eligible for State listing (CNPS 2001). The Energy Commission considers those plants appearing on CNPS List 1B or 2 to be potentially eligible to meet CEQA's Section 15380 criteria, and evaluates project impacts to each one known from the site, as explained below.

Significance Conclusions

Listed threatened or endangered species with potential to occur in project area:

Lane Mountain milk-vetch is the only listed threatened or endangered plant species occurring in the region. Staff concludes that Lane Mountain milk-vetch is unlikely to occur on or adjacent to the project site because of its distance from known occurrences, no plants were found during field survey (TS 2010i), and unsuitable bajada habitat throughout most of the project site.

CNPS List 1B / BLM Sensitive Taxa

One CNPS List 1B species (white-margined beardtongue) was documented on the project site, and five others could occur there, though their probabilities of occurrence are moderate to low. In Condition of Certification **BIO-12** below, staff recommends follow-up field surveys to inventory potential project impacts to white-margined beardtongue and other List 1B species, and impact avoidance measures to conserve occurrences on-site to the greatest extent feasible. This measure would provide for the conservation of rare plants in portions of the project site through avoidance and evaluate the potential existence of these species on potential mitigation lands.

Five other plant species that are designated BLM sensitive and CNPS List 1B species have low potential to occur within the project area:

- Desert cymopterus (*Cymopterus deserticola*) – Low potential
- Barstow woolly-sunflower (*Eriophyllum mohavense*) – Low potential
- Mojave monkeyflower (*Mimulus mohavensis*) – Low potential
- Creamy blazing-star (*Mentzelia tridentate*) – Low potential
- Rusby's desert mallow (*Sphaeralcea rusbyi* var. *eremicola*) – Low potential

Project impacts to white-margined beardtongue would consist of isolation of some plants and their habitat within the surrounding solar facility during project development and operation. In addition, indirect project impacts to this species could result on-site or off-site, from facility operations (e.g., dust, herbicide overspray, isolation from pollinators or other ecological associations, or alterations to the existing wind and hydrological conditions that transport sand. Proposed project alterations to surface hydrology would avoid or minimize impacts to minor channels where most of the white-margined beardtongue plants on-site are located (Collison 2010) but would alter hydrology at several other locations. Project construction, including the SunCatchers, fences, and

drainage structures would likely alter the aeolian transport of sand across the site to downwind habitat within the adjacent Pisgah Crater ACEC, immediately east of the project boundary, though available data are insufficient to quantify this potential impact. Staff's review of sand movement in the area indicates transport eastward across the project is unlikely to be important to white-margined beardtongue habitat farther east, where the majority of known occurrences are located (Appendix A; also see Cumulative Impacts, Section C.2.8 below, including **Biological Resources Figure 16**).

Two white-margined beardtongue locations on the project site are near project area boundaries. One of these, where 17 individual plants were counted (TS 2010i), is outside the proposed disturbance area, due to the plants and other resource concerns. Another location, where two plants were mapped, is on the eastern project site boundary, adjacent to the Pisgah Crater ACEC. The proposed project would avoid impacts to these plants and provide a 250-foot buffer area around them. Surface hydrology at both locations would not be altered by proposed project stormwater control structures. The other white-margined beardtongue locations also would be surrounded by 250-foot buffer areas, but would be subject to altered hydrology due to stormwater control as proposed by the applicant.

White-margined beardtongue apparently exists as a local "metapopulation" consisting of scattered small clusters or individual plants at locations that may not persist long-term. Instead, changing environmental conditions such as rainfall, drought, sand movement, or hydrology cause periodic localized extinctions and colonizations. Project development and operation would substantially alter soil, vegetation, and hydrology throughout the project area and would likely prevent new white-margined beardtongue colonizations within the project area.

Based on analysis of its rarity, range and distribution, staff concludes that white-margined beardtongue meets criteria for consideration as rare, threatened or endangered under CEQA Section 15380. Staff concludes that, absent mitigation, adverse impacts to white-margined beardtongue or other CNPS List 1B species would be significant under CEQA. Staff concludes that these impacts can be mitigated below a level of significance by implementing staff's proposed Condition of Certification **BIO-12**, including measures to provide buffer areas around white-margined beardtongue locations; monitor and manage direct and indirect project impacts and plant persistence within these areas; and monitor and manage indirect project impacts to occurrences off-site to the east, in the BLM Pisgah Crater ACEC. By incorporating these measures, staff concludes that adverse impacts to white-margined beardtongue would be reduced to less than significant by minimizing indirect impacts to the plants protected within buffer areas; and by managing potential on-site and off-site impacts, including alterations to sand movement and plant demography.

CNPS List 2 Taxa

Three CNPS List 2 taxa are reported on the project site (SES 2009aa), though only one of these was confirmed by 2010 field surveys (TS 2010i). The other two species remain unconfirmed, and may have been misidentified in the original survey reports. An additional six could occur on the site, with low potential. Staff believes that most or all occurrences of CNPS List 2 species onsite, whether documented by prior surveys or not, would be lost or substantially degraded due to grading; soil compaction during

construction and facilities operation; and the indirect effects of increased weed abundance, weed control, and alterations to hydrology, soil temperatures, and aeolian sand transport.

Small-flowered androstephium was reported at 52 locations on the project site and 14 additional occurrences within a 1000-foot buffer surrounding the site (SES 2009aa). Follow-up surveys in 2010 documented more than 1500 additional plants, mapped as one extensive occurrence throughout much of the southern part of the site (TS 2010i). Staff believes that most small-flowered androstephium on-site, would be lost or adversely impacted as described above (except that any plants within white-margined beardtongue set-aside areas would be protected, as described in Condition of Certification **BIO-12**). However, staff concludes that adverse impacts to small-flowered androstephium would be less-than-significant per CEQA due to numerous additional occurrences documented elsewhere in California in recent years, including new occurrences documented by the applicant on public lands to the west and east, including many in the Pisgah ACEC.

Emory's crucifixion thorn is reported from four individual plants at three locations within the survey area (TS 2010h). All three locations are north of the proposed project area, near the toe slopes of the Cady Mountains. The proposed project as analyzed in this SSA would avoid direct or indirect effects to those occurrences. Emory's crucifixion thorn is a large and distinctive shrub and staff does not expect that additional plants will be found on-site during future surveys.

Coves' cassia and small-flowered sand-verbena were reported on the project site in the Biological Resources Technical Report (SES 2009aa) Appendix D, but were not confirmed during more thorough 2010 field surveys (TS 2010i). Staff believes that the original reports may have been erroneous and no impacts to either species are anticipated. However, if either species is found on-site during follow-up field surveys as recommended by Condition of Certification **BIO-12**, appropriate avoidance or off-site mitigation measures would be required.

Six other CNPS List 2 species have low or moderate potential to occur within the project area:

- King's eyelash grass (*Blepharidachne kingie*) – Low potential.
- Booth's evening primrose (*Camissonia boothii* var. *boothii*) – Moderate potential.
- Viviparous foxtail cactus (*Coryphantha vivipara* var. *rosea*) – Low potential.
- Purple-nerved cymopterus (*Cymopterus multinervatus*) – Low potential.
- Thorny milkwort (*Polygala acanthoclada*) – Low potential.
- Jackass clover (*Wislizenia refracta* ssp. *refracta*) – Moderate potential.

Project impacts to small-flowered androstephium and possibly other CNPS List 2 taxa would include loss of plants and their habitat during ground-disturbing activity for project development and operation and additional habitat alteration or degradation to nearby occurrences due to potential indirect off-site effects. Based on analysis of their rarity, range and distribution, staff concludes that Coves' cassia, small-flowered sand verbena,

meet criteria for consideration as rare, threatened or endangered under CEQA Section 15380. Staff concludes that, absent mitigation, adverse impacts to Coves' cassia, small-flowered sand verbena, or other CNPS List 2 species would be significant under CEQA. Staff concludes that impacts to small-flowered androstephium would not be significant under CEQA. Staff concludes that these impacts can be mitigated below a level of significance by implementing Condition of Certification **BIO-12**.

CNPS List 4 Taxa

CNPS List 4 species are plants of limited distribution or infrequent throughout a broader area of California, and their vulnerability or susceptibility to threat appears low at this time (CNPS 2010). The CNPS List 4 plants reported on the project site are foxtail cactus, winged cryptantha, Utah vine milkweed, and crowned muilla. Very few CNPS List 4 plants meet the definition for State or federal listing (CNPS 2001). Nevertheless, they may be locally significant if, for example, they occur at the periphery of their geographic ranges, exhibit unusual morphology, or occur in atypical habitats. Thus, they should be evaluated in a CEQA analysis. Based on known geographic ranges and abundance, absence of any reported unusual morphology among local populations, and local occurrence in typical habitat, staff concludes that project impacts to CNPS List 4 species occurring on the proposed project site and discussed above in this SA/DEIS do not reach the level of significance under the Energy Commission's adopted significance criteria.

Impact Evaluation and Mitigation Strategy

Staff concludes that project impacts to white-margined beardtongue and possibly to other special-status plants reported but not verified occurring on the site would reach CEQA standards as significant, and that several other species not documented on the site also could occur there and, if present, could also be subject to adverse project impacts. The extent of these impacts cannot be fully evaluated due to limitations of available field survey data. Staff recommends an impact evaluation and mitigation strategy that would fully evaluate potential project impacts to special-status plants and, for significant impacts, mitigate them below a level of significance.

Staff evaluated several approaches to mitigating these impacts. These approaches were:

1. Avoiding or minimizing on-site impacts.
2. Acquisition and protection of special-status plant populations on private lands.
3. Protection and enhancement of populations on public lands.
4. Seed collection, translocation or transplantation of special-status plants.

Mitigation Strategies Considered But Rejected

Protection and Enhancement of Populations on Public Lands. Special-status plant occurrences on National Park Service lands are considered to be adequately protected and thus offer no potential for offsetting project losses. In recognition that some of the occurrences on BLM land are subject to the effects of grazing, ORV, transmission projects, mining (CDFG 2010a), and future energy projects, staff investigated the possibility of off-setting project losses by placing land use restrictions on or enhancing

BLM lands where one or more of these special-status plants occur and which are not protected, e.g., within the Mojave Preserve or a Desert Wildlife Management Area (DWMA). However, BLM cannot make pre-decisional commitments to implement specific actions such as fencing, altering grazing allotments, burro removal, or habitat restoration without conducting NEPA analysis and providing full public disclosure on the effects of those actions. Thus, mitigation measures such as land use changes potentially affecting other uses would necessitate a separate NEPA analysis. Consequently, this mitigation option would not be timely and its outcome would remain unknown until BLM completed a Record of Decision. Pursuant to CEQA, the Energy Commission cannot defer mitigation to a future NEPA document.

Transplantation or Translocation. The general consensus in the scientific community is that transplantation has not been shown to be a viable strategy for special-status plant mitigation (Howald 1996). A study by CDFG (Fiedler 1991) found that, even under optimum conditions, transplantation was not effective in 85% of cases studied. Attempts to transplant or propagate white-margined beard-tongue have been unsuccessful (Scogin 1989). Nonetheless for some species including cacti transplanting is often a statutory requirement. On BLM lands, all yucca species and most cacti, with the exception of chollas, require relocation from project impacts. It is CNPS's (1998) policy to oppose transplantation as mitigation for loss of rare plants. In a separate policy statement, CNPS (1992) identifies appropriate use of ex-situ conservation techniques and summarizes reasons these techniques have failed as mitigation.

Successful translocation or transplantation requires extensive information about microhabitat requirements, reproductive biology, essential pollinators, soil conditions and soil organisms, community relationships, and other critical biological characteristics. This information is lacking for most species, including the special-status species that would be affected by the proposed project. The applicant proposes to collect seed and cuttings of CNPS List 1B and List 2 plants on the project site, but provides no further discussion of methods or relocation sites. The applicant states that "seeding areas of suitable habitat in undisturbed sites within and adjacent to the project areas would provide some conservation benefit" (TS 2010h). In consideration of the high rate of failed transplantation and translocation attempts with rare plants, staff believes that the applicant's proposed measures would not provide meaningful conservation benefit, unless proven species-specific feasible methods are specified and adhered to with rigorous performance monitoring. Staff knows of no such methods for white-margined beardtongue or for other CNPS List 1B or List 2 plants potentially occurring on the site. In the absence of known and proven reestablishment techniques for a given species, reestablishment attempts must be considered experimental in nature. These efforts may show early promise but lose viability or decline after the first few years due to one or more of the many factors listed above. Staff concludes that experimental reintroductions could yield important new information that may inform future mitigation efforts, but cannot be expected to succeed and therefore would not constitute mitigation as it is defined under CEQA.

In lieu fee. The overall approach to compensatory mitigation for desert tortoise habitat loss on this and other proposed solar projects has not yet been resolved by land management and resource agencies. Current BLM policy allows for *in lieu* fee payment as an alternative to purchasing and protecting private lands. *In lieu* mitigation fees for

this and other proposed projects would be pooled and dedicated to purchasing and managing desert tortoise mitigation lands. Newly developing State policy would likely create similar mitigation fees for compensatory lands.

In lieu fee payment to fund compensatory mitigation for desert tortoise habitat loss would not feasibly or verifiably mitigate the project's impacts to special-status plants, unless the presence of special-status plants affected by the project are verified on the land planned for acquisition and protection and management of the plants is assured and funded in perpetuity. The *in lieu* fee program was not sufficiently developed at the time the SSA was prepared to judge whether it will be able to accommodate mitigation for special-status plants as part of the desert tortoise habitat mitigation. Under limited circumstances, compensation lands for desert tortoise could, however, serve to mitigate adverse impacts to rare plants, as discussed below and in staff's recommended Condition of Certification **BIO-12**.

Staff's Recommended Conceptual Mitigation Strategy

To reduce project impacts to special-status plants below a level of significance, staff recommends a mitigation strategy to (1) avoid and protect all white-margined beardtongue locations on the project site, (2) determine whether any additional late-season special-status plants occur on the site or would be affected by the project, and (3) mitigate any additional significant adverse impacts to special status plants either on-site, on acquired lands off-site, or through other off-site measures such as habitat improvement or management. Staff recommends on-site protection for all occupied habitat of white-margined beardtongue and on-site or off-site mitigation for any additional CNPS List 1A, 1B, or List 2 plants discovered within the project area or within 250 feet of any project activities during future pre-construction clearance surveys as recommended in staff's proposed Condition of Certification **BIO-12**. This mitigation strategy is described further in the paragraphs below. Full implementation of this mitigation strategy would reduce the project's direct, indirect, and cumulative impacts below a level of significance by avoiding and protecting all white-margined beardtongue locations on-site, locating and identifying late-season special-status plants that may be affected by the project, and mitigating any significant adverse impacts to them through additional on-site avoidance and protection, or through acquiring and protecting lands off-site, or through other off-site measures such as habitat improvement or management. Staff concludes that this mitigation strategy is both feasible and effective.

<u>Avoiding or minimizing on-site impacts</u>. Staff concludes that configuration of the project footprint to avoid areas that support white-margined beardtongue, as analyzed in this SSA would minimize direct impacts to special-status plant species.

Staff's recommended mitigation approach is to protect and manage all of the individual white-margined beardtongue plants within the project site. Protection would be achieved by avoiding direct and indirect impacts to the plants and a 250-foot buffer area surrounding each protected plant location. Staff concludes that this goal is feasible for white-margined beardtongue because only a few plants are known within the project site and the proposed project design would provide the recommended avoidance areas. Staff would expect a few more individual plants to be discovered during pre-construction

surveys, and that these could be similarly avoided. Staff concludes that this measure would reduce impacts to white-margined beardtongue below a level of significance.

This level of protection is not recommended for small-flowered androstephium because staff concludes that impacts to this plant would be less than significant under CEQA. Staff notes, however, that avoidance measures for white-margined beardtongue would likely also benefit small-flowered androstephium due to its scattered distribution in the project area.

Staff's proposed Condition of Certification **BIO-12** (Special-Status Plant Impact Avoidance and Minimization) requires the applicant to minimize disturbance to the extent feasible as described above. This condition also requires preparation of a special-status plant protection and monitoring plan to be implemented for the life of the project and other measures to fully avoid impacts to white-margined beardtongue, and minimize impacts to Emory's crucifixion thorn, Coves' cassia, and small-flowered sand-verbena and any additional CNPS List 1B or List 2 taxa discovered during future pre-construction clearance surveys.

Additional Field Surveys. Due to the potential for occurrence of special-status late-season plant taxa on the project site, staff recommends follow-up late-season field surveys in summer and fall 2010. Staff's proposed Condition of Certification **BIO-12, Section B** describes scheduling and other recommendations for these additional surveys; **Section C** describes thresholds for identifying significant impacts to special status plants that may be found during those surveys; and **Section D** would require that the project owner prepare and implement a mitigation plan for any such impacts. **Section D** also describes a series of potential mitigation strategies that would reduce these impacts below a level of significance.

Conclusion

Staff has concluded that implementation of proposed Conditions of Certification **BIO-1** through **BIO-12** and **BIO-17** would be effective and feasible in reducing impacts to special-status plants to less-than-significant levels. Proposed Condition of Certification **BIO-12** would require full protection of white-margined beardtongue on-site; require late-season field surveys to document presently unknown locations of other special-status plants; provides specific thresholds to determine whether impacts to newly discovered plants would be significant; and would require additional mitigation to reduce such impacts below a level of significance.

Impacts to Common Wildlife

Construction of the Calico Solar Project would result in large scale direct and indirect impacts to common wildlife. These effects could include mortality from trampling or crushing; increased predation when wildlife is flushed from cover; increased noise levels due to heavy equipment and SunCatcher engine noise; light impacts from construction during low-light periods; increased vehicular and human presence along access roads and desert washes; displacement due to habitat modifications, including vegetation removal, alterations of existing soil conditions; fugitive dust; and a modified hydrologic and sediment regime due to the construction of the storm water management system.

Direct mortality of small mammals; reptiles; eggs and nestlings of bird species with small, well-hidden nests; and other less mobile species could occur during construction. This action would result during habitat clearing and mowing, road construction, earth removal, grading, excavation of the retention basins and storm water management systems, and equipment movement. Bird eggs and nestlings could be directly impacted by construction (specific impacts to nesting birds are discussed below in Migratory/Special-status Birds). More mobile species like birds and larger mammals are expected to disperse into nearby habitat areas during construction. However, the dispersal of wildlife from active construction zones would be hindered by the projects perimeter fencing (i.e., the tortoise exclusion fence).

By design, the Calico Solar facility would include perimeter fencing to prevent desert tortoise and bighorn sheep from entering the work area. Prior to construction, tortoises inhabiting the project site would be translocated to suitable receptor sites (See impacts to desert tortoise below for a detailed discussion of desert tortoise translocation). With the exception of birds this barrier would exclude or entrap wildlife at the project site. Therefore, during construction, terrestrial wildlife trapped within the perimeter fence would not be able to disperse from the project area. This would subject any trapped wildlife to repeated disturbance from construction and the use of roads to support maintenance activities.

The ecological effects of roads have been widely studied (Hoff and Marlow 2002; Trombulak and Frissell 2000; Findlay and Bourdages 2000; Jones et al. 2000; Parendes and Jones 2000; Haskell 2000; and Vistnes and Nellemann 2001). These studies have identified seven general effects from roads that include: mortality from road construction and vehicle collisions; modification of animal behavior; changes to the physical and chemical environment; the spread of invasive species, and increased human access and use (Trombulak and Frissell 2000). There would be substantial use of access roads outside of the fenced project site given the phased implementation of the project. Desert tortoise exclusion fencing would need to be installed along both sides of these access roads, unless otherwise authorized by staff, USFWS, and CDFG (see staff's recommended Condition of Certification **BIO-15**).

Construction Noise and Lighting

Construction noise may affect birds in several ways, including annoyance which causes birds to abandon nests that are otherwise suitable; raise the level of stress hormones, interfering with sleep and other activities; cause permanent injury to the auditory system; and interfere with acoustic communication by masking important sounds or sound components (Dooling 2006). Many bird species rely on vocalizations during the breeding season to attract a mate within their territory, and noise from construction could disturb nesting birds and other wildlife and adversely affect nesting and other activities. Golden eagles, for example, are highly susceptible to disturbance from noise and may abandon nests if disturbed. Other avian taxa may respond similarly. In general, 60 dBA Leq hourly is considered the threshold for disturbance for many bird species, but some species are less sensitive. Interestingly, some species of birds and common wildlife do not appear to be as sensitive to noise as other species; however, the long-term ecological consequences from noise exposure may have unseen effects to wildlife. Noise pollution exacerbates the problems posed by habitat fragmentation and wildlife

responses to human presence; therefore, highly fragmented or heavily visited locations are priority candidates for noise management (Barbour et al. 2010).

Construction could affect wildlife in adjacent habitats by interfering with breeding or foraging activities and movement patterns, causing animals to temporarily avoid areas adjacent to the construction zone. This could disrupt foraging, breeding, sheltering, and other activities. Nocturnal (i.e., active at night) wildlife would be affected less by construction than diurnal (i.e., active during the day) species since construction would occur primarily during daylight hours. However, construction may also occur during dusk, dawn, or nighttime, and if this occurs, impacts to nocturnal and crepuscular (i.e., active at dawn and dusk) species would be similar to impacts described for diurnal species. More mobile species like birds and larger mammals are expected to disperse into adjacent habitat areas during the land clearing and grading phases associated with tower construction and road construction and widening. For example, noise and human presence are likely to adversely affect bighorn sheep which are expected to avoid the lower foothills during construction of the proposed project.

Noise from construction activities could also temporarily discourage wildlife from foraging and nesting immediately adjacent to the project area. As discussed in the **Noise** section of the AFC (SES 2008), a maximum noise level of 75 dBA Ldn is estimated to occur at a distance of 50 feet from the acoustic center of the construction activity (most often the power block) and attenuate to 40 dBA Ldn or less at project site boundaries. Assuming that construction noise for this project would be relatively constant, the 40 dBA Ldn estimated at the site boundaries for construction noise would be similar to levels of ambient noise.

The loudest noise likely to occur during construction of the Calico Solar Project would be created by the operation of construction equipment. Depending on the type of equipment used, the noise produced can vary from 77 dBA to 90 dBA at 50 feet. Staff concludes that noise impacts to nesting birds and other wildlife would be mitigated through implementation of Conditions of Certification **BIO-1** through **BIO-9** and **BIO-19**. These measures contain language regarding the reduction of noise adjacent to nesting birds. For example, if the noise meets or exceeds the 60 dBA Leq threshold, or if the biologist determines that the construction activities are disturbing nesting activities, the biologist shall have the authority to halt the construction and shall devise methods to reduce the noise and/or disturbance in the vicinity. This may include methods such as, but not limited to, turning off vehicle engines and other equipment whenever possible to reduce noise, installing a protective noise barrier between the nest site and the construction activities, and working in other areas until the young have fledged.

If noise levels still exceed 60 dBA Leq hourly at the edge of nesting territories and/or a no-construction buffer cannot be maintained, construction shall be deferred in that area until the nestlings have fledged. All active nests shall be monitored on a weekly basis until the nestlings fledge. Similarly, should bighorn sheep be present within 1000 feet of the proposed project and noise levels at the project fence line exceed 60 dBA Leq the work will halt until the sheep move out of the project area.

Lighting may also be required to facilitate nighttime construction activities, which might disrupt the activities and affect behavior of nocturnal wildlife. As discussed in the Visual

Resources section, construction lighting must be consistent with worker safety codes, directed toward the center of the construction site, shielded to prevent light from straying offsite, and task-specific. Staff has proposed Condition of Certification **VIS-2** to formalize temporary lighting measures during construction activity and on the laydown area. See staff's Visual analysis for more details about staff's proposed Condition of Certification **VIS-2**. With implementation of this measure, construction lighting at the Calico Solar Project would be reduced to less-than-significant levels under CEQA.

Construction-related effects to common wildlife are typically not considered significant under the CEQA. However, the large scale of the construction, the fact that many species of wildlife will remain trapped within the perimeter fencing, and the multiyear schedule would result in potential significant effects to common species without implementation of the mitigation measures.

The applicant has recommended general impact avoidance and minimization measures such as erosion and sedimentation control, worker training for avoidance of special-status wildlife, construction monitoring to reduce construction impacts to common wildlife. Staff has incorporated these recommendations into conditions of certification and provided additional language to reduce effects to common wildlife. These Conditions of Certification are designed to educate workers of the presence and sensitivity of wildlife that may occur in the project area; provide limitations on the work that may occur during the breeding season; reducing the effect of fugitive dust on adjacent areas through dust control and reduced vehicle speeds; monitoring construction to reduce direct wildlife mortality; and the control of noxious weeds.

These include the following Conditions of Certification: **BIO-1** (Designated Biologist Selection) which states the minimum qualifications to the satisfaction of the Energy Commission's Compliance Project Manager (CPM) and BLM's Wildlife Biologist ; **BIO-2** (Designated Biologist Duties) which outlines the duties performed during any site mobilization, ground disturbance, grading, construction, operation, closure, and restoration activities; **BIO-3** (Biological Monitor Qualifications); **BIO-4** (Biological Monitor Duties) in which the Biological Monitor assists the Designated Biologist during any site mobilization, ground disturbance, grading, construction, operation, closure, and restoration activities; **BIO-5** (Designated Biologist and Biological Monitor Authority) in which the Designated Biologist and Biological Monitor can call a halt to any activities that would be an adverse impact to biological resources; **BIO-6** (Worker Environmental Awareness Program) in which workers on the project site or any related facilities are informed about sensitive biological resources; **BIO-7** (Biological Resources Mitigation Implementation and Monitoring Plan) which identifies all biological resources mitigation, monitoring, compliance measures, Conditions of Certification, and permits; **BIO-8** (Impact Avoidance and Minimization Measures) in which all feasible measures which avoid or minimize impacts to the local biological resources are incorporated in any modification or finalization of project design; **BIO-9** (Compliance Verification); and in other proposed conditions of certification. Staff concludes that implementation of these measures would reduce impacts of the proposed project to less-than-significant levels under CEQA by requiring a qualified biologist and monitor to review and monitor activities that could affect wildlife; require worker training to minimize likelihood that wildlife would be crushed by vehicles or otherwise affected during project construction and operation; minimizing project impacts to only areas necessary for its

implementation; and preparing and implementing a detailed monitoring and reporting plan to ensure compliance and verification with each project mitigation measure is verified.

Special-Status Wildlife

Habitat in the proposed Calico Solar project area supports a variety of special-status wildlife including State and federally listed species. Some of the sensitive species observed in the project area include desert tortoise, Mojave fringe-toed lizard, burrowing owl, Le Conte's thrasher, golden eagles, Swainson's hawk, American badger, and Nelson's bighorn sheep. **Biological Resource Table 3** describes the sensitive species that have the potential to occur in the project area. Listed or fully protected species that may be subject to project disturbance include desert tortoise and golden eagle.

Impacts to listed species would occur in the same way as described for non-listed wildlife and could be caused by a variety of direct and indirect factors. Direct impacts to wildlife could include displacement and/or potential mortality of wildlife that are poor dispersers such as tortoise, lizards, and small mammals. Construction may also result in the temporary degradation of the value of adjacent native habitat areas due to disturbance, noise, increased human presence, and increased vehicle traffic during construction. Indirect impacts may include increased human presence and the loss of habitat through the colonization of non-native invasive plants. Mortality or loss of reproductive success may also occur during land clearing, excavation, grading, and construction of the Calico Solar Project. Impacts to these special-status species are detailed below.

Impacts to Special-Status Reptiles

The AFC identified two special-status reptile species that have been reported from the project site. These include the desert tortoise and Mojave fringe-toed lizard. Gila monsters, which are known to occur in isolated populations in portions of the Mojave Desert, have not been recorded in the project area. However, these highly secretive reptiles are seldom observed and may be present within portions of the Cady Mountains north of the project site.

Mojave Fringe-Toed Lizard

Mojave fringe-toed lizards were observed by the applicant and staff at several locations on the project site, and staff estimates that a minimum of 164.7 acres of suitable habitat is found on the site (**Biological Resources Figure 4**). Direct project impacts to Mojave fringe-toed lizards would include direct loss of habitat during site preparation and construction for the SunCatchers, roads, and drainage channels; mechanical crushing during site preparation, grading of access roads, preparation of staging areas, disturbance by noise or vibrations from the heavy equipment and future operations and maintenance activities; fugitive dust; and general disturbance due to increased human activity. The cryptic nature of Mojave fringe-toed lizards increases the likelihood that individuals could be injured or killed during ground-disturbing activities, even if equipment operators have been trained to avoid them.

Indirect project impacts to this species would include habitat degradation due to compaction of soils, introduction or spread of invasive exotic plant species, alterations in

the existing solar regime from shading, modification of prey base and altered species composition. The project would contribute to habitat isolation and fragmentation by preventing east-west movement by Mojave fringe-toed lizards between occupied habitat in the Pisgah Crater ACEC (to the east) and suitable habitat in sandy washes and aeolian sand deposits off-site to the west. Road construction, the placement of SunCatchers, and construction of drainage control structures may also alter the aeolian transport of sand within the site boundaries. The project also could affect sand transport extent eastward into the adjacent Pisgah Crater ACEC, though available information indicates that this impact would be relatively minor and is insufficient to quantify this potential impact. Further, the placement of fencing and the structures of the SunCatchers would provide roosting or hunting perches for avian predators that target lizard prey, including loggerhead shrike, merlin, American kestrel, burrowing owl, greater roadrunner and others.

The proposed project's large scale land use conversion and disruption of native habitat, including sandy washes and scattered patches of sand habitat, would likely disrupt the ability of Mojave fringe-toed lizard to effectively disperse east and west among suitable habitat areas on-site and off-site. Based on the patchy distribution of suitable habitat on the site, staff believes that Mojave fringe-toed lizards probably persist there by dispersing among discontinuous patches of good quality habitat. While small habitat patches may not be large enough to support viable populations, the numerous scattered habitat patches, together, support the population, provide refugia and foraging habitat, and may also play an important role in the linking populations east and west of the site.

Staff concludes that, in combination, the project's effects would seriously degrade Mojave fringe-toed lizard habitat throughout the site and would be likely to cause extirpation of the species on the project site. In the AFC the applicant indicated that to minimize direct effects to this species, the 16.9-acre dune complex would be avoided and preserved in perpetuity (SES 2008; SES 2009aa).

Based on staff's review of the project site, discussion with CDFG, BLM, and USFWS, and review of the Mojave fringe-toed lizard literature, staff considers the applicant's original proposed avoidance and preservation measures on-site to be inadequate to mitigate potential project impacts of the proposed project, described above, below a level of significance. The applicant's revised proposal as analyzed in this SSA does not include the 16.9-acre Mojave fringe-toed lizard set-aside area as proposed earlier. Staff has proposed Condition of Certification **BIO-13** (Mojave Fringe-Toed Lizard Mitigation). This measure requires the acquisition of suitable dune and wash habitat at a 3:1 ratio to compensate for loss on-site of high value habitat; and at a 1:1 ratio to compensate for suitable surrounding habitat.

Staff calculated minimum estimates of dune and wash habitat on site as 21.4 acres, and surrounding suitable habitat (i.e., 45-meter buffer) as 143.3 acres. At minimum, compliance with this measure would require the acquisition and dedication in perpetuity of 207.5 acres of suitable habitat. Staff's proposed Condition of Certification **BIO-13** would require the applicant to provide refined estimates of these acreages, to be verified by an expert in Mojave fringe-toed lizard ecology, as a basis for the final application of compensation requirements. Staff's estimated costs for compensation land are presented in **Biological Resources Table 6,** below.

Biological Resources Table 6
Mojave Fringe-Toed Lizard Compensation Cost Estimate[1]

	Task	Cost
1	Land Acquisition	$1000 per acre[2]
2	Level 1 Environmental Site Assessment	$3000 per parcel[3]
3	Appraisal	$5000 per parcel
4	Initial site work – clean-up, enhancement , restoration	$250 per acre[4]
5	Closing and Escrow Costs – 1 transaction includes landowner to 3rd party and 3rd party to agency	$5000 per transaction
6	Biological survey for determining mitigation value of land (habitat based with species specific augmentation)	$5000 per parcel
7	3rd party administrative costs – includes staff time to work with agencies and landowners; develop management plan; oversee land transaction; organizational reporting and due diligence; review of acquisition documents; assembling acres to acquire….	10% of land acquisition cost (#1)
8	Agency costs to review and determine accepting land donation – includes 2 physical inspections; review and approval of the Level 1 ESA assessment; review of all title documents; drafting deed and deed restrictions; issue escrow instructions; mapping the parcels….	15% of land acquisition costs (#1) × 1.17 (17% of the 15% for overhead)
	SUBTOTAL – *Acquisition & Initial Site Work*	***$424,541.25***
9	Long-term Management and Maintenance (LTMM) Fund – includes land management; enforcement and defense of easement or title [short and long term]; monitoring….	$1450 per acre[5]
	SUBTOTAL *– Acquisition, Initial Site Work, & LTMM*	***$725,416.25***
	NFWF Fees	
10	Establish the project specific account	n/a (presumes establishment of desert tortoise account for project)
11	NFWF management fee for acquisition & initial site work	3% of SUBTOTAL
12	NFWF Management fee for LTMM Fund	1% of LTMM Fund
	TOTAL *for deposit in REAT-NFWF Project Specific Account*	***$741,161.24***

1 - Estimates prepared in consultation with CDFG, BLM, and USFWS. All costs are best estimates as of summer 2010. Actual costs will be determined at the time of the transactions and may change the funding needed to implement the required mitigation obligation. Note: regardless of the estimates, the developer is responsible for providing adequate funding to implement the required mitigation.
2 - Generalized estimate taking into consideration a likely jump in land costs due to demand, and an 18-24 month window to acquire the land after agency decisions are made. If the agencies, developer, or 3rd party has better, credible information on land costs in the specific area where project-specific mitigation lands are likely to be purchased, that data overrides this general estimate. Note: regardless of the estimates, the developer is responsible for providing adequate funding to implement the required mitigation.
3 - For the purposes of determining costs, a parcel is 40 acres (based on input from CDD).
4 - Based on information from CDFG.
5 - Estimate for purposes of calculating general costs. The actual long term management and maintenance costs will be determined using a Property Assessment Report (PAR) tailored to the specific acquisition.

Depending on the location, habitat type, and soil conditions of the proposed desert tortoise mitigation lands (described below) it is possible that some or all of the compensation required under **BIO-13** would be achieved through implementation of tortoise habitat compensation. In general, dune formations are poor or minimally suitable tortoise habitat and most dune lands would be unsuitable as desert tortoise compensation land. However, some suitable Mojave fringe-toed lizard habitat (i.e., sand hummocks, sand ramps, desert washes, or other areas with suitable friable sands) may be found within parcels acquired as desert tortoise habitat in compliance with **BIO-17**, below.

With the implementation of staff's recommended Condition of Certification **BIO-13**, the applicant would not be required to avoid the dune complex and associated mosaic of habitats on-site and could utilize the area for the placement of SunCatchers or other project facilities. Energy Commission, BLM, USFWS, and CDFG staff believe that preservation of appropriate mitigation lands off-site would provide a more viable approach to mitigating project impacts to Mojave fringe-toed lizard then on-site preservation, as originally proposed. Implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-9** and Condition of Certification **BIO-13** would reduce impacts to Mojave fringe-toed lizards to less than significant levels by minimizing habitat disturbance to only that necessary for project development, and compensating for habitat loss through off-site habitat acquisition. In addition, the BLM may implement desert tortoise habitat enhancements as a part of the desert tortoise mitigation. These measures also could benefit Mojave fringe-toed lizard habitat so long as they are carried out on land where both species live. Even with implementation of these measures, staff notes that there would be a residual adverse impact to east-west movement habitat and consequent contribution to habitat fragmentation.

Gila Monster

Gila monsters were not observed during biological surveys conducted in 2007, 2008, or 2010 of the proposed Calico Solar project site. While staff acknowledges that there is a low potential for occurrence of this species in the project area, this species occurs in low densities, is difficult to detect, and may be overlooked during surveys. If present, direct impacts to this species could include mortality during ground-disturbing activities; being hit by vehicles on access roads; mechanical crushing during site preparation, grading of spur roads or drainage features; fugitive dust; and general disturbance due to increased human activity. Indirect impacts to this species include compaction of soils and the introduction of exotic plant species.

Operational impacts include risk of mortality by vehicle strikes and disturbance on access roads due to increased use by the public and maintenance personnel. Other operational impacts include removal and trimming of vegetation during maintenance activities. Staff considers these impacts to be significant under CEQA absent mitigation.

The applicant has not proposed specific mitigation to reduce potential impacts to Gila monsters. Staff's proposed Condition of Certification **BIO-14** requires that concurrent with the desert tortoise clearance surveys, a biologist perform a preconstruction survey for Gila monsters in the project area, and implement appropriate impact avoidance and minimization measures if detected. This would include relocating any individuals of this species outside of the proposed project footprint into suitable habitat.

Construction of the Calico Solar Project would eliminate 6,215 acres of habitat that may provide cover, foraging, and breeding habitat for Gila monsters. However, much of the habitat between the BNSF Railroad and I-40 has been subject to historic disturbance and may provide lower quality habitat compared to the bajadas situated closer to the Cady Mountains. Implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-9, BIO-14,** and **BIO-17,** which include impact minimization measures for Gila monsters and compensatory land acquisition for desert tortoise (described below) would reduce impacts to Gila monsters and their habitat to less-than-significant levels.

Desert Tortoise

Desert tortoises are present within the proposed Calico Solar Project footprint and within the adjacent desert areas both east and west of the site. Protocol surveys conducted in 2010 detected 104 tortoises within the project footprint identified in the SA/DEIS (**Biological Resources Figure 3**). Using the formula recommended by the USFWS to calculate the total number of tortoises that are likely present but were not identified during the surveys (either because the tortoises were below ground, concealed by vegetation or topography or overlooked by the surveyor), the originally-proposed project footprint is expected to support approximately 176 tortoises.

The highest concentration of tortoises is in the Phase II area of the original footprint, located on the foothills and bajadas of the Cady Mountains. Burrow density was also concentrated in this area; however, burrows were present to some degree in most of the project area. Interestingly, although habitat utilized by desert tortoises is present across most of the site, only eight tortoises were observed in the Phase I area. The high tortoise density in the foothills is likely linked to the microhabitats associated with the bajadas that provide increased foraging opportunities and soil structure for burrowing. Tortoise densities in the Phase II area are considered very high and well over the average tortoise density of (4.7 tortoise/km^2) identified by the West Mojave Plan (BLM et al. 2005). Because of concerns presented by staff and the wildlife agencies regarding the preservation of habitat near the toe of the Cady Mountains to provide a linkage and movement corridor for desert tortoise, the applicant modified the project footprint to provide approximately 4,000 feet between the project boundary and the base of the mountains as a movement corridor, as recommended by the USFWS Desert Tortoise Recovery Office (DTRO). This reduction would avoid some tortoises and would preserve movement areas and occupied habitat for tortoises. Nonetheless, the proposed project would result in the loss of high density tortoise habitat. Based on the new project footprint addressed in this SSA, 57 tortoises were identified during the 2010 surveys within the proposed project area.

Implementation of the proposed project would result in the direct loss of approximately 6,215 acres of occupied desert tortoise habitat: 4,074.7 acres occur north of the BNSF railroad and 2,139.9 are located south of the BNSF railroad. In addition, portions of excluded private lands identified as Not A Part [NAP] areas, see **Biological Resources Figure 1**) would be surrounded on three sides by the Calico Solar facility fencing. One of these areas is located in an area with low tortoise density adjacent to I-40, but the other is in an area of higher value habitat and tortoise density, north of the BNSF railroad tracks.

Habitat north of the railroad constitutes good quality habitat and supports high densities of desert tortoise in some areas. This area is characterized by creosote bush scrub and has less obstructed connectivity to adjacent natural lands. Although habitat for desert tortoise is present in the area between the BNSF railroad and I-40, staff concurs with the applicant that the area between the BNSF railroad and I-40 provides lower quality habitat for tortoises. This area is isolated by the highway and railroad, has been subject to disturbance from pipeline development, and provides little long-term value to the species. Nonetheless, tortoise sign was detected in this area by staff and the applicant. In addition, while the railroad poses a substantial barrier to movement, there are

numerous corridors for dispersal beneath the many railroad trestles that span drainages.

A site visit conducted by BLM and members of the USFWS DTRO on June 17, 2010 concluded that because of the low tortoise density of the area any remaining tortoises within the excluded property would be able to persist, and that connectivity to adjacent lands is present (via a culvert under Interstate 40). Staff considered these areas for inclusion in the total mitigation requirements however, based on an inspection of the project site these areas were determined to either provide adequate connectivity to occupied lands (NAP area to the north) or provide limited habitat value and have such low tortoise density (NAP area to the south) that mitigation for these areas was not warranted. Two tortoises found in a small exclusion area east of the southern NAP area would be left in place provided the culvert under Interstate 40 can be fenced to prevent tortoises from entering the highway. If the culvert cannot be fenced due to restrictions associated with highway maintenance, the two tortoises would be translocated off the site (see Conditions of Certification **BIO-15** and **BIO-16**).

Impacts to Critical Habitat

There is no federally designated critical habitat for desert tortoise within the proposed development footprint and no direct or indirect impacts to critical habitat would result from the project. The nearest critical habitat is in the Ord-Rodman Mountains Unit, directly south and upslope of the western end of the project site, across Interstate 40 (USFWS 1994b).

Direct Impacts

During construction of the Calico Solar project desert tortoises could be harmed during clearing, grading, and trenching activities or may become entrapped within open trenches and pipes. Construction activities could also result in direct mortality, injury, or harassment of individuals as a result of encounters with vehicles or heavy equipment. Other direct effects could include individual tortoises being crushed or entombed in their burrows, collection or vandalism, disruption of tortoise behavior during construction or operation of facilities, disturbance by noise or vibrations from the heavy equipment and the SunCatcher engines, and injury or mortality from encounters with workers' or visitors' pets. Desert tortoises may also be attracted to the construction area by the application of water to control dust, placing them at higher risk of injury or mortality. Increased human activity and vehicle travel would occur from the construction and improvement of access roads, which could disturb, injure, or kill individual tortoises. Also, tortoises may take shelter under parked vehicles and be killed, injured, or harassed when the vehicle is moved. The applicant has recommended impact avoidance and minimization measures to reduce these direct impacts to desert tortoise, including installation of exclusion fencing to keep desert tortoises out of construction areas, translocating the resident desert tortoises from the Calico Solar site, reducing construction traffic and speed limits to reduce the incidence of vehicles strikes and worker training programs. Staff has incorporated these recommendations into conditions of certification. These include Conditions of Certification **BIO-1** through **BIO-9**, which apply to protection of desert tortoise and other biological resources in and near the Calico Solar Project area, and Conditions of Certification **BIO-15** through **BIO-17**, which are specific to desert tortoise.

Staff's proposed Condition of Certification **BIO-15** (Desert Tortoise Clearance Surveys and Exclusion Fencing) would require installation of security and desert tortoise exclusionary fencing around the entire project site and along access roads, and **BIO-16** (Desert Tortoise Translocation Plan) would require that the applicant prepare and implement a desert tortoise translocation plan to move the tortoises currently living in the Calico Solar project area to proposed translocation sites. The applicant has identified several potential translocation sites including areas north, east, and west of the project site. Some of these sites are areas less than 500 meters from the project boundary which would limit the need for disease testing and may allow some tortoises to maintain a portion of their home ranges after translocation. Additional information on the status of the Translocation Plan and potential receptor sites is described below.

Section 6 of staff's proposed **BIO-9** (Compliance Verification) requires written verification that all desert tortoise impact avoidance, minimization, and compensation measures have been implemented. In addition, **BIO-9** would require written documentation any project-related impacts, including incidental take, to listed species; an assessment of the effectiveness of conditions of certification in minimizing and compensating for project impacts with recommendations for future mitigation measures; and any other pertinent information. Staff's proposed **BIO-8** (Impact Avoidance and Minimization Measures) recommends a variety of additional impact avoidance and minimization measures to reduce the risk of injury and death to desert tortoise as well as other sensitive species. For example, these measures include minimization of construction, road, and traffic impacts; avoidance of vehicle impacts and wildlife entrapment; and monitoring of construction activities.

Because of the large scale land use conversion of the site coupled with the expected level of vehicle traffic and maintenance activities (i.e., mowing, mirror washing, etc.) required at the site, construction of the Calico Solar Project will require the applicant to translocate all the tortoises that occur within the proposed project footprint. The translocation of desert tortoise would occur prior to construction and would reduce the potential for construction and operation related mortality. However, the implementation of staff's proposed Conditions of Certification **BIO-15 (**Desert Tortoise Clearance Surveys And Exclusion Fencing) and **BIO-16** (Desert Tortoise Translocation Plan) have inherent risks and could themselves result in direct effects such as mortality, injury, or harassment of desert tortoises due to equipment operation, fence installation activities, removal of tortoise burrows, and tortoise translocation. These impacts are described in more detail below.

Translocation

Capturing, handling, and relocating desert tortoises from the proposed site after the installation of exclusion fencing could result in harassment and possibly death or injury. Impacts of translocation upon desert tortoises may include elevated stress hormone levels, changes in behavior and social structure dynamics, genetic mixing, increased movement (caused by antagonistic behavior with other tortoises, avoidance of predators or anthropogenic influence, homing, or seeking out of preferred habitat), spread of disease, and increased predation. Furthermore, handling, holding, and transport protocols may compound with abiotic factors to affect the outcome for translocated individuals (Bertolero et al. 2007; Field et al. 2007; Rittenhouse et al. 2007; Teixeira et al. 2007), particularly during extreme temperatures, or if they void their bladders.

Averill-Murray (2001) determined that tortoises that voided their bladders during handling had significantly lower overall survival rates (0.81-0.88) than those that did not void (0.96). If multiple desert tortoises are handled by biologists without the use of appropriate protective measures, pathogens may be spread among the tortoises, both resident and translocated animals. For those tortoises near but not within the Calico Solar site, removal of habitat within a tortoise's home range or segregating individuals from their home range with a fence would likely result in displacement stress that could result in loss of health, exposure, increased risk of predation, increased intraspecific competition, and death. Tortoises moved outside of their home ranges may attempt to return to the area from which they were moved, therefore making it difficult to isolate them from the potential adverse effects associated with project construction. Mortality of translocated desert tortoises has been estimated at approximately 15% (Sullivan 2008), though recent evidence from the desert tortoise translocation effort conducted in support of the Fort Irwin Land Expansion Project indicates that mortality rates may be closer to 25% per year (Gowan and Berry 2010).

Success rates of herpetofauna translocations range from 14% to 42%, suggesting that improved efforts are essential for the future recovery of many reptiles and amphibians (Dodd and Seigel 1991; Germano and Bishop 2009). A recent review of 91 herpetofauna translocation projects reported the primary causes of translocation failure were homing response by translocated individuals and poor habitat in translocated areas, followed by human collection, predation, food and nutrient limitation, and disease (Germano and Bishop 2009). The risks and uncertainties of translocation to desert tortoises are well recognized in the desert tortoise scientific community. The DTRO Science Advisory Committee (SAC) has made the following observation regarding desert tortoise translocations (DTRO 2009, p. 2):

> *As such, consensus (if not unanimity) exists among the SAC and other meeting participants that translocation is fraught with long-term uncertainties, notwithstanding recent research showing short-term successes, and should not be considered lightly as a management option. When considered, translocation should be part of a strategic population augmentation program, targeted toward depleted Populations in areas containing "good" habitat. The SAC recognizes that quantitative measures of habitat quality relative to desert tortoise demographics or population status currently do not exist, and a specific measure of "depleted" (e.g., ratio of dead to live tortoises in surveys of the potential translocation area) was not identified. Augmentations may also be useful to increase less depleted populations if the goal is to obtain a better demographic structure for long-term population persistence. Therefore, any translocations should be accompanied by specific monitoring or research to study the effectiveness or success of the translocation relative to changes in land use, management, or environmental condition.*

To provide guidance for the applicant in addressing these concerns and developing an adequate relocation/translocation plan, on January 27, 2010, the USFWS prepared specific draft guidelines for clearance and translocation of desert tortoises from the project sites. This included the Translocation of Desert Tortoises (Mojave Population) From Project Sites: Plan Development Guidance (USFWS 2010). This document provided guidance including the timing of relocation/translocation, disease testing

requirements, and other actions to minimize impacts to desert tortoise. Current USFWS standards require disease testing and quarantine for any tortoise translocated more than 500 meters (985 feet). This requirement is intended to limit the potential exposure risk to healthy tortoises in adjacent habitat.

To date the applicant has not finalized the Draft Desert Tortoise Translocation Plan. As of June 2010 the USFWS, BLM, CDFG, and staff are still reviewing the information provided by the applicant and working to identify adequate translocation sites and procedures. Potential translocation sites have been surveyed for desert tortoises. Some sites already support high desert tortoise densities, which limit the number of tortoises that can be introduced into them. Staff, USFWS, BLM, and CDFG are still evaluating the number of tortoises that may be translocated to the linkage area north of the site. Staff's proposed Condition of Certification **BIO-16** requires development of a final Desert Tortoise Translocation Plan in consultation with staff, CDFG, BLM, and USFWS to address outstanding concerns that these agencies have regarding the specifics of the plan. The plan, while still under development, would be reviewed by BLM, CDFG, USFWS, and Energy Commission staff, and approved pursuant to **BIO-16**, and would be implemented for the tortoises detected during clearance surveys. The Desert Tortoise Translocation Plan includes the identification and prioritization of potentially suitable locations for translocation; desert tortoise handling and transport considerations (including temperature); animal health considerations; a description of translocation scheduling, site preparation, and management; and specification of monitoring and reporting activities for evaluating success of translocation. With implementation of staff's proposed Condition of Certification **BIO-16**, adverse impacts associated with desert tortoise translocation would be minimized.

Habitat Loss and Compensatory Mitigation

Construction of the proposed Calico Solar facility would result in the direct and permanent loss of 6,215 acres of occupied desert tortoise habitat (TS 2010d). Compensatory mitigation is required to offset this significant impact and to fully mitigate for impacts to desert tortoise. Compensatory mitigation for desert tortoise typically involves balancing the acreage of habitat loss with acquisition of lands that would be permanently protected and enhanced to support healthy populations of desert tortoise. The compensation comes about by improving the carrying capacity of the acquired property so that more desert tortoises will survive and reproduce on these lands, thus offsetting over time the decrease in numbers of tortoises resulting from the habitat loss.

For the acquisition of mitigation lands to truly compensate for the habitat loss and to make up for the numbers of desert tortoise that would otherwise have been supported by that habitat, the acquisition must be accompanied by: (1) permanent protection and management of the lands for desert tortoise, and (2) enhancement actions. The permanent protection is essential because it would allow the lands to be managed in a way that excludes multiple threats and incompatible uses (grazing, off-highway vehicle use, roads and trails, utility corridors, military operations, construction, mining, grazing by livestock and burros, invasive species, fire, and environmental contaminants). Without this protection and management the desert tortoise populations on the acquired lands would be subject to the same threats that led to its population declines and threatened status. While the BLM cannot guarantee the exclusion of these types of activities from acquired lands due to their multiple-use mandate, the Energy

Commission concludes that this level of protection would be necessary to meet the mitigation requirements for loss of desert tortoise habitat under CEQA and CESA. An equally important component is the implementation of enhancement actions to improve desert tortoise survival and reproduction. These actions might include habitat restoration, invasive plant control, road closures or road fencing, reducing livestock and burro grazing, and controlling ravens and other predators. Without permanent protection and enhancement actions on lands acquired for mitigation, the project's impacts would result in a net loss of desert tortoises and their habitat.

To fully mitigate the loss of desert tortoise habitat under CESA,CDFG usually requires a mitigation ratio greater than 1:1 for compensation lands (i.e., acquisition of more than one acre of compensation lands for every acre lost), and typically uses a 3:1 ratio or higher for good quality habitat such as that found in portions (i.e., north of the BNSF Railroad) of the Calico Solar Project site. The higher ratio reflects the limits to increases in carrying capacity that can be achieved on the acquired lands, even with implementation of all possible protection and enhancement measures. Depending on the quality of habitat that is lost and the habitat conditions of the land that is acquired, it is difficult to sufficiently increase the carrying capacity of the acquisition lands to completely offset habitat loss without relying on additional acreage to boost the numbers of desert tortoise that can be supported on the mitigation lands. The BLM applies a 1:1 compensation ratio and also pursues desert tortoise recovery goals through implementation of region-wide management plans and land use planning as described in the WEMO, the California Desert Conservation Act plan, and the Desert Tortoise Recovery Plan (USFWS 1994).

The applicant has proposed a 1:1 ratio to mitigate for permanent impacts to desert tortoise habitat. In consultation with USFWS and CDFG, staff has concluded that a mixed habitat compensation ratio of land acquisitions based on the final construction footprint would mitigate for desert tortoise habitat loss within the Project Disturbance Area. The rationale for the mixed ratio is that tortoise habitat, use of the site, and long term habitat value for tortoise varies within the project footprint.

The highest tortoise densities were observed in the northern portions of the project site where more complex topography provides for better foraging and soils for burrowing than found on the southern portions of the site. The northern areas abut other occupied lands and, while subject to some level of historic disturbance from mining, are more isolated from human activity and provide improved connectivity to other areas of occupied habitat, due in part to their distance from Interstate 40 and the BNSF railroad tracks. Staff proposed mitigation for habitat loss on the portion of the project site north of the BNSF railroad tracks (4,075 acres) at a 3:1 ratio. This mitigation ratio is consistent with past Energy Commission mitigation requirements for projects with impacts to desert tortoise (for example, High Desert Power Plant Project and the Victorville 2 Hybrid Power Project), as well as staff's recommended mitigation as stated in the Final Staff Assessment for the Beacon Solar Energy Project and the Ivanpah Solar Energy Generating Station, and with Incidental Take Permits issued by CDFG for other non-Energy Commission jurisdiction projects in the region.

Conversely, only two tortoises and a scattered assemblage of burrows were observed in the area between the BNSF railroad and Interstate 40. This area has been subject to

repeated anthropogenic disturbance, including construction of the BNSF Railroad, Interstate 40, and pipeline and utilities. The railroad and interstate highway have also modified the hydrology of this area to some degree by intersecting a series of desert washes that flow from the Cady Mountains (SES 2009l), though culverts and railroad trestles continue to convey flow and sediment south of the BNSF Railroad. Because the southern portion of the project site between the railroad and highway (2,140 acres) has been subject to previous and ongoing human disturbance, and provides poor biological connectivity with occupied habitat to the north, staff recommends a 1:1 ratio for this area.

State and Federal Desert Tortoise Mitigation Requirements

To satisfy BLM requirements a 1:1 compensation ratio has been applied for the entire 6,215 acre site. This includes lands both north and south of the BNSF railroad. This has been deemed adequate to mitigate for tortoise because the BLM pursues desert tortoise recovery goals not through parcel by parcel acquisitions and management, but rather through implementation of region-wide management plans and land use planning as described in the WEMO, the California Desert Conservation Act plan, and the Desert Tortoise Recovery Plan (USFWS 1994).

To satisfy CDFG's full mitigation standard and to comply with requirements of a State Incidental Take Permit for desert tortoise, the proposed mitigation must meet certain criteria described in Title 14 CCR, Sections 783.4(a) and (b). These criteria include requirements that the proposed mitigation would be capable of successful implementation and that adequate funding is provided to implement the required mitigation measures and to monitor compliance effectiveness of the measures. As described above, the CDFG has recommended the following mitigation strategies that fulfill the state's full mitigation standard for desert tortoise. CDFG requires a 1:1 ratio for the area between the BNSF Railroad and I 40. This mitigation requirement would be achieved through the application of the standard BLM 1:1 ratio and mitigation strategy (i.e., payment of fees) described below. For all other areas a 3:1 ratio is required. This ratio would include both the 1:1 ratio (fee payment) required by the BLM and the 2:1 ratio required by the CDFG and USFWS for habitat acquisition and management.

As specified in staff's proposed Condition of Certification **BIO-17**, acquisition, protection and enhancement of desert tortoise habitat, in combination with the requirements of **BIO-15** and **BIO-16**, would mitigate project impacts to desert tortoise. Acquisition of appropriate mitigation lands as described in **BIO-17** would secure lands that would promote protection of high quality desert tortoise habitat and facilitate biological connectivity in the region.

Staff's proposed Condition of Certification **BIO-17**, Desert Tortoise Compensatory Mitigation, specifies security for acquisition of 14,365 acres and provides an estimate of associated costs. These costs include an acquisition fee of $1,000 per acre, initial habitat improvement costs at $250 per acre, long-term management fund is estimated at $1,450 per acre, and other administrative and acquisition costs (see **Biological Resources Table 7**). The estimated composite mitigation cost to meet staff's recommendation for establishing the security would be $3,501 per acre. This security amount may change with updated appraisals and when a Property Analysis Record is

prepared for the parcels selected for acquisition. It is important to note that these are estimates based on current costs; the requirement is defined in terms of acres, not dollars per acre, and actual costs may vary.

Integrating State and Federal Desert Tortoise Mitigation

Staff from BLM, Energy Commission, USFWS, and CDFG agree that compensatory mitigation at the 3:1 and 1:1 ratios described above is appropriate for the Calico Solar Project's impacts to desert tortoise habitat. However, some differences remain between the federal and state approach to desert tortoise mitigation that currently preclude a complete integration of desert tortoise mitigation requirements. One difference is the state requirement for permanent protection of acquired mitigation lands. Energy Commission staff and CDFG require that mitigation lands acquired for endangered species be maintained and protected in perpetuity for the benefit of those species. The BLM cannot always make the same commitment to protecting acquired mitigation lands because their multiple use mandate restricts their ability to designate lands solely for conservation purposes and to exclude potentially incompatible development and activities.

The Renewable Energy Action Team Agencies (Energy Commission, BLM, CDFG, and USFWS) agree that to address the in perpetuity protection requirement, any lands acquired and subsequently donated to BLM will have either a deed restriction or conservation easement in title that will preclude future development of the land. The REAT Agencies also note that protection could be achieved by buying private in-holdings within designated wilderness or wilderness study areas, being that these areas are congressionally designated and as such preclude any development within them, thus meeting the requirement for in perpetuity protection. The BLM has an established process for accepting lands with deed restrictions or conservation easements and is working on streamlined version of this process. Staff anticipates that the streamlined process for in-perpetuity protection of BLM mitigation lands will be established before the end of 2010 (Fesnock pers. comm., Flint pers. comm.).

Rather than just purchasing compensation lands, BLM may use a portion of the compensation funds to implement desert tortoise habitat enhancement measures. These measures may include, but would not be limited to: Construction of tortoise proof fencing along Hwy 247 to prevent desert tortoises from entering the roadway; installation of barrier fencing (e.g. post and cable) along Camp Rock Road to prevent unauthorized vehicular use of important tortoise habitat; or rehabilitation of administratively closed or undesignated routes within Ord-Rodman DWMA. Additionally, habitat enhancement such as exotic weed control, modifying mine openings to reduce or prevent risk of tortoises falling into them, and funding a headstart program for desert tortoise in coordination with the USFWS's Desert Tortoise Recovery Office may also be implemented with some of these funds.

Staff believes that habitat enhancement measures, in combination with habitat acquisition, would feasibly and effectively mitigate the project's impacts to desert tortoises. The measures outlined above are consistent with the USFWS desert tortoise recovery plan recommendations (USFWS 1994, 2008a), which describe actions in addition to land acquisition that could reduce threats to desert tortoise populations. Some of these recommended actions include habitat restoration and invasive plant

control, eliminating livestock and burro grazing, fencing to exclude livestock and vehicles or reduce the incidence of road strikes, controlling tortoise predators such as ravens, feral dogs and coyotes, as well as increased law enforcement, signage and education. Staff agrees that fencing, retirement of grazing allotments, removal of burros, and habitat restoration show considerable promise as actions that could increase desert tortoise survivorship and reproduction in portions of the Mojave Desert. These measures would address specific known threats to desert tortoise as identified in the Recovery Plan (USFWS 1994b), Draft Revised Recovery Plan (2008a) and Spotlight Species Action Plan (USFWS 2009e). These threats, which would be relieved in part through the habitat enhancement measures listed above, include proliferation of roads; off-highway vehicle activity; deliberate maiming, killing, or collecting; habitat invasion by non-native invasive species; and increased frequency of wildfire due to invasion of desert habitats by non-native plant species.

The amount of the security deposit (calculated below) is based upon estimated cost to purchase and protect mitigation land at the ratios described above. BLM may use no more than the portion of the fund that corresponds to staff's estimated purchase and protection cost for 6,215 acres of desert tortoise habitat (i.e., a 1:1 ratio for the entire project site) to implement habitat enhancement measures as described above. The remainder of the mitigation obligation (i.e., the additional 2:1 compensation ratio for the 4,075 project site acres north of the BNSF railroad tracks, amounting to 8,150 acres of compensation land) shall be used only for compensation land acquisition and protection, initial improvement and management.

Calculation of Security for Desert Tortoise Compensatory Mitigation

To satisfy section 2081 of the California Endangered Species Act, the applicant must provide financial assurances to guarantee that an adequate level of funding is available to implement all impact avoidance, minimization, and compensation measures described in the desert tortoise conditions of certification that are not carried out before project impacts occur. These financial assurances are generally provided in the form of an irrevocable letter of credit, a pledged savings account or another form of security prior to initiating ground-disturbing project activities. Staff's proposed conditions of certification typically specify the dollar amount of the security, and include a provision for adjusting that security amount when parcel-specific information is available. This security amount is calculated by multiplying the acreage of the impact area by the total per-acre costs, a figure which represents the sum of the costs required for: (1) land acquisition, (2) initial habitat improvements, and (3) a fund to support long-term management of the acquired lands.

The latter cost for the long-term management fund is typically the largest component of the mitigation fee. Interest from the fund provides enough income to cover annual stewardship costs on the acquired lands and includes a buffer to offset inflation. The amount for the fund is established by a Property Analysis Record (PAR), a computerized database methodology developed by the Center for Natural Lands Management (http://www.cnlm.org/cms) which calculates the costs of land management activities for a particular parcel. These activities include preparation of a desert tortoise management plan tailored for each parcel of mitigation land to assess habitat status, identify desired conditions, and develop plans to achieve conditions that would best

support desert tortoise. Once the management plan is prepared and approved by the appropriate resource agencies, implementation of enhancement actions such as fencing, road closure, invasive plant control, habitat restoration, and monitoring can begin. The goal of these activities is to increase the carrying capacity of the acquired lands for desert tortoise and increase their population numbers by enhancing survivorship and reproduction.

Funding for the initial habitat improvements supports those actions needed immediately upon acquisition of the property to secure it and remove hazards. These activities might include fencing or debris clean-up, or other urgent remedial action identified prior to acquisition. When the management plan is completed for the acquired parcel, activities such as these are thereafter funded from the interest produced by the long-term management fund described above.

In contrast to CDFG's mitigation approach, BLM does not require a long-term maintenance and management fee or other funding to manage the acquired desert tortoise mitigation lands To mitigate project impacts on BLM lands, BLM typically requires a cash payment (proffer) prior to initiating ground-disturbing activities, which generally includes a per-acre cost reflecting current land value and recent purchase prices, as well as additional acquisition and indirect costs and funding for appraisals, environmental site assessments, property cleanup, and an inflation contingency. BLM also pursues recovery goals through implementation of region-wide management plans and land use planning as described in the WEMO and the Desert Tortoise Recovery Plan (USFWS 1994) rather than through parcel by parcel acquisition and management. As noted by the REAT Agencies, mitigation methods may be employed which would satisfy both BLM and the State agency legal requirements.

The applicant may elect to purchase and permanently protect compensation lands itself; to fund the acquisition and initial improvement of compensation lands through NFWF by depositing funds for that purpose into NFWF's REAT Account; or to fund the acquisition of compensation lands through to a third party other than NFWF, as outlined in **BIO-17** and **BIO-30**. Further, **BIO-17** would require that the project owner provide financial assurances to guarantee an adequate level of funding to implement the compensation measures described above. Because there are several suitable options available to the applicant to satisfy the compensation requirement, and because mitigation requirements must satisfy the requirements of both state and federal Endangered Species Acts, staff's calculation of the security amount includes estimates of all transaction and management fees described above. These calculations are presented in **Biological Resources Table 7**.

Biological Resources Table 7
Desert Tortoise Compensation Cost Estimate[1]

	Task	Cost
1	Land Acquisition	$1000 per acre[2]
2	Level 1 Environmental Site Assessment	$3000 per parcel[3]
3	Appraisal	$5000 per parcel
4	Initial site work – clean-up, enhancement , restoration	$250 per acre[4]
5	Closing and Escrow Costs – 1 transaction includes landowner to 3rd party and 3rd party to agency	$5000 per transaction

	Task	Cost
6	Biological survey for determining mitigation value of land (habitat based with species specific augmentation)	$5000 per parcel
7	3rd party administrative costs – includes staff time to work with agencies and landowners; develop management plan; oversee land transaction; organizational reporting and due diligence; review of acquisition documents; assembling acres to acquire….	10% of land acquisition cost (#1)
8	Agency costs to review and determine accepting land donation – includes 2 physical inspections; review and approval of the Level 1 ESA assessment; review of all title documents; drafting deed and deed restrictions; issue escrow instructions; mapping the parcels….	15% of land acquisition costs (#1) × 1.17 (17% of the 15% for overhead)
	***SUBTOTAL** – Acquisition & Initial Site Work*	***$28,393,807.50***
9	Long-term Management and Maintenance (LTMM) Fund – includes land management; enforcement and defense of easement or title [short and long term]; monitoring….	$1450 per acre[5]
	***SUBTOTAL** – Acquisition, Initial Site Work, & LTMM*	***$49,223,057.50***
	NFWF Fees	
10	Establish the project specific account	n/a (presumes establishment of desert tortoise account for project)
11	NFWF management fee for acquisition & initial site work	3% of SUBTOTAL
12	NFWF Management fee for LTMM Fund	1% of LTMM Fund
	***TOTAL** for deposit in REAT-NFWF Project Specific Account*	***$50,295,164.23***

1 - Estimates prepared in consultation with CDFG, USFWS, and BLM. All costs are best estimates as of summer 2010. Actual costs will be determined at the time of the transactions and may change the funding needed to implement the required mitigation obligation. Note: regardless of the estimates, the developer is responsible for providing adequate funding to implement the required mitigation.
2 - Generalized estimate taking into consideration a likely jump in land costs due to demand, and an 18-24 month window to acquire the land after agency decisions are made. If the agencies, developer, or 3rd party has better, credible information on land costs in the specific area where project-specific mitigation lands are likely to be purchased, that data overrides this general estimate. Note: regardless of the estimates, the developer is responsible for providing adequate funding to implement the required mitigation.
3 - For the purposes of determining costs, a parcel is 40 acres (based on input from CDD).
4 - Based on information from CDFG.
5 - Estimate for purposes of calculating general costs. The actual long term management and maintenance costs will be determined using a Property Assessment Report (PAR) tailored to the specific acquisition.

Indirect Impacts to Desert Tortoise

The indirect effects of the Calico Solar Project to desert tortoise include loss of forage, burrowing sites, and cover sites, the spread of non-native invasive plants, loss of dispersal areas and connectivity to other areas, contracted home ranges, and increased risk of predation by predators attracted to the area by increased human activity. Each of these impacts is discussed in more detail below.

Ravens, Coyotes, and Other Predators

Human activities in the Calico Solar Project area potentially provide food or other attractants in the form of trash, litter, or water, which attract and subsidize unnaturally high numbers of tortoise predators such as the common raven, kit fox, and coyote. Common raven populations in some areas of the Mojave Desert increased 1,500% from 1968 to 1988 in response to expanding human use of the desert (Boarman 2002). Since ravens were scarce in this area prior to 1940, the current level of raven predation on juvenile desert tortoises is considered to be an unnatural occurrence (BLM 1990; USFWS 2008a). In addition to ravens, feral dogs have emerged as major predators of the tortoise. Dogs may range several miles into the desert and have been found digging

up and killing desert tortoises (USFWS 1994; Evans 2001). Dogs brought to the project site with visitors may harass, injure, or kill desert tortoises, particularly if allowed off leash to roam freely in occupied desert tortoise habitat. Implementation of the worker environmental awareness training (Condition of Certification **BIO-6**) and restrictions on pets being brought to the site (Condition of Certification **BIO-11**) would reduce or eliminate the potential for these impacts. Construction and operation of the Calico Solar Project would increase raven and coyote presence in the project area. Ravens depend on human encroachment to expand into areas where they were previously absent or in low abundance.

Ravens habituate to human activities and are subsidized by the food and water, as well as roosting and nesting resources that are introduced or augmented by human encroachment. Ravens were observed during site visits of the Calico Solar Project site and a stick nest with raven feathers was observed along the railroad tracks. Ravens may also use the new transmission line structures as potential nest and perch sites increasing the potential for loss of tortoises from raven predation. Because of the agricultural lands west of the project near Daggett and access to water in the region, ravens will continue to occupy this section of the desert. Small mammal, fox, coyote, rabbit, lizard, snake, and tortoise road kill along I-40 also provides an additional attractant and subsidy for opportunistic predators/scavengers such as ravens.

Construction and operation of the Calico Solar Project could provide new sources of food, water, and nesting sites that might draw unnaturally high numbers of tortoise predators such as the common raven. In addition, clearing and grading activities would result in the exposure of large numbers of fossorial species such as small rodents and reptiles. Many of these species are killed or injured during these activities and attract ravens and other opportunistic predators. Roads provide a ready source of raven food in the carcasses of small mammals and reptiles that result from vehicle collisions, and increased nesting opportunities are provided by human structures. Road kills would mount with increased Calico Solar Project construction and operations traffic, further exacerbating the raven/predator attractions and increasing desert tortoise predation levels. In addition, bird collisions with facility structures or transmission lines may also attract ravens. The Calico Solar area is already subject to elevated raven predation pressure and any loss of juvenile tortoise due to the further addition of raven subsidies could have a long-term effect on the tortoise population by reducing the recruitment of juvenile tortoises into the adult life stages (Boarman 2003). The effects of reduced recruitment may not be apparent for years because tortoises do not typically reach sexual maturity until approximately 15 to 20 years of age.

To reduce the impacts of increased raven presence at the Calico Solar Project site, the applicant has prepared a draft Raven Management Plan (SES 2009aa) and has recommended additional avoidance and minimization measures. Staff has incorporated these recommendations with proposed Conditions of Certification **BIO-8** (Impact Avoidance and Minimization Measures) and **BIO-18** (Raven Monitoring, Management, and Control Plan). These conditions would minimize the project's potential to cause increased predation on desert tortoise by ravens and other species in the project area by requiring a variety of impact avoidance and minimization measures to minimize and control trash and other human activities that tend to increase raven activity; and on-site

raven activity management and control, and a per-acre contribution to support the USFWS Regional Raven Management Program (below).

Regional Approach to Raven Control

The USFWS, in cooperation with CDFG and BLM, has developed a comprehensive, regional raven management and monitoring program in the California Desert Conservation Area to address the regional, significant threat that increased numbers of common ravens pose to desert tortoise recovery efforts (USFWS 2010b). The Regional Raven Management Program will implement recommendations in the USFWS E*nvironmental Assessment to Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise* (USFWS 2008b). To mitigate the Calico Solar Project's contribution to cumulative and indirect impacts on desert tortoise from raven predation, staff proposes that the applicant contribute toward implementation of the Regional Raven Management Program (USFWS 2010b), as described in staff's proposed Condition of Certification **BIO-18**. To mitigate for the regional effects of ravens on desert tortoise, the applicant shall provide a onetime fee in the amount of $105.00 per acre to the REAT Account held by the National Fish and Wildlife Foundation (NFWF), for 6,215 acres of desert tortoise habitat disturbed by the project. This payment of $652,575 would support the regional raven management plan activities focused within the Mojave Desert Recovery Unit, which would be adversely affected by increases in raven subsidies attributable to the proposed project. The fees contributed by the applicant would fund staff who would implement the raven removal actions, education and outreach efforts, and surveying and monitoring activities identified in the federal Environmental Assessment (USFWS 2008b). Staff has concluded that that implementation of these actions would be an effective means of reducing the project's cumulative contributions to desert tortoise predation from increased raven numbers; would reduce the impacts below a level of significance; and would satisfy the requirements of the CDFG for full mitigation pursuant to CESA.

The applicant's Raven Management Plan would involve identifying and preventing conditions that might attract or support ravens (for example, eliminating food sources such as garbage or roadkill and minimizing creation of structures that could provide ravens perches, nests, or roosts), monitoring the effectiveness of raven management and control measures, and then implementing additional adaptive management measures to make sure that the project does not result in an increase in raven numbers. Implementation of measures in Condition of Certification **BIO-18** would avoid or minimize the contributions of the project to increased desert tortoise predation from ravens to less-than-significant levels.

Increased Risk from Roads/Traffic

Vehicle traffic would increase as a result of construction and improvement of access roads, increasing the risk of injuring or killing desert tortoise. Construction of the Calico Solar Project would occur over a four-year period and access through Hector Road could result in mortality of desert tortoises by vehicle strikes. The potential for increased traffic-related tortoise mortality is greatest along paved roads where vehicle frequency and speed is greatest though tortoises on dirt roads may also be affected depending on vehicle frequency and speed. Data indicate that desert tortoise numbers decline as vehicle use increases (Bury et al. 1977) and that tortoise sign increases with increased

distance from roads (Nicholson 1978; Karl 1989; von Seckendorf and Marlow 1997, 2002). Additional unauthorized impacts that may occur from casual use of the access roads in the project area include unauthorized trail creation. To minimize the risks of increased traffic fatality and other hazards associated with roads at the Calico Solar project site, the applicant has proposed a variety of minimization measures which staff has incorporated into Condition of Certification **BIO-8**. These measures include confining vehicular traffic to and from the project site to existing routes of travel, prohibiting cross country vehicle and equipment use outside designated work areas, and imposing a speed limit of 25 miles per hour on Hector Road and other dirt access routes within desert tortoise habitat. The implementation of measures in **BIO-18** would further reduce subsidies for desert tortoise predators through the collection and management of road kill.

Conclusion – Impacts and Mitigation for Desert Tortoise

Staff's proposed Conditions of Certification **BIO-1** through **BIO-9** describe measures that would avoid and minimize direct impacts to sensitive biological resources, including desert tortoise. Staff's proposed Conditions of Certification **BIO-15** through **BIO-17** would require additional measures specific to desert tortoise, including installation of tortoise exclusion fencing; pre-construction clearance surveys; monitoring; verification that all desert tortoise impact avoidance, minimization, and compensation measures to replace lost habitat are implemented; translocation of tortoises from the project area; and acquisition of compensation lands. Staff's proposed Condition of Certification **BIO-18** would require the preparation and implementation of a Raven Monitoring, Management, and Control Plan which would minimize impacts to desert tortoise resulting from increases in raven populations.

Staff concludes that implementation of these conditions would reduce impacts to desert tortoise to less-than-significant levels under CEQA and would also satisfy the CESA requirements to fully mitigate impacts to desert tortoise under Fish and Game Code Section 2081. The conditions would minimize habitat disturbance to only that necessary for project development; would prevent desert tortoises from entering the project site through installation of exclusion fencing; would require removal and translocation of tortoises now present on the project site; and would compensate for habitat loss through off-site habitat acquisition. All of these measures would be monitored and verified.

Migratory/Special-Status Bird Species

The variety of topographical features, manmade structures (railroad trestles), vegetation, and adjacent Cady Mountains provide foraging, cover, and/or breeding habitat for a variety of resident and migratory birds. During surveys of the project site the applicant identified approximately 36 avian species in the project area (Appendix G – SES 2009aa). These birds included several species considered as California species of special concern or BLM sensitive. These include loggerhead shrike, Le Conte's thrasher, Bendire's thrasher, burrowing owl, golden eagle, and Swainson's hawk. Golden eagle is a State fully protected species and Swainson's hawk is State listed. Impacts to burrowing owl, golden eagle, and Swainson's hawks are discussed further below.

Several other species have a moderate to high potential to occur on site, including prairie falcon (*Falco mexicanus*) which was observed during helicopter surveys for golden eagles and black-tailed gnatcatcher (*Polioptila melanura*). Both prairie falcon and golden eagle nest within the Cady Mountains and utilize the project site for foraging to some degree. The project site provides roosting and foraging habitat for a variety of wintering birds such as merlins, sharp-shinned hawks, and ferruginous hawks. In addition, the windrows of salt cedar that border the BNSF Railroad support potential nesting spots for a variety of birds. However, it is recognized that the heavy rail traffic on this line may limit the use of the windrow by less disturbance tolerant species.

A single stick nest was observed in the tamarisk windrow along the BNSF railroad in this location. This nest showed signs of both raven and owl use. During surveys of the site in May 2010 the nest was occupied by a raven and three chicks. While the species of owl was not determined it is possible the nest was used by a great horned owl, a species known to occur in the region. In some areas it is not uncommon for an early nesting species such as a great horned owl to use a nest, hatch and fledge chicks, and then depart the nest in time to allow other later breeding species such as ravens to occupy the site. These windrows also provide suitable habitat for long-eared owl (*Asio otus*). While more typically associated with riparian areas this species has been recorded in more arid regions. Nest sites for common species including mourning dove were noted under the railroad trestles. Results from the March 2010 helicopter surveys conducted by the applicant indicate that at least 16 raptor nests were identified within a 10-mile radius of the project site, one of which contained incubating golden eagles.

Direct impacts to nesting birds or raptors would include the removal or disturbance of vegetation that supports nesting birds, increased noise levels from heavy equipment and the SunCatcher engines, increased human presence, and exposure to fugitive dust. Because of the large size of the project, direct effects would include the loss of foraging habitat. Indirect impacts could include the loss of habitat due to the colonization of invasive plants and a disruption of breeding or foraging activity due to facility maintenance. Weed abatement, mirror washing, and maintenance of the storm water system would likely limit the use of some areas as foraging habitat. Glare from the solar panels and the use of evaporation ponds may also adversely affect bird's use of the site. In addition, noise and lighting effects have been demonstrated to adversely affect behavior, reproduction, and increase the risk of predation. A detailed discussion of glare, evaporation ponds, noise, and lighting effects are described below for all birds.

Construction of the Calico Solar facility would require large scale land disturbance within the 6,215 acre site. Although the applicant would leave 75-foot swaths of native vegetation relatively undisturbed between the SunCatchers ;the remaining habitat would require mowing to a minimum height of 3-inches. In addition, construction of the pads, roadways, storm water system, debris basins, and various facilities would result in the removal of potential nesting habitat.

With the exception of a few non-native birds such as European starling, the loss of active bird nests or young is regulated by the federal Migratory Bird Treaty Act (MBTA) and Fish and Game Code Section 3503. The applicant has proposed mitigation measures to avoid and minimize impacts to nesting birds that have been incorporated into staff's proposed Condition of Certification **BIO-19** (Pre-Construction Nest Surveys

and Impact Avoidance Measures for Migratory Birds). This measure includes removing vegetation outside the breeding season, pre-construction nesting surveys, and the establishment of 500-foot buffers around active nests. Staff concurs with the approach proposed by the applicant but considers it difficult to achieve due to the extended (i.e., four-year) construction schedule, scale of the project (i.e., 6,215 acres), and the numerous common birds expected to nest within the area prior to and during construction. Staff considers it highly unlikely that nesting birds could be completely avoided if clearing and grubbing occur during the nesting season.

As described above, the construction and maintenance activities associated with the project are expected to exclude some species of birds that are less tolerant of anthropogenic disturbance. However, some species of birds will likely nest in the project area both during construction and operation of the facility. Depending on the species, birds may actively nest on the ground close to equipment, within the open metal framework of the SunCatchers, or on idle construction equipment. For example, staff has observed recent nesting activity at several large electrical transmission line projects currently underway in the western Mojave Desert. In these locations birds nested on vehicles, foundations, construction trailers, and other equipment left overnight or during a long weekend. In areas where construction was phased (i.e., footings, or tower structures) birds quickly utilized these features as nest sites. While many of the birds consisted of common ravens, house finches, and doves, these species are protected by the MBTA and relevant Fish and Game codes. Destruction of these nests would require permits from the USFWS and/or CDFG. Staff considers that the likelihood of encountering nesting birds either within the 500-foot disturbance buffer proposed by the applicant or on vehicles and equipment to be high. Therefore, to avoid impacts to nesting birds staff recommends conducting preconstruction surveys of the work area if work is to occur during the breeding season. If active nests are detected during the survey, a 500 foot no-disturbance buffer zone shall be implemented (Condition of Certification **BIO-19**). Implementation of staff's proposed conditions of certification would avoid direct impacts to nests, eggs, or young of migratory birds and would reduce the impacts of construction disturbance to nesting birds to less than significant levels under CEQA.

While staff has proposed Condition of Certification **BIO-19** to reduce or minimize impacts to nesting birds, the scale of the project and the known nesting behaviors of some native birds increases the likelihood that the project would require the removal or relocation of active nests in order to proceed with construction or operate the facility. To comply with the legal requirements under the MBTA and Fish and Game Code provisions, staff has proposed as part of the condition that the applicant coordinate with staff, the CDFG, and USFWS to be certain that this work is conducted properly. Similarly, staff has provided language in proposed Condition of Certification **BIO-19** that would allow certain construction activities to occur closer than 500 feet of active nests with approval of staff, CDFG, and USFWS. The ability to work closer than the proposed 500-foot buffer would depend on the species, stage of development of chicks within the nest, proposed construction activity, and biological response of the animal.

Operational impacts are expected to remain an ongoing source of disturbance to nesting birds. As described above operation of the facility would likely result in disturbance to both ground nesting birds and possible to birds actively nesting on the structures.

Species that utilize the project site for foraging but not nesting, such as golden eagle and prairie falcon, and wintering birds such as merlins, sharp-shinned hawks, and ferruginous hawks would not be directly affected; however, the loss of foraging habitat would be considered significant absent mitigation. Overall the loss of foraging habitat for these special-status bird species would add to the cumulative, significant loss of habitat for these species within the region. Implementation of staff's proposed Condition of Certification **BIO-17**, the compensatory mitigation plan for desert tortoise, would compensate for this habitat loss by the preservation of similar foraging areas.

Swainson's Hawk

Two Swainson's hawks were observed by the applicant overflying the project area on March 30, 2008. Based on the timing of the surveys it is possible these birds were a nesting pair. However, there are no recent observations of this species nesting in the project region and generally the project area does not support nesting habitat for this species. With the exception of the windrow of salt cedar that occurs along the BNSF railroad track and existing transmission towers, nesting trees are not present on the project site. While this species is more commonly associated with large nest trees in the San Joaquin Valley, this species has been documented nesting in Joshua trees in the Antelope Valley.

Information proposed in the Biological Technical Report indicated that the Swainson's hawk breeding range in California is limited to the northern portion of the state (SES 2009aa). Staff agrees that the project area does not appear to support preferred nesting habitat for this species and the agricultural lands in Daggett do not support extensive nest trees. However, this species is known to nest in the Antelope Valley and historical records (1970s) for this species have been documented as far as the Ivanpah Valley (Bloom 2010). Nonetheless there does not appear to be any known nesting of this species in the project area. Surveys conducted in early March 2010 for golden eagles and burrowing owls did not detect any additional Swainson's hawks; however, the timing may have been too early to pick up the birds. No additional observations of Swainson's hawks have been made during a variety of other surveys conducted between February and June 2010. Implementation of the proposed project is not expected to result in the loss of Swainson's hawks or their nests, but it would contribute to the ongoing loss of foraging habitat in the region. While this species is more closely associated with agricultural lands that support large microtene (i.e., rodent) populations the CDFG considers suitable foraging habitat to include creosote bush scrub. Implementation of staff's proposed Condition of Certification **BIO-17**, the compensatory mitigation plan for desert tortoise, would compensate for this habitat loss for this species by the preservation of similar foraging areas.

Golden Eagle

Golden eagles were observed by the applicant during the 2007 and 2008 survey season and by staff in 2010 (SES 2009aa). Helicopter surveys for this species conducted on March 11th and 12th, 2010 detected approximately eight inactive, but potential golden eagle nests, and one active nest that contained an incubating adult golden eagle within a ten-mile radius of the project (TS 2010f). Golden eagle territories can have up to six nests, but they have been found to contain up to 14 nests in some locations (Kochert et al. 2002). The active nest is located approximately 3.5 miles east of the proposed

project area and does not occur in the line of sight. Nest sites or breeding activity was not observed on the site and the project does not support nesting habitat. However, potential nesting habitat is present within the adjacent Cady Mountains. Staff inspected the foothills of the Cady Mountains and reviewed aerial photography to evaluate potential nest sites for this species. Numerous shallow caves, ledges, and rocky outcrops are present within one mile of the northern project boundary where construction activities, including the construction of retention basins, would occur. Should construction occur when golden eagles are present these activities may result in disturbance to this species or the abandonment of nest sites.

The USFWS is the primary federal authority charged with the management of golden eagles in the United States. A permit for take of golden eagles, including take from disturbance such as loss of foraging habitat, may be required for this project. USFWS guidance on the applicability of current Eagle Act statutes and mitigation is currently under review. On November 10, 2009 the USFWS implemented new rules (74 FR 46835) governing the “take” of golden and bald eagles. Although the federal government may issue a take permit for this species, the direct take of golden eagles would not be authorized by the CDFG. This species is designated as “fully protected” (California Fish & Game Code §§ 3511) and may not be taken or possessed.

Based on guidance provided by the USFWS (72 FR 31132 [disturbance], June 5, 2007) staff defined disturbance as an activity that would result in injury to an eagle or which would substantially interfere with normal breeding, feeding, or sheltering behavior. For example, a nestling being knocked from the nest by a startled adult would be considered an injury. A nestling fed inadequately because adults were agitated in the vicinity of the nest due to construction-related noise and activity would also be considered substantial interference, as would a situation in which nestlings starve because the adults were excluded from their familiar foraging grounds and could not provide adequate food to their young. Staff concluded that project construction activities could potentially injure or disturb golden eagles if nests were established sufficiently close to project boundaries to be affected by the sights and sounds of construction.

Direct impacts to golden eagles could occur through the loss of or disruption of foraging habitat, noise, construction activities and human disturbance or collision with SunCatchers. Because this species commences nest building prior to most other birds disruption of nest building or the abandonment of existing nest sites could occur should eagles nest within 1 mile of the project site. This species is sensitive to human encroachment and if nests are disturbed by humans, nest abandonment will typically occur (Thelander 1974). A study by Whitfield et al. (2008) found that human activities up to and in some cases exceeding one mile from a nest site have resulted in nest disturbance.

Golden eagles avoid developed areas, and eagle populations in California have declined during the past century due to a decrease in open habitats (Grinnell and Miller 1944). The development of the 6,215 acre project site will result in substantial loss of foraging habitat for this species. While it is possible that this species may forage between the arrays of SunCatchers; staff considers that the large number of structures coupled with the presence of maintenance staff and noise generated from the units will likely preclude foraging within the Calico Solar project site. Should foraging occur within the

SunCatcher arrays, this action could also lead to collision or electrocution. Collision and electrocution are discussed further below.

Indirect effects to golden eagles could result from a disruption of normal foraging activity through the use of the facility and the subsequent increase in human activities required to maintain and wash the SunCatchers. Degradation and alteration of habitat adjacent to the project from construction activities could preclude use of the area by golden eagles for up to four years. Similarly, golden eagles are not expected to forage within the project area once the project is complete. These impacts would be considered significant absent mitigation under CEQA.

Golden eagles are known to nest within 3.5 miles of the project site and there remains a potential for the species to nest within sight of the proposed project. In order to avoid impacts to golden eagle, staff has developed the proposed Condition of Certification **BIO-20** (Golden Eagle Inventory and Monitoring), which recommends that during construction, golden eagle nest surveys be conducted in accordance with USFWS guidelines to verify the status of golden eagle nesting territories within 10 miles of the project boundaries. If active nests are detected, the project owner would establish a disturbance-free buffer around the nest. No construction activities would be authorized within the 1.0-mile buffer pending the successful fledging of the nest. Staff's proposed Condition of Certification **BIO-22** also recommends monitoring guidelines, performance standards, and adaptive management measures to avoid adverse impacts to birds, including golden eagles from project construction. These measures would require the project owner to monitor nest sites within the 10-mile buffer, and if the loss of foraging habitat was determined to result in adverse effects to the birds, to implement management actions such as temporary road closures near nest sites, weed management, or other approved enhancement actions to minimize the potential for take of the species.

The overall loss of foraging habitat for this species would add to the cumulative, significant loss of habitat that is occurring within the region. Implementation of staff's proposed Condition of Certification **BIO-17**, the compensatory mitigation plan for desert tortoise, would compensate for this habitat loss by the preservation of similar foraging areas.

The USFWS has also raised concerns regarding potential collision threats associated with solar and renewable technologies. To address potential collision concerns (discussed below under operational effects) staff has proposed Conditions of Certification **BIO-22** (Avian Protection Plan / Monitoring Bird Impacts from Solar Technology). This requires a monitoring and reporting program that would document and report potential collision mortality from the proposed solar fields.

In summary, the implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-9, BIO-20,** and **BIO-22** which include worker training, implementation of Best Management Practices, pre-construction surveys, biological monitoring, avian protection plan, and potential take authorization would be expected to reduce potential impacts to golden eagles to less-than-significant levels under CEQA, and the project would be compliance with the California Department of Fish and Game's provision for

no take of the State Fully Protected Species under Section 3511 of California's Fish and Game Code.

Burrowing Owl

Burrowing owls are known to occur in the project area. Two burrowing owls were detected in the north-central portion of the original project site, as described in the SA/DEIS. A third burrowing owl was observed approximately 2,500 feet from the eastern project boundary in the adjacent BLM ACEC during the 2008 surveys. Surveys for burrowing owls were not conducted in 2009. Burrowing owl surveys conducted in 2010 covered the 8,230-acre site as originally proposed by the applicant. These surveys identified two additional burrowing owls within the survey area, one in the south-central portion of the area and the other in the east-central portion of the area. Twelve burrows with sign were observed throughout the survey area during these surveys. The revised project boundary as analyzed in this SSA now excludes most if not all of the locations of the owl sightings. However, burrows that could support burrowing owls occur within the project boundary as analyzed here.

Considering the observation of owls by the applicant, the known range of the species, the presence of foraging habitat and access to existing burrows, staff believes that burrowing owls may be detected in portions of the project site prior to or during the four year development of the proposed project.

Construction of the proposed Calico Solar facility could affect foraging and breeding habitat for this species. The potential effects of the project to burrowing owls depend on many factors including the number of owls present in the project footprint and how they utilize the area (i.e., migratory stopover, year round, breeding, or wintering). Impacts from construction would be greater if the owls use the site year round or for breeding. While wintering birds would be adversely affected, seasonal displacement outside the breeding season would be less adverse than loss of breeding habitat. To date the applicant has not detected breeding activity on the project site.

Direct impacts to burrowing owls would include the crushing of any suitable burrows, removal or disturbance of vegetation (including mowing, increased noise levels from heavy equipment and the SunCatcher engines, increased human presence, and exposure to fugitive dust. Indirect impacts could include the loss or degradation of foraging or breeding habitat due to the colonization of noxious weeds, altered plant community composition caused by operation and maintenance, and long term human presence associated with the four-year construction schedule. Operational impacts include increased human presence from maintenance personnel that would flush or otherwise disturb burrowing owls, invasive plant control activities, exposure to high salinity levels at the evaporation basins, and vehicular use of access roads.

If burrowing owls are present within or adjacent to a construction zone, disturbance could destroy occupied burrows or cause the owls to abandon burrows. Construction during the breeding season could result in the incidental loss of fertile eggs or nestlings or otherwise lead to nest abandonment. The loss of occupied burrowing owl habitat (habitat known to have been occupied by owls during the nesting season within the past three years) or reductions in the number of this rare species, either directly or indirectly through nest abandonment or reproductive suppression, would constitute a significant

impact absent mitigation. Furthermore, burrowing owls and their nests are protected under both federal and State laws and regulations, including the Migratory Bird Treaty Act and California Fish and Game Code Section 3503.5.

To avoid potential impacts to burrowing owls that might be nesting or residing within burrows in the project impact area, the applicant has proposed conducting pre-construction surveys on the plant site using established protocols (SES 2009aa). If present the applicant proposes to passively displace the owls and construct replacement burrows in the ACEC located east of the project site. In addition, the applicant has proposed general avoidance measures for nesting birds which require avoidance during the breeding season.

The strategy for displacing owls depends greatly on how the owls are using the site, their number, and the timing of construction activities. Because project construction would occur for up to four years and result in the land use conversion of 6,215 acres of habitat, passive relocation may result in the repeated harassment of owls should the owls relocate into areas subject to later project disturbance. While construction of replacement burrows in off-site areas would have some potential benefits to the species, it is likely that burrowing owls would select available, natural burrow sites if available near their previously occupied territories. Because of the timeframe this behavior could necessitate multiple passive relocation events for individual birds. Each relocation event would stress the birds and exposes them to increased predation risk, thermal stress, and potential territorial disputes.

There is much debate among State, federal, local, and private entities over the most practicable and successful relocation/translocation methods for burrowing owl. When passive relocation is used solely as an impact avoidance measure, it is generally only effective when burrowing owl nesting territories are directly adjacent to permanently protected lands (i.e., military reservation, airport, wildlife reserve, agricultural reserve with appropriate crop type such as alfalfa) (Bloom 2003). Conversely, active translocation of owls involves trapping owls, temporarily holding them in enclosures with supplemental feeding, and releasing at a suitable off-site location with existing or artificial burrows prior to breeding.

While active translocation might be a better solution than passive relocation for removing owls from large sites like the Calico Solar Project site, California Fish and Game Code Section 3503.3 prohibits the active relocation of burrowing owls.

Staff therefore recommends passive relocation techniques if burrowing owls are detected within the Project Disturbance Area and need to be relocated to avoid direct impacts. Staff requests that the applicant coordinate with CDFG on the approval of the color-banding of any burrowing owls to be passively relocated (in accordance with the guidance provided by USGS bird banding lab (http://www.pwrc.usgs.gov/bbl) in order to document the success of the burrowing owl relocation and monitoring program. Staff would also support a cooperative research effort with the Applicant, CDFG and USFWS to develop a research protocol to assess the efficacy of an active translocation program. The California Burrowing Owl Consortium (CBOC 1993) guidelines state that offsite suitable habitat for use by burrowing owl must be acquired at one of the following ratios:

- Replacement of occupied habitat with occupied habitat at 9.75 acres (6.5 acres times 1.5 acres) per pair or single bird;
- Replacement of occupied habitat with habitat contiguous to currently occupied habitat at 13.0 (6.5 acres times 2) acres per single pair or single bird, or;
- Replacement of occupied habitat with suitable unoccupied habitat at 19.5 (6.5 acres times 3) acres per pair or single bird.

The USFWS notes that the above guidelines were developed for owls nesting in coastal habitats, and their efficacy in desert environments has not been ascertained (Sorenson pers. comm.). No documentation is available to statistically evaluate the success of passive relocation in southern California. Passive relocations in Western Riverside County have not involved banded birds, so information on rates of success and direct/indirect mortality are not available. Reports elsewhere (Trulio 1995; 1997) do not provide long term analyses associated with passive relocation efforts to determine if passively relocated burrowing owls are present in the area after one or more years. The lack of documented success of passive translocations raises concerns regarding the fate of evicted owls.

Acquisition of the appropriate amount of offsite habitat for burrowing owl should take into consideration the number of owls being displaced as a result of the Project, the amount of foraging habitat being impacted by the Project, and the average home ranges and foraging distances of breeding and non-breeding owls. Diurnal home range for owls can be 150 feet on both sides of burrow. Nocturnal home range is much larger, 1 square mile per owl pair, and several owls can overlap in that 1 square mile (Bloom pers. comm.). The mean home range for 11 male burrowing owls in 1998 and 22 males in 1999 was 177 ha (437 acres) and 189 hectares (467 acres), respectively, at naval Air Station in Lemoore, California which is located south of Fresno (Bloom 2003). Male burrowing owls often move greater than 1,000 meters when foraging in the breeding season and home ranges can often times overlap (Bloom 2003).

Staff has reviewed the applicant's proposed mitigation (pre-construction burrowing owl survey; passive relocation if necessary; and provision of replacement burrows) and has incorporated these and additional measures (determination of breeding status; methods and timing of passive displacement; and conformance with CBOC Guidelines, below) to reduce impacts to burrowing owls into staff's proposed Condition of Certification **BIO-21** (Burrowing Owl Impact Avoidance and Minimization Measures).

Condition **BIO-21** prescribes that the applicant must establish the breeding status of the owls on-site and, should it become necessary to destroy an occupied burrow, the applicant would be required to avoid the nest during the breeding season, then implement a passive relocation plan outside the breeding period, construct artificial burrows, and acquire compensatory lands consistent with the California Burrowing Owl Consortium (CBOC 1993) guidelines to offset the loss of foraging habitat. In addition, implementation of staff's proposed Condition of Certification **BIO-17**, the compensatory mitigation plan for desert tortoise, could also serve to offset burrowing owl habitat loss by the preservation of similar habitat off-site, depending upon the specific location of the compensation lands and their occupancy by burrowing owls. There are many areas in the Mojave Desert where desert tortoise and burrowing owls do not co-occur.

With implementation of staff's recommended Conditions of Certification **BIO-1** through **BIO-10** and **BIO-21**, the project's impacts to burrowing owls would be mitigated to less-than-significant under CEQA. The conditions would minimize habitat disturbance and off-site impacts to only that necessary for project development, and would passively relocate any burrowing owls in the project area, removing them from harm's way.

Special-Status Mammals

Nelson's Bighorn Sheep

Nelson's bighorn sheep were not observed during the 2007 or 2008 surveys; however, 62 (12 rams, 38 ewes, and 12 lambs) were observed in the Cady Mountains ranging from 3.5 to 8 miles from the project site during golden eagle helicopter surveys conducted in March 2010 (TS 2010f). In addition, the applicant observed sheep skulls within 0.5 miles of the project site. Staff also detected sheep scat on one of the large volcanic outcrops that abuts the project site. An occupied year-round use area for the Cady Mountains population of at least 300 Nelson's bighorn sheep is located within 0.5 miles from the project boundary (DW 2010).

Nelson's bighorn sheep are known to occur adjacent to the project site and likely forage along the bajadas that occur near the toe of the Cady Mountains. Direct effects to Nelson's bighorn sheep would avoid the mapped year-round range but would likely result in the loss of foraging opportunities for this species to some degree. Typically this species forages within one mile of the foothills where adequate escape habitat occurs. As designed, the project footprint would avoid most of these areas, but bighorn sheep may avoid foraging close to the fence line. Lambing areas would not be impacted by the proposed project. Lambing areas are typically associated with ledges on steep cliffs where the females can protect the lambs from predation. When the lambs are mobile, the females and lambs stay near steep escape habitat. Nelson's bighorn sheep lambing habitat necessitates proximity to dependable water (within ca. one mile), steep rocky terrain, and high-quality forage (Krausman et al. 1999; Sawyer et al. 2009). These habitat elements allow the female and her lamb daily access to drinking water; ready access to escape habitat; and food quality to support the dietary needs of the lactating female. Desert bajadas and lower alluvial fans, including the project area and adjacent upslope bajada, do not provide ideal lambing habitat due to topography and vegetation. The bajadas are distant from cliffs, talus slopes, or other suitable escape cover. Creosote bush shrublands, dominant on the bajadas, are used proportionately less by bighorn sheep than other habitats. Creosote bush is high in resins, and makes up only a small proportion of bighorn sheep diets (Krausman et al. 1989).

Direct effects would also include disturbance from construction activities, noise, and lighting. Construction of the Calico Solar facility will also pose a potential barrier to movement for this species. While little is known regarding the movement of this species in the project area, Nelson's bighorn sheep are known to move from the Cady Mountains to winter ranges in the Bristol Mountains to the east (SES 2009aa – Figure 9.). There is evidence that in some circumstances, sheep may habituate to predictable human activity (Wehausen et al. 1977; Kovach 1979), including highway traffic (Horesji 1976), hiking (Hicks and Elder 1979; Hamilton et al. 1982; Holl and Bleich 1987), aircraft (Krausman et al. 1998), and mining (Jansen et al. 2007; 2009). However, even in otherwise optimum habitat, sheep are known to abandon an area, either

temporarily or permanently, when the limit of their tolerance to disturbance is exceeded (Welles and Welles 1961; Light 1971; Wehausen 1980; Papouchis et al. 2001). Even when bighorn sheep appear to be tolerant of a particular activity, continued and frequent use can cause them to avoid an area, eventually interfering with use of resources such as water, mineral licks, lambing or feeding areas, or use of traditional movement routes. In addition, disturbance can result in physiological responses such as elevated heart rate, even when no behavioral response is discernible. Ewes with kids are especially sensitive to disturbance, and ewes with lambs were detected in the March 2010 golden eagle surveys (TS 2010f).

Indirect impacts include the degradation of habitat, noise, dust, and lighting. Indirect effects to habitat would occur within the 1,000-foot buffer of the proposed project. Staff estimates that noise levels during operation would attenualte to approximately 60 dBA Leq at approximately 850 feet from the project fence line. Staff believes that noise may adversely affect Nelson's bighorn sheep habitat usage, on the desert bajada at distance to 850 feet from the project boundary. Additional indirect effects include avoidance of areas near manmade structures, increased traffic on desert roads by the public, and the spread of invasive plants.

Operational impacts include the degradation of habitat in adjacent areas due to increased human presence associated with use of new facility, noise, nighttime maintenance activities and SunCatcher washing. Public interest in the new facility may also result in increased road traffic along desert roads. A road proposed to border the facility would provide the public greater access to the foothills of the Cady Mountains. While this area is currently public land, access roads are limited in the region.

Access to water is of critical importance to bighorn sheep. There is an existing guzzler maintained in the Cady Mountains that is currently accessed through the proposed project site. This access will have to be maintained post development. There are no known seeps or springs in the Cady Mountains and potential impacts of the proposed Calico Solar wells would not affect seeps or springs. For additional detail regarding water resources please see Section C.7 (Hydrology, Water Use, and Water Quality).

Throughout their range bighorn sheep have suffered considerable population declines in the past 140 years, and metapopulations have been fragmented by roads and other barriers, with a resulting decline in genetic diversity (Bleich et al. 1996; Epps et al. 2005). Disease, sometimes brought about by contact with domestic sheep, drought, and predation, combined with interactions with other anthropogenic factors, may also have contributed to declines in bighorn sheep populations (Wehausen 2005). Loss of surface water sources may also diminish the viability of existing populations (Wehausen 2005).

Staff has concluded that construction and operation of the Calico Solar Project could reduce some foraging opportunities for bighorn sheep on the lower bajadas; however, this is not expected to result in a significant loss of habitat. Because the project footprint has been revised since the SA/DEIS to accommodate movement and foraging, the proposed project is not expected to pose serious restrictions to movements for bighorn sheep. The reduced footprint would also avoid potential lambing areas.

In order to minimize effects of the project on bighorn sheep, the applicant proposed general monitoring of Nelson's bighorn sheep found on-site or within 2,000 feet of the site. Staff has incorporated the applicant's proposal into Condition of Certification **BIO-23** and recommended additional measures to minimize construction disturbance to bighorn sheep. This measure would require construction monitoring and the potential cessation of construction activities should sheep be present within 500 feet of the project area.

In summary, the implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-9** and **BIO-23,** which include worker training, implementation of Best Management Practices, and biological monitoring, would reduce impacts to bighorn sheep to less-than-significant levels under CEQA.

American Badger and Desert Kit Fox

American badgers are present on the Calico Solar Project site and the area supports suitable foraging and denning habitat for this species. Surveys completed by the applicant in 2010 indicate approximately three badger dens were located on the site (TS 2010d). Desert kit fox is also present, and over 36 burrows were noted on site (TS 2010d). The desert kit fox (*Vulpes macrotis*), while not a special-status species, is protected under Title 14, California Code of Regulations.

Direct project impacts to American badger and desert kit fox would include mechanical crushing of individuals or burrows by vehicles and construction equipment, noise, dust, and loss of habitat. Construction activities could also result in the disturbance of badger maternity dens during the pup-rearing season (15 February to 1 July). Because of the large size of the project, numerous badgers or kit foxes may be affected. For example, depending on prey densities, home ranges of badgers can vary from 338 to 1,549 acres (Ziener et al. 1990). Their distribution in a landscape coincides with the availability of prey, burrowing sites, and mates, with males ranging wider than females during the breeding and summer months (Minta 1993). While home ranges are expected to be larger and badger densities lower in more arid regions, construction of the Calico Solar facility could result in the loss of as many as 24 home ranges if home ranges are small (6,215 acres divided by 338-acre home ranges) to as few as five home ranges if home ranges are large (6,215 acres divided by 1,549-acre home ranges). Considering the fact that only three badger burrows were noted during the 2010 surveys, the territory size in this region is likely to be fairly large. While badgers near the perimeter of the project may be able to effectively disperse to other areas, the placement of the tortoise exclusion fence is expected to entrap badgers in the project footprint.

Estimates of kit fox home range size vary widely, and population densities fluctuate drastically depending on the availability of food, predation pressures, rainfall, etc. (Zoellick and Smith 1992; White and Garrott 1999; Arjo et al. 2003). In addition, many kit fox home ranges overlap considerably, often by 20% or more (Zoellick and Smith 1992). Therefore, it is difficult to estimate the actual number of desert kit fox that currently occupy the project site. However, desert kit fox and their sign were observed onsite during surveys conducted for the proposed project, and kit fox could be entrapped within the site by the exclusion fence, as described above for badgers.

Indirect impacts to badgers and kit foxes include alteration of soils, such as compaction that could preclude burrowing, alteration in prey base, and the spread of invasive plants. Operational impacts include risk of mortality by vehicle strikes on access roads by maintenance personnel, the spread of invasive plants, and disturbance due to increased human presence.

The applicant has proposed general measures to minimize impacts to badgers. These include monitoring active dens and collapsing the dens once the animal leaves the site. However, badgers often retreat to burrows when alarmed and without active monitoring of a den it is difficult to ascertain whether the burrow is occupied and, if so, whether it is a maternal den. . In addition, because the site would be fenced to avoid impacts to desert tortoise (to minimize the need for multiple relocation events) badgers that abandon existing burrows will remain trapped within the project footprint by the tortoise fence. Animals left within the fence would be subject to ongoing long term impacts that may result in mortality from road kill, loss or alteration of foraging habitat, overlapping territories, and barriers to dispersal. Similar effects would be expected for desert kit fox. While individual animals could persist within the fenced project area for a time, and perhaps even reproduce, staff concludes that the project area would not support sustainable badger or kit fox populations over the long term and that it eventually would become unoccupied and unavailable to these animals, due to desert tortoise fencing and incompatible land use.

Staff concludes that avoidance of badgers and kit fox alone would not mitigate the direct, indirect, and operational effects of the Calico Solar Project. Staff's proposed Condition of Certification **BIO-24** requires that prior to ground disturbance, a qualified biologist perform a preconstruction survey for badger and kit fox dens in the project area, including areas within 250 feet of all project facilities, utility corridors, and access roads. If present, the applicant will flag and avoid occupied badger and kit fox dens during ground-disturbing activities and establish a buffer to avoid loss of maternity dens. Should the applicant need to work in an area with occupied badger dens the applicant will slowly excavate the den in accordance with Condition of Certification **BIO-24**. Implementation of **BIO-24** would reduce impacts to the American badger and desert kit fox. Staff's proposed Condition of Certification **BIO-17**, the compensatory mitigation plan for desert tortoise habitat, would offset the loss of habitat for this species and reduce the impact from habitat loss to less-than-significant levels under CEQA.

Special-Status Bats

Several bat species are expected to occur in the Calico Solar project area including pallid bat, Townsend's big-eared bat, western mastiff bat, and Yuma myotis. All these species have the potential to forage within the project area, and some bat species utilize large areas for foraging. For example, the pallid bat is capable of flying more than 18 miles, although most foraging occurs within about 2 miles of the diurnal roost (Hermanson and O'Shea 1983).

The rocky mountainous terrain associated with the Cady Mountains, historic mining operations, and the lava tubes at Pisgah crater all support suitable bat roosts and potential hibernaculum. The West Mojave Plan indicates bats are present at Pisgah Crater and a mine shaft was noted along the proposed Phase 2 transmission line route (required to support the complete build out of the project). In addition, staff has noted

bat roosts occurring within railroad trestles and bridges; however, bat sign was not detected by staff at any of the trestles in the project area.

The Calico Solar Project is not expected to result in the loss of maternity, day roosts, or hibernacula for sensitive bats. These features are not known to occur on the project site, and while bats will utilize large trees for day roosts, the habitat on the project site (primarily creosote bush scrub and windrows of sparse salt cedar) is not suited for this behavior. Caves, rock crevices, and old mines are likely present within the adjacent Cady Mountains and it may be possible that some areas of the project that support exposed lava formations may have limited potential to support bats.

Direct impacts to bats could include mortality of individuals during construction activities, loss of foraging habitat due to construction of permanent structures (e.g., SunCatchers) or other construction activities, and temporary disturbance during construction (noise, air turbulence, dust, and ground vibrations from construction equipment). Bats that forage near the ground, such as the pallid bat, would also be subject to crushing or disturbance by vehicles driving at dusk, dawn, or during the night. Indirect effects include the loss of foraging habitat due to type conversion, night time lighting that exposes bats to predation, and alteration in prey bases. Bats may ultimately be attracted to project features such as night lighting, evaporation ponds, and retention basins, as these features may attract prey items such as insects.

In general, bats are highly mobile and it is unlikely that construction activities would result in mortality of bats in the project area. Although bats forage in the project area, most construction activities will occur during daylight hours when the potential for bat interactions is limited. The applicant has not proposed specific avoidance measures for bats and staff considers the likelihood of roosting bats to be low. However, because potential roost sites occur in the project area (i.e., railroad trestles, and rock outcroppings) and bats are known from the nearby Pisgah Craters, staff has developed pre-construction monitoring and impact avoidance measures for bats to reduce impacts to potential hibernacula or day roosts. Staff's proposed Condition of Certification **BIO-25** requires pre-construction surveys, avoidance of maternity colonies, provision of substitute roosting habitat, and exclusion of bats prior to demolition of roosts. Implementation of this condition would reduce project impacts to less-than-significant levels under CEQA.

Impacts to Wildlife Movement Corridors

Studies indicate that habitat fragmentation and isolation of natural areas ultimately results in the loss of native species within those communities (Soulé et al. 1988). In the West Mojave desert large areas of the desert have been subject to habitat fragmentation from residential development, agricultural practices (i.e., near Daggett), military land uses (including Fort Irwin, Marine Corps Logistic Base Yermo, and Twentynine Palms), and off highway vehicle use.

The project site is located in an area supporting a complex assemblage of sensitive plant and wildlife species. Because of the project's geographic location, sited between I-40 and the Cady Mountains, the proposed project has the potential to adversely affect wildlife movement by restricting the size and functional value of the existing movement corridor. The amount and distribution of suitable habitat within a movement corridor is

an essential element to consider for the management of wildlife. For example, some species require, and are often limited to, unique vegetation or terrain features for breeding or foraging such as bighorn sheep, desert tortoise, and Mojave fringe-toed lizard.

While the development of infrastructure (i.e., I-40, Route 66, and utility corridors), and military uses (Marine Corps Logistics Base Yermo, Marine Air Combat Center Twentynine Palms) has resulted in habitat fragmentation to some degree in the region; the project area still supports large areas of open space between I-40 and I-15 that are utilized by a variety of sensitive species. A recent study completed in cooperation between Caltrans and the CDFG has identified the project region as an essential connectivity area between the Bristol and Ord Mountains (Spencer et al. 2010). This area acts as an important link between wildlife populations in the eastern and western deserts. As proposed, the Calico Solar Project is located within the essential connectivity area and has the potential to adversely affect wildlife movement.

On BLM lands, some of the management strategies regarding wildlife include the preservation of ACECs, Wilderness Areas, Wilderness Study Areas, and DWMAs. Federal lands also play an important regional role in maintaining large blocks of wildlands for a variety of uses, including the management of wildlife. This includes maintaining diverse habitats of native plant, fish, and animal species and protecting areas that are the only remaining habitat for species imperiled by the loss or degradation of habitat.

Wildlife corridors provide a variety of functions and can include habitat linkages between natural areas; provide greenbelts and refuge systems; and divert wildlife across permanent physical barriers to dispersal such as highways and dams by roadway underpasses and ramps (Haas 2000, Simberloff et al. 1992). Generally, the accepted definition describes a wildlife corridor as a linear habitat, embedded in a dissimilar matrix that connects two or more larger blocks of habitat (Beier and Noss 1998). Noss (1987) also suggests several potential advantages to corridors, including increased species richness and diversity, decreased probability of extinction, maintenance of genetic variation, a greater mix of habitat and successional stages, and alternative refugia from large disturbances. The following corridor functions are important in evaluating impacts to wildlife movement corridors and have been considered in the context of evaluating impacts from the proposed Calico Solar Project:

a. Movement corridors are physical connections that allow wildlife to move between patches of suitable habitat.
b. Dispersal corridors are linear landscape features that link two or more areas of suitable habitat that would otherwise be fragmented and isolated from one another by rugged terrain, changes in vegetation, or human-altered environments (Beier and Noss, 1998). Dispersal corridors provide physical links for genetic exchange and allow animals to access alternative territories as dictated by fluctuating population densities.
c. Landscape habitat linkages (or simply linkages) are relatively large open space areas that contain natural habitat and provide connection between at least two larger adjacent open spaces that can provide for both diffusion and dispersal of many

species (USACE and CDFG 2009). Linkages can be large enough areas to support the complete life history of a target species such as desert tortoise.

d. Wildlife buffers are areas between the urban development edge and an important biological resource. These buffers protect the resource from adverse edge effects such as habitat degradation, increased occurrence of non-native and urban-related species, increased predation from domestic animals and mesopredators (e.g., raccoons, skunks, snakes, foxes), and other edge effects. (USACE and CDFG 2009).

e. Travel routes are usually landscape features, such as ridgelines, drainages, canyons, or riparian corridors within larger natural habitat areas that facilitate movement and provide access to water, food, cover, den sites, or other necessary resources (Meffe and Carroll 1997).

f. Wildlife crossings are small, narrow areas of limited extent that allow wildlife to bypass an obstacle or barrier. Crossings typically are manmade and include culverts, underpasses, drainage pipes, bridges, and tunnels to provide access past roads, highways, pipelines, or other physical obstacles. Wildlife crossings often represent "choke points" along a movement corridor because useable habitat is physically constricted at the crossing by human-induced changes to the surrounding areas (Meffe and Carroll 1997).

Construction of the proposed Calico Solar facility would result in the land use conversion of approximately 6,215 acres of open space. This includes approximately 2,140 acres of open space between the BNSF Railroad and I-40 and approximately 4,075 acres between the railroad and the Cady Mountains. While the area between the interstate and railroad is somewhat isolated, this parcel still provides suitable habitat and north-south movement for a variety of local species including Mojave fringe-toed lizards and desert tortoise. In addition, although culverts are present, fencing and road traffic on the interstate reduce or hinder the movement for some species in the planning area. Similarly, the existing BNSF railroad limits unrestricted movement between the Interstate and railroad for species such as desert tortoise and Mojave fringe-toed lizards.

The area with the most potential to serve as an east-west linkage and corridor is the remaining lands north of the railroad. Most of this land consists of creosote bush scrub and the topography varies with distance from the Cady Mountains. Because this is an alluvial fan, the terrain near the foothills is more complex and is characterized by numerous drainages, complex topography, and boulder strewn areas. Conversely, areas further from the foothills support more sand dominated soils with gentle topography.

Based on the vegetation, topography and connectivity to other open areas, staff considers the northern portion of the project region to function as a wildlife linkage. Depending on the mobility, home range requirements, and dispersal abilities of the species, the project site would have different functional roles in the life history of the target species. For desert tortoise the project site supports live-in habitat and acts as a linkage to adjacent areas for dispersing animals. For Nelson's bighorn sheep the area supports winter forage and likely acts as a movement corridor for intermountain movement. As described in Section C.2.2. (Introduction), in order to address concerns regarding wildlife

movement and to minimize impacts to important linkages for wildlife, substantial project modifications have occurred since the analysis presented in the SA/DEIS. These changes included reducing the project footprint from approximately 8,230 acres to 6,215 acres. One of the most prominent design changes was the alteration of the project footprint to avoid large tracks of densely populated tortoise habitat that occurs on the bajadas of the Cady Mountains. By avoiding this area the proposed project is not expected to pose significant barriers to movement for desert tortoise or Nelson's bighorn sheep.

Bighorn sheep are known to forage in the bajadas near the foothills of the mountains and may move across the flatlands associated with the Calico Solar project. Wehausen (2005) and others (Schwartz et al. 1986; Bleich et al. 1990, 1996) consider intermountain areas of the desert floor that bighorn traverse between mountain ranges as important to the long term viability of populations as the mountain ranges themselves. Construction of the project may obstruct or hinder some of this movement but is not expected to pose complete barriers to movement. For other wide ranging mammals including coyotes, badgers, and desert kit fox, the project would also pose a barrier but would not prevent passage to adjacent areas.

For other less motile species such as desert tortoise construction of the Calico Solar Project will hinder north-south and east-west movement. To reduce potential operational effects to desert tortoise the project will be constructed with fencing that prohibits tortoises and other non-avian wildlife from entering the site. This fencing will result in permanent barriers to north-south movement for the entire project site. Because of the modified project design, east-west movement will remain available along the northern boundary of the project. As proposed, the project would conform to the 4,000-foot minimum buffer design suggested by the USFWS Desert Tortoise Recovery Office. This would allow for permanent residency for some desert tortoise north of the project site and provide a linkage where dispersing animals could maintain genetic linkages to adjacent populations. In consultation with CDFG, USFWS, BLM, and staff, the applicant has proposed several other design features to reduce corridor and movement concerns along the northern border of the project. This includes relocating the retention basins within the fence line and routinely inspecting fences after each storm event. Staff concurs with these measures and has included them into staff's proposed Condition of Certifications **BIO-8** and **BIO-9**.

Staff considers impacts to wildlife movement from the construction and operation of the Calico Solar Project power plant site and transmission line to be less than significant with mitigation.

IMPACTS TO WATERS OF THE STATE

Construction of the Calico Solar Project would result in direct and indirect impacts to numerous ephemeral streams and washes that occur within the floodplain of the Cady Mountains and would alter the hydrological, biogeochemical, vegetation and wildlife functions of these drainages. This would result from the construction of the proposed sediment catchment basins and a series of diversion channels required to direct flow into the primary natural drainages on site. Because these structures would attenuate peak flood discharge rates, construction of the Calico Solar Project would impact desert wash communities on the project site and to some degree immediately downstream of

the project. Impacts would primarily occur from the placement of facility structures including SunCatcher footings, roads, detention basins, and other project components. Vegetation mowing would occur on a routine basis around the SunCatchers to keep vegetation no more than 4 inches tall. Therefore, impacts to vegetation from mowing are considered permanent as well. With the exception of vegetation mowing the applicant has considered all impacts to State waters as permanent, but staff concludes that mowing would also be a permanent impact to State waters.

Direct impacts to State jurisdictional waters include the removal of native vegetation including some areas characterized by microphyll woodland, alterations to the existing topographical conditions, the discharge of fill, degradation of water quality, and the attenuation of peak flood flows which affect sediment transport. Most of these impacts would occur during access road improvements and the development of the projects detention basin and storm water management system. The attenuation of peak storm flows and the subsequent loss of sediment to the system from the detention basins can adversely affect biological resources dependent on these features. Flooding and regular scour is a form of disturbance to which many plant and animal species appear well adapted and is often required to provide suitable nesting or breeding habitat (Busch and Smith 1995). The imposition of artificial stream flows by the attenuation of storm events may affect seedling recruitment at appropriate stream bank elevations, exaggerate drought stress, and increase mortality of seedlings (Mahoney and Rood 1998). In arid systems, this may be particularly important to ensure seedling survival. In addition, the attenuation of flood events may prevent the essential geomorphic disturbance required to create new nursery sites for seedling recruitment while maintaining other areas relatively clear of vegetation within the scour zone that provides habitat for a number of other plant and animal species (Johnson et al. 1976). Non-natural flow regimes may also change the sediment load carried during regular storm events.

Indirect impacts could include alterations to downstream habitat due to altered hydrology or sediment delivery, and the introduction of non-native, invasive plant species. As described above construction of the project would result in alterations to the existing hydrology and expected sediment transport across the site. Adverse effects on habitat are created as sediment starved water removes fine particulate material from the stream course resulting in stream narrowing, erosion of the streambed and banks, and development of a coarse, boulder-dominated streambed (Mount 1995). This could alter fine sand transport utilized by several species of rare plants and the Mojave fringe-toed lizard. Conversely, uninhibited storm flows carry a natural mixture of boulder, cobble, gravel, sand, and silt materials that are deposited at different intervals within the floodplain reflective of the strength of the most recent flood event. The diversity and episodic nature of streams and streambed materials creates habitat niches within the floodplain for varying wildlife.

Operational impacts would include routine mowing of vegetation, vehicle access, and repair of damaged culverts and roads following large storm events.

The applicant has provided drainage plans that conceptually discuss how flows would be directed from the large linear detention basins along the northern boundary of the site. In addition, several small debris basins and diversion channels would convey flow into the primary drainage channels (TS 2010j). In addition, the applicant has provided

general information regarding the types of project features that would result in permanent and temporary impacts to waters of the State. Based on the attenuation of storm flows and loss of sediment to the system coupled with the level of maintenance expected to occur on the site, staff and CDFG consider that all of the ephemeral washes on the project site would be adversely affected by the proposed project. However, an hydrologic and sediment analysis study completed by the Energy Commission found that habitat areas outside the project site will not be affected by the proposed project since they are supplied by sediment that is transported on paths that are unaffected by the project (Appendix A).

Staff considers direct and indirect impacts of the project to approximately 282.2 acres of State jurisdictional waters to be permanent and significant absent mitigation. This impact would include 3.3 acres of microphyll woodland that was mapped in the northeast corner of the site. The ephemeral drainages in the project area provide beneficial functions and values such as groundwater recharge, flood peak attenuation, floodwater storage, and wildlife corridors and habitat. For the proposed project, these functions would be impaired by construction and operation of the project. Staff and CDFG agree that off-site acquisition and enhancement of off-site State waters would mitigate project impacts to waters. For the Calico Solar Project staff and CDFG have proposed a mitigation ratio of 1:1 for permanent impacts to 282.2 acres due to the loss of habitat functions. Staff is not seeking compensatory mitigation for downstream reaches as flows are already attenuated to some degree by the BNSF Railroad and I-40.

To reduce impacts of the proposed project on State jurisdictional waters, staff has proposed Condition of Certification **BIO-26** (Streambed Impact Minimization and Compensation Measures). This condition's requirements are consistent with CDFG Streambed Alteration Agreement requirements. These include the acquisition of offsite habitat and the implementation of Best Management Practices and the replacement of 3.3 acres of lost smoke tree and catclaw acacia habitats at a 3:1 ratio. Total streambed comensation required under **BIO-26** would be 288.8 acres, to include at minimum 9.9 acres of microphyll woodland (i.e., 278.9 acres mitigated at 1:1 and 3.3 acres of microphyll woodland mitigated at 3:1). Staff believes that the applicant would likely meet these requirements with the implementation of Condition of Certification **BIO-17,** which requires 14,375 acres of compensatory mitigation lands for desert tortoise. **BIO-26** requires that the applicant verify acreage of state jurisdictional streambed area with the required tortoise mitigation land and, if necessary, acquire additional mitigation lands to achieve total streambed compensation as required by this condition. With implementation of staff's proposed Condition of Certification **BIO-26**, impacts to State jurisdictional waters associated with the desert washes would be mitigated to less-than-significant levels under CEQA. This condition also fulfills requirements of CDFG's Lake and Streambed Alteration Agreement program pursuant to Fish and Game Code Section 1600 et seq. Should the project be terminated or cease operation, staff has identified Condition of Certification **BIO-28** (Channel Decommissioning and Reclamation Plan). This measure would be required in order to replace the lost hydrologic function to the numerous small drainages that would be dewatered from the construction of the detention basins. Because the construction of the Calico Solar Project would involve the construction of numerous basins and a series of small diversion channels that direct flow into the primary natural drainages on site, staff would require the applicant to

restore flow to the existing channels upon the project's retirement. Staff concludes that these measures would reduce the project's impacts to state-jurisdictional streambeds below a level of significance by minimizing project impacts to streambeds; protecting sufficient off-site acreage to offset the on-site impacts; and reclaiming on-site streambed upon eventual closure of the Calico Solar Project.

OPERATION IMPACTS AND MITIGATION

The operation of the Calico Solar Project would result in long term persistent impacts to biological resources both within the existing perimeter fence and in adjacent habitats. Operational impacts to biological resources include disturbance to common and sensitive wildlife from vehicle traffic; SunCatcher maintenance and washing (i.e., each SunCatcher would be washed approximately every 30 days [ca. 1000 SunCatchers washed every night]); mowing; night time lighting and maintenance activities (i.e., washing and maintenance would occur at night); noise; and bird collisions with structures. The use of evaporation ponds would also provide subsidies for ravens which can lead to increased tortoise predation. These operational impacts were addressed in the preceding analysis of project impacts by species and biological resources, but are discussed in the aggregate below.

Ravens

Human activities have the indirect effect of causing increased raven populations, largely due to increased food and water supplies and increased nesting sites. Although ravens are native to the deserts, their populations have increased dramatically over the past several decades, and they are considered a "subsidized predator" in the biological literature (Boarman 2003). That is, their numbers are unnaturally high due to human resource "subsidies"; these high numbers of ravens result in an increase in raven predation on other native species. The project's potential impacts to raven populations are discussed in more detail above (Impacts to Desert Tortoises).

The applicant has proposed general measures to reduce potential project impacts from ravens and have recommended the preparation of a Raven Control Plan (SES 2009aa). Staff considers that the construction and operation of the Calico Solar Project would result in new attractants and potential subsidies that might result in changes in raven population or behavior, which could subsequently affect the desert tortoise population in the region through increased predation. To reduce this effect, staff incorporated the recommendations that the applicant proposed, which includes the development and implementation of a Raven Monitoring, Management, and Control Plan for the Calico Solar Project. These measures are described in more detail in staff's proposed Condition of Certification **BIO-18** (Raven Monitoring, Management, and Control Plan).

As described in staff's proposed Condition of Certification **BIO-8** (Impact Avoidance and Minimization Measures), excess ponded water, food waste and other attractants would be controlled to reduce subsidies to ravens. This potential impact would be minimized by using the minimal amount of water needed for dust abatement, by routine trash collection and appropriate storage, and by use of a Biological Monitor to inspect the construction sites and ensure that potential attractants of the common raven are minimized. Staff's proposed conditions **BIO-8** and **BIO-18**, would minimize the project's potential to cause effects of increased predation on desert tortoise by ravens and other

species in the project area by requiring a variety of impact avoidance and minimization measures to minimize and control trash and other human activities that tend to increase raven activity; and on-site raven activity management and control, and a per-acre contribution to support the USFWS Regional Raven Management Program (below).

Cumulative/Regional Impacts of Ravens

Construction and operation of the Calico Solar Project and subsequent increases in raven predation could contribute incrementally to cumulative impacts to the western Mojave Desert population of desert tortoise. In addition, due to the long distances ravens are capable of flying, any raven subsidies in the region would contribute to the decline in tortoise populations throughout the western Mojave Desert and may affect the adjacent ACEC or desert tortoise critical habitat.

The USFWS has developed a comprehensive, regional raven management and monitoring program in the California Desert Conservation Area to address the regional, significant threat that increased numbers of common ravens pose to desert tortoise recovery efforts (USFWS 2010b). To mitigate for the regional effects of ravens, staff's proposed Condition of Certification **BIO-18** would require the applicant to contribute a one-time fee to support the regional raven management plan activities. The fund and fee are described above (Impacts to Desert Tortoise). The fee would offset contributions of the project to cumulative impacts associated with regional increases in raven numbers, and the project-specific raven management efforts proposed by the applicant would reduce impacts to desert tortoise from raven predation to less-than-significant levels under CEQA.

Other Predators

Feral dogs are significant predators on desert tortoise and other native wildlife. Dogs may range several miles into the desert and have been found digging up and killing desert tortoises (USFWS 1994; Evans 2001). Dogs brought to the project site with visitors may harass, injure, or kill desert tortoises particularly if allowed off leash to roam freely in occupied habitat. Implementation of staff's proposed Condition of Certification **BIO-6**, the Worker Environmental Awareness Program (WEAP), and restrictions on pets being brought to the site (Condition of Certification **BIO-8**), to be monitored and enforced by the project owner and CPM, would reduce the project's potential to increase numbers of free-roaming or escaped pet dogs below a level of significance by prohibiting pets.

Increased Risk from Roads/Traffic

While many species of wildlife can tolerate human disturbance to some degree; operation of the proposed project would result in an ongoing loss of wildlife from mowing, vehicle traffic, nest failure, and alteration of foraging habitat. The most likely long term threats to wildlife that is trapped within the perimeter fencing is from habitat alteration and mortality from road traffic.

Vehicle traffic would increase on access roads and on maintenance roads throughout the site as a result of the construction and operation of the Calico Solar Project increasing the risk of injuring or killing desert tortoise and other wildlife. Information provided by the applicant indicated that 1,462 peak construction traffic trips (peak daily

round trips) and 248 daily operations trips would occur (SES 2008). In addition, up to 36 delivery trips will arrive and depart throughout the day. The ecological effects of roads include seven general effects that include: mortality from road construction and vehicle collisions; modification of animal behavior; changes to the physical and chemical environment; the spread of invasive plants, and increased human access and use (Trombulak and Frissell 2000). Construction traffic along access and spur roads, particularly in areas used by nesting birds can adversely affect wildlife by disrupting breeding, foraging, and movement. Wildlife species are most vulnerable to disturbances during their breeding seasons and these disturbances could result in nest, roost, or territory abandonment and subsequent reproductive failure if these disturbances were to occur during the breeding season. The use of access roads by construction and maintenance vehicles would result in accidental road-killed wildlife if these species occurred on roads during construction activities. Diurnal reptiles and small mammals such as desert tortoise, Mojave-fringe toed lizards, chuckwallas, badgers, and desert cottontails are the most likely to be subject to vehicle-caused mortality, although few if any wildlife species are immune to vehicle collisions. Coupled with the large size of the project (6,215 acres) and the expected vehicle traffic to support operation and maintenance activities the Calico Solar project could result in adverse effects to wildlife. Mortality to wildlife would be expected to occur both within the perimeter fencing and along the proposed access roads including Hector Road and I-40.

To minimize the risks of increased traffic fatality and other hazards associated with roads at the Calico Solar Project site, the applicant has proposed a variety of general minimization measures which staff has incorporated into staff's proposed Condition of Certification **BIO-8**. These measures include confining vehicular traffic to and from the project site to existing routes of travel, prohibiting cross-country vehicle and equipment use outside designated work areas, and imposing a speed limit of 25 miles per hour within the project area, on maintenance roads for linear facilities, and on access roads to the Calico Solar Project site. Staff concludes that implementation and enforcement of these measures would be effective and feasible; would minimize adverse effects of project roads to biological resources, and would mitigate those effects below a level of significance.

Impacts of Evaporation Ponds

The proposed Calico Solar Project includes two 3,000,000-gallon evaporation ponds that would collect wastewater from the reverse osmosis water treatment system (SES 2008). Evaporation ponds would provide a potential perennial water source in an otherwise arid region and act as a subsidy to ravens (above). Even if they are fenced off from wildlife, evaporation ponds may attract predators and other species, including waterfowl. In addition, small mammals, waterfowl, shorebirds, and other resident or migratory birds that drink or forage at the ponds could be exposed to potentially lethal doses of hyper-saline water. Monitoring results from the summer of 2007 at Harper Lake Solar Electric Generating System in the Mojave Desert revealed that numerous waterfowl died at the evaporation ponds due to salt toxicosis (Luz 2007). The Harper Lake ponds are similar to those proposed by the Calico Solar Project. Although Harper Lake is near a wetland area where bird numbers are higher than at the Calico site, the evaporation ponds and associated risk to birds are a source of significant concern. Another concern is the location of the evaporation ponds near the proposed

transmission towers on the project site where attraction to the ponds by birds would increase the possibility of collision.

Staff considers potential impacts of evaporation ponds to wildlife to be significant absent mitigation. To reduce these impacts the applicant has proposed specific measures identified in a Draft Evaporation Pond Management Plan. Staff has considered these actions and has incorporated them into proposed Condition of Certification **BIO-27** (Evaporation Pond Design, Monitoring, and Management Plan). Staff also recommends that the applicant either cover the ponds with netting or other suitable materials to minimize bird mortality or implement an evaporative pond design that does not allow for large areas of ponded water. This could include the implementation of a dry cooling zero liquid discharge (ZLD) system. In addition, the project owner will develop an Evaporation Pond Design, Monitoring, and Management Plan. This plan would incorporate any revisions to pond size or design discussed in the Soil and Water section of the SA/DEIS and would require the review and approval by USFWS, CDFG, and staff. The plan would be developed and implemented per guidance in staff's proposed Condition of Certification **BIO-27**. If appropriately designed, implementation of this plan would reduce evaporation pond impacts to birds to less than significant levels under CEQA. The plan will include language specifying the type of netting and fencing to be used, reporting protocols, and remedial actions required in the event of bird mortality. Staff concludes that the measures outlines in **BIO-27** are feasible and would effectively minimize adverse effects of the evaporation ponds to wildlife by preventing animals from accessing the ponds and minimizing the ponds' surface areas, and implementing further management measures as needed. Staff concludes that implementation of **BIO-27** would reduce the ponds' adverse effects below a level of significance.

Noise Impacts

The impact of operational noise on surrounding wildlife is expected to be a constant source of disturbance and would likely preclude use of the adjacent area to some degree. Operation of the SunCatcher units will result in noise levels generally considered to exceed the levels acceptable to most wildlife. Each of the SunCatcher units generates noise levels of 84 dBA Leq at approximately 50 feet. At 850 feet this level attenuates to 60 dBA. These levels would be expected to limit, and in some cases preclude, the use of habitat adjacent to the project site.

Noise may affect birds in several ways, including annoyance which causes birds to abandon nests that are otherwise suitable; raise the level of stress hormones, interfering with sleep and other activities; cause permanent injury to the auditory system; and interfere with acoustic communication by masking important sounds or sound components (Dooling 2006). Many bird species rely on vocalizations during the breeding season to attract a mate within their territory, and noise from operations and maintenance activities could disturb nesting birds and other wildlife and adversely affect nesting and other activities. Studies have shown that noise levels over 60 dBA can affect the behavior of certain bird species, but Reijnen et al. (1995) demonstrated that for two species of European warbler (*Phylloscopus* spp.), sound levels between 26 dBA and 40 dBA reduced breeding density by up to 60% compared to areas without disturbance. These data suggest that disturbance from adjacent road noise and urban development may be a contributing factor in the use of habitat adjacent to developed areas. Similar effects may occur in other taxa, though staff are not aware of any studies

of noise effects to desert tortoises. Anthropogenic noise associated with Interstate 40, the BNSF railroad, and other human activities (e.g., OHV activity) is present in the project area. Many bird species avoid developed areas within urban settings and, due to the noise level, these species will avoid the SunCatchers.

Ambient noise levels at a nearby residence 1,200 feet south-west of the project site, to the south of Route 66 and west of Hector Road showed ambient noise levels of 63 to 65 dBA, consistent with the site's proximity to the nearby rail lines and highway. Ambient noise at another site, more distant from the highway and railroad, showed ambient noise levels of 38 to 41 dBA, consistent with a rural environment (**Noise Table 4**). Staff estimates that the noise level will be approximately 75 dBA at the project fence line during project operations, about 10-12 dBA above current ambient noise levels in the southern part of the site (near the highway and railroad) and about 35 dBA above current ambient noise more distant from the transportation corridor. One hundred feet offsite, the noise level would attenuate to approximately 72 dBA, and staff estimates that noise levels would attenualte to approximately 60 dBA at approximately 850 feet from the project fence line. The 60 dBA level is often applied as an avoidance threshold for nesting birds. Staff believes that operational noise would adversely affect wildlife at distances up to approximately 850 feet from the solar generators. Staff notes, however, that the southern portion of the site, near the highway and railroad, has high existing ambient noise levels. In some parts of the northern part of the site, project flood control structures would be sited at the northern project boundary, so that significant noise sources (SunCatchers) may be several hundred feet south of adjacent open lands, buffering some off-site habitat from noise impacts. Staff concludes that remaining adverse impacts of noise would be mitigated below a level of significance through staff's recommended Condition of Certification **BIO-17**, which would require habitat compensation at a ratio of 3:1 for project impact acreage north of the BNSF railroad tracks (4,075 acres). This condition would require the project owner to acquire and protect 12,225 acres of off-site desert habitat.

Bird Collisions and Electrocution

Birds are known to collide with communications towers, transmission lines, and other elevated structures. Estimates of the number of bird fatalities specifically attributable to interactions with utility structures vary considerably. Nationwide, it is estimated that hundreds of thousands to as many as 175 million birds are lost annually to fatal collisions with transmission and distribution lines (Erickson et al. 2001). In California, even general estimates are unavailable, although it is plausible that such collisions result in the deaths of hundreds of thousands of birds each year (Hunting 2002).

Solar facilities, including large scale complexes such as the 6,215 acre Calico Solar facility, present a new and relatively un-researched risk for bird collisions and other injuries. The primary threats to collision on the project site include the main SunCatcher assembly building (78 feet) main services complex (44 feet), SunCatcher units (40 feet), and required transmission line facilities (90-110 feet). The SunCatchers at the Calico Solar Project plant site would pose a collision risk to birds. Depending on the time of day, use of the site by various species, and glare, it is probable that birds will collide with the structures. Bird fatality studies conducted at the existing Solar One facility near Daggett, west of the Calico Solar project site, indicated that much of the bird mortality consisted predominantly of collisions with mirrors, in large part resulting from increased

numbers of birds attracted to the adjacent evaporation ponds and agricultural fields (McCrary et al. 1986). While the proposed Calico Solar facility would not be adjacent to agricultural fields, the use of evaporation ponds and the reflection of the SunCatchers may attract various species of birds. The Calico Solar Project would also require the construction of approximately 12 to 15 new 220 kV transmission line structures which are approximately 90 to 110 feet tall (SES 2008).

Avian interactions with transmission lines and structures and the risks those interactions impose would vary greatly by location within the proposed project area. Bird collisions with power lines generally occur when a power line or other aerial structure transects a daily flight path used by a concentration of birds, or migrants are traveling at reduced altitudes and encounter tall structures in their path (Brown 1993). Collisions are more probable near wetlands, valleys that are bisected by power lines, and within narrow passes where power lines run perpendicular to flight paths. Passerines (e.g., songbirds) and waterfowl (e.g., ducks) collide with wires (APLIC 2006), particularly during nocturnal migrations or poor weather (Avery et al. 1978).

There is insufficient information available to conclude whether the Calico Solar Project would be a significant ongoing source of mortality to birds for the life of the project. Given the lack of research-based data on the impacts of glare and collision threats to birds, staff's proposed Condition of Certification **BIO-22** (Avian Protection Plan / Monitoring Bird Impacts from Solar Technology), would provide the information needed to develop and implement adaptive management measures to mitigate bird collision impacts. If the SunCatchers pose a collision risk for birds, the applicant shall be required to implement measures such as construction of bird diverters, aerial markers, or other units to minimize potential collision risks for birds. Staff concludes that the Avian Protection Plan and bird impact monitoring as recommended in Condition of Certification **BIO-22** would effectively determine rates of bird collisions with project facilities and would result in implementation of further feasible measures as needed to mitigate significant bird collisions, if they should occur, below a level of significance.

Power line electrocutions result in the losses of tens to hundreds of thousands of birds annually in the United States (Erickson et al. 2001). In the project area, golden eagles, red-tailed hawks, and other large aerial perching birds are susceptible to electrocution on power lines because of their large size, distribution, and proclivity to perch on tall structures that offer views of potential prey. Electrocution occurs when a perching bird simultaneously contacts two energized phase conductors or an energized conductor and grounded hardware. This happens most frequently when a bird attempts to perch on a transmission tower/pole with insufficient clearance between these elements. Electrocution can occur when horizontal separation is less than the wrist-to-wrist (flesh-to-flesh) distance of a bird's wingspan or where vertical separation is less than a bird's length from head-to-foot. Electrocution can also occur when birds perched side-by-side span the distance between these elements (APLIC 2006).

The proposed transmission line from the energy collection facilities to the Pisgah Substation would be energized at 220 kV, which poses a low risk for most avian electrocutions because the conductors must be relatively far apart. The majority of raptor electrocutions are caused by lines that are energized at voltage levels between 1 kV and 69 kV, which typically have more closely-spaced conductors, and "the likelihood

of electrocutions occurring at voltages greater than 69 kV is extremely low" (APLIC 2006). The applicant has proposed constructing the line in accordance with the Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006 (APLIC 2006). Staff's proposed Condition of Certification **BIO-8** would require transmission lines and all electrical components to be designed, installed, and maintained in accordance with the Avian Power Line Interaction Committee's (APLIC's) Suggested Practices for Avian Protection on Power Lines (APLIC 2006) and Mitigating Bird Collisions with Power Lines (APLIC 2004) to reduce the likelihood of large bird electrocutions and collisions. The proposed mitigation addressed in staff's proposed Condition of Certification **BIO-8** provide effective and feasible measures to prevent bird electrocution, and staff concludes that the proposed transmission lines would not pose a significant threat to birds with incorporation of this condition.

Glare

Glare from the reflection of sunlight from the SunCatcher units may contribute to the risk of avian collision on the project site. To date little is known regarding the avian response to glare from solar technology. However, it is likely that glare will affect birds to some degree. In the same way that large mirrored buildings may be confused by birds as open sky, the mirrors will reflect light and take on the color of the image being reflected. This may result in birds confusing the SunCatchers as either open sky or water and increase the collision risk. The AFC indicated that studies of military overflights did not detect significant glare from existing solar facilities; however the sites are anticipated to be similar to a body of water (SES 2008). Further, reflected light may result in damage to a bird's vision from direct exposure to high levels of photon flux density (PFD). Exposure to high intensity light or glare can damage vision and impair foraging in some species. The proposed solar mirrors and heat collection elements would be sources of bright light caused from the diffuse reflection of the sun. The SunCatchers are designed so that sun rays from the mirrors would be reflected directly at the receiver and not at surrounding viewers or overhead (SES 2008). However, glint and glare studies of solar trough technology found that pedestrians standing within 20 meters (60 feet) of the perimeter fence when the mirrors rotate from the stowed position to a vertical position may see light intensity equal to or greater than levels considered safe for the human retina (URS 2008). Staff concludes that any wildlife on the ground at a distance of 20 meters (66 feet) or closer could experience similar hazards from unsafe light intensity.

Bird response to glare from the proposed SunCatcher technology is not well understood. Given the lack of research-based data on these impacts, staff cannot conclude that they are not significant. Staff recommends Condition of Certification **BIO-22** (Avian Protection Plan / Monitoring Impacts of Solar Technology on Birds) to monitor and minimize potential bird mortality due to glare. Staff concludes that the Avian Protection Plan and bird mortality monitoring as recommended in Condition of Certification **BIO-22** would effectively determine rates of bird mortality and would result in implementation of further feasible measures as needed to mitigate significant bird collisions, if they should occur, below a level of significance.

Lighting

Lighting may affect essential behavioral activities, physiology, population ecology, and ecosystems of diurnal, crepuscular, and nocturnal wildlife, and ecological light pollution

may affect competition and predation for some species (Longcore and Rich 2004). Lighting may also increase the risk of predation of wildlife because they may be more detectable to nocturnal predators (USACE and CDFG 2009). Many insects are drawn to lights, and species that prey on insects, such as bats, may be attracted to lighted construction areas which would increase the potential for disturbance and mortality. However, studies have indicated that many small species, such as rodents, rabbits, snakes, and bats, actually forage at lower rates at high illumination levels (Longcore and Rich 2004), which may be a biological adaptation to high levels of moonlight. Overall, chronic ecological light pollution may favor light-tolerant species over those that are dark-adapted (Longcore and Rich 2004).

For birds, lighting plays a significant role in collision risk with tall towers because lights can attract nocturnal migrant songbirds, and major bird kill events have been reported at lighted communications towers (Manville 2001), with most kills from towers higher than 300 to 500 feet (Kerlinger 2004). Increased lighting during low-light periods can cause some species to leave the area and can disrupt foraging, breeding, or other activities. Lighting may disturb the nighttime rest and sleep periods of diurnal species, including most passerine birds, having similar effects as noise, including annoying individuals and causing them to abandon nests that are otherwise perfectly suitable (USACE and CDFG 2009). Nest site selection by some birds may also be affected by light, with nests being established farther from light sources (Longcore and Rich 2004).

Operation of the Calico Solar Project would require on-site nighttime lighting for safety and security, which could disturb nocturnal wildlife. In addition, the large scale maintenance activities would require vehicle and equipment lighting to safely clean and service the SunCatchers. The project would be operated with a staff of approximately 180 full-time employees. The project would operate 7 days per week, generating electricity during normal daylight hours when the solar energy is available. Maintenance activities would occur 7 days per week, 24 hours a day to ensure SunCatcher availability when solar energy is available. Although facility lighting would be shielded, light from these activities is expected to result in ongoing disturbance to wildlife both within the perimeter fencing and in adjacent habitat.

To reduce off-site lighting impacts, lighting at the Calico Solar Project facility would be restricted to areas required for safety, security, and operation. Exterior lights would be hooded, and lights would be directed toward the site to minimize light or glare off-site. Low-pressure sodium lamps and fixtures of a non-glare type would be specified. Switched lighting would be provided for areas where continuous lighting is not required for normal operation, safety, or security; this would allow these areas to remain un-illuminated (dark) most of the time, thereby minimizing the amount of lighting potentially visible off site. These measures are described in staff's proposed Condition of Certification **VIS-2**. Staff concludes that implementation of this measure would minimize lighting impacts to wildlife at the Calico Solar Project site and would mitigate this impact below a level of significance.

C.2.5 REDUCED ACREAGE ALTERNATIVE

The Reduced Acreage Alternative would essentially be a 275-MW solar facility located within the central portion of the proposed 850 MW project. It was developed because it

can be constructed without upgrading the existing SCE electrical transmission line between the Pisgah and Lugo Substations. This alternative's boundaries and the revised locations of the transmission line, substation, laydown, and control facilities are shown in **Alternatives Figure 1**. All Figures described in this document are present at the end of the section.

C.2.5.1 SETTING AND EXISTING CONDITIONS

The setting for this alternative would include approximately 2,600 acres or 42% of the lands affected by the proposed project. Lands affected by this alternative would be located generally in the center of the proposed project site, and would all be entirely under the jurisdiction of the BLM. This alternative would include 11,000 SunCatchers, or 31% of the SunCatchers that would be installed under the proposed project, and the net generating capacity would be 275 MW. SCE would be able to complete system upgrades within the existing Pisgah Substation, and would not require the 65-mile upgrade to the existing Pisgah-Lugo transmission line. This Alternative would still require the construction of numerous retention basins, detention and sediment basins, and a series of small diversion channels that direct flow into the primary natural drainages on site. As with the proposed project, these structures would attenuate peak flood discharge rates and would impact desert wash communities both within and downstream of the project. Because the footprint of the Reduced Acreage Alternative is located entirely within the footprint of the proposed project, the environmental setting with regard to biological resources would be the same. Please see the discussion of existing conditions under Section C.2.4.1.

Implementation of the reduced acreage alternative would substantially reduce impacts to biological resources identified on site, including desert washes, desert tortoise habitat, and some identified populations of rare plants. The footprint of the Reduced Acreage Alternative would also reduce impacts to Nelson's bighorn sheep by avoiding potential foraging habitat on the lower bajadas and providing greater distance between bighorn sheep and construction/operation activities. Likewise, while barriers to wildlife movement would still remain under this alternative, by moving the footprint further away from the foothills the Alternative would greatly reduce barriers to east-west wildlife movement for desert tortoise, Nelson's bighorn sheep, and other species. North-south movement would still be constrained by this Alternative.

C.2.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Vegetation Impacts

As discussed in Section C.2.4.2, the proposed project would result in the loss of native vegetation communities. The types of effects to native vegetation communities resulting from this alternative would be similar to the proposed project but less intense in scale and magnitude. Under the Reduced Acreage Alternative the project would result in an approximately 58% reduction in impacts to native vegetation when compared to the proposed project. The Reduced Acreage Alternative would result in impacts to the same general types of vegetation communities as the proposed project with the following exceptions. Areas mapped as desert saltbrush scrub and un-vegetated habitat would be avoided under this alternative, and most of the native vegetation that would be lost

would consist of Mojave creosote bush scrub. In addition, because the project would avoid some of the desert washes and bajadas present in the foothills of the Cady Mountains, habitat supporting vegetation consistent with microphyll woodlands would be greatly reduced. However, the construction of the proposed stormwater management system would still occur and these structures would attenuate flows, disrupt sediment transport, and alter the existing morphology of onsite drainages. Vegetation that occurs in these areas would remain subject to long-term effects from the modified flow and sediment regime.

Staff's proposed conditions of certification would mitigate for the Reduced Acreage Alternative's direct, indirect, and cumulative impacts to vegetation communities. These conditions are identical to those recommended for the proposed project, and include general minimization and avoidance Conditions of Certification **BIO-1** through **BIO-9**. Specific impacts to vegetation communities would be minimized through the implementation of Conditions of Certification **BIO-10** (Revegetation Plan and Compensation for Impacts to Native Vegetation Communities) and **BIO-11** (Weed Management Plan). To address specific construction-related impacts to native vegetation communities and habitat loss, staff has proposed Condition of Certification **BIO-17** (Desert Tortoise Compensatory Mitigation)**.**

Impacts to Special-Status Plants

Several special-status plant species were detected on or near the site during floristic surveys conducted for the proposed project during the spring 2010. This included large numbers of small-flowered androstephium and several white-margined beardtongue locations not documented previously. In addition, an undescribed lupine was detected north of the project site and several CNPS List 4 species were observed in scattered locations within the development footprint. Implementation of the Reduced Acreage Alternative would reduce impacts to rare plants. Similar to the proposed project this alternative would avoid the mapped occurrences of white-margined beardtongue, crucifixion thorn and the undescribed lupine. However, impacts to small-flowered androstephium and Utah vine milkweed would still occur. While most of these plants are located within the footprint of the Reduced Acreage Alternative, locations of these species would be avoided where they occur south of the BNSF railroad. Impacts to small-flowered androstephium and Utah vine milkweed are not considered significant for the proposed project. This alternative would result in impacts to special-status plants similar to the types of impacts described in **Section C.2.4.2**, but the magnitude of the impacts would be lower due to the reduced acreage of the alternative.

Staff's proposed conditions of certification would mitigate the Reduced Acreage Alternative's direct, indirect, and cumulative impacts to special-status plants below a level of significance. These conditions are identical to those recommended for the proposed project, and include general minimization and avoidance Conditions of Certification **BIO-1** through **BIO-9**. Specific impacts to vegetation communities would be minimized through the implementation of Conditions of Certification **BIO-10** (Revegetation Plan and Compensation for Impacts to Native Vegetation Communities), **BIO-11** (Weed Management Plan), and **BIO-12** (Special-Status Plant Impact Avoidance and Minimization). To address specific construction-related impacts to special-status plants and habitat loss, staff has proposed Condition of Certification **BIO-17** (Desert Tortoise Compensatory Mitigation).

Impacts to Common Wildlife

Common wildlife range widely over the project area and use the site for breeding, foraging, and to support movement. Impacts to common wildlife resulting from the Reduced Acreage Alternative would be similar to the proposed project, but the magnitude and intensity of these impacts would be proportionately reduced due to the 58% decrease in project size. The reduction in acreage would also provide greater access to movement corridors along the foothills of the Cady Mountains. To reduce and minimize effects to common wildlife, the applicant would implement the exact same Conditions of Certification as the proposed project. These include Conditions of Certification **BIO-1** through **BIO-9**. In addition, while specific mitigation for common non-sensitive taxa is not required, the implementation of desert tortoise compensatory mitigation (**BIO-17**) would benefit common species that inhabit proposed mitigation lands.

Impacts to Special-Status Wildlife

The Reduced Acreage Alternative would result in reduced impacts to a number of special-status wildlife species on the project site, including desert tortoise, Mojave fringe toed-lizard, and bighorn sheep.

Implementation of this alternative would reduce the amount of desert tortoise habitat lost to development. As shown in **Biological Resources Figure 3**, the highest concentration of tortoises is located in the Phase II area immediately north of the Reduced Acreage Alternative. Under this alternative approximately seven desert tortoises would require translocation. Compared to 57 that would require translocation for the proposed project, this is a 78% reduction in impacts. In addition, the Reduced Acreage Alternative would no longer border the NAP areas that would have been largely surrounded by the proposed project on three sides. Accordingly, impacts to desert tortoises would be reduced in magnitude and scale. This alternative would also reduce potential barriers to east-west movement for desert tortoise.

The Reduced Acreage Alternative would also limit impacts to habitat occupied by the Mojave fringe-toed lizard, including the large washes and existing dune habitat identified in the Biological Resources Technical Report. Although this species is expected to range more broadly across the project site due to the presence of sandy washes, friable soils, and micro-dune environments, this alternative would reduce overall impacts to the species and would not result in complete barriers to passage when compared to the proposed project. This alternative would still interfere with aeolian and hydrologic sand transport on the project site, which could indirectly impact habitat for this species. However, the project would adversely affect sand transport to offsite habitats and overall impacts to Mojave fringe-toed lizard would be reduced in extent and magnitude under this alternative.

Gila monsters were not identified in the project area; however, this species is difficult to detect and potential habitat does occur on site. The reduced acreage of this alternative would decrease potential impacts to this species by avoiding the bajadas of the Cady Mountains. Similarly, impacts to migratory birds and resident birds including golden eagles, burrowing owls, and Le Conte's thrasher would be reduced in proportion to the reduction in size of this alternative. The duration of impacts related to construction, such

as disturbance from noise and light, would also be reduced since the alternative would only include 31% of the originally proposed SunCatchers and associated infrastructure. Impacts to birds related to collisions and electrocutions would also be reduced, as SCE's upgrade to 65 miles of transmission line would not be required.

This alternative would avoid most impacts to Nelson's bighorn sheep, as the boundaries of the alternative site reduce potential impacts to foraging areas for the species. Bighorn sheep would not be constrained from ranging into the southern foothills of the Cady Mountains as they could be under the proposed project. Direct effects including disturbance from construction activities, noise, and lighting, would also be minimized as this alternative would place the project farther from areas potentially used by this species. Therefore, impacts to Nelson's bighorn sheep would be reduced in magnitude and extent.

Impacts to other wide-ranging species in the project area, including American badger, desert kit fox, and special-status bats would also be reduced in proportion to the reduction in size of this alternative. Generally speaking, a 58% reduction in habitat loss would occur. Therefore, impacts to these species would be reduced in magnitude and extent.

Staff's proposed conditions of certification would mitigate for the Reduced Acreage Alternative's direct, indirect, and cumulative impacts to special-status wildlife. These conditions are identical to those recommended for the proposed project and include Conditions of Certification **BIO-1** through **BIO-11** and **BIO-13** through **BIO-30**.

Impacts to Wildlife Movement Corridors or Native Wildlife Nursery Sites

The Reduced Acreage Alternative would decrease the project site from the original 6,215 acres to approximately 2,600 acres of land, a 42% reduction compared to the proposed project. As with the proposed project, this alternative would include perimeter fencing designed to exclude desert tortoises from the site and provide for site security. Therefore, the Reduced Acreage Alternative would still present a permanent north-south barrier to wildlife movement in the area. However, because the northern perimeter of the site would be located in some areas more than 1.5 miles back from the foothills of the Cady Mountains and would avoid much of the occupied desert tortoise habitat; this alternative would result in the avoidance of a large documented linkage area for wildlife (Spencer et al. 2010). Therefore, impacts associated to wildlife movement in the region would be more than proportionally reduced under this alternative.

Staff's proposed conditions of certification would mitigate for the Reduced Acreage Alternative's direct, indirect, and cumulative impacts to wildlife movement. These conditions are identical to those recommended for the proposed project and include Conditions of Certification **BIO-1** through **BIO-9**.

Impacts to Waters of the State

The Reduced Acreage Alternative would avoid many of the desert washes that occur within the proposed project site including the bajadas that occur on the foothills of the Cady Mountains. This includes most of the of the high quality wash habitat that supports microphyll woodland. Although wash habitat would be affected near the BNSF Railroad,

this alternative would result in substantially lower impacts to State jurisdictional waters. While impacts to jurisdictional waters would still occur, they would be proportionally reduced under the Reduced Acreage Alternative. This Alternative would still require the construction of a storm water management system that would disrupt the hydrologic and sediment transport system within the washes that occur on the project site. Because these structures would attenuate peak flood discharge rates; construction of the Calico Solar project would impact desert wash communities downstream of the project to same extent as the proposed project. However, because of the large watersheds that occur adjacent to the proposed project the effects of this attenuation would not be considered significant (Appendix A).

Staff's proposed conditions of certification would mitigate for the Reduced Acreage Alternative's direct, indirect, and cumulative impacts to Waters of the State. These conditions are identical to those recommended for the proposed project and include Conditions of Certification **BIO-1** through **BIO-9, BIO-26** (Streambed Impact Minimization and Compensation Measures), and **BIO-28** (Channel Decommissioning and Reclamation Plan).

C.2.5.3 CEQA LEVEL OF SIGNIFICANCE

Vegetation Impacts

As discussed above in **Section C.2.5.2**, and similar to the proposed project, impacts resulting from this alternative on vegetation would be less-than-significant with the implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-11** and **BIO-17**.

Impacts to Special-Status Plants

As discussed above in **Section C.2.5.2**, and similar to the proposed project, impacts resulting from this alternative on special-status plants would be less-than-significant with the implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-12** and **BIO-17**.

Impacts to Common Wildlife

As discussed above in **Section C.2.5.2**, and similar to the proposed project, impacts resulting from this alternative on common wildlife would be less-than-significant with the implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-9** and **BIO-17**.

Impacts to Special-Status Wildlife

As discussed above in **Section C.2.5.2**, and similar to the proposed project, impacts resulting from this alternative on special-status wildlife would be less-than-significant with the implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-11** and **BIO-13** through **BIO-30**.

Impacts to Wildlife Movement Corridors or Native Wildlife Nursery Sites

As discussed above in **Section C.2.5.2**, and similar to the proposed project, impacts resulting from this alternative on wildlife movement corridors would be less-than-

significant with the implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-9**. No impacts would occur to native wildlife nursery sites.

Impacts to Waters of the State

As discussed above in **Section C.2.5.2**, and similar to the proposed project, impacts resulting from this alternative on waters of the State would be less-than-significant with the implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-9, BIO-26,** and **BIO-28**.

C.2.6 NO PROJECT / NO ACTION ALTERNATIVE

There are three No Project / No Action Alternatives evaluated as follows:

No Project / No Action Alternative #1: No Action on the Calico Solar Project application and on CDCA land use plan amendment

Under this alternative, the proposed Calico Solar Project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

The results of the No Project / No Action Alternative would be the following:

- The impacts of the proposed project would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another renewable energy project.

If this project is not approved, renewable projects would likely be developed on other sites in the California Desert or in adjacent states as developers strive to provide renewable power that complies with utility requirements and State/Federal mandates. For example, there are large solar and wind projects proposed on BLM managed land along the I-40 corridor within a few miles of the Calico Solar site. In addition, there are currently over 70 applications for solar projects covering over 650,000 acres pending with BLM in California.

No Project / No Action Alternative #2: No Action on the Calico Solar Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed Calico Solar Project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. As a result, GHG emissions would result from the construction and operation of the solar technology and would likely be similar to the GHG emissions from the proposed project. Different solar technologies require different amounts of construction and operations maintenance;

however, it is expected that all the technologies would provide the more significant benefit, like the proposed project, of displacing fossil fuel fired generation and reducing associated GHG emissions. As such, this No Project/No Action Alternative could result in GHG benefits and impacts similar to those of the proposed project.

No Project / No Action Alternative #3: No Action on the Calico Solar Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed Calico Solar Project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the GHG emissions from the site, including carbon uptake, is not expected to change noticeably from existing conditions and, as such, this No Project/No Action Alternative would not result in the GHG benefits from the proposed project. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.2.7 PROJECT-RELATED FUTURE ACTIONS – BIOLOGICAL RESOURCES

This section examines the potential impacts of future transmission line construction, line removal, substation expansion, and other upgrades that may be required by Southern California Edison Company (SCE) as a result of the Calico Solar Project. The SCE upgrades are a reasonably foreseeable event if the Calico Solar Project is approved and constructed as proposed. The SCE upgrades would take place in two phases:

- A **275 MW Early Interconnection Phase** would include upgrades to the existing SCE system that would result in 275 MW of additional latent system capacity. Under the 275 MW Early Interconnection option, Pisgah Substation would be expanded adjacent to the existing substation, and new telecommunication facilities would be installed between the Gale and Pisgah substations as well as between the Lugo and Pisgah substations within existing SCE ROWs utilizing existing transmission structures.
- A **850 MW Full Build-Out Phase** would include replacement of a 67-mile 220 kV SCE transmission line with a new 500 kV line between the Pisgah and Lugo substations, expansion of the Pisgah Substation either at the existing site at a new location and other telecommunication upgrades to allow for additional transmission system capacity to support the operation of the full Calico Solar Project. Ten miles of the upgraded Pisgah to Lugo transmission line would be outside of the existing SCE ROW.

The SCE projects will be fully evaluated in a future EIR/EIS prepared by the BLM and the California Public Utilities Commission (CPUC) after the lead agencies receive complete applications for the proposed projects. Because no complete applications have yet been submitted and the SCE projects are still in the planning stages, the level of impact analysis presented in this document is based on available information provided by the applicant and SCE. The purpose of this analysis is to inform the Energy Commission and BLM, interested parties, and the general public of the potential environmental and public health effects that may result from other actions related to the Calico Solar Project.

C.2.7.1 ENVIRONMENTAL SETTING

The environmental setting described herein incorporates both the 275 MW Early Interconnection and the 850 MW Full Build-Out phases. The setting for the 275 MW Early Interconnection upgrades at the Pisgah Substation and along the telecomm corridors is included within the larger setting for the project area under the 850 MW Full Build-Out phase.

Vegetation. The applicant conducted a reconnaissance level habitat assessment to characterize the vegetation within the Pisgah Lugo corridor and determine potential habitats for sensitive species in 2007 and 2008 (SES 2008 – Appendix EE). To date, no surveys have been conducted along the Gale to Pisgah telecommunication corridor. The applicant is proposing to conduct desert tortoise surveys along this corridor in 2010; however, additional data would be required to complete the application for this upgrade. The Pisgah Lugo transmission corridor encompasses a wide range of terrain and elevation with 17 native vegetation types and three non-native or disturbance-related vegetation types observed. The vegetation at the western end of the corridor near the Lugo Substation is characterized by semi-desert scrubs and woodlands within the hilly terrain. The Pisgah Lugo corridor crosses the Mojave River and several ephemeral drainages that are characterized by riparian scrub or forest habitats. As the corridor moves east, the terrain opens into mid-elevation desert basins with creosote bush and other drought tolerant species near the Pisgah Substation. The Pisgah Lugo corridor was surveyed by the applicant by vehicle and on foot. Vegetation communities were identified by one or more indicative species. The project study area included approximately 5,830.4 acres and supports 17 vegetation communities and three altered communities, as are listed in **Biological Resources Table 8** (SES 2008 – Appendix EE).

Biological Resources Table 8
Vegetation Community Types and Acreages within the Survey Area

Vegetation Community	Acreage*
Shrublands	
Mojave creosote scrub	3,301.0 acres
Mojave mixed woody scrub	281.1 acres
Burned Mojave mixed woody scrub	199.6 acres
Mojave wash scrub	21.8 acres
Big sagebrush scrub	97.0 acres
Rabbitbrush scrub	44.3 acres

Vegetation Community	Acreage*
Disturbed rabbitbrush scrub	79.3 acres
Desert saltbush scrub	174.6 acres
Mulefat scrub	8.8 acres
Chaparral	
Semi-desert chaparral	28.1 acres
Grasslands Mojave mixed steppe	14.4 acres
Native grassland	4.0 acres
Non-native grassland	13.0 acres
Disturbed non-native grassland	23.3 acres
Woodlands and Forests	
Southern cottonwood-willow riparian forest	1.3 acres
Mojave juniper woodland scrub	455.6 acres
Joshua tree woodland	312.8 acres
Disturbed Joshua tree woodland	13.7 acres
Joshua tree woodland/Mojave juniper woodland scrub	267.0 acres
Altered Communities	
Developed	179.7 acres
Disturbed	117.1 acres
Orchards and vineyards	24.0 acres
Extensive agriculture	47.4 acres

*Acreages are estimates and vary by up to 5%. Actual acreages would be mapped to support the proposed permit application.
Source: SES 2008.

The western end of the Pisgah to Lugo transmission corridor occurs in the Antelope Valley. Vegetation characteristic of this valley includes various desert scrubs, chaparral, and arid grasslands. As the proposed transmission line moves east, the corridor crosses the Mojave River and the Ord Mountains where Mojave and Joshua tree woodlands are found at the higher elevations. The terrain flattens east of the Ord Mountains into the lower elevations of Apple Valley where Mojave creosote scrub and other drier communities dominate. The proposed transmission line then moves into Lucerne Valley where the vegetation is typically Mojave creosote scrub and desert saltbush scrub. The proposed transmission line would travel along the southern segment of this valley that is characterized by desert saltbush with some areas of agriculture. Continuing east-northeast to the end of the corridor, the vegetation is exclusively Mojave creosote scrub on this rolling terrain (SES 2008 – Appendix EE).

Wildlife. The applicant conducted reconnaissance-level surveys along the Pisgah Lugo corridor for wildlife species in 2007 and 2008. Species were identified by scat, tracks, burrows, vocalizations, or direct observations with the aid of binoculars. The Pisgah Lugo corridor supports a wide range of desert wildlife. Eleven (11) species of reptiles were observed during the biological surveys including desert tortoise, Mojave fringe-toed lizard, side-blotched lizard, western whiptail lizard, zebra-tailed lizard, Mojave

black-collared lizard (*Crotaphytus bicinictores*), and desert spiny lizard (*Sceloprous magister*). Sand dunes along the banks of the Mojave River provide habitat for the Mojave fringe-toed lizard (SES 2008 – Appendix EE).

The Pisgah Lugo corridor spans a wide range of vegetation types that support a diversity of mammal species. Mule deer (*Odocoileus hemionus*), coyotes, bobcats, and kit fox range over most of the project area. Smaller mammals present include kangaroo rats (*Dipodomys* spp.), pocket mice (*Perognathus* spp.), black-tailed jackrabbits, and desert cottontails. The applicant's biologists observed 13 mammal species while conducting their surveys including the kit fox, coyote, black-tailed jackrabbit, bobcat, American badger, and white-tailed antelope squirrel (*Ammospermophilus leucurus*).

The Pisgah Lugo corridor lies near the Pacific flyway and serves as a stopover for a wide range of migratory birds in the spring and the fall. Other birds spend winter in the area including the white-crowned sparrow, dark-eyed junco (*Junco hyemalis*), sage sparrow, and cedar waxwing (*Bombycilla cedrorum*). Certain birds are residents of the area and can be observed year-round including the greater roadrunner (*Geococcyx californianus*), phainopepla (*Phainopepla nitens*), northern mockingbird, verdin (*Auriparus flaviceps*), cactus wren (*Campylorhynchus brunneicapillus*), and rock wren (*Salpinctes obsoletus*). SES biologists observed 36 bird species in their biological surveys including the golden eagle, cactus wren, red-tailed hawk, and the horned lark (SES 2008 – Appendix EE).

Sensitive Plant and Animal Species. Ten (10) special-status species were detected during the 2007 and 2008 surveys. The desert tortoise is federally listed as threatened. The short-joint beavertail cactus (*Opuntia basilaris* var. *brachyclada*) and white-margined beardtongue are BLM Sensitive Species. The Mojave fringe-toed lizard, western burrowing owl, golden eagle, American badger, horned lark, yellow warbler (*Dendroica petechia*), and loggerhead shrike (*Lanius ludovicianus*) are California Species of Concern with no federal status. The Applicant's Response to CURE Data Requests, Set Four (Data Requests 378-402) (dated December 2009) includes a table that lists the abundance of each special-status species that was detected, and for plants, whether each reported occurrence represented an individual plant or multiple plants (SES 2009w).

Of the BLM sensitive species outlined in the West Mojave Plan, the short-joint beavertail cactus and white-margined beardtongue were the only species observed during surveys. The Mojave monkeyflower (*Mimulus mohavensis*) and gray vireo (*Vireo vicinior*) have potential habitat within the project area, but were not observed during field surveys (SES 2008 – Appendix EE).

Desert Tortoise. Sign of the desert tortoise was detected throughout the project area including inactive burrows, carapace remains, and dried and fresh tortoise scat. URS biologists observed five live desert tortoises and their burrows within the survey corridor during the surveys. The Pisgah Lugo corridor would cross 533 acres of the U.S. Fish and Wildlife Service (FWS) designated desert tortoise critical habitat in the eastern section of the proposed transmission line near the Rodman Mountain Range. Potential desert tortoise habitat was scored on the basis of suitability of soils, vegetation, and presence of tortoise sign. A total of 4,720.2 acres were determined to be suitable for

desert tortoise and approximately 2,512.2 acres were classified as either good tortoise habitat or within designated critical habitat for desert tortoise.

Mojave Ground Squirrel. The Mojave ground squirrel (MGS) (*Spermophilus mohavensis*) ranges from Palmdale to Lucerne Valley and from the Coso Range to the Avawatz Mountains. Habitat is typically dominated by creosote bush and burrobush in flat to moderate terrain. Associated species include winterfat (*Krascheninnikovia lanata*) and Joshua tree. This species is a State-listed species with no federal status. The Mojave ground squirrel was not detected during reconnaissance level biological surveys conducted by the applicant in 2007 and 2008. A segment of the transmission corridor analyzed would fall within five miles of a known MGS sighting. Reconnaissance level surveys were performed along that part of the corridor, but did not detect any individuals. Only antelope ground squirrels were detected (SES 2008 – Appendix EE).

West Mojave Management Plan. The transmission corridor would cross through the Ord-Rodman Desert Wildlife Management Area (DWMA), the Pisgah Area of Critical Environmental Concern (ACEC), and the Upper Johnson Valley Yucca Rings ACEC. The West Mojave Plan area, which includes the SCE upgrades, establishes a "one percent" threshold for new ground disturbance within each DWMA and development guidelines are provided in management plans developed for each individual ACEC. The report does not specify the extent of impacts (i.e., acreage and linear distance) to the Ord-Rodman DWMA, and with respect to the Upper Johnson Valley Yucca Rings ACEC, it states the existing right-of-way corridor "is presumed to be included in the ACEC management plan." (BLM et al. 2005).

In addition to meeting the cumulative limitation on ground disturbance, projects on lands covered by the Plan would be required to a pay a mitigation fee. Under the Plan, incidental take of white-margined beardtongue is limited to 50 acres of occupied and potential habitat. In addition, take as a result of utility construction is only allowed where avoidance is infeasible. It's not clear whether the SCE upgrades to the Pisgah to Lugo transmission line would comply with these requirements of the Plan as currently proposed.

It appears that the upgraded Pisgah to Lugo transmission line would go directly through the Upper Johnson Valley Yucca Rings ACEC. The applicant's report does not discuss the impacts of the upgrades on protected resources within this ACEC, or whether the project would comply with the California Desert Conservation Area Plan Amendment that protects the ACEC (SES 2008 – Appendix EE).

C.2.7.2 ENVIRONMENTAL IMPACTS

Potential impacts to biological resources caused by the upgrading of the Pisgah to Lugo transmission line could occur as a result of construction disturbance at or near the construction work sites that would be established for the project components. These sites include the pull and tensioning sites used to pull the new conductors onto the towers and potential sites for staging or marshalling yards. Temporary equipment and material staging areas would be established for short-term utilization within the existing SCE ROW near the new and retrofitted transmission structure locations, along the telecomm ROWs, and/or at Pisgah Substation during the 275 MW Early Interconnection option. In addition, temporary construction yards would also be established along the

500 kV transmission route for the Full Build-Out Option. Generally these yards would range in size from a few acres to up to approximately 30 acres.

Construction of the expanded Pisgah Substation under the 275 MW Early Interconnection option would occur in a 270-foot by 100-foot area and may require a temporary laydown area located at or near the existing roadway at the site. Upgrades at Lugo Substation would be within the existing substation property. Although the exact location is not yet known, construction of the expanded Pisgah Substation under the 850 MW Full Build-Out option would occur on 40 to 100 acres in the area nearby to the existing 5-acre Pisgah Substation, which would result in permanent loss of habitat. For the proposed 500 kV route, new dulled galvanized 500 kV lattice steel structures would be installed in the existing and new ROWs. Permanent loss of habitat would occur at each of these structure sites as well.

Few new main access roads are expected to be required for the proposed Pisgah to Lugo transmission route except along the 10 miles of new ROW, because it would largely follow an existing transmission corridor; however, spur roads to individual towers would be required. Where overland vehicle travel is not possible, upgrades to main access roads and extensions to existing spur roads would be needed to allow passage of construction vehicles. Such upgrades may require vegetation clearing and grading based on site conditions. During transmission line construction, most of the spur roads built to accommodate new construction are usually left in place to facilitate future access for operations and maintenance purposes. Thus for the purposes of this analysis, the disturbance associated with roads is assumed to be permanent.

Vegetation within the proposed Pisgah to Lugo transmission line ROW may need to be managed to maintain necessary ground to conductor clearances. The majority of the vegetation in the project area is a variety of desert scrub communities that do not grow to heights where trimming would be necessary. Certain areas of the cottonwood-willow riparian forests, Joshua tree woodlands, and Mojave juniper woodlands may require trimming to maintain the necessary ground clearances. Actual removal of vegetation would occur at each structure location (approximately 0.5 acres per structure), where road widening and road construction is necessary, and where vegetation maintenance is required to assure a safe clearance between the vegetation canopy and the conductors and lines. Any project-related surface disturbance could lead to invasion of the newly disturbed area by exotic weed species. Any wetland or riparian habitats would be spanned when possible to avoid impacts. When damage to U.S. Army Corps of Engineers or CDFG jurisdictional wetlands is unavoidable, permits and mitigation would be required to offset the losses. Other special vegetation communities include the sand dunes along the Mojave River, which provide habitat for the Mojave fringe-toed lizard (SES 2008 – Appendix EE).

Construction activities associated with the proposed SCE upgrades would impact general wildlife species through the removal of habitat at each structure location, the expanded Pisgah Substation, and for road widening and road construction. These activities could also increase wildlife mortality in the short-term. The noise and additional vehicle traffic during construction activities could impact wildlife movement and some wildlife may not use areas surrounding the utility corridor during construction activities. Installation of the proposed transmission line and telecomm upgrades is not

anticipated to impede resident and migratory wildlife patterns after construction is complete.

Raptors and other large perching birds such as common ravens could be electrocuted by the installation of the proposed transmission line. Design and construction standards such as those outlined by the Avian Power Line Interaction Committee (APLIC 2006) would minimize the risk of bird electrocution. Electrocution of small mammals such as rodents and jackrabbits is a possibility near substations. However, such mortality would be unlikely to affect regional populations of any small mammal species in the area.

Mortality of birds by collision with the wires is also a potential impact. However, none of the proposed lines would pass areas of high bird concentrations such as large wetlands, so the potential for impacts to waterfowl would not likely be significant. The proposed transmission line would cross canyons and woodland areas where the risk of bird collision increases. For the most part, migrating birds in the Pacific flyway fly at a higher elevation than powerlines with the possible exception of some canyon crossings. Design and construction standards outlined by the Avian Power Line Interaction Committee (APLIC 2006) would be expected to be implemented to minimize bird collisions.

During biological surveys in 2007 and 2008 of the Pisgah to Lugo corridor, the applicant's biologists observed three species that are listed by the FWS or the BLM. Those species are the desert tortoise, short-joint beavertail cactus, and white-margined beardtongue (SES 2008 – Appendix EE).

- *Desert Tortoise*. The desert tortoise was the only federally listed species found in the project area during biological surveys in 2007 and 2008. Five (5) individuals were observed within the survey corridor and signs of tortoise activity were observed throughout the project area. The project corridor also would cross critical habitat for the desert tortoise on the eastern end of the transmission corridor near the Rodman Mountains. Formal consultation with the USFWS under Section 7 of the Federal Endangered Species Act and the CDFG State Endangered Species Act process would occur before construction activities would begin. The USFWS would review the expected impacts to the desert tortoise and recommend a plan to avoid impacts where feasible and recommend mitigation where impacts would be unavoidable.
- *Short-joint beavertail cactus and white-margined beardtongue.* These two plants are listed as BLM Sensitive Species. The short-joint beavertail cactus was observed in the eastern portion of the project area while the white-margined beardtongue was observed near Pisgah Substation. These populations would likely be avoided wherever possible. Relocation has proven infeasible for white-margined beardtongue (C. Lund, BLM, pers. comm.), but if impacts would be unavoidable, relocation of the short-joint beavertail cactus could occur where feasible, and other appropriate mitigation would be developed if needed. Transplanted individuals should be relocated within the ROW, as close to the original location as possible, while far enough to avoid impacts (Scogin 1989). The BLM would be consulted regarding impacts to these sensitive species before any construction activities would begin.

In summary, impacts that could occur include disturbance of habitat caused by movement of the construction equipment, disturbance of nesting activities caused by construction noise and movement of machinery, and potential take of listed species caused by construction activities at the structure locations. Because the 275 MW Early Interconnection phase would only necessitate the fiber-optic upgrades using existing structures between the Pisgah and Lugo substations and the Pisgah and Gale substations, it would have less construction disturbance than the 850 MW Full Build-Out phase, which requires the replacement of all structures between the Pisgah and Lugo substations, and both temporary and permanent loss of habitat and other biological resources impacts would be reduced. In addition to meeting the cumulative limitation on ground disturbance, activities on lands covered by the West Mojave Plan would be required to a pay a mitigation fee. Therefore, the SCE upgrades, especially with construction of the 850 MW Full Build-Out phase could potentially impact special-status species and sensitive habitats or conflict with the West Mojave Plan. Mitigation measures would be required to avoid, eliminate, and/or reduce impacts to a less-than-significant level or compensate for those impacts.

C.2.7.3 MITIGATION

As discussed above, the CPUC and the BLM would have permitting authority for the SCE transmission and telecommunications upgrades. Once an application is submitted, the CPUC and BLM would prepare an environmental analysis under CEQA and NEPA, respectively. The following measures were recommended in Appendix EE of the Calico Solar AFC to reduce or eliminate effects on biological resources during project construction. It should be noted that measures recommended in the future CEQA/NEPA analysis may differ from the following.

- Clearance surveys for listed and sensitive species should be conducted before each phase of project construction.
- Any listed or sensitive wildlife species observed within the construction area should be relocated to suitable habitat outside the development effect footprint as directed by the Federal Wildlife Biologist (FAO) and in accordance with any required permits or authorizations.
- Where practicable, ground-disturbing activities should occur outside listed and sensitive species breeding times.
- Clearance surveys for nesting birds should be conducted before each phase of project construction if the activity must be conducted during the bird breeding season.
- Off-site mitigation for the permanent loss of suitable habitat for listed and sensitive species habitat should be provided per agreement with the BLM and CPUC.
- After project completion, a seed mix of dominant plant species should be distributed within any extensive temporarily disturbed areas as directed by the FAO.
- Erosion and sedimentation control should be implemented during project construction to retain sediment on-site and to prevent violations of water quality standards.

- Diversion ditches and/or berms should be constructed as necessary to divert runoff from off-site areas around the construction site.

In addition, a team of biologists should inspect each transmission structure site to detect and remove desert tortoises approximately 24 to 48 hours prior to construction equipment being moved on to an individual site. If a tortoise burrow is detected, it should be cleared of tortoises that could be inside and then closed to prevent additional tortoises from entering the burrow. This should be accomplished consistent with USFWS and CDFG incidental take authorizations.

Mitigation should be included such that breeding birds would be avoided by limiting construction periods or by installing noise attenuation on construction equipment. Vehicle use should be limited in areas where sensitive habitats are located. If the aforementioned means of impact avoidance were found to be infeasible at the time of construction, a helicopter could be used to install the structures to minimize ground disturbances. Use of helicopters for installation would eliminate land disturbance associated with crane pads, structure laydown areas, and the trucks and tractors used for steel delivery to structure sites.

Further, construction activities would need to be monitored by qualified personnel. However, no formal construction plan would be developed until SCE submits its application to the CPUC and BLM and they conduct their own environmental review of the project, which could require implementation of mitigation measures for any identified potentially significant impacts. With implementation of measures that would address potential impacts specific to this upgrade project on a tower-by-tower basis for the 500 kV line upgrade and for each individual project component, such as the expanded Pisgah Substation, it is likely that impacts to biological resources would be reduced. However, before mitigation can be proposed, the project and its potential impacts must be clearly defined, including exact identification of work site locations.

As mentioned above, recommended mitigation includes identification of and avoidance of critical habitat and endangered species. Construction activities would be limited during the nesting season in compliance with the Migratory Bird Treaty Act and recommendations to avoid electrocution by maintaining optimal phase separation between new phase conductors or a phase conductor and grounded hardware/conductor would be implemented. An additional biological survey should also be conducted prior to initiation of the project to ensure there are no nesting birds on 220 kV towers, conductors, or OHGW that are being removed. Finally, the following general measures should be implemented during construction to minimize impacts to sensitive biological resources:

- ***Document Environmentally Sensitive Areas.*** Additional direct and indirect impacts to sensitive biological resources throughout the project corridors should be avoided or minimized by designating these features outside of the construction impact area as environmentally sensitive areas (ESAs) on project plans and in project specifications. Information related to the locations of ESAs and their treatment should be shown on contract plans and discussed in the Environmental Awareness Training. ESA provisions should include, but are not limited to, the use of temporary high-visibility orange fencing to delineate the proposed limit of work in areas adjacent to sensitive resources, and to delineate and exclude sensitive resources from potential construction impacts. Contractor encroachment into ESAs

should be restricted (including the staging/operation of heavy equipment or casting of excavation materials). ESA provisions should be implemented as a first order of work, and remain in place until all construction activities have been completed.

- ***Biological Monitor*.** A qualified biologist should monitor all construction activities. Construction activities should not proceed without presence of a biological monitor. The biological monitor should have the authority to stop construction, if necessary, to avoid impacts to special-status species or sensitive habitats.
- ***Environmental Awareness Training.*** All construction personnel working in the project corridor should be required to attend environmental awareness training. At a minimum, the training should include: (1) an overview of the regulatory requirements for the project components, (2) descriptions of the special-status species in the project area and the importance of these species and their habitats, (3) the general measures that are being implemented by SCE to minimize environmental impacts, and (4) the boundaries within which equipment and personnel would be allowed to work during construction. SCE should maintain a record of all workers who have completed the program.
- ***Limit Vegetation Removal*.** Vegetation removal should be limited to the absolute minimum amount required for construction.
- ***Erosion Control.*** Temporary erosion control devices should be installed on slopes where erosion or sedimentation could degrade sensitive biological resources.
- ***Construction Clean-up*.** All temporary fill and construction debris should be removed from the project site after completion of construction activities.
- ***Construction Scheduling.*** Construction should be timed to minimize potential impacts to sensitive biological resources.

C.2.7.4 CONCLUSION

Construction of the proposed Pisgah to Lugo transmission line would result in direct effects to a variety of sensitive plant and wildlife species including the desert tortoise. Because it appears some of the construction work would occur in or near sensitive species, habitats, and/or jurisdictional waters, this SA/DEIS concludes that the upgrades could adversely impact sensitive biological resources in and/or adjacent to the transmission line and telecomm corridors and substation sites. Potential impacts include direct mortality, disruption of habitat, construction noise effects on nesting activities, impacts to listed species and/or critical habitat, and physical effects on habitats related to construction activity.

Impact avoidance measures would help reduce potentially significant biological impacts to less-than-significant levels. However, there would also be permanent habitat disturbances at tower locations, at the Pisgah Substation (or new substation location), and with the construction of new access and spur roads. After construction plans are finalized, a complete project description (including results of all sensitive species surveys, and a revised assessment of potential impacts) for the 850 MW Full Build-Out should be developed as part of the CPUC EIR and BLM EIS.

Activities associated with upgrading the Pisgah to Lugo transmission line, substations, and telecommunication facilities would require compliance with applicable federal, State, and local laws, ordinances, and regulations, including: West Mojave Plan, Federal and State Endangered Species Acts, Federal Migratory Bird Treaty Act, and Federal and State Clean Water Acts. Specific agency permits would be required before any work could commence. To determine which permits may be applicable to the upgrades, SCE should consult with applicable local, State, and federal agencies.

Even if the upgrades work complies with all applicable laws, ordinances, regulations, and standards (LORS), absent complete biological survey information, wetland delineation, and temporary and permanent impact acreages, this SA/DEIS concludes that the SCE upgrades may create significant impacts to biological resources due to the permanent loss of habitat and the disturbance to sensitive plant and wildlife species during construction. However, mitigation such as the measures described above is available and feasible, and would likely reduce most impacts to biological resources to less-than-significant levels under CEQA. These impacts will be assessed and addressed, and appropriate mitigation recommended, in separate future environmental evaluations for these associated projects.

C.2.8 CUMULATIVE IMPACT ANALYSIS

C.2.8.1 CEQA AND NEPA DEFINITIONS

A cumulative impact analysis is required under both CEQA and NEPA. “Cumulative impact” is the impact on the environment which results from the incremental impact of the proposed project when considered with other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such other actions (40 CFR §1508.7).

Under CEQA Guidelines, “a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts” (Title 14 Cal Code Regs §15130(a)(1)). A project’s contribution to significant cumulative impacts must be addressed if the project’s incremental effect is “cumulatively considerable” (Title 14 Cal Code Regs §15130(a)). Such incremental effects are to be “viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects” (Title 14 Cal Code Regs §15164(b)(1)). Together, these projects comprise the cumulative scenario which forms the basis of the cumulative impact analysis.

NEPA states that cumulative effects can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR §1508.7). Under NEPA, both context and intensity are considered. When considering intensity of an effect, we consider “whether the action is related to other actions with individually minor but cumulatively significant impacts. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.” 40 CFR §1508.27(b)(7)

Analysis of Cumulative Effects to Biological Resources

Staff used the following steps to develop the cumulative effects analysis described in this subsection:

- Identified resources to consider in the analysis;
- Defined the geographic study area for each resource;
- Described the current health and historical context for each resource;
- Identified direct and indirect impacts of the proposed project that might contribute to a cumulative impact;
- Identified past, current, and reasonably foreseeable future actions that affect each resource;
- Assessed the significance of potential cumulative impacts; and
- For each significant cumulative impact identified, assessed whether this project's contributions to the impact was cumulatively considerable.

C.2.8.2 GEOGRAPHIC SCOPE

This cumulative impact analysis makes a broad, regional evaluation of the impacts of existing and reasonably foreseeable future projects that threaten plant and animal communities within the context or geographic scope of the West Mojave Plan (WEMO) (BLM et al. 2005). The WEMO Planning Area is located in the southeastern California Desert Conservation Area (CDCA), and encompasses 9.3 million acres in Inyo, Kern, Los Angeles, and San Bernardino Counties. For most resources the analysis focused in particular on renewable projects proposed on BLM, State, and private land in the I-40 corridor west of Barstow to the eastern boundary of the WEMO planning area, in the U.S. 395 Highway corridor from SR 58 north to the northern boundary of the WEMO planning area, and in the SR 14 corridor between California City and Ridgecrest.

C.2.8.3 REGIONAL OVERVIEW

This overview of regional impacts is followed by a more detailed discussion of the effects of past, present, and future projects to biological resources of the project vicinity, with an emphasis on resources found within eastern San Bernardino County.

The California Desert remained an isolated area for the first few decades of the 20th century. Disturbance was more or less restricted to highways, railroad, and utility corridors, scattered mining, and sheep grazing. In the 1940s, several large military reservations were created for military training, testing, and staging areas.

The Calico Solar Project is located south of the Cady Mountains in a broad alluvial fan that abuts I-40. While the development of infrastructure (i.e., I-40, Route 66, and utility corridors), and military uses (Marine Corps Logistics Base Yermo, Marine Air Combat Center Twentynine Palms) has resulted in habitat fragmentation to some degree in the region; the project vicinity still supports large areas of open space between I-40 and I-15 that are utilized by a variety of sensitive species.

Energy providers have recently submitted project applications that would collectively cover more than 1 million acres of the region (including the western Mojave and northern Colorado desert regions; BLM 2010), with each project contributing to habitat loss and fragmentation.

The introduction of non-native plant species and increases in predators such as ravens has also contributed to population declines and range contractions for many special-status plant and animal species (Boarman 2002). Combined with the effects of historical grazing and military training, and fragmentation from highway construction, the proposed wind and solar energy projects have the potential to further reduce and degrade native plant and animal populations, in particular sensitive species such as desert tortoise. In the context of this large scale habitat loss, the Calico Solar Project would incrementally contribute to the cumulative loss and degradation of habitat for desert plants and wildlife, including desert tortoise, bighorn sheep, and white-margined beardtongue, within the Mojave Desert region of southeastern California.

C.2.8.4 MAKING CONCLUSIONS ABOUT THE SEVERITY OR SIGNIFICANCE OF THE EFFECT

Mitigating project impacts to biological resources to a level that is less than significant does not necessarily indicate that a project's incremental contribution to cumulative impacts will be less than significant when viewed in connection with the effects of other past, current and future projects. For each cumulative effect the following questions were considered in making conclusions about the severity or significance of an effect:

- The health, status, or condition of the resource as a result of past, present and reasonably foreseeable impacts;
- The contribution of the proposed project to the overall cumulative impact to the resource;
- The project's mitigated effect, when viewed in connection with the effects of past, current and planned future projects, and
- Impact avoidance and minimization: any project design changes that were made, or additional opportunities that could be taken, to avoid and minimize potential impacts in light of cumulative impact concerns.

A cumulative impact can result from past, present and reasonably foreseeable probable future projects that have individually minor impacts that are "collectively significant" over a period of time, according to CEQA Guidelines section 15355. The analysis must assess the collective or combined effect of the projects, and if combined cumulative impacts are determined to be significant, it must also analyze whether the project's incremental contribution is cumulatively considerable within the meaning of CEQA Guidelines section 15065(a)(3). Cumulative impact assessments cannot conclude that a project's contributions to cumulative impacts are not significant or cumulatively considerable merely because the project's contributions represent a small percentage of the overall problem. Doing so could improperly omit facts relevant to an analysis of the collective effect that the proposed project and other related projects would have upon biological resources.

C.2.8.5 ANALYTIC TOOLS AND STUDY LIMITATIONS

This cumulative effects analysis employed a combination of quantitative and qualitative analyses: a Geographic Information System (GIS)-based quantitative analysis for assessing the direct cumulative effects to habitat loss, and a qualitative analysis of the cumulatively considerable indirect effects, based on consultations with agency biologists

and regional experts, as well as a literature review of the threats to species and their habitats.

GIS-Based Quantitative Analysis of Habitat Loss

The GIS-based analysis of direct habitat loss was used for this cumulative effects analysis to:

- Identify the overlap between existing and future projects and various biological data layers (e.g., landforms, soils, species occurrences, hydrographic data, vegetation mapping, wildlife habitat models, ownership and management layers);
- Compile digital map information about each resource for purposes of display and analysis; and
- Create statistical tables to summarize the direct impacts to these resources from existing and anticipated future projects, and the proposed project's contribution to those effects. Information on the datasets used, the sources of the data, and any limitations of the data, are provided in each biological resource section.

Qualitative Analysis of Indirect Effects

GIS is a widely used and effective tool for analyzing large amounts of spatial data, for documenting and quantifying assumptions about direct habitat loss, and the value of the habitat (where habitat models are available). However, the indirect impacts of projects are not easily captured in GIS and thus were only addressed qualitatively. This is important to note because many of these indirect effects (i.e., effects following construction) have greater significance and greater ecological consequences than the original habitat loss. Of particular concern are the effects of habitat fragmentation and its consequences for population viability and the effects of disrupted wildlife movement and connectivity and its effects on gene flow, subjecting populations of species such as bighorn sheep to isolation and inbreeding depression, and reducing their adaptability to climate change.

Other common themes that arose in this qualitative analysis of indirect cumulative effects include: increased vehicle-related mortality; disturbance from noise, lighting and increased human activity; increase in predators such as ravens; spread of invasive non-native plants; downwind effects of facilities and wind fencing on sand transport corridors; bird collisions and electrocutions; climate change and its accompanying increased risk of drought, fire and spread of invasive exotic plants; and the downstream effects of channel diversions on fluvial sediment transport and riparian vegetation.

Limitations of the Cumulative Project Data and Datasets

The large renewable projects proposed on BLM and private land that made up the dataset of future projects in the cumulative analysis for Biological Resources (**Biological Resources Table 9 and Figures 6 and 7**) represent only those projects that had applications to the BLM, the Energy Commission, or eastern Riverside County as of February 5, 2010 (the time of the analysis). Projects for which no GIS-based shape files were available were not included in the quantitative analysis. Further, not all of the projects shown on the table will complete the environmental review, and not all

projects will be funded and constructed. Alternatively, it is possible, even likely, that new projects will be proposed in the near future that are not reflected in this analysis.

For the analysis of cumulative effects to special-status species, this analysis does not compare the loss of individuals against the total known metapopulation; population data are incomplete for many or most species or occurrences and for some species can vary widely from year to year in response to drought.

Finally, the GIS-based analysis requires the use of compatible datasets that encompass the entire geographic scope of the analysis; the project-specific survey data could not be compared against data for the region that was derived from different methodologies. For example, the project survey data for habitats is based on field surveys; the WEMO datasets for plant communities are based largely on aerial photo interpretation. The GIS analysis of impacts to plant communities, landforms, and habitats is based on region-wide datasets for those resources (primarily WEMO datasets), and not on project survey data. Therefore, the acreages presented in the analysis below will not match or reflect the project-specific survey results. Where there are such differences, they are noted in a footnote to the table or in the summary of a specific analysis. Notwithstanding the challenges presented by comparing region-wide and project-specific datasets, the GIS-based datasets for vegetation and landforms still provide a powerful and efficient tool for conducting large-scale, region-wide analyses.

C.2.8.6 PROJECTS CONTRIBUTING TO CUMULATIVE EFFECTS TO BIOLOGICAL RESOURCES

This analysis evaluates the impacts of the proposed project in addition to the current baseline of past effects, present (existing) projects, and reasonably foreseeable or probable future projects in the I-40 corridor as well as the greater WEMO Planning Area. **Biological Resources Figure 8** illustrates the numerous proposed renewable projects on BLM, State, and private land in the I-40 corridor in the proposed project vicinity, and **Biological Resources Figure 9** illustrates the numerous proposed renewable projects on BLM, State, and private land in the WEMO Planning Area. **Biological Resources Table 9** lists the existing and foreseeable future projects (proposed) that were included in the quantitative analysis of cumulative effects.

Biological Resources Table 9
Existing and Proposed Future Projects Considered in Cumulative Effects Analysis

Existing Projects with Cumulative Impacts[1]				
Project	**Area (acres)**		**Project**	**Area (acres)**
Urban lands mapped in the WEMO planning area (includes the Cities of Ridgecrest, Lancaster, Palmdale, Barstow, Victorville, Hesperia, Apple Valley, Yucca Valley, and Twentynine Palms)	219,644		Agricultural lands mapped in the WEMO planning area	182,360
Total Existing Projects Acreage: 402,004				

Foreseeable Future Projects[2] [Proposed] (analyzed quantitatively)				
Project	**ROW Area[1] (acres)**		**Project**	**ROW Area[1] (acres)**
Advanced Development Services – Barren Ridge	11,541		Horizon Waterman Hills	724
AES Seawest – Daggett Ridge	1,574		Horizon Wind – Calico Mtns.	27,945
AES Seawest Daggett	2,593		Horizon Wind – Iron Mountain	10,103
AES Seawest, Inc.	8,598		Horizon Wind – Stoddard/Daggett	24,380
AES Wind Generation – North Daggett	1,642		IDIT, Inc. – Rabbit Dry Lake	477
AES Wind Generation – Sand Ridge	3,898		Little Mountain Wind Power – Bristol Lake	14,786
AES Wind Generation – Sand Ridge	4,176		LSR Pisgah, LLC – Barstow Road	7,440
AES Wind Generation – Sand Ridge 2	801		LSR Pisgah, LLC – Reche Road	17,685
AES Wind Generation, Inc.	211		Oak Creek Energy – Black Butte	36,315
Airtricity / E On	15,485		Oak Creek Energy – Lucchese	7,250
Alta Gas – Ghost Town	7,954		Oak Creek Energy – Ludlow South	23,664
Boulevard Associates – Tehachapi	9,712		Oak Creek Energy – Mojave/ Tehachapi	1,442
BP Orion – Sidewinder Mtn.	2,398		Oak Creek Energy – Rand Mountain	9,215
Brewer Energy – Black Hills	4,503		Oak Creek Energy – Soledad Mtn.	1,229
Caithness LLC – Soda Mountain	7,987		Oak Creek Energy – Tehachapi	160
Calico Solar LLC, Phase 1	5,207		Pacific Crest Power, LLC	21
Calico Solar LLC, Phase 2	3,389		Padoma Wind Power – Flat Top Mountain	12,680
Cameron Ridge, LLC	546		Padoma Wind Power – Pinto Mountains	23,797
Chevron Energy Solutions – Lucerne Valley	518		Power Partners SW – Tylerhorse Canyon	1,531
Competitive Power Ventures, LLC – Saltdale	38,364		Power Partners SW – Tylerhorse Canyon	1,207
Debenham Energy-Haiwee Reservoirs	19,031		Power Partners SW/EnXco – Troy Lake	10,118
Debenham Energy-Searles Hills	7,943		Renewergy, LLC – El Paso Peaks	7,646
DPT Broadwell Lake	8,616		RES North America/Granite Wind	2,085
enXco – Donut	5,033		Ridgecrest/Solar Millennium	3,884
enXco Avalon One	276		Sean Roberts RMC	536
enXco Troy Lake Solar	3,707		Sierra Renewables LLC – Black Lava Butte	4,042
First Solar – Desert Garnet	6,719		Sierra Renewables – Pearsonville	4,121
First Solar – Desert Obsidian	8,943		Sierra Renewables – Rose Valley	13,994
First Solar – Desert Opal	15,803		Solel, Inc. – Johnson Valley	1,798

First Solar – Desert Sapphire	5,327		Solel, Inc. – Stedman	7,443
FPL Energy – West Fry Wind Project	2,908		Verde Resources	3,105
Granite Wind LLC – Granite Mountains	2,085		West Fry Wind LLC – West Fry Mtns.	3,060
GreenWing – Mojave Valley	640		Wind Power Partners – Short Canyon	2,258
Horizon – Daggett Camp Rock	4,741			
Total Foreseeable Future Projects Acreage: 509,013 acres				

1 - According to the WEMO Plant Communities dataset (BLM et al. 2005)
2 - BLM Solar and Wind Renewable Projects - 02/16/2010. Not all of the projects depicted here will complete the environmental review, not all projects will be funded and constructed, and many will not use the entire ROW area

The dataset for existing projects was limited to WEMO vegetation mapping for urban, agricultural, and ruderal areas, and a few solar and wind projects on private land. The data set for reasonably foreseeable future projects was limited to available GIS-based spatial data for proposed energy projects, and does not include any residential or commercial projects planned within the watershed. Therefore, the quantitative analysis could be said to under-represent the number of projects. However, it also over-estimates, to some degree, the actual impacts of the future BLM Renewable projects because the entire right-of-way (ROW) was included in the calculations; not all of the projects depicted in **Biological Resources Figure 9** will complete the environmental review, not all projects will be funded and constructed, and many will not use the entire ROW area.

C.2.8.7 ANALYSIS OF CUMULATIVE EFFECTS TO BIOLOGICAL RESOURCES

Waters of the State

The geographic scope for the analysis of cumulative impacts to waters of the State is the Newberry Springs watershed; the watershed encompassing the Calico Solar Project. The analysis was based on the USGS National Hydrographic Dataset (USGS 2010) within the watershed boundary as defined by the California Interagency Watershed Map of 1999 (Calwater 2.2.1).

Biological Resources Table 10 summarizes the direct loss of desert washes that has resulted from past and present activities and that would result from anticipated future projects within the Newberry Springs watershed. These effects are also illustrated spatially in **Biological Resources Figure 10.** The contribution of the project to cumulative effects from future projects is provided as the sum of all drainages within the project boundaries.

Cumulative effects to these features that cannot be adequately addressed with the GIS analysis include: impacts to water quality and sediment transport from the numerous channel diversions, culverts and road crossings, fragmentation of the habitat and the corresponding loss of habitat function and values. In addition, the USGS maps do not include all waters that would qualify as State jurisdictional drainages. Therefore the total linear miles identified in Table 10 likely underreport the total impact to jurisdictional drainages.

Biological Resources Table 10
Desert Washes in Newberry Springs Watershed – Cumulative Effects

Total Desert Washes[1] in Newberry Springs Watershed	**Impacts to Habitat from Existing Projects[2]** (percent of total watershed)	**Impacts to Habitat from Foreseeable Future Projects[3]** (percent of total watershed)	**Contribution of Calico Solar Project to Future Cumulative Impacts** (percent of total impacts from future projects)
530.9 miles	0.7 miles (0.1%)	74.8 miles (14.1%)	26.6 miles (35.6% of foreseeable future impacts) (based on USGS dataset)

1 - Based on the USGS National Hydrographic Dataset (2010) and California Interagency Watershed Map of 1999 (Calwater 2.2.1)
2 - Based on Agriculture and Urban mapping units from the WEMO Plant Communities dataset (BLM et al. 2005); see **Biological Resources Table 9**
3 - Includes only BLM Renewables that had submitted a Plan of Development (POD) at the time of the analysis and those additional future projects listed in **Biological Resources Table 9**

Staff considers cumulative effects to the Newberry Springs watershed streams from future projects to be significant (approximately 14%). Absent mitigation, the project's contribution to cumulative effects within the Newberry Springs watershed comprise 35.6% of those impacts. To mitigate impacts to jurisdictional washes to a level less than significant, staff proposes Condition of Certification **BIO-26** for avoidance and minimization of impacts to State waters and compensation for unavoidable impacts. Staff concludes that, with implementation of on-site protection measures and off-site compensation, the project's contribution to significant cumulative effects will be less than significant when the incremental effects of the project, after mitigation, are viewed in connection with the effects of other projects; therefore the project's impacts on waters of the state are not cumulatively considerable. Condition **BIO-26** requires a series of best management practices and other measures to avoid, minimize and mitigate on-site impacts (i.e., impacts within the watershed), as well as to compensate off-site for impacts to streambeds. With these measures incorporated, the project's contribution to cumulative impacts would not be cumulatively considerable.

Special-Status Wildlife

Desert Tortoise

This analysis addresses cumulative impacts to desert tortoise as defined by the current USGS Desert Tortoise Habitat Model (Nussear et al. 2009). It is a predictive model for mapping the potential distribution of desert tortoise habitat and is a useful tool for evaluating different land-use issues that tortoises face at a landscape scale. **Biological Resources Figure 11** is a spatial representation of the predicted habitat potential index values for desert tortoise, based on the 2009 model. The model is not intended to be used, or viewed, as a substitute for ground-based and site-specific field surveys. Model scores reflect a hypothesized habitat potential given the range of environmental conditions where tortoise occurrence was documented. The report specifically states:

> *As such, there are likely areas of potential habitat for which habitat potential was not predicted to be high, and likewise, areas of low potential for which the model predicted higher potential. Finally, the map of desert tortoise potential habitat that we present does not account either for anthropogenic*

effects, such as urban development, habitat destruction, or fragmentation, or for natural disturbances, such as fire, which might have rendered potential habitat into habitat with much lower potential in recent years.

GIS-based files for the boundaries of the Western Mojave Recovery Unit of the 1994 Desert Tortoise Recovery Plan were not available from the USFWS at the time of this analysis and the proposed new boundaries as depicted in the USFWS 2008 Draft Revised Recovery Plan had not been adopted as of the time of this analysis. Consequently, the WEMO boundary was used for this analysis. The WEMO boundary closely approximates the boundaries of the USFWS recovery unit; however, the USFWS boundaries extend further north of the WEMO boundary, past SR 190.

Urbanization/loss of habitat, deteriorating habitat quality from off-highway vehicles, invasion of non-native grasses and weeds, predation by ravens, collection, livestock grazing, and spread of an upper respiratory tract disease have all contributed to the decline of desert tortoise populations. In response to this decline, large expanses of desert tortoise critical habitat and numerous ACEC/DWMA areas have been identified or established within the WEMO planning area. Region-wide, the cumulative impacts of past, present, and foreseeable future large-scale habitat conversions to desert tortoise habitat and connectivity are cumulatively significant, even with these conservation efforts. Such effects can only be addressed through a regional and coordinated effort. Ongoing collaborative efforts by federal and State agencies to develop a Desert Renewable Energy Conservation Plan and BLM's Solar Energy Development Programmatic EIS provide an appropriate vehicle for such a regional mitigation approach.

Using the GIS-based habitat model and data from USGS, staff analyzed the cumulative impacts to desert tortoise habitat. The project's unmitigated effects to desert tortoise habitat (based on the 2009 USGS habitat model) are quantified below in **Biological Resources Table 11** (and **Biological Resources Figure 11**). The Calico Solar Project supports medium and high quality desert tortoise habitat according to the USGS model. The cumulative effects before mitigation are significant given that nearly 54% of the acreage comprised by future projects is within high quality desert tortoise habitat (rated between 0.8 and 1.0), and another 16% of this acreage is within medium quality desert tortoise habitat.

In consultation with other agencies, staff has developed extensive mitigation requirements to fully mitigate impacts to desert tortoise to a level less than significant. Staff concludes that, with implementation of on-site protection measures and off-site compensation, the project's contribution to significant cumulative effects on desert tortoise will be less than significant when the incremental effects of the project, after mitigation, are viewed in connection with the effects of other projects; therefore the project's impacts desert tortoise are not cumulatively considerable. Staff's proposed desert tortoise-specific conditions of certification (**BIO-15 through BIO-17**) and general avoidance and minimization measures (**BIO-1** through **BIO-9**) would reduce the project's direct effects to desert tortoise during construction and operation to a level less than significant. In addition, staff's proposed Condition of Certification **BIO-18** would require a contribution to region-wide raven monitoring and control plan to reduce the cumulative effects of this and other projects throughout the range of the desert tortoise.

Staff concludes that, with implementation of these conditions of certification, the project's contribution to cumulative impacts to desert tortoise would not be considerable because Staff's proposed mitigation would require the applicant to relocate all tortoises from the project area; prevent future on-site impacts to tortoises by fencing the site; monitor and manage raven predation on-site and contribute to regional raven management; and compensate for habitat loss by protecting extensive acreage now presently under conservation management. Further, the project design as analyzed in this SSA significantly reduces the project's impacts to desert tortoises by avoiding much of the most densely populated area in the northern parts of the previous proposed project and providing significant area for east-west tortoise movement between the project boundary and the toe slopes of the Cady Mountains.

Cumulative effects on the desert tortoise may best be addressed through a regional and coordinated effort aimed at preserving and enhancing large tracts of high quality desert tortoise habitat, restoring degraded areas to address the net loss of habitat, and protecting or enhancing probable desert tortoise linkages between DWMAs and other movement corridors. Ongoing collaborative efforts by federal and State agencies to develop a Desert Renewable Energy Conservation Plan and BLM's Solar Energy Development Programmatic EIS provide an appropriate vehicle for such a regional mitigation approach.

Biological Resources Table 11
Cumulative Effects: Desert Tortoise Habitat[1]

Habitat Value[1]	**Total Desert Tortoise Habitat[1] in WEMO**	**Impacts to Habitat from Existing Projects[2]**	**Impacts to Habitat from Foreseeable Future Projects[3]**	**Contribution of Calico Solar Project to Future Cumulative Impacts** (percent of total impacts from future projects)
0	833,987 acres	12,547 acres 1.5%	36,678 acres 4.4%	0 acres
0.1	480,311 acres	36,482 acres 7.6%	24,471 acres 5.1%	0 acres
0.2	405,838 acres	43,260 acres 10.7%	26,038 acres 6.4%	0 acres
0.3	406,092 acres	23,107 acres 5.7%	20,339 acres 5.0%	0 acres
0.4–0.5	895,824 acres	68,394 acres 7.6%	38,161 acres 4.3%	0 acres
0.6–0.7	1,359,651 acres	70,201 acres 5.2%	91,920 acres 6.8%	258 acres 0.3%
0.8–0.9	4,881,882 acres	138,505 acres 2.8%	245,203 acres 5.0%	5,953 acres 0.2%
1.0	84,001 acres	0 acres	2,227 acres 2.7%	0 acres

1 - Based on the USGS Desert Tortoise Habitat Model (Nussear et al. 2009)
2 - Based on Agriculture and Urban mapping units from the WEMO Plant Communities dataset (BLM et al. 2005); see **Biological Resources Table 9**
3 - Includes only BLM Renewables that had submitted a Plan of Development (POD) at the time of the analysis and those additional future projects listed in **Biological Resources Table 9**

Golden Eagle

The geographic scope of the analysis of cumulative effects on golden eagle foraging habitat was completed for the entire WEMO planning area, as well as on foraging habitat within 10 miles of nests occurring within 10 miles of the proposed project, and used the WEMO plant communities dataset to map and quantify cumulative effects on foraging habitat (**Biological Resources Tables 12 and 13** and **Biological Resources Figures 12 and 13**). The WEMO plant communities dataset is based on the 1996 California Gap Analysis Project conducted by the Biogeography Lab at the University of California, Santa Barbara and coordinated through the USGS Biological Resources Division.

Biological Resources Figure 13 also depicts the locations of other known and documented golden eagle nest locations. The source of this information includes the "nest card" database--helicopter surveys conducted in 1978 and 1979 desert-wide--and on locations depicted in a 1984 BLM California Desert Conservation Area (CDCA) map of “Sensitive, Rare, Threatened and Endangered Fish and Wildlife”. An Environmental Assessment (EA) and Implementation Guidance for take permits were issued under the Bald Eagle and Golden Eagle Protection Act (USFWS 2009d). The EA specifies that in implementing the resource recovery permit for take of inactive golden eagle nests (50 CFR 22.25), data within a 10-mile radius of the nest provides adequate information to evaluate potential effects.

The project contribution to impacts to foraging habitat within 10 miles of the nearest known nests is cumulatively considerable; 15% of the anticipated impacts to Mojave creosote scrub and 22.9% of the impacts to saltbush scrub. However, the analysis of direct habitat loss does not reflect the indirect effects of the proposed new transmission lines and associated collisions and raptor electrocutions, which also significantly contribute to cumulative impacts to golden eagle populations. The USFWS (2010b) estimates there are currently approximately 30,000 golden eagles in the western U.S., down from an estimated 100,000 in the late 1970s. Survey data from 2003, 2006-2008 indicate a decline of 26% since 2003.

The overall loss of foraging habitat for golden eagles within the region is a cumulatively significant impact. The project contribution to this cumulative effect, however, would be less than significant when the incremental effects of the project, after mitigation, are viewed in connection with the effects of other projects; therefore the project’s impacts desert tortoise are not cumulatively considerable. Condition of Certification **BIO-20** requires focused nest surveys within 1 mile of project activities and if nests are identified, the project owner would establish a disturbance-free buffer around the nest. No construction activities would be authorized within the 0.5-mile buffer pending the successful fledging of the nest. Implementation of staff’s proposed Condition of Certification **BIO-17**, the compensatory mitigation plan for desert tortoise, would offset this habitat loss by the preservation of similar plant communities. While acquisition does not address the net loss of foraging habitat in the immediate future, it is expected to prevent future losses of habitat by permanently protecting more habitat lands than are being used for the project and further benefit the species by providing funding for long-term maintenance and management activities on those lands.

Biological Resources Table 12
Cumulative Effects: Golden Eagle Foraging Habitat for Nests within 10 Miles of Project

Foraging Habitat[1] (by plant community)	**Total Plant Communities**[1] **in 10-mile radii**	**Impacts to Foraging Habitat from Existing Projects**[2] (percent of all community type in 10-mile radii)	**Impacts to Foraging Habitat from Foreseeable Future Projects**[3] (percent of all community type in 10-mile radii)	**Contribution of Calico Solar Project to Future Cumulative Impacts** (percent of total impacts from future projects)
Mojave Creosote Scrub	260,451 acres	0 acres	53,533 acres (20.6%)	5978 acres (11%)
Mixed Desert Scrubs	22.1 acres	0 acres	0 acres	0 acres
Saltbush Scrub	13,038 acres	0 acres	997 acres (7.7%)	233 acres (23%)
Desert Wash Scrub[4]	2608.5 acres	0 acres	376 acres (14.4%)	0 acres[4]
Sand Dunes[4]	0 acres	0 acres	0 acres	0 acres[4]
Desert Sink Scrub	66.5 acres	0 acres	699 acres (32.8%)	0 acres
Riparian Scrub/Forest	139 acres	0 acres	0 acres	0 acres
Lava	8,798 acres	0 acres	15 acres (0.2%)	0.1 acres (0.7%)

1 - Based on the WEMO Plant Communities dataset (BLM et al. 2005)
2 - Based on Agriculture and Urban mapping units from the WEMO Plant Communities dataset (BLM et al. 2005); see **Biological Resources Table 9**
3 - Includes only BLM Renewables that had submitted a Plan of Development (POD) at the time of the analysis and those additional future projects listed in **Biological Resources Table 9**
4 - Acreages based on the WEMO Plant Communities dataset (BLM et al. 2005) vegetation mapping and does not reflect the ground-based delineation of habitat.

Biological Resources Table 13
Cumulative Effects: Golden Eagle Foraging Habitat in WEMO Planning Area

Foraging Habitat[1] (by plant community)	**Total Plant Communities**[1] **in WEMO**	**Impacts to Foraging Habitat from Existing Projects**[2]	**Impacts to Foraging Habitat from Foreseeable Future Projects**[3]	**Contribution of Calico Solar Project to Future Cumulative Impacts** (percent of total impacts from future projects)
Mojave Creosote Scrub	5,685,847 acres	2,272 acres (0.04%)	362,587 acres (6.4%)	5978 acres (1.6%)
Mixed Desert Scrubs	1,462,366 acres	32 acres (0.002%)	73,128 acres (5.0%)	0 acres
Saltbush Scrub	845,157 acres	1,569 acres (0.2%)	21,247 acres (2.5%)	233 acres (1%)
Oak/Juniper/Pine/ Joshua Tree Woodland	320,031 acres	0 acres	14,812 acres (4.6%)	0 acres
Chaparral	194,551 acres	0 acres	11,546 acres (5.9%)	0 acres
Agriculture	182,360 acres	182,360 acres (100%)	0 acres	0 acres

Foraging Habitat[1] (by plant community)	Total Plant Communities[1] in WEMO	Impacts to Foraging Habitat from Existing Projects[2]	Impacts to Foraging Habitat from Foreseeable Future Projects[3]	Contribution of Calico Solar Project to Future Cumulative Impacts (percent of total impacts from future projects)
Desert Wash Scrub	81,683 acres	0 acres	1,387 acres (1.7%)	0 acres
Non-native Grassland	69,563 acres	0 acres	344 acres (0.5%)	0 acres
Sand Dunes	41,416 acres	0 acres	8 acres (<0.1%)	0 acres
Desert Sink Scrub	30,586 acres	0 acres	853 acres (2.8%)	0 acres
Riparian Scrub/Forest	26,671 acres	0 acres	378 acres (1.4%)	0 acres
Lava	23,789 acres	0 acres	17 acres (0.1%)	0.11 acres (0.6%)
Mesquite Bosque	7,576 acres	0 acres	0 acres	0 acres
Native Grassland	3,375 acres	0 acres	24 acres (0.7%)	0 acres
Montane Meadow	974 acres	0 acres	2 acres (0.2%)	0 acres
Sand Fields	547 acres	0 acres	0 acres	0 acres
Seeps	447 acres	0 acres	0 acres	0 acres
Palm Oasis	33 acres	0 acres	0 acres	0 acres

1 - Based on the WEMO Plant Communities dataset (BLM et al. 2005)
2 - Based on Agriculture and Urban mapping units from the WEMO Plant Communities dataset (BLM et al. 2005); see **Biological Resources Table 9**
3 - Includes only BLM Renewables that had submitted a Plan of Development (POD) at the time of the analysis and those additional future projects listed in **Biological Resources Table 9**

Burrowing Owl

The western burrowing owl is widely distributed throughout western North America in areas containing short vegetation and/or bare ground in desert, grassland, and low-lying shrub habitats. They are closely associated with burrowing mammals, whose burrows are used by the owls for nesting and roosting. Burrowing owl is a California Species of Special Concern and is a BLM Sensitive Species. Additionally, it is provided federal protection under the Migratory Bird Treaty Act and is listed as a Bird of Conservation Concern by the USFWS. Threats include habitat loss or damage and/or a reduction in prey base due to urbanization, mining, trash disposal, pesticide use, grazing activities, off-highway vehicle use, invasion of non-native plants, and brush control activities (BLM et al. 2005). Current and foreseeable renewable energy developments in the Mojave Desert contribute to the loss and damage of habitat through development, a potential reduction in prey base and the disruption of natural areas. Cumulatively, impacts to the burrowing owl populations in the Mojave Desert area would be significant, and the project's contribution to these cumulative effects would be cumulatively considerable without project mitigation. Staff concludes, however, that the project's contribution to significant cumulative effects will be less than significant when the incremental effects of the project, after mitigation, are viewed in connection with the effects of other projects. The project's incremental contribution to the cumulative effects will not be cumulatively considerable because of required avoidance and passive relocation in staff's proposed Condition of Certification **BIO-21** and implementation of staff's proposed Condition of

Certification **BIO-17**, the compensatory mitigation plan for desert tortoise, which will also benefit burrowing owls. The acquisition is expected to prevent future losses of habitat by permanently protecting more habitat lands than are being used for the project and further benefit the species by providing funding for long-term maintenance and management activities on those lands.

Le Conte's Thrasher

Le Conte's thrasher is patchily distributed within the deserts of the American Southwest and northwestern Mexico (Sheppard 1996). This species is listed as a California Species of Special Concern by CDFG and is a BLM Sensitive Species. Additionally this species is provided federal protection under the Migratory Bird Treaty Act and is listed as a Bird of Conservation Concern by the USFWS. Threats to Le Conte's thrasher primarily include habitat loss or degradation due to development, grazing, invasion of nonnative weeds, wildfires, and off-highway vehicle use. Current and foreseeable renewable energy developments in the Mojave Desert contribute to the loss and damage of habitat through development and the disruption of natural areas. Cumulatively, impacts to Le Conte's thrasher in the Mojave Desert would be significant, and the project's contribution to these cumulative effects would be cumulatively considerable without project mitigation, given the threats to this species from future developments. Staff concludes, however, that the project's contribution to significant cumulative effects will be less than significant when the incremental effects of the project, after mitigation, are viewed in connection with the effects of other projects. The project's incremental contribution to the cumulative effects will not be cumulatively considerable because of mitigation measures requiring pre-construction breeding bird surveys and avoidance of active nests, in staff's proposed Condition of Certification **BIO-19**. In addition, implementation of staff's proposed Condition of Certification **BIO-17**, the compensatory mitigation plan for desert tortoise, would reduce the impacts of habitat loss by the preservation of habitat for the species. The acquisition is expected to prevent future losses of habitat by permanently protecting more habitat lands than are being used for the project and further benefit the species by providing funding for long-term maintenance and management activities on those lands.

Migratory Birds

Migratory birds, depending on the time of year, range over the entire Mojave Desert and surrounding areas. Most, if not all, of the migratory birds whose ranges may extend to the Mojave Desert are protected under the Migratory Bird Treaty Act. Threats to migratory birds include habitat loss or damage due to urbanization and agriculture, hunting, pesticide applications, and power line electrocution. Current and foreseeable renewable energy developments in the Mojave Desert contribute to the loss and damage of habitat through development, a reduction in prey base, and the disruption of natural areas. Cumulatively, impacts to migratory bird populations in the Mojave Desert area would be will be significant, and the project's contribution to these cumulative effects would be cumulatively considerable without project mitigation, given the threats to these species from future developments. The project's contribution to these cumulative effects will be less than significant when the incremental effects of the project, after mitigation, are viewed in connection with the effects of other projects. The project's incremental contribution to the cumulative effects will not be cumulatively considerable due to mitigation measures requiring pre-construction breeding bird

surveys and avoidance of active nests, in staff's proposed Condition of Certification **BIO-19**. In addition, implementation of staff's proposed Condition of Certification **BIO-17**, the compensatory mitigation plan for desert tortoise, and Condition of Certification **BIO-26**, avoidance, minimization, and compensation for impacts to desert washes would reduce the impacts to migratory birds from habitat loss by the preservation of similar plant communities.

Mojave Fringe-Toed Lizard

The Mojave fringe-toed lizard is endemic to southern California and a small area of western Arizona. Its primary habitat is windblown sand but it also is found in habitats surrounding dune systems, or other areas with scattered patches of fine sandy habitat. Its ecology and conservation status are described above (Section C.2.4.1, Special-Status Species). Mojave fringe-toed lizards occur at several disjunct localities in the WEMO planning area, including the Saddleback Buttes region of Los Angeles County, Edwards Air Force Base, El Mirage, Mojave River near Barstow, Mojave Valley, Alvord Mountain, Pisgah, Cronese Lakes, Dale Lake, Twentynine Palms, and Harper Dry Lake. Threats to the lizard include population fragmentation from both urban and rural development along the Mojave River and at Twentynine Palms, as well as agricultural development in the Mojave Valley. Other major threats are flood control structures which prevent the waterborne flow of sand towards the occupied habitat, windbreaks and construction that impedes the aeolian transport of sand to the occupied habitat, and vehicle use within the occupied habitat (BLM et al. 2005).

The geographic scope for the cumulative effects analyses for Mojave fringe-toed lizard is the entire WEMO Planning Area and used landform mapping from the MDEP to map and quantify cumulative effects on fringe-toed lizard habitat. Using the MDEP landforms dataset, this analysis created a simple habitat model by selecting the following landforms: sand sheet, barchanoid dune field, linear dune field, parabolic dune field, climbing-falling dune field, coppice dune field, and undifferentiated dune field. These data are misleading, however, because they indicate no habitat in some areas of known Mojave fringe-toed lizard occurrence, and indicate suitable habitat in urban areas including several large desert cities (Palmdale, Barstow, and others).

Anticipated cumulative effects to Mojave fringe-toed lizard that are not reflected in this quantitative analysis of habitat conversion include: downwind indirect impacts to dune habitats from interruption of the fluvial and aeolian sand transport systems; premature stabilization of dunes by the spread of noxious weeds, which also fuel wildfires; the effects of past and future grazing and off-road vehicles; fragmentation of the remaining habitat and reduced gene flow; an increase in predation by ravens and other predators from an increase in perching structures; and an increase in the potential for fire from transmission lines and increased vehicle use.

The landforms dataset did not identify suitable habitat for the Mojave fringe-toed lizard within the Calico Solar Project site, which can illustrate the limits of large-scale mapping efforts for project mapping; this species was documented in the project area and the applicant identified a dune complex in the project site (approximately 16.9 acres). Staff has proposed mitigation to off-set the expected habitat fragmentation that would occur from the development of the Calico Solar Project. This includes Condition of Certification **BIO-13** which requires the acquisition of suitable dune/sand habitat. While

this mitigation would reduce the project's impacts below a level of significance, a residual adverse impact remains, including a net loss of habitat and interruption of suitable east-west movement habitat.

Current and foreseeable renewable energy developments in the range of the Mojave fringe-toed lizard contribute to the cumulative loss and damage of habitat through development, fragmentation, and disruption of aeolian sand movement. Cumulatively, impacts to the Mojave fringe-toed lizard will be significant and are likely to contribute to the decline of this species. Even with project-specific mitigation, Staff concludes that the project's contribution to the significant cumulative impact, even with staff's recommended Condition of Certification **BIO-13** would be considerable due to the net habitat loss and interruption of suitable breeding and dispersal habitat between occupied Mojave fringe-toed lizard habitat to the east (in the Pisgah Crater ACEC) and west (in sandy washes and aeolian sand deposits in the upper portions of the Mojave River watershed).

Nelson's Bighorn Sheep

Within the WEMO planning area, there are 16 extant or historic bighorn sheep populations. Separate populations are defined by mountain range complexes. Five of these 16 areas no longer contain populations, three ranges have reintroduced populations, and two have been augmented with sheep from another population (BLM et al. 2005). For the past decade, bighorn sheep populations in California have been viewed in a metapopulation context. Within the WEMO planning area there are three metapopulations whose geographic boundaries are now formed by major fenced highways (I-15 and I-40) — the south, central, and north Mojave Desert metapopulations (Torres et al. 1994, 1996). Preferred habitat of bighorn is primarily on or near mountainous terrain above the desert floor. Access to surface water is another element of desert bighorn habitat important to population health.

The distribution and extent of bighorn sheep occupied and unoccupied range (WHMAs), connectivity corridors, and spring forage habitat (1 mile from outer edges of range), overlaid with past and foreseeable future projects within the WEMO planning area are quantified in **Biological Resources Table 14** and illustrated in **Biological Resources Figure 14**.

The GIS analysis of the WEMO bighorn sheep range and connectivity corridors indicates that the effects of past and foreseeable future projects (i.e., land use conversion) to occupied and unoccupied ranges are relatively minor, due largely to their locations, in wilderness areas and at higher elevations. Cumulatively, however, large-scale renewable energy development could significantly impact gene flow and local demographics, decreasing the viability of the regional bighorn sheep metapopulation . The Calico Solar Project would not contribute significantly to the loss of bighorn sheep habitat, as most occupied habitat for Nelson's bighorn sheep within the Cady Mountains does not overlap the northern portion of the project site as it is analyzed in this SSA. Further, while intermountain movement of sheep is poorly understood the project would avoid large open space areas between the Cady Mountains and the project fenceline that could provide connectivity to adjacent mountain ranges. Because of these conditions, project impacts on bighorn sheep are not cumulatively considerable. Because of this, project impacts on bighorn sheep are not cumulatively considerable.

Biological Resources Table 14
Cumulative Effects: Bighorn Sheep Range and Connectivity Corridors

Bighorn Sheep Range (WHMAs) & Connectivity Corridors[1]	Total Range or Connectivity Corridor[1] in WEMO	Impacts to Range & Connectivity Corridors from Existing Projects[2] (percent of all WHMAs or corridors in WEMO)	Impacts to Range & Connectivity Corridors from Foreseeable Future Projects[3] (percent of all WHMAs or corridors in WEMO)	Contribution of Calico Solar Project to Future Cumulative Impacts (percent of total impacts from future projects)
Total in WEMO	5,319,405 acres	7,169 acres (0.1% of total WEMO)	300,524 acres (5.6% of total WEMO)	0 acres
Occupied Range	1,020,111 acres	548 acres (0.05% of total occupied range)	35,488 acres (3.5% of total occupied range)	0 acres
Unoccupied Range	601,955 acres	0 acres	12,421 acres (2.1% of total unoccupied range)	0 acres
Connectivity Corridors	3,695,747 acres	6,621 acres (0.2% of total connectivity corridor)	252,615 acres (6.8% of total connectivity corridor)	0 acres
Concentration Area	1,592 acres	0 acres	0 acres	0 acres

1 - Based on the BLM WEMO Bighorn Sheep WHMAs dataset
2 - Based on Agriculture and Urban mapping units from the WEMO Plant Communities dataset (BLM et al. 2005); see **Biological Resources Table 9**
3 - Includes only BLM Renewables that had submitted a Plan of Development (POD) at the time of the analysis and those additional future projects listed in **Biological Resources Table 9**

American Badger and Desert Kit Fox

The range of the American badger extends throughout the state of California in areas where suitable vegetative structure exists for cover and friable soils are present for burrowing. The American badger is a CDFG Species of Special Concern. The desert kit fox distribution ranges from the southwestern United States into areas of northern Mexico, and can be found in many of the same habitats that support the badger. The desert kit fox currently retains no special status; however, it is protected under Title 14, California Code of Regulations (sections 460). Threats to both of these species include habitat loss or damage due to development, agriculture, pesticide use, off-highway vehicle use, mining, and trash disposal. Current and foreseeable renewable energy developments in the Mojave Desert contribute to the loss and damage of habitat through development, fragmentation, and the disruption of natural areas. Cumulatively, impacts to American badger and desert kit fox populations in the Mojave Desert area will be significant, and the project's contribution to these cumulative effects would be significant without project mitigation measures, given the threats to these species from future developments. The project's actual incremental contribution to the significant cumulative effects will be less than significant, however, when the incremental effects of the project, after mitigation, are viewed in connection with the effects of other projects. Avoidance and minimization measures in staff's proposed Condition of Certification **BIO-24** combined with Condition of Certification **BIO-17**, the compensatory mitigation plan for desert tortoise, will reduce the impacts of habitat loss by the preservation of habitat for other species. The acquisition is expected to prevent future losses of habitat by permanently protecting more habitat lands than are being used for the project and further benefit the species by providing funding for long-term maintenance and management activities on those lands,

Bats

A variety of bat species are known to occur in the Mojave Desert. The pallid bat, Yuma myotis, and Townsend's big-eared bat range throughout most of California while the western mastiff bat is generally found south of the San Joaquin Valley (inland range) and Monterey County (coast range). All four species are BLM Sensitive Species while the pallid bat, Townsend's big-eared bat and western mastiff bat are also CDFG Species of Special Concern. Threats to bat species include habitat loss or damage and/or a reduction in prey base due to urbanization, mining, trash disposal, pesticide use, and noise from off-road vehicles. Current and foreseeable renewable energy developments in the Mojave Desert contribute to the loss and damage of habitat through development, a potential reduction in prey base and the disruption of natural areas. Cumulatively, impacts to bat populations in the Mojave Desert area would be significant, and the project's contribution to these cumulative effects would be significant given the threats to these species from future developments, without project mitigation measures. The project's actual incremental contribution to the significant cumulative effects will be less than significant, however, when the incremental effects of the project, after mitigation, are viewed in connection with the effects of other projects. The project contribution to these cumulative effects would not be cumulatively considerable due to by avoidance and minimization measures in staff's proposed Condition of Certification **BIO-25**. In addition, implementation of staff's proposed Condition of Certification **BIO-17**, the compensatory mitigation plan for desert tortoise, would reduce the impacts of habitat loss by the preservation of similar habitat to that which is being lost.

Wildlife Movement and Connectivity

Wildlife movement and dispersal habitat on the project site helps facilitate movement over a range that includes the entire Mojave Desert. Wildlife corridors provide a variety of functions and can include habitat linkages between natural areas, provide greenbelts and refuge systems, and divert wildlife across permanent physical barriers to dispersal such as highways and dams by roadway underpasses and ramps (Haas 2000; Simberloff et al. 1992). Threats to wildlife movement corridors include large-scale development, including agriculture, infrastructure, commercial and residential development, and military uses. Current and foreseeable renewable energy developments in the Mojave Desert contribute to the loss and damage of wildlife movement corridors. Cumulatively, impacts to corridors in the Mojave Desert area would be significant. The proposed project is located in an essential connectivity area between the Bristol and Ord Mountains (Spencer et al. 2010). This area acts as an important link between wildlife populations in the eastern and western deserts. Because of connectivity concerns raised by staff and the regulatory agencies during the SA/DEIS process; the Applicant redesigned the project to avoid a large area of high value habitat at the toe of the Cady Mountains. As proposed, the project would conform to the 4,000-foot minimum buffer design suggested by the USFWS Desert Tortoise Recovery Office. The revised project design as analyzed in this SSA (Section **C.2.2** and **Biological Resources Table 1**) would substantially reduce impacts to wildlife movement on the upper bajada, north of the project boundary and would preserve east-west movement along the northern boundary of the project. Because of these changes the proposed projects contribution to cumulative impacts would be minimized and considered less than significant. Staff concludes that, the project's incremental contribution to cumulative impacts will not be cumulatively considerable.

Plant Communities

Thirty-two distinct plant communities are found within the western Mojave Desert (BLM et al. 2005), some of which have been consolidated into more general categories in **Biological Resources Table 15**. Creosote bush scrub and saltbush scrub are the most common, occupying 75% of the undeveloped lands. Mojave mixed woody scrub accounts for 13% of the native vegetation. The remaining 29 plant communities are found in isolated areas with unique conditions, such as freshwater or alkali wetlands, or occur along the south and west edges of the WEMO planning area, in the desert-mountain transition (BLM et al. 2005).

The geographic scope of the analysis of cumulative effects on plant communities and general wildlife habitat encompasses the WEMO Planning Area and uses the WEMO plant communities dataset to map and quantify cumulative effects on plant communities (**Biological Resources Table 15** and **Biological Resources Figure 15**). The WEMO plant communities dataset is based on the 1996 California Gap Analysis Project conducted by the Biogeography Lab at the University of California, Santa Barbara and coordinated through the USGS Biological Resources Division. A new vegetation mapping dataset recently became available for the Mojave Desert Region (Thomas et al. 2002); however, the dataset does not cover the entire WEMO area and therefore was not used in this analysis.

Biological Resources Table 15 quantifies the cumulative effects to plant communities, stratified by community type. Mojave creosote scrub refers to the creosote bush-dominant desert scrubs that occur within the Mojave Desert region of the California Desert geographic subdivision (Hickman 1993).

Significant cumulative effects to plant communities from future projects are seen in many community types, particularly Mojave creosote scrub, mixed desert scrubs, woodland habitats, playa and desert sink scrub, desert wash scrub, and riparian scrub. The project contributes at least incrementally to the cumulative impacts of future projects to Mojave creosote scrub and saltbush scrub. Mojave creosote scrub is a common and widespread community in the southeastern deserts of California; however, this broad designation does not reflect the many uncommon and even rare plant assemblages within creosote scrub that have been documented and are monitored by the CNDDB. These are communities ranked as State rare (S3 or below) because the associations are rare due to a restricted range, relatively few occurrences, recent and widespread declines, or other factors. Examples include associations of creosote scrub and galleta grass, which occur on the project site but were not delineated separately from creosote scrub.

The analysis of impacts to foraging habitat based on the WEMO plant communities dataset concludes that the project would impact 1.6% of all the Mojave creosote bush scrub affected by future projects, as well as 1% of all the saltbush scrub affected by future projects. The project's contribution to these effects would not be cumulatively considerable because the incremental effects would be reduced by the compensatory mitigation of desert tortoise habitat, bighorn sheep habitat, and golden eagle foraging habitat; implementation of Best Management Practices for minimizing construction impacts; and specifications for restoring temporarily disturbed habitat. While acquisition does not address the net loss of habitat in the immediate future (a temporal net loss of habitat), it is expected to prevent future losses of habitat by permanently protecting

habitat that could otherwise be converted for urban, agricultural or energy development, and further benefit the plant communities by providing funding for long-term maintenance and management activities on those lands.

The project also would have minor impacts to lava flows, a noteworthy landform in the WEMO planning area. These impacts are not significant given that the total contribution to effects on lava flows resulting from future projects is less than 1%.

The project does not contribute to cumulative effects to any other plant community type other than Mojave creosote scrub and saltbush scrub, to which it has only minor cumulative effects that are not cumulatively considerable.

Biological Resources Table 15
Cumulative Effects: Plant Communities

Plant Community[1]	Total Plant Communities[1] in WEMO	Impacts to Habitat from Existing Projects[2] (percent of all community type in WEMO)	Impacts to Habitat from Foreseeable Future Projects[3] (percent of all community type in WEMO)	Contribution of Calico Solar Project to Future Cumulative Impacts (percent of total impacts from future projects)
Mojave Creosote Scrub	5,685,847 acres	2,272 acres (0.04%)	362,587 acres (6.4%)	5981 acres (1.6%)
Mixed Desert Scrubs	1,462,366 acres	32 acres (0.002%)	73,128 acres (5.0%)	0 acres
Saltbush Scrub	845,157 acres	1,569 acres (0.2%)	21,247 acres (2.5%)	233 acres (1%)
Oak/Juniper/ Pine/Joshua Tree Woodland	320,031 acres	0 acres	14,812 acres (4.6%)	0 acres
Chaparral	194,551 acres	0 acres	11,546 acres (5.9%)	0 acres
Playa/Dry Lake	153,593 acres	0 acres	3,329 acres (2.2%)	0 acres
Desert Wash Scrub	81,683 acres	0 acres	1,387 acres (1.7%)	0 acres
Non-native Grassland	69,563 acres	0 acres	344 acres (0.5%)	0 acres
Sand Dunes	41,416 acres	0 acres	8 acres (<0.1%)	0 acres
Desert Sink Scrub	30,586 acres	0 acres	853 acres (2.8%)	0 acres
Riparian Scrub/Forest	26,671 acres	0 acres	378 acres (1.4%)	0 acres
Lava	23,789 acres	0 acres	17 acres (0.1%)	0.1 acres (0.6%)
Mesquite Bosque	7,576 acres	0 acres	0 acres	0 acres
Native Grassland	3,375 acres	0 acres	24 acres (0.7%)	0 acres
Montane Meadow	974 acres	0 acres	2 acres (0.2%)	0 acres
Sand Fields	547 acres	0 acres	0 acres	0 acres
Seeps	447 acres	0 acres	0 acres	0 acres
Palm Oasis	33 acres	0 acres	0 acres	0 acres

1 - Based on the BLM WEMO Plant Communities dataset
2 - Based on Agriculture and Urban mapping units from the WEMO Plant Communities dataset (BLM et al. 2005); see **Biological Resources Table 9**
3 - Includes only BLM Renewables that had submitted a Plan of Development (POD) at the time of the analysis and those additional future projects listed in **Biological Resources Table 9**

Special-Status Plants

White-margined beardtongue

White-margined beardtongue is a locally endemic species in three widely disjunct locations in California, Nevada, and Arizona. It is a rare plant throughout its known range in all three states and its occurrences in Nevada are threatened (Christina Lund, BLM, pers. comm.). Its range and habitat are discussed in more detail under "Special-Status Species" (Section C.2.4.1: Setting and Existing Conditions). In California, most known occurrences are within the BLM Pisgah ACEC southeast of the project site. The California occurrences are far distant and genetically isolated from the other occurrences. Leppig and White (2006) present a rationale for conservation of peripheral populations such as CNPS List 2 taxa (rare in California but more common elsewhere in their ranges). Given that white-margined beardtongue is a CNPS List 1B species, occurs in only a few long-disjunct populations, and is rare everywhere in its known range, the same reasoning argues strongly for local conservation. Given the long distances among the three disjunct geographic ranges and their locations in three different states, cumulative impacts to California beardtongue are evaluated here in terms of the project's potential impacts to the regional population. Significant adverse cumulative impacts to the regional population would also be significant in the broader context of all three known populations.

There is no quantitative data available on population sizes or areal extent of occupied habitat. White-margined beardtongue occurs in sandy habitats. Yet there are many extensive dune systems in the California deserts where white-margined beardtongue has never been documented, despite repeated field survey efforts, implying that the species requires additional, unknown, habitat conditions. In the absence of quantitative data on populations and habitat area, the project's cumulative impacts to white-margined beardtongue are evaluated here in qualitative terms.

The proposed project as analyzed here would avoid direct impacts to white-margined beardtongue and its occupied habitat. Project facilities may indirectly affect white-margined beardtongue populations off-site to the southeast, within the BLM Pisgah ACEC, by interrupting aeolian sand transport systems. However, those effects appear to be minimal. These potential effects are discussed above, in Assessment of Impacts and Discussion of Mitigation (Section C.2.4.2). Other cumulative indirect effects not reflected in the quantitative analysis include: the effects of past and future grazing and off-road vehicles; altered drainage patterns, and the potential spread of invasive non-native plants.

As illustrated in **Biological Resources Figure 16**, foreseeable future projects, including the proposed project, have the potential to convert a substantial portion of the range of this rare species in California, and threats to the southern Nevada populations have also been reported (Christina Lund, BLM, pers. comm.). Cumulative effects on the California population are therefore significant. Absent mitigation the project's

contribution to cumulative effects to white-margined beardtongue would be cumulatively considerable, particularly in light of the species' highly restricted range in California. However, these significant incremental contributions to the cumulative effects will be minimized to a level less than significant when viewed in connection with the impacts of other projects. Areas within the project boundary that contain the plant will be avoided and protected within Environmentally Sensitive Areas. Further, and measures to avoid or minimize off-site impacts to the BLM Pisgah Crater ACEC, are required in staff's proposed Condition of Certification **BIO-12.**

Other Special-Status Plants

A variety of special-status plant species have ranges that extend through the Mojave Desert, and several are endemic. Nine special-status plants occur on the Calico Solar Project site, including CNPS List 1, 2 and 4 plants as well as BLM Sensitive Species. Threats to special-status plants in the Mojave Desert include habitat loss and fragmentation due to development, off-highway vehicle activity, cattle and sheep grazing, overdrawn groundwater, and the spread of invasive plant species (CDFG 2005). Current and foreseeable renewable energy developments in the Mojave Desert contribute to impacts to special-status plants through loss and fragmentation of habitat to development, contributing to depletion of groundwater supplies, and contributing to the spread of nonnative and invasive weeds. Cumulatively, impacts to special-status plants will be significant, and, absent mitigation, the project's contribution to cumulative effects would also be significant given the threats to these species from future developments. These significant incremental contributions to the cumulative effects will, however, be minimized at a level less than significant when viewed in connection with the impacts of other projects. Mitigation measures requiring partial avoidance and measures for avoiding indirect impacts to remaining plants following construction, in staff's proposed Condition of Certification **BIO-12**.

C.2.8.8 CUMULATIVE IMPACTS ANALYSIS CONCLUSION

Construction and operation of the proposed project will have effects on a number of biological resources that are individually limited but cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects. However, cumulative impact assessments cannot conclude that contributions to cumulative impacts are not significant merely because the contributions represent a small percentage of the overall problem.

Staff considers cumulative impacts to Mohave fringe-toed lizard from this and other foreseeable future projects in the area to be significant, and considers the project's incremental contribution to the impacts to be cumulatively considerable. In combination, this and other foreseeable projects would significantly reduce and fragment habitat for Mojave fringe-toed lizard region-wide. Although this project's contribution to habitat loss would be mitigated with staff's proposed Condition of Certification **BIO-13** which requires the acquisition of suitable dune/sand habitat, the Calico Solar Project would interfere with potential movement east and west between the Pisgah Crater ACEC and the upper Mojave River watershed.

The project's incremental contribution to cumulatively significant impacts to other special-status species and habitats would be mitigated at a level less than significant when viewed in connection with the impacts of other projects, as described above, including avoidance, minimization, and compensation, detailed monitoring, reporting requirements, and funding mechanisms to ensure implementation and accountability, as described in staff's recommended Conditions of Certification **BIO-1** through **BIO-30**.

Some significant cumulative effects to biological resources may remain even after project-specific mitigation is implemented for this and other projects. These residual cumulative effects from all future projects could be addressed through a regional and coordinated planning effort aimed at preserving and enhancing large, intact expanses of wildlife habitat and linkages, including maintaining connections between wildlife management areas and other movement corridors.

C.2.9 COMPLIANCE WITH LORS

The proposed project must comply with State and federal laws, ordinances, regulations, and standards (LORS) that address State and federally listed species, as well as other sensitive species and habitats, and must secure the appropriate permits to satisfy these LORS. The Energy Commission has a one-stop permitting process for all thermal power plants rated 50 MW or more under the Warren-Alquist Act (Pub. Resources Code § 25500). Under the act, the Energy Commission's certificate is "in lieu of" other State, local, and regional permits (*ibid*.) The Energy Commission's streamlined permitting process accomplishes a primary objective of the Renewable Energy Action Team, as identified in the Governor's Executive Order S-14-08 — to create a "one-stop" process for permitting renewable energy generation facilities under California law. Accordingly, Energy Commission staff has coordinated joint environmental review with the California Department of Fish and Game and the Lahontan Regional Water Quality Control Board, as well as the U.S. Fish and Wildlife Service. Staff has incorporated all required terms and conditions that might otherwise be included in State permits into the Energy Commission's certification process. The conditions of certification described below satisfy the following State LORS and take the place of terms and conditions that, but for the Commission's exclusive authority, would have been included in the following State permits.

In addition, the applicant has submitted an application to the BLM requesting a ROW to construct the proposed project and its related facilities. Pursuant to the

California Desert Conservation Area (CDCA) Plan (1980, as amended), sites associated with power generation or transmission not identified in the CDCA Plan are considered through the Plan Amendment process. Under Federal law, BLM is responsible for processing requests for ROWs to authorize such proposed projects and associated transmission lines and other appurtenant facilities on land it manages. The CDCA Plan, while recognizing the potential compatibility of solar generation facilities on public lands, requires that all sites associated with power generation or transmission not identified in the Plan be considered through the Plan Amendment process. BLM would use the following Planning Criteria during the Plan Amendment process:

- The plan amendment process would be completed in compliance with the Federal Land Policy and Management Act (FLPMA), NEPA, and all other relevant Federal law, Executive orders, and management policies of the BLM;
- The plan amendment process would include an EIS (i.e., this joint Energy Commission Staff Assessment/BLM EIS) to comply with NEPA standards;
- Where existing planning decisions are still valid, those decisions may remain unchanged and be incorporated into the new plan amendment;
- The plan amendment would recognize valid existing rights;
- Native American Tribal consultations would be conducted in accordance with policy, and Tribal concerns would be given due consideration. The plan amendment process would include the consideration of any impacts on Indian trust assets (please see the **Cultural Resources** section);
- Consultation with the State Office of Historic Preservation (SHPO) would be conducted throughout the plan amendment process (please see the **Cultural Resources** section); and
- Consultation with the US Fish and Wildlife Service (USFWS) would be conducted throughout the plan amendment process.

If the ROW and proposed land use plan amendment are approved by BLM, the proposed solar thermal power plant facility on public lands would be authorized in accordance with Title V of the FLPMA of 1976 and the Federal Regulations at 43 CFR part 2800. This Environmental Impact Statement (EIS) acts as the mechanism for meeting NEPA requirements, and also provides the analysis required to support a Plan Amendment identifying the facility within the Plan.

Biological Resources Table 16 provides a summary of the proposed project's compliance with federal, State, and local LORS.

Biological Resources Table 16
Summary of Compliance with LORS

Applicable Law	Description	Rationale for Compliance
FEDERAL		
Federal Endangered Species Act (Title 16, United States Code, section 1531 et seq., and Title 50, Code of Federal Regulations, part 17.1 et seq.)	Designates and provides for protection of threatened and endangered plant and animal species and their critical habitat. "Take" of a federally-listed species is prohibited without an incidental take permit, which may be obtained through Section 7 consultation (between federal agencies) or a Section 10 Habitat Conservation Plan.	The applicant is currently undergoing consultation with the USFWS for project impacts to desert tortoise and a Biological Opinion will be issued for the proposed project. In addition, staff's proposed Conditions of Certification BIO-1 through BIO-9 and BIO-15 through BIO-18 include measures to minimize and compensate for impacts to the federally listed desert tortoise.
Migratory Bird Treaty (Title 16, United States Code, sections 703 through 711)	Makes it unlawful to take or possess any migratory nongame bird (or any part of such migratory nongame bird) as designated in the Migratory Bird Treaty Act unless permitted by regulation (e.g., duck hunting).	Staff's proposed Condition of Certification BIO-19 includes preconstruction nest surveys, no-disturbance buffers around active nests, and monitoring of nests to minimize impacts to nesting birds covered under the Migratory Bird Treaty Act.
Clean Water Act (Title 33, United States Code, sections 1251 through 1376, and Code of Federal Regulations, part 30, section 330.5(a)(26))	Requires the permitting and monitoring of all discharges to surface water bodies. Section 404 requires a permit from the U.S. Army Corps of Engineers (USACE) for a discharge from dredged or fill materials into waters of the U.S., including wetlands. Section 401 requires a permit from a regional water quality control board (RWQCB) for the discharge of pollutants. By federal law, every applicant for a federal permit or license for an activity that may result in a discharge into a California water body, including wetlands, must request State certification that the proposed activity will not violate State and federal water quality standards.	Waters of the U.S. do not occur within the project area.
Bald and Golden Eagle Protection Act (Title 16, United States Code section 668)	Provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the take, possession, and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the act.	A recently issued Final Rule (September 2009) provides for a regulatory mechanism under the BGPA to permit take of bald or golden eagles comparable to incidental take permits under the ESA. This rule adds a new section at 50 CFR 22.26 to authorize the issuance of permits to take bald eagles and golden eagles on a limited basis. The BGPA defines the ''take'' of an eagle to include a broad range of actions, including disturbance. ''Disturb'' is defined in regulations at 50 CFR 22.3 as: ''to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.'' The proposed project may result in "take" of the golden eagle from disturbance to nesting pairs as well as loss of foraging habitat, which may result loss of productivity for this species. Golden eagles are known to nest within a 10-mile

Applicable Law	Description	Rationale for Compliance
		radius of the project and at least three pairs occur within 5-miles. Results of golden eagle nesting surveys and foraging habitat assessment are required to determine whether construction of the proposed project would result in take of the species and therefore require a permit. The USFWS Migratory Bird Division is in the process of developing guidance regarding implementation of this final rule, including establishing take thresholds within each Bird Conservation Region that must not be exceeded. If it is ultimately determined that take of golden eagle would occur as a result of the proposed project, an individual (non-programmatic) permit would be required. Permit issuance will be conditioned on various criteria, the most important of which is that the permitted take is compatible with the preservation of the bald eagle and the golden eagle (i.e., consistent with the goal of stable or increasing breeding populations). Staff encourages the applicant to coordinate closely with USFWS as guidance becomes available regarding implementation of the revised BGPA. At this time, staff is unable to determine whether the proposed project would be in compliance with the BGPA. Staff's proposed Condition of Certification BIO-20 includes preconstruction nest surveys, no-disturbance buffers around active nests, and monitoring of nests to minimize impacts to nesting golden eagles.
California Desert Conservation Area Plan 1980, as amended (reprinted in 1999)	Administered by the BLM, the CDCA Plan requires that proposed development projects are compatible with policies that provide for the protection, enhancement, and sustainability of fish and wildlife species, wildlife corridors, riparian and wetland habitats, and native vegetation resources.	Staff's proposed Conditions of Certification BIO-1 through BIO-30 minimize, avoid, and compensate for impacts to various biological resources covered by the CDCA Plan.
California Desert Protection Act of 1994	An Act of Congress which established 69 wilderness areas, the Mojave National Preserve, expanded Joshua Tree and Death Valley National Monuments and redefined them as National Parks. Lands transferred to the National Park Service were formerly administered by the BLM and included significant portions of grazing allotments, wild horse and burro Herd Management Areas, and Herd Areas.	Staff's proposed Conditions of Certification BIO-1 through BIO-30 minimize, avoid, and compensate for impacts to various biological resources covered by the California Desert Protection Act of 1994.
West Mojave Plan	As an amendment to the CDCA Plan, the BLM produced the West Mojave Plan (WEMO) (BLM 2006). The WEMO is a federal land use plan amendment that (1) presents a comprehensive strategy to conserve and protect the desert tortoise, the Mohave ground squirrel (MGS) and nearly 100 other plants and animals and the natural communities of which they are part, and (2) provides a streamlined program for complying with the requirements of the California and federal Endangered Species Acts (BLM et al. 2005).	Staff's proposed Conditions of Certification BIO-1 through BIO-30 minimize, avoid, and compensate for impacts to various biological resources covered by the West Mojave Plan.

Applicable Law	Description	Rationale for Compliance
STATE		
California Endangered Species Act of 1984 (Fish and Game Code, sections 2050 through 2098)	Protects California's rare, threatened, and endangered species. "Take" of a State-listed species is prohibited without an Incidental Take Permit.	Staff's proposed Conditions of Certification BIO-1 through BIO-9 and BIO-15 through BIO-19 would ensure that the project is not likely to jeopardize the continued existence of desert tortoise or Swainson's hawk or result in the degradation of occupied habitat for any State-listed species.
California Code of Regulations (Title 14, sections 670.2 and 670.5)	Lists the plants and animals of California that are declared rare, threatened, or endangered.	Analysis of potential project impacts to rare, threatened, or endangered species is provided above, and Conditions of Certification are proposed that would minimize impacts to these species.
Fully Protected Species (Fish and Game Code, sections 3511, 4700, 5050, and 5515)	Designates certain species as fully protected and prohibits the take of such species or their habitat unless for scientific purposes (see also California Code of Regulations, Title 14, section 670.7).	Golden eagle is designated as fully protected and has been observed in the project area. However, Staff's proposed Condition of Certification BIO-20 includes preconstruction nest surveys, no-disturbance buffers around active nests, and monitoring of nests to minimize impacts to golden eagles.
Nest or Eggs (Fish and Game Code section 3503 and 3503.5)	Protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird.	Staff's proposed Condition of Certification BIO-19 includes preconstruction nest surveys, no-disturbance buffers around active nests, and monitoring of nests to minimize impacts to nesting birds. Staff's proposed Condition of Certification BIO-6 includes a Worker Environmental Awareness Program to educate workers about compliance with environmental regulations, including Fish and Game Code section 3503.
Migratory Birds (Fish and Game Code section 3513)	Protects California's migratory birds by making it unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame birds.	Staff's proposed Condition of Certification BIO-19 includes preconstruction nest surveys, no-disturbance buffers around active nests, and monitoring of nests to minimize impacts to nesting birds. Staff's proposed Condition of Certification BIO-6 includes a Worker Environmental Awareness Program to educate workers about compliance with environmental regulations, including Fish and Game Code section 3513.
Significant Natural Areas (Fish and Game Code section 1930 et seq.)	Designates certain areas such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitat.	Refuges, natural sloughs, riparian areas, and vernal pools do not occur on the project site.
California Environmental Quality Act (CEQA), CEQA Guidelines section 15380	CEQA defines rare species more broadly than the definitions for species listed under the State and federal Endangered Species Acts. Under section 15830, species not protected through State or federal listing but nonetheless demonstrable as "endangered" or "rare" under CEQA should also receive consideration in environmental analyses. Included in this category are many plants considered rare by the California Native Plant Society (CNPS) and some animals on the CDFG's Special Animals List.	Implementation of Staff's proposed Conditions of Certification BIO-1 through BIO-30 would ensure that the project remains in compliance with CEQA.

Applicable Law	Description	Rationale for Compliance
Streambed Alteration Agreement (Fish and Game Code sections 1600 et seq.)	Regulates activities that may divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake in California designated by CDFG in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit. Impacts to vegetation and wildlife resulting from disturbances to waterways are also reviewed and regulated during the permitting process.	Staff's proposed Condition of Certification BIO-26 includes measures to minimize and avoid impacts to jurisdictional waters of the State.
California Native Plant Protection Act of 1977 (Fish and Game Code section 1900 et seq.)	Designates State rare, threatened, and endangered plants.	Staff's proposed Conditions of Certification BIO-10 through BIO-12 include restoration and compensation for impacts to native plant communities, a Weed Management Plan, special-status plant surveys, and minimization and avoidance measures to minimize impacts to special-status plants.
California Desert Native Plants Act of 1981 (Food and Agricultural Code section 80001 et seq. and California Fish and Game Code sections 1925-1926)	Protects non-listed California desert native plants from unlawful harvesting on both public and private lands in Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego Counties. Unless issued a valid permit, wood receipt, tag, and seal by the commissioner or sheriff, harvesting, transporting, selling, or possessing specific desert plants is prohibited.	Staff's proposed Condition of Certification BIO-12 includes a Protected Plant Salvage Plan, which would minimize impacts to specific native desert plants.
LOCAL		
San Bernardino County General Plan: Conservation/Open Space Element of the County General Plan (County of San Bernardino 2007)	Includes objectives to preserve water quality and open space to benefit biological resources, and specific policies and goals for protecting areas of sensitive plant, soils and wildlife habitat and for assuring compatibility between natural areas and development. Although the Calico Solar Project is not located on lands under county jurisdiction, the general plan provides objectives which are consistent with some of the LORS listed above.	Implementation of Staff's proposed Conditions of Certification BIO-1 through BIO-30 would ensure that the project remains in compliance with the San Bernardino County General Plan.

C.2.10 NOTEWORTHY PUBLIC BENEFITS

The Calico Solar Project and the proposed alternatives would result in significant impacts to sensitive biological resources, and would permanently diminish the extent and value of native plant and animal communities in the region. Staff has therefore concluded that the Calico Solar Project would not provide any noteworthy public benefits related to biological resources, despite the contributions the project would make to meeting federal and State mandates for development of renewable energy resources.

C.2.11 FACILITY CLOSURE

In the future, Calico Solar Project would experience either a planned closure or be unexpectedly (either temporarily or permanently) closed. When facility closure occurs, it must be done so that it protects the environment and public health and safety. A closure plan would be prepared by the project owner prior to any planned closure. To address unanticipated facility closure, an "on-site contingency plan" would be developed by the project owner and approved by the Energy Commission Compliance Project Manager (CPM). Facility closure requirements are discussed in more detail in the **General Conditions** section of this SA/DEIS. Facility closure mitigation measures would also be included in the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) prepared by the project owner and described in staff's proposed Condition of Certification **BIO-7.**

The facility closure plan should address habitat restoration measures to be implemented in the event of a planned or an unexpected permanent closure and must also include a funding mechanism to ensure sufficient funds are available for decommissioning and habitat restoration. Planned or unexpected permanent facility closure should address the removal of the transmission conductors and poles since birds are known to collide with transmission line ground wires and poles may serve as predatory perches and nesting sites.

Staff's proposed Conditions of Certification **BIO-28** and **BIO-29** contain measures to ensure that impacts to biological resources are addressed prior to the planned permanent or unexpected permanent closure of the project.

C.2.12 RESPONSE TO PUBLIC AND AGENCY COMMENTS

Staff received comments on the Biological Resources section of the SA/DEIS. Comments on biological resources were received from the following parties during the SA/DEIS comment period:

- Stirling Energy Systems (applicant), April 15, 2010
- Patrick C. Jackson, May 27, 2010
- Western Watersheds Project, June 4, 2010
- San Bernardino County, June 4, 2010
- California Unions For Reliable Energy, June 4, 2010

Energy Commission staff has summarized comments from these letters that raise biological resource issues and have provided the following responses:

Stirling Energy Systems (SES), written comments dated April 15, 2010

SES Comment #1: SES believes that staff's recommended Conditions of Certification for the Calico project are "inconsistent" and "more onerous" than staff's recommendations for other projects, and that these conditions should be consistent among projects and commensurate with levels of impacts.

> Staff response: Staff has recommended Conditions of Certification that are consistent with other projects, insofar as the projects, their impacts, and available documentation are comparable. Staff's recommended Conditions of Certification for the Calico project were prepared with specific reference to the proposed project design; its location; existing conditions at the proposed project site; the impacts to biological resources as determined by staff's analysis; and further documentation provided by the applicant. Staff notes that proposed Condition of Certification **BIO-12** (Special Status Plant Impact Avoidance and Minimization), for example, has been extensively revised in this SSA and is substantially similar in scope and content to a similar Condition of Certification recommended in Staff Assessments for other large solar projects currently under Energy Commission review.

SES Comment #2: SES comments that "wording of many of the Conditions should be revised to focus on the actual mitigation desired and move the details of implementation to the verification section." Elsewhere in its comments, SES suggests reducing several Conditions of Certification to lists of major points, and transferring most supporting text into the verification sections of those recommended Conditions.

> Staff response: Staff recommends retaining the general structure and organization of these Conditions of Certification, as they appear in this SSA. The specific mitigation recommendations as stated in each Condition of Certification are the basis upon which staff concludes whether each impact identified in the SSA would be reduced below a level of significance. The requested revisions would remove some of the substance of the recommendations, including performance criteria and other requirements, postponing the adoption of actual mitigation standards and requirements from the Commission's formal project certification process to the later project compliance phase when there would be no opportunity for public review and comment. Staff believes that adopting SES's requests would improperly defer final decisions on certain details of mitigation to a later date, outside the Committee's certification authority.

SES Comment #3: SES comments that the Project site is in a BLM Solar Energy Study Area (SESA) which excludes any land identified as sensitive, wilderness area, or any other high conservation value lands.

Staff response: Staff agrees with this statement and added text in the introductory section of this SSA.

SES Comment #4: SES requests that the term "special status plant species" as it appears in the SA/DEIS be limited to state and federally listed threatened or endangered species; candidates for listing as threatened or endangered; species proposed or petitioned for listing; and the California Native Plant Society's (CNPS) List 1 and List 2 plants.

Staff response: Throughout the SA/DEIS and the SSA, the term "special-status plants" refers to all plant taxa included in several different compendia of rare, threatened or endangered plants of California, including the California Native Plant Society's *Inventory of Rare and Endangered Plants* (http://cnps.site.aplus.net/cgi-bin/inv/inventory.cgi) and the California Department of Fish and Game's *Special Vascular Plants, Bryophytes, and Lichens List* (http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/SPPlants.pdf). In addition to the conservation status categories requested by the applicant (listed above) "special status plants" also includes plant taxa ranked by CNPS as List 3 and List 4. By staff's definition, all of these plant taxa have special conservation status by their inclusion in these compendia. However, staff has concluded that none of the project's potential impacts CNPS List 3 or List 4 species would reach a level of significance under CEQA and staff has not recommended mitigation of such impacts in its proposed Conditions of Certification.

SES Comment #5: The applicant proposes to collect seed and cuttings of CNPS List 1B and List 2 plants, and comments that ". . . seeding areas of suitable habitat in undisturbed sites within and adjacent to the project areas would provide some conservation benefit."

Staff response: No conservation benefit could reliably result without using known, feasible methods. Staff is not aware of any known reliable or feasible wildland propagation (by seed, cuttings, or other methods) for white-margined beardtongue or other special status plants that could be affected by the proposed project.

Additional SES comments (not numbered): SES provided numerous additional comments addressing specific wording of the SA/DEIS; describing a then-proposed revision to the project design (which has since then been replaced by the proposed project and analyzed in this SSA); and commenting on portions of the SA/DEIS that have been deleted or replaced in the SSA. Staff has reviewed these comments and revised the SSA as appropriate. None of these comments raised significant environmental issues or issues related to the adequacy of the SA/DEIS.

PATRICK C. JACKSON (PCJ) LETTER DATED MAY 27, 2010

PCJ Comment #1: PCJ states that the SA/DEIS does not comply with the National Environmental Policy Act (NEPA) in that it does not address the impact the Project will have on the sensitive, scenic, natural, ecological, cultural, and biological resources of

the adjacent privately owned lands, some of which the Applicant has acquired or intends to acquire for use in conjunction with the Project.

> Staff Response: Whereas the SA/DEIS was a joint NEPA and CEQA document, this SSA is prepared exclusively to comply with CEQA. The BLM will prepare a separate Final EIS to comply with NEPA. This SSA does address biological resources on private lands insofar as they may be affected by the proposed project.

PCJ Comment #2: PCJ states that the Applicant currently owns 130.05 acres of privately owned lands adjacent to the Project. The *Applicant's Supplement to the Calico Solar (formerly Solar One) Application for Certification (08-AFC-13) May 2010* (Applicant's Supplement) indicates the Applicant intends to acquire another 25 acres of privately owned lands. The Applicant's Supplement indicates the Applicant has permission to conduct water well testing on a 40-acre privately owned parcel identified as assessor parcel number 0530-241-39-0000. Of utmost importance, the SA/DEIS does not address the impact the Project will have on the endangered desert tortoises on the adjacent privately owned lands.

> Staff Response: The Applicant has provided, and the SSA incorporates and analyzes, additional desert tortoise field survey data on the parcels described.

PCJ Comment #3: PCJ states that to comply with NEPA, the SA/DEIS must be supplemented to address the impact the Project will have on the sensitive, scenic, natural, ecological, cultural and biological resources on all the adjacent privately owned lands.

> Staff Response: Please see response to PJC Comment #1, above.

WESTERN WATERSHEDS PROJECT (WWP) LETTER DATED JUNE 4, 2010

WWP Comment #1: WWP states that it cannot provide full comments on the Staff Assessment at this time for several reasons. First, two days prior to the end of the comment period and the submission of this letter, on June 2, 2010, Tessera Solar (the Project Applicant) announced a new alternative layout for the project with a revised project boundary. This alternative had not yet been posted on the Energy Commission webpage as of June 4 (the end of the comment period), so that members of the public, including Western Watersheds Project, have been unable to review it prior to the close of the SA comment deadline. Second, as the Energy Commission Staff note frequently throughout the SA, the materials provided by the Applicant fail to fully cover important resources. For example, Staff references the Applicant's failure to map microphyll woodlands on the site, its failure to document sensitive plant occurrences, and cites other issues of controversy including the inadequacy of the desert tortoise surveys.

> Staff Response: This SSA analyzes the most recent project design as submitted by the Applicant to the Energy Commission in June 2010. This SSA incorporates all additional data provided by the Applicant, including mapped microphyll woodlands and new botanical and desert tortoise field

survey results, as recommended by staff in the SA/DEIS. Staff also notes that the Energy Commission's certification process provides additional future opportunities for public comment on the project as revised and the environmental analysis.

WWP Comment #2: WWP states that the environmental review for this project is being rushed at the expense of public participation and this rush shows in the documentation. To comply with the spirit and intent of CEQA, the Energy Commission Staff should issue a Supplemental Staff Assessment that fully describes the project and the project site, and includes a full analysis of the Applicant's new alternative. Only by doing so can the Energy Commission ensure that the public can review the project and provide informed comment.

Staff Response: Consistent with WWP's recommendation, this SSA (Supplemental Staff Assessment) fully describes the revised project and project site, and includes a full analysis of the proposed project as currently proposed by the Applicant.

WWP Comment #3: WWP notes that the project site includes habitat acquired as compensation for other projects. WWP is extremely concerned about the implications of this to achieving the fully mitigated standard since this requires protection of replacement habitat for CESA listed species in perpetuity.

Staff Response: Upon review of land acquisition history, staff has determined that the project site does not include habitat acquired as compensation for other projects. This SSA is revised to reflect that determination.

WWP Comment #4: WWP notes that the SA estimates over 100 individual desert tortoises may be present on site, but that firm numbers are not available because of the inadequacy of the Applicant's surveys. The SA/DEIS proposes to mitigate for direct impacts to desert tortoises through acquisition of compensation lands. WWP states that at a high enough ratio, this may compensate for the direct loss of habitat. However, although the SA/DEIS recognizes that the project site includes habitat that provides connectivity to adjacent natural lands the mitigations do not address how impacts to this connectivity will be mitigated.

Staff Response: The applicant has provided new desert tortoise field survey results that are incorporated into the analysis in this SSA. The revised project design as analyzed in this SSA substantially reduces project impacts to habitat connectivity from those described in the SA/DEIS. Based on this revised project footprint, staff concludes that impacts to connectivity, with incorporation of staff's recommended conditions of certification, would be less than significant.

WWP Comment #5: WWP notes that, as explained earlier in their scoping comments, the West Mojave Plan ROD signed March 2006 includes "Goal 3: ensures genetic connectivity among tortoise populations, both within the West Mojave Recovery Unit,

and between this and other recovery units." WWP states that the SA/DEIS does not explain how the project and proposed mitigations will meet this biological goal.

> Staff Response: The revised project design as analyzed in this SSA provides for suitable desert tortoise habitat and east-west desert tortoise movement on the upper bajada, north of the project footprint and south of the toe slope of the Cady Mountains. Based on this revised project footprint, staff concludes that impacts to connectivity, including genetic connectivity, with incorporation of staff's recommended conditions of certification, would be less than significant.

WWP Comment #6: WWP states that the SA/DEIS discusses translocation of desert tortoises but provides no information on potential translocation sites, and no translocation protocol is provided for public review. Despite the huge number of tortoises that will be impacted, Staff defer the details to some future translocation plan.

> Staff Response: The applicant has provided a Draft Desert Tortoise Translocation Plan identifying, among other things, potential desert tortoise translocation sites. These sites are under evaluation by staff, CDFG, BLM, and USFWS biologists. Staff's recommended Condition of Certification **BIO-16** requires that the Applicant revise the Draft Desert Tortoise Translocation Plan in consultation with staff, CDFG, and USFWS to address these and other outstanding concerns regarding details of the plan. Staff's recommended Condition of Certification **BIO-16** requires that the Plan, once finalized, must conform to standards and guidelines described in Translocation of Desert Tortoises (Mojave Population) From Project Sites: Plan Development Guidance (USFWS 2010). This document provides guidance including the timing of relocation/translocation, disease testing requirements, and other actions to minimize impacts to desert tortoise.

WWP Comment #7: WWP states that the Cady Mountains WSA has a native population of bighorn sheep that use the project site on a seasonal basis for foraging, drinking, and movement. The West Mojave Plan's conservation strategy calls for protecting springs used by bighorn sheep and calls for providing methods for crossing freeways and other barriers to dispersal. The revised CEQA document should review all direct, indirect, and cumulative impacts to this species including impacts to linkage habitat and connectivity issues, and compliance with the WMP's conservation strategy. It should include mitigation measures such as land bridges to compensate for impacts to connectivity.

> Staff Response: The project design as analyzed in this SSA substantially reduces impacts to seasonal foraging habitat and wildlife movement on the upper bajada, north of the project boundary, from those described in the SA/DEIS for the previous project design. There are no known seeps or springs in the Cady Mountains, and the project would not affect springs. Consistent with this comment, the SSA analyzes direct, indirect, and cumulative impacts to Nelson's bighorn sheep, including impacts to habitat connectivity. Staff concludes that project impacts to habitat connectivity

and wildlife movement would be less than significant with incorporation of staff's recommended mitigation. Staff concludes that land bridges are not necessary to mitigate the project's impacts to biological connectivity, including impacts to bighorn sheep connectivity.

WWP Comment #8: WWP states that the revised CEQA document should fully analyze impacts to Mojave fringe-toed lizard in compliance with the West Mojave Plan's conservation strategy and other applicable governing plans. This analysis requires full documentation of Mojave fringe-toed lizard occurrences. The analysis must include full consideration of blowsand habitat, sand movement in the area, and the impacts of project structures that are required to protect the Pisgah Mojave fringe-toed lizard populations (West Mojave Plan at 2-186).

Staff Response: The SSA substantially expands the analysis of project impacts to Mojave fringe-toed lizard, including an expanded analysis of occupied and potential habitat on the project site; anticipated project impacts to habitat; and sand transport on-site and in the surrounding area. Based on staff's analysis, windblown sand originating on the project site does not contribute substantially to aeolian sand habitat off-site to the east where additional Mojave fringe-toed lizard habitat is located. Staff concludes that project impacts to Mojave fringe-toed lizard would be less than significant with adoption of its recommended Condition of Certification **BIO-13**, as revised in this SSA.

WWP Comment #9: WWP states that the proposed project site provides important habitat for the white-margined beardtongue (*Penstemon albomarginatus*), and other sensitive and at-risk species. The supplemental CEQA document should fully document all occurrences on the site so that the impacts of the project can be determined. The supplemental CEQA document should also provide full documentation of other rare plant species present.

Staff Response: Analysis in this SSA of impacts to special-status plants, including white-margined beardtongue, is based on new botanical field survey data provided by the Applicant. Updated special-status plant occurrence data are described in the Setting and Existing Conditions (C.2.4.1) and Assessment of Impacts and Discussion of Mitigation (C.2.4.2) sections. Special-status plant species occurrence information is fully documented and disclosed in the SSA.

WWP Comment #10: WWP notes that it directly raised these issues and concerns in scoping comments; states that CEQA requires the agencies to address significant issues that are raised not simply recognize them; that relevant and important public comments must be specifically addressed in the supplemental CEQA document. WWP believes that the analyses presented in the SA/DEIS do not provide an adequate basis for the public to make informed comment; that the SA/DEIS does not analyze the Applicant's June 2 revised project; and that Energy Commission Staff should produce a CEQA-compliant supplemental to remedy this situation.

Staff Response: This SSA addresses the issues and concerns raised by WWP's scoping comments and its more recent comments on the SA/DEIS summarized here. This SSA provides a thorough analysis of the proposed revised project as described in the Introduction (C.2.2). Staff also notes that the Energy Commission's certification process provides additional future opportunities for public comment on the project as revised and the environmental analysis.

SAN BERNARDINO COUNTY (SBC) LETTER DATED JUNE 4, 2010

SBC Comment #1: SBC states that regarding mitigation for threatened/endangered species, SBC supports project development in a manner that optimizes future economic opportunity by minimizing land set-asides and instead focusing on funding conservation, habitat restoration, and species recovery efforts. The Staff Assessment is consistent with their approach by requiring avoidance of impacts via several mitigation measures, including rehabilitation in **BIO-28** and invasive plant removal in **BIO-11**. Mitigation measure **BIO-17** discusses compensatory mitigation and sensibly allows financial security for the procurement of land suitable for desert tortoise, as well as funding for the enhancement and long-term management of these lands. SBC strongly supports the option to provide adequate mitigation fees in lieu of providing mitigation land, especially when the replacement involves multiples (e.g. 3 to 1) of the project acreage. They believe that this is a realistic and adequate mitigation strategy for the loss of habitat instead of simply requiring mitigation land to be provided. Further, this is only one of many renewable energy projects being planned for construction within San Bernardino County, presumably all of which will require biological mitigation. The cumulative impacts of requiring mitigation lands are not addressed in terms of economic impacts to the host jurisdiction.

Staff Response: Staff's recommended Condition of Certification **BIO-17** does require the acquisition, permanent protection and long-term management of desert tortoise habitat lands that are not currently protected and management for conservation purposes. Other conditions require smaller acquisitions for other species, and most of these requirements may be satisfied by the acquisitions required by **BIO-17** if the land contains the specified habitat types. Acquisition of habitat land is consistent with state and federal Endangered Species Acts, described in the Biological Resources **Table 2** (Laws, Ordinances, Regulations, and Standards), and with current state and federal policies and guidelines. Staff has coordinated extensively with CDFG, BLM, and USFWS in preparation of this SSA, including Condition of Certification **BIO-17**. Large-scale purchases of desert habitat to mitigate the impacts of renewable energy projects could have some effect on the real estate market in the region, but mitigation land purchases will generally involve the acquisition of large non-agricultural parcels in rural and remote areas. CEQA does not require an analysis of a project's economic impacts, including cumulative economic impacts, unless the economic effect is related to an impact on the physical environment. Staff has not identified such an impact related to a potential change in real estate values.

CALIFORNIA UNIONS FOR RELIABLE ENERGY (CURE) LETTER DATED JUNE 4, 2010

CURE Comment #1: CURE states that the SA/DEIS must be revised and recirculated for public comment; that it does not inform decision makers and the public of the potential significant environmental effects of the project, or avoid or reduce environmental damage when possible. Cure believes that the Applicant provided inadequate information to draft a CEQA-compliant document and, as a result, the SA/DEIS is incomplete with respect to potentially significant impacts and mitigation measures for several resource areas, including biological resources.

Further, CURE states that the SA's deficiencies violate power plant site certification regulations, citing Cal. Code Regs., §§1001-2557. CURE believes that the SA/DEIS lacks considerable information and thus does not completely consider all "significant environmental issues" or notify the public or decision-makers of the "environmental consequences" of the Project.

CURE comments on CEQA and Warren-Alquist Act requirements for public review and comment; re-notice and recirculation when significant new information is added to the EIR; and adequacy of time for intervenors' preparation prior to evidentiary hearings. CURE comments that the Revised [Supplemental] SA will contain new analyses and mitigation measures for biological resources, including desert tortoise, golden eagle, Mojave fringe-toed lizard, and special-status plants.

> Staff Response: The applicant has worked with staff to provide extensive follow-up data in conformance with staff's recommended Conditions of Certification published in the SA/DEIS. These data, in combination with information provided earlier by the applicant, including the AFC and other documents cited in the SA/DEIS, and by staff's additional independent research, provide a suitable basis for CEQA analysis, as presented in this SSA. The applicant's revised project design, as analyzed in this SSA, was prepared in response to staff's Conditions of Certification as recommended in the SA/DEIS and has the effect of substantially reducing several impacts associated with the original proposal. The revisions were the subject of follow-up discussions held in public workshops and are consistent recommendations by BLM, USFWS, and CDFG. Staff also notes that the Energy Commission's certification process provides additional future opportunities for public comment on the project as revised and the environmental analysis. Recirculation of the SA/DEIS is not required.

CURE Comment #2: CURE states that the SA does not provide sufficient detail to analyze the project's impacts, referencing several quotations from the SA. Once the Applicant satisfies its burden to provide Staff with the pertinent information regarding its proposed Project, a revised SA containing additional analyses and mitigation measures must be drafted and circulated for public review and comment.

> Staff Response: The applicant has provided reports of follow-up surveys in conformance with staff's recommended Conditions of Certification published in the SA/DEIS [date]. Those analyses are incorporated into the analyses

and recommended Conditions of Certification in this SSA. See also response to CURE Comment #3.

CURE Comment #3: CURE states that the SA relies on incomplete data and does not establish an adequate environmental baseline; that further field surveys for rare plants, golden eagles, Mojave fringe-toed lizards, Nelson's bighorn sheep, desert tortoises and burrowing owls are required to establish a baseline and to enable an adequate analysis of impacts.

Staff Response: The environmental analysis made use of the best available information and follow-up field survey data have been submitted by the applicant and incorporated into existing (baseline) conditions as analyzed in this SSA.

CURE Comment #4: CURE states that a thorough environmental review of the transmission line's affected environment must be completed to describe its environmental setting, support impacts analysis, and identification of mitigation measures.

Staff Response: Section C.2.8 of the SSA examines the potential impacts of future SCE transmission line project, which would be related to the Calico Solar Project, under the separate jurisdiction of the California Public Utilities Commission. The SCE upgrades are a reasonably foreseeable event if the Calico Solar Project is approved and constructed as proposed, and are discussed in the SSA based on available information. As a separate project under another agency's jurisdiction, the SCE upgrades will also be the subject of a more detailed CEQA analysis in the future, based on a more specific project description that is now available.

CURE Comment #5: CURE states that the SA/DEIS does not disclose and analyze all potentially significant impacts to biological resources. CURE states that analyses in the SA/DEIS of several biological resources (vegetation in jurisdictional drainages, rare plants, desert tortoise, burrowing owl, Nelson's bighorn sheep, golden eagle, and MFTL) may be revised based on results of later field surveys. CURE believes that the analysis in the SA/DEIS may bear little resemblance to the analysis and mitigation recommendations based upon follow-up survey efforts.

Staff Response: For several biological resources, staff's analyses and recommended conditions of certification have been extensively revised, based in part on follow-up field surveys provided by the Applicant. Staff's analysis of the follow-up field data have not resulted in identification of any potentially significant impacts to biological resources beyond those identified in the SA/DEIS. Revisions to existing conditions and impacts analysis also have been made due to revisions to the proposed project, which would substantially reduce its impacts to several resources, including microphyll woodlands, state-jurisdictional streambeds, desert tortoise, bighorn sheep, and Emory's crucifixion thorn. Many of the revisions to staff's recommended conditions of certification in this SSA are

based not on new data or project design, but on interagency communication among Energy Commission staff and CDFG, BLM, and USFWS.

CURE Comment #6: CURE states that the SA/DEIS improperly defers mitigation to future plans, citing the following Conditions of Certification as examples: **BIO-7**, **BIO-10**, **BIO-11, BIO-12, BIO-13, BIO-16, BIO-17, BIO-18, BIO-21,** and **BIO-26.** CURE describes its understanding of mitigation deferral and applicable requirements for CEQA findings.

Staff Response: The comment refers to several Conditions of Certification which would require preparation and implementation of conservation or management plans by the project owner. Each of the cited Conditions of Certification includes performance criteria with verification requirements in a manner that is consistent with CEQA and laws governing the Energy Commission's certification process. While the plans themselves have not been completed to date, staff concludes that the mitigation measures as recommended are feasible, are enforceable through the Energy Commission's compliance requirements, and would mitigate the potentially significant impacts of the project below a level of significance.

CURE Comment #7: CURE states that staff's recommended mitigation measures for impacts to biological resources may not be feasible and that significant impacts to biological resources may remain unmitigated. As an example CURE cites **BIO-13** which would require the Applicant to acquire compensation lands to mitigate impacts to Mojave fringe-toed lizard habitat, and lists specific requirements for compensation lands. CURE indicates that qualifying private lands may not exist and, thus, the mitigation measure may not be feasible. CURE recommends that the compensation lands should be identified now to ensure adequate mitigation. CURE makes a similar argument regarding desert tortoise compensation lands.

Staff Response: Given the project's location in the central Mojave Desert, and the widespread distribution of suitable habitat for Mojave fringe-toed lizard and desert tortoises in the region, staff concludes that since suitable private lands do exist and could be available for purchase, staff believes that its proposed habitat compensation mitigation strategy is feasible.

Staff does not agree that it would be feasible to identify specific mitigation parcels in the SSA. Until the project is certified and further surveys are completed, the final mitigation obligation will not be known. Identification of specific mitigation parcels at this stage of the process would take additional staff resources without ensuring the parcels identified are available for purchase after the project is certified, and the Energy Commission cannot require an applicant to purchase mitigation lands or options on such lands prior to certification. The process that will be used on this project to identify and acquire suitable mitigation land has been successfully used by the Energy Commission, CDFG and other agencies on many other projects.

CURE Comment #8: CURE states that staff's recommended mitigation for impacts to biological resources are vague and uncertain, worded ambiguously, and thus unenforceable. As an example, CURE cites **BIO-12,** asserting that it is vague and uncertain because it only would require avoidance and minimization of disturbance to rare plants "to the extent feasible" and that required delineations of rare plant occurrences could take place during a time of year when each target species may not be identifiable.

> Staff Response: Staff has reviewed its recommended conditions of certification, including **BIO-12**, and made numerous revisions for improved clarity and to ensure enforceability.

CURE Comment #9: CURE provides numerous comments and recommendations relating to changes in for specific wording in staff's recommended conditions of certification to mitigate impacts to biological resources. These comments do not raise significant environmental issues, or issues related to the adequacy of the SA/DEIS, and are not individually summarized.

> Staff Response: Staff has reviewed the recommended revisions and incorporated them as appropriate. Staff also has made numerous other revisions to the conditions of certification, as described in responses to CURE comments #5 and #7, above.

C.2.13 STAFF'S PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

With implementation of staff's proposed conditions of certification, construction and operation of the Calico Solar Project would comply with all federal, State, and local laws, ordinances, regulations, and standards relating to biological resources. Staff recommends adoption of the following conditions of certification to mitigate potential impacts to sensitive biological resources to less-than-significant levels under CEQA and to satisfy mitigation requirements of other relevant laws. The accelerated timing requirements described in these proposed conditions of certification and associated verification requirements reflect the need for the Calico Solar Project to commence construction before the end of 2010 in order to receive American Recovery and Reinvestment Act of 2009 (ARRA) funding.

DESIGNATED BIOLOGIST SELECTION[1]

BIO-1 The project owner shall assign at least one Designated Biologist to the project. The project owner shall submit the resume of the proposed Designated Biologist, with at least three references and contact information, to the Energy Commission Compliance Project Manager (CPM) and the Bureau of Land Management's (BLM's) Wildlife Biologist for approval in consultation with the California Department of Fish and Game (CDFG) and U.S. Fish and Wildlife Service (USFWS).

The Designated Biologist must meet the following minimum qualifications: Bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field;

1. Three years of experience in field biology or current certification of a nationally recognized biological society, such as The Ecological Society of America or The Wildlife Society;
2. Have at least one year of field experience with biological resources found in or near the project area;
3. Meet the current USFWS Authorized Biologist qualifications criteria (http://www.fws.gov/ventura/speciesinfo/protocols_guidelines), demonstrate familiarity with protocols and guidelines for the desert tortoise, and be approved by the USFWS; and
4. Possess a California ESA Memorandum of Understanding pursuant to Section 2081(a) for desert tortoise.

In lieu of the above requirements, the resume shall demonstrate to the satisfaction of BLM's Wildlife Biologist and the CPM, in consultation with CDFG and USFWS, that the proposed Designated Biologist or alternate has the appropriate training and background to effectively implement the conditions of certification.

Verification: No fewer than 30 days prior to construction-related ground disturbance, the Designated Biologist(s) shall complete a USFWS Desert Tortoise Authorized Biologist Request Form (http://www.fws.gov/ventura/speciesinfo/protocols_guidelines) and submit it to the USFWS, BLM's Wildlife Biologist, and the CPM for review and final approval.

The project owner shall submit the resume of the Designated Biologist to the CPM and BLM within 7 days of receiving the Energy Commission Decision. No construction-

[1] USFWS <http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt> designates biologists who are approved to handle tortoises as "Authorized Biologists." Such biologists have demonstrated to USFWS that they possess sufficient desert tortoise knowledge and experience to handle and move tortoises appropriately, and have received USFWS approval. Authorized Biologists are permitted to then approve specific monitors to handle tortoises, at their discretion. The California Department of Fish and Game (CDFG) must also approve such biologists, potentially including individual approvals for monitors approved by the Authorized Biologist. Designated Biologists are the equivalent of Authorized Biologists. Only Designated Biologists and certain Biological Monitors who have been approved by the Designated Biologist would be allowed to handle desert tortoises.

related ground disturbance, grading, boring, or trenching shall commence until an approved Designated Biologist is available to be on site.

If a Designated Biologist needs to be replaced, the specified information of the proposed replacement must be submitted to BLM's Wildlife Biologist and the CPM as soon as possible prior to the termination or release of the Designated Biologist. In an emergency, the project owner shall immediately notify the BLM's Wildlife Biologist and the CPM to discuss the qualifications and approval of a short-term replacement while a permanent Designated Biologist is proposed to BLM's Wildlife Biologist and the CPM and for consideration.

DESIGNATED BIOLOGIST DUTIES

BIO-2 The project owner shall ensure that the Designated Biologist performs the activities described below during any site mobilization activities, construction-related ground disturbance, grading, boring, or trenching activities. The Designated Biologist may be assisted by the approved Biological Monitor(s) but remains the contact for the project owner, BLM's Wildlife Biologist, and the CPM. The Designated Biologist Duties shall include the following:

1. Advise the project owner's Construction and Operation Managers on the implementation of the biological resources conditions of certification;
2. Consult on the preparation of the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) to be submitted by the project owner;
3. Be available to supervise, conduct, and coordinate mitigation, monitoring, and other biological resources compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources, such as special-status species or their habitat;
4. Clearly mark sensitive biological resource areas and inspect these areas at appropriate intervals for compliance with regulatory terms and conditions;
5. Inspect active construction areas where animals may have become trapped prior to construction commencing each day. At the end of the day, inspect for the installation of structures that prevent entrapment or allow escape during periods of construction inactivity. Periodically inspect areas with high vehicle activity (e.g., parking lots) for animals in harm's way;
6. Notify the project owner, the BLM's Wildlife Biologist and the CPM of any non-compliance with any biological resources condition of certification;
7. Respond directly to inquiries of BLM's Wildlife Biologist and the CPM regarding biological resource issues;
8. Maintain written records of the tasks specified above and those included in the BRMIMP. Summaries of these records shall be submitted in the Monthly Compliance Report and the Annual Compliance Report to both the CPM and BLM Wildlife Biologist;

9. Train the Biological Monitors as appropriate, and ensure their familiarity with the BRMIMP, Worker Environmental Awareness Program (WEAP) training, and USFWS guidelines on desert tortoise surveys and handling procedures (http://www.fws.gov/ventura/speciesinfo/protocols_guidelines); and

10. Maintain the ability to be in regular, direct communication with representatives of CDFG, USFWS, BLM's Wildlife Biologist , and the CPM, including notifying these agencies of dead or injured listed species and reporting special-status species observations to the California Natural Diversity Data Base.

Verification: The Designated Biologist shall provide copies of all written reports and summaries that document biological resources compliance activities in the Monthly Compliance Reports submitted to BLM's Wildlife Biologist and the CPM. If actions may affect biological resources during operation a Designated Biologist shall be available for monitoring and reporting. During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report unless his or her duties cease, as approved by BLM's Wildlife Biologist and the CPM.

BIOLOGICAL MONITOR QUALIFICATIONS

BIO-3 The Designated Biologist shall submit the resume, at least three references, and contact information of each of the proposed Biological Monitors to BLM's Wildlife Biologist and the CPM. The resume shall demonstrate, to the satisfaction of the BLM's Wildlife Biologist and the CPM, the appropriate education and experience to accomplish the assigned biological resource tasks. The Biological Monitor is the equivalent of the USFWS designated Desert Tortoise Monitor (USFWS 2008c).

Biological Monitor(s) training by the Designated Biologist shall include familiarity with the conditions of certification, BRMIMP, WEAP, and USFWS guidelines on desert tortoise surveys and handling procedures (http://www.fws.gov/ventura/speciesinfo/protocols_guidelines).

Verification: The project owner shall submit the specified information to the BLM's Wildlife Biologist and the CPM for approval at least 30 days prior to the start of any site mobilization or construction-related ground disturbance, grading, boring, and trenching. The Designated Biologist shall submit a written statement to BLM's Wildlife Biologist and the CPM confirming that individual Biological Monitor(s) has been trained including the date when training was completed. If additional biological monitors are needed during construction, the specified information shall be submitted to BLM's Wildlife Biologist and the CPM for approval at least 10 days prior to their first day of monitoring activities.

BIOLOGICAL MONITOR DUTIES

BIO-4 The Biological Monitors shall assist the Designated Biologist in conducting surveys and in monitoring of site mobilization activities, construction-related ground disturbance, grading, boring, or trenching. The Designated Biologist shall remain the contact for the project owner, BLM's Wildlife Biologist, and the CPM.

Verification: The Designated Biologist shall submit in the Monthly Compliance Report to BLM's Wildlife Biologist and the CPM and copies of all written reports and summaries that document biological resources compliance activities, including those conducted by Biological Monitors. If actions may affect biological resources during operation a Biological Monitor, under the supervision of the Designated Biologist, shall be available for monitoring and reporting. During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report unless their duties cease, as approved by BLM's Wildlife Biologist and the CPM.

DESIGNATED BIOLOGIST AND BIOLOGICAL MONITOR AUTHORITY

BIO-5 The project owner's construction/operation manager shall act on the advice of the Designated Biologist and Biological Monitor(s) to ensure conformance with the biological resources conditions of certification. The Designated Biologist shall have the authority to immediately stop any activity that is not in compliance with these conditions and/or order any reasonable measure to avoid take of an individual of a listed species. If required by the Designated Biologist and Biological Monitor(s), the project owner's construction/operation manager shall halt all site mobilization, ground disturbance, grading, boring, trenching, and operation activities in areas specified by the Designated Biologist. The Designated Biologist shall:

1. Require a halt to all activities in any area when determined that there would be an unauthorized adverse impact to biological resources if the activities continued;
2. Inform the project owner and the construction/operation manager when to resume activities; and
3. Notify BLM's Wildlife Biologist and the CPM if there is a halt of any activities and advise them of any corrective actions that have been taken or would be instituted as a result of the work stoppage.
4. If the Designated Biologist is unavailable for direct consultation, the Biological Monitor shall act on behalf of the Designated Biologist.

Verification: The project owner shall ensure that the Designated Biologist or Biological Monitor notifies BLM's Wildlife Biologist and the CPM immediately (and no later than the morning following the incident, or Monday morning in the case of a weekend) of any non-compliance or a halt of any site mobilization, ground disturbance, grading, construction, and operation activities. The project owner shall notify BLM's Wildlife Biologist and the CPM of the circumstances and actions being taken to resolve the problem.

Whenever corrective action is taken by the project owner, a determination of success or failure would be made by BLM's Wildlife Biologist and the CPM within five working days after receipt of notice that corrective action is completed, or the project owner would be notified by BLM's Wildlife Biologist and the CPM that coordination with other agencies would require additional time before a determination can be made.

WORKER ENVIRONMENTAL AWARENESS PROGRAM (WEAP)

BIO-6 The project owner shall develop and implement a Project-specific Worker Environmental Awareness Program (WEAP) and shall secure approval for the WEAP from BLM's Wildlife Biologist and the CPM. The WEAP shall be administered to all onsite personnel including surveyors, construction engineers, employees, contractors, contractor's employees, supervisors, inspectors, subcontractors, and delivery personnel. The WEAP shall be implemented during site preconstruction, construction, operation, and closure. The WEAP shall:

1. Be developed by or in consultation with the Designated Biologist and consist of an on-site or training center presentation in which supporting written material and electronic media, including photographs of protected species, is made available to all participants;
2. Discuss the locations and types of sensitive biological resources on the project site and adjacent areas, and explain the reasons for protecting these resources; provide information to participants that no snakes, reptiles, or other wildlife shall be harmed;
3. Place special emphasis on desert tortoises, Mojave fringe-toed lizards, burrowing owls, golden eagles, nesting birds, badgers, and white-margined beardtongue, including information on physical characteristics, distribution, behavior, ecology, sensitivity to human activities, legal protection, penalties for violations, reporting requirements, and protection measures;
4. Include a discussion of fire prevention measures to be implemented by workers during project activities; request workers dispose of cigarettes and cigars appropriately and not leave them on the ground or buried;
5. Describe the temporary and permanent habitat protection measures to be implemented at the project site;
6. Identify whom to contact if there are further comments and questions about the material discussed in the program;
7. Include printed training materials, including photographs and brief descriptions of desert tortoises, Mojave fringe-toed lizards, burrowing owls, golden eagles, nesting birds, badgers, and white-margined beardtongue, including behavior, ecology, sensitivity to human activities, legal protection, penalties for violations, reporting requirements, and protection measures;
8. Prominently display posters and descriptions in offices, conference rooms, employee break rooms, and other areas where employees may congregate of desert tortoises, Mojave fringe-toed lizards, burrowing owls, golden eagles, nesting birds, badgers, and white-margined beardtongue, including behavior, ecology, sensitivity to human activities, legal protection, penalties for violations, reporting requirements, and protection measures; and

9. Include a training acknowledgment form to be signed by each worker indicating that they received training and shall abide by the guidelines.

The specific program can be administered by a competent individual(s) acceptable to the Designated Biologist.

Verification: Within 7 days of publication of the Energy Commission's License Decision, or the Record of Decision/ROW Issuance, whichever comes first, the project owner shall provide to BLM's Wildlife Biologist and the CPM a copy of the final WEAP and all supporting written materials and electronic media prepared or reviewed by the Designated Biologist and a resume of the person(s) administering the program.

The project owner shall provide in the Monthly Compliance Report the number of persons who have completed the training in the prior month and a running total of all persons who have completed the training to date. At least 10 days prior to construction-related ground disturbance activities the project owner shall submit two copies of the BLM- and CPM-approved final WEAP. Training acknowledgement forms signed during construction shall be kept on file by the project owner for at least 6 months after the start of commercial operation.

Throughout the life of the project, the WEAP shall be repeated annually for permanent employees, and shall be routinely administered within one week of arrival to any new construction personnel, foremen, contractors, subcontractors, and other personnel potentially working within the project area. Upon completion of the orientation, employees shall sign a form stating that they attended the program and understand all protection measures. These forms shall be maintained by the project owner and shall be made available to BLM's Wildlife Biologist and the CPM upon request. Workers shall receive and be required to visibly display a hardhat sticker or certificate that they have completed the training.

During project operation, signed statements for operational personnel shall be kept on file for 6 months following the termination of an individual's employment.

BIOLOGICAL RESOURCES MITIGATION IMPLEMENTATION AND MONITORING PLAN

BIO-7 The project owner shall develop a Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP), and shall submit two copies of the proposed BRMIMP to the BLM-Wildlife Biologist and the CPM for review and approval. The project owner shall implement the measures identified in the approved BRMIMP. The BRMIMP shall incorporate avoidance and minimization measures described in final versions of the Hazardous Materials Plan; the Revegetation Plan; the Weed Management Plan; the Special-Status Plant Protection and Monitoring Plan; the Special-Status Plant Remedial Action Plan; the Seed Collection Plan; the Protected Plant Salvage Plan; the Desert Tortoise Translocation Plan; the Raven Monitoring, Management, and Control Plan; the Burrowing Owl Monitoring and Mitigation Plan; the Burrowing Owl Relocation Area Management Plan; the Bighorn Sheep Mitigation Plan; the Streambed Management Plan; and the Evaporation Pond Design, Monitoring, and Management Plan.

The BRMIMP shall be prepared in consultation with the Designated Biologist and shall include accurate and up-to-date maps depicting the location of sensitive biological resources that require temporary or permanent protection during construction and operation. The BRMIMP shall include complete and detailed descriptions of the following:

1. All biological resources mitigation, monitoring, and compliance measures proposed and agreed to by the project owner;
2. All biological resources conditions of certification identified as necessary to avoid or mitigate impacts;
3. All biological resource mitigation, monitoring, and compliance measures required in federal agency terms and conditions, such as those provided in the USFWS Biological Opinion, the CDFG 2080.1 consultation, and BLM stipulations;
4. All sensitive biological resources to be impacted, avoided, or mitigated by project construction, operation, and closure;
5. All required mitigation measures for each sensitive biological resource;
6. All measures that shall be taken to avoid or mitigate temporary disturbances from construction activities;
7. Duration for each type of monitoring and a description of monitoring methodologies and frequency;
8. Performance standards to be used to help decide if/when proposed mitigation is or is not successful;
9. All performance standards and remedial measures to be implemented if performance standards are not met;
10. Biological resources-related facility closure measures including a description of funding mechanism(s);
11. A process for proposing plan modifications to BLM's Wildlife Biologist and the CPM and appropriate agencies for review and approval; and
12. A requirement to submit any sightings of any special-status species that are observed on or in proximity to the project site, or during project surveys, to the California Natural Diversity Data Base (CNDDB) per CDFG requirements.

Verification: The project owner shall submit the final BRMIMP to BLM's Wildlife Biologist and the CPM at least 30 days prior to start of any preconstruction site mobilization and construction-related ground disturbance, grading, boring, and trenching. The BRMIMP shall contain all of the required measures included in all biological Conditions of Certification. No construction-related ground disturbance, grading, boring, or trenching may occur prior to approval of the final BRMIMP by BLM's Wildlife Biologist and the CPM.

If any permits have not yet been received when the BRMIMP is first submitted, these permits shall be submitted to BLM's Wildlife Biologist and the CPM within five days of their receipt, and the BRMIMP shall be revised or supplemented to reflect the permit

conditions within at least 10 days of their receipt by the project owner. Ten days prior to site and related facilities mobilization, the revised BRMIMP shall be resubmitted to BLM's Wildlife Biologist and the CPM.

To verify that the extent of construction disturbance does not exceed that described in this analysis, the project owner shall submit aerial photographs, at an approved scale, taken before and after construction to the CPM and BLM's Wildlife Biologist. The first set of aerial photographs shall reflect site conditions prior to any preconstruction site mobilization and construction-related ground disturbance, grading, boring, and trenching, and shall be submitted at least 60 days prior to initiation of such activities. The second set of aerial photographs shall be taken subsequent to completion of construction, and shall be submitted to the CPM and BLM's Wildlife Biologist no later than 90 days after completion of construction. The project owner shall also provide a final accounting of the acreages of vegetation communities/cover types present before and after construction and a depiction of the approved project boundaries superimposed on the post project aerial photograph. If final acreages and/or disturbance footprints exceed those previously approved, the project owner shall coordinate with staff, CDFG, and USFWS to determine appropriate mitigation for such impacts. Such mitigation may exceed the requirements as outlined in these Conditions of Certification (i.e., higher mitigation ratios may be imposed at the discretion of the wildlife agencies).

Any changes to the approved BRMIMP (including the project footprint) must be approved by BLM's Wildlife Biologist and the CPM and in consultation with CDFG and USFWS before such action is taken.

Implementation of BRMIMP measures (for example, construction activities that were monitored, species observed) shall be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of project construction, the project owner shall provide to BLM's Wildlife Biologist and the CPM, for review and approval, a written Construction Termination Report identifying which items of the BRMIMP have been completed, summarizing all modifications to mitigation measures made during the project's preconstruction site mobilization and construction-related ground disturbance, grading, boring, and trenching, naming any mitigation and monitoring items still outstanding, and providing a timeline for implementing outstanding items. The project owner shall coordinate with the CPM and BLM's Wildlife Biologist to revise and finalize the Construction Termination Report to fulfill its reporting requirements to be outlined in the BRIMP.

IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-8 The project owner shall undertake the following measures to manage the construction site and related facilities in a manner to avoid or minimize impacts to biological resources. All measures shall be subject to review and approval by the CPM.

1. Limit Disturbance Areas and Perimeter Fencing. The boundaries of all areas to be disturbed (including staging areas, access roads, and sites for temporary placement of spoils) shall be delineated with stakes and flagging prior to construction activities in consultation with the Designated Biologist. Spoils and topsoil shall be stockpiled in disturbed areas lacking native

vegetation and which do not provide habitat for special-status species. Parking areas, staging and disposal site locations shall similarly be located in areas without native vegetation or special-status species habitat. All disturbances, project vehicles, and equipment shall be confined to the flagged areas. Tortoise fencing shall be placed along the outside perimeter of the access road that would provide access to areas north of the project site.

2. Minimize Road Impacts. New and existing roads that are planned for construction, widening, or other improvements shall not extend beyond the flagged impact area as described above. All vehicles passing or turning around would do so within the planned impact area or in previously disturbed areas. Where new access is required outside of existing roads or the construction zone, the route shall be clearly marked (i.e., flagged and/or staked) prior to the onset of construction.
3. Minimize Traffic Impacts. Vehicular traffic during project construction and operation shall be confined to existing designated routes of travel to and from the project site, and cross country vehicle and equipment use outside designated work areas shall be prohibited. The speed limit shall not exceed 25 miles per hour within the project area, on maintenance roads for linear facilities, or on access roads to the project site. Speed limits on paved roads shall be consisted with posted speed limits.
4. Monitor During Construction. In areas that have not been fenced with desert tortoise exclusion fencing and cleared, the Designated Biologist shall be present at the construction site during all project activities that have potential to disturb soil, vegetation, and wildlife. The Designated Biologist or Biological Monitor shall walk immediately ahead of equipment during brushing and grading activities.
5. Minimize Impacts of Transmission/Pipeline Alignments, Roads, Staging Areas. Staging areas for construction on the plant site shall be within the area that has been fenced with desert tortoise exclusion fencing and cleared. For construction activities outside of the plant site (transmission line, pipeline alignments) access roads, pulling sites, and storage and parking areas shall be designed, installed, and maintained with the goal of minimizing impacts to native plant communities and sensitive biological resources. Transmission lines and all electrical components shall be designed, installed, and maintained in accordance with the Avian Power Line Interaction Committee's (APLIC's) S*uggested Practices for Avian Protection on Power Lines* (APLIC 2006) and *Mitigating Bird Collisions with Power Lines* (APLIC 2004) to reduce the likelihood of large bird electrocutions and collisions.
6. Avoid Use of Toxic Substances. Soil bonding and weighting agents used on unpaved surfaces shall be non-toxic to wildlife and plants.
7. Minimize Lighting Impacts. Facility lighting shall be designed, installed, and maintained to prevent side casting of light towards wildlife habitat.
8. Avoid Vehicle Impacts to Desert Tortoise. Parking and storage shall occur within the area enclosed by desert tortoise exclusion fencing to the extent

feasible. No vehicles or construction equipment parked outside the fenced area shall be moved prior to an inspection of the ground beneath the vehicle for the presence of desert tortoise. If a desert tortoise is observed, it shall be left to move on its own. If it does not move within 15 minutes, a Designated Biologist or Biological Monitor under the Designated Biologist's direct supervision may remove and relocate the animal to a safe location if temperatures are within the range described in the USFWS' 2009 *Desert Tortoise Field Manual* (http://www.fws.gov/ventura/speciesinfo/protocols_guidelines). All access roads outside of the fenced project footprint shall be delineated with temporary desert tortoise exclusion fencing on either side of the access road, unless otherwise authorized by the CPM, BLM Wildlife Biologist, USFWS, and CDFG.

9. Avoid Wildlife Pitfalls:

   a. Avoid Wildlife Entrapment. At the end of each work day, the Designated Biologist shall ensure that all potential wildlife pitfalls (trenches, bores, and other excavations) have been backfilled. If backfilling is not done, all trenches, bores, and other excavations shall be sloped at a 3:1 ratio at the ends to provide wildlife escape ramps, or covered completely to prevent wildlife access, or fully enclosed with desert tortoise-exclusion fencing. All trenches, bores, and other excavations outside the areas permanently fenced with desert tortoise exclusion fencing shall be inspected periodically, but no less than three times, throughout the day and at the end of each workday by the Designated Biologist or a Biological Monitor. Should a tortoise or other wildlife become trapped, the Designated Biologist or Biological Monitor shall remove and relocate the individual as described in the Desert Tortoise Relocation/Translocation Plan. Any wildlife encountered during the course of construction shall be allowed to leave the construction area unharmed.

   b. Avoid Entrapment of Desert Tortoise. Any construction pipe, culvert, or similar structure with a diameter greater than 3 inches, stored less than 8 inches aboveground, and within desert tortoise habitat (i.e., outside the permanently fenced area) for one or more nights, shall be inspected for tortoises before the material is moved, buried, or capped. As an alternative, all such structures may be capped before being stored outside the fenced area, or placed on pipe racks. These materials would not need to be inspected or capped if they are stored within the permanently fenced area after the clearance surveys have been completed.

10. Minimize Standing Water. Water applied to dirt roads and construction areas (trenches or spoil piles) for dust abatement shall use the minimal amount needed to meet safety and air quality standards in an effort to prevent the formation of puddles, which could attract desert tortoises and common ravens to construction sites. A Biological Monitor shall patrol these areas to ensure water does not puddle and shall take appropriate action to reduce water application where necessary.

11. Dispose of Road-killed Animals. Road-killed animals or other carcasses detected on roads near the project area shall be picked up immediately and delivered to the Biological Monitor. For special-status species roadkill, the Biological Monitor shall contact USFWS and CDFG within 1 working day of receipt of the carcass for guidance on disposal or storage of the carcass. The Biological Monitor shall report the special-status species record as described in Conditions of Certification **BIO-2** and **BIO-26**.

12. Minimize Spills of Hazardous Materials. All vehicles and equipment shall be maintained in proper working condition to minimize the potential for fugitive emissions of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. The Designated Biologist shall be informed of any hazardous spills immediately as directed in the project Hazardous Materials Plan. Hazardous spills shall be immediately cleaned up and the contaminated soil properly disposed of at a licensed facility. Servicing of construction equipment shall take place only at a designated area. Service/maintenance vehicles shall carry a bucket and pads to absorb leaks or spills.

13. Worker Guidelines. During construction all trash and food-related waste shall be placed in self-closing containers and removed daily from the site. Workers shall not feed wildlife or bring pets to the project site. Except for law enforcement personnel, no workers or visitors to the site shall bring firearms or weapons. Vehicular traffic shall be confined to existing routes of travel to and from the project site, and cross country vehicle and equipment use outside designated work areas shall be prohibited. The speed limit when traveling on dirt access routes within desert tortoise habitat shall not exceed 25 miles per hour.

14. Implement Erosion Control Measures. Standard erosion control measures shall be implemented for all phases of construction and operation where sediment run-off from exposed slopes threatens to enter “Waters of the State”. Sediment and other flow-restricting materials shall be moved to a location where they shall not be washed back into the stream. All disturbed soils and roads within the project site shall be stabilized to reduce erosion potential, both during and following construction. Areas of disturbed soils (access and staging areas) with slopes toward a drainage shall be stabilized to reduce erosion potential.

15. Monitor Ground-Disturbing Activities Prior to Pre-Construction Site Mobilization. If pre-construction site mobilization requires ground-disturbing activities such as for geotechnical borings or hazardous waste evaluations, a Designated Biologist or Biological Monitor shall be present to monitor any actions that could disturb soil, vegetation, or wildlife.

16. Control and Regulate Fugitive Dust. To reduce the potential for the transmission of fugitive dust the project owner shall implement dust control measures. These shall include:

    a. The project owner shall apply non-toxic soil binders, equivalent or better in efficiencies than the CARB-approved soil binders, to active

unpaved roadways, unpaved staging areas, and unpaved parking area(s) throughout construction to reduce fugitive dust emissions.

b. Water the disturbed areas of the active construction sites at least three times per day and more often if uncontrolled fugitive dust is noted.

c. Enclose, cover, water twice daily, and/or apply non-toxic soil binders according to manufacturer's specifications to exposed piles with a 5% or greater silt content.

d. Establish a vegetative ground cover (in compliance with biological resources impact conditions of certification) or otherwise create stabilized surfaces on all unpaved areas at each of the construction sites within 21 days after active construction operations have ceased.

e. Increase the frequency of watering, if water is used as a soil binder for disturbed surfaces, or implement other additional fugitive dust mitigation measures, to all active disturbed fugitive dust emission sources when wind speeds (as instantaneous wind gusts) exceed 25 mph.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP and implemented. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of project construction, the project owner shall provide to BLM's Wildlife Biologist and the CPM, for review and approval, a written construction termination report identifying how measures have been completed.

COMPLIANCE VERIFICATION

BIO-9 The project owner shall provide Energy Commission staff, BLM, CDFG, and USFWS with reasonable access to the project site and mitigation lands under the control of the project owner and shall otherwise fully cooperate with the Energy Commission's and BLM's efforts to verify the project owner's compliance with, or the effectiveness of, mitigation measures set forth in the conditions of certification. The project owner shall hold harmless the Designated Biologist, the Energy Commission and staff, BLM, and any other agencies with regulatory requirements addressed by the Energy Commission's sole permitting authority for any costs the project owner incurs in complying with the management measures, including stop work orders issued by the CPM or the Designated Biologist. The Designated Biologist shall do all of the following:

1. Notification. Notify the CPM, BLM, CDFG, and USFWS at least 14 calendar days before initiating ground-disturbing activities. Immediately notify the CPM, BLM, CDFG, and USFWS in writing if the project owner is not in compliance with any conditions of certification, including but not limited to any actual or anticipated failure to implement mitigation measures within the time periods specified in the conditions of certification. CDFG shall be notified at their Southern Region Headquarters Office, 4949 Viewridge Avenue, San Diego, CA 92123; (858) 467-4201. USFWS shall be notified at their Ventura office at 2493 Portola Road, Suite B, Ventura, CA 93003; (805) 644-1766.

2. Monitoring During Grading. Remain on site daily while grubbing and grading are taking place to avoid or minimize take of listed species, to check for compliance with all impact avoidance and minimization measures, and to check all exclusion zones to ensure that signs, stakes, and fencing are intact and that human activities are restricted in these protected zones.
3. Fence Monitoring. During construction maintain and check desert tortoise exclusion fences on a daily basis to ensure the integrity of the fence is maintained. The Designated Biologist shall be present on site to monitor construction and determine fence placement during fence installation. During operation of the project, fence inspections shall occur at least once per month throughout the life of the project, and within 24 hours after storms or other events that might affect the integrity and function of desert tortoise exclusion fences. Fence repairs shall occur within two days (48 hours) of detecting problems that affect the functioning of the desert tortoise exclusion fencing. If fence damage occurs during any time of year when tortoises may be active, the project owner shall be responsible for monitoring the site of the damaged fence until it is fully repaired, to prevent a desert tortoise from entering the project area. All incidents of damaged tortoise exclusion fence, including dates of damage and repair; extent of damage; and monitoring summaries (methods and results) shall be reported to the BLM, CPM, CDFG, and USFWS. All wildlife found entrapped or dead in the fence shall be reported to the BLM, CPM, CDFG, and USFWS.
4. Monthly Compliance Inspections. Conduct compliance inspections at a minimum of once per month after clearing, grubbing, and grading are completed and submit a monthly compliance report to the CPM, BLM, USFWS, and CDFG. All observations of listed species and their sign shall be reported to the Designated Biologist for inclusion in the monthly compliance report.
5. Annual Listed Species Status Report. No later than January 31 of every year the Project facility remains in operation, provide the CPM, BLM, USFWS, and CDFG an annual Listed Species Status Report, which shall include, at a minimum: 1) a general description of the status of the project site and construction/operation activities, including actual or projected completion dates, if known; 2) a copy of the table in the BRMIMP with notes showing the current implementation status of each mitigation measure; 3) an assessment of the effectiveness of each completed or partially completed mitigation measure in minimizing and compensating for project impacts, 4) recommendations on how effectiveness of mitigation measures might be improved, and 5) a summary of any agency approved modifications to the BRMIMP.
6. Final Listed Species Mitigation Report. No later than 45 days after initiation of project operation, provide the CPM a Final Listed Species Mitigation Report that shall include, at a minimum: 1) a copy of the table in the BRMIMP with notes showing when each of the mitigation measures was implemented; 2) all available information about project-related incidental take of listed species; 3) information about other project impacts

on the listed species; 4) construction dates; 5) an assessment of the effectiveness of conditions of certification in minimizing and compensating for project impacts; 6) recommendations on how mitigation measures might be changed to more effectively minimize and mitigate the impacts of future projects on the listed species; and 7) any other pertinent information, including the level of take of the listed species associated with the project.

7. Notification of Injured, Dead, or Relocated Listed Species. In the event of a sighting in an active construction area (e.g., with equipment, vehicles, or workers), injury, kill, or relocation of any listed species, the CPM, BLM, CDFG, and USFWS shall be notified immediately by phone by the Designated Biologist or Biological Monitor. Notification shall occur no later than noon on the business day following the event if it occurs outside normal business hours so that the agencies can determine if further actions are required to protect listed species. Written follow-up notification via FAX or electronic communication shall be submitted to these agencies within five calendar days of the incident and include the following information as relevant:

    a. Injured Desert Tortoise. If a desert tortoise is injured as a result of project-related activities during construction, the Designated Biologist shall immediately take it to a CDFG-approved wildlife rehabilitation and/or veterinarian clinic. Any veterinarian bills for such injured animals shall be paid by the project owner. Following phone notification as required above, the CPM, BLM, CDFG, and USFWS shall determine the final disposition of the injured animal, if it recovers. Written notification shall include, at a minimum, the date, time, location, circumstances of the incident, and the name of the facility where the animal was taken.

    b. Desert Tortoise Fatality. If a desert tortoise is killed by project-related activities during construction or operation, or if a desert tortoise is otherwise found dead, submit a written report with the same information as an injury report. These desert tortoises shall be salvaged according to guidelines described in Salvaging Injured, Recently Dead, Ill, and Dying Wild, Free-Roaming Desert Tortoise (Berry 2001). The project owner shall pay to have the desert tortoises transported and necropsied. The report shall include the date and time of the finding or incident.

8. Stop Work Order. The CPM/BLM may issue the project owner a written stop work order to suspend any activity related to the construction or operation of the project to prevent or remedy a violation of one or more conditions of certification (including but not limited to failure to comply with reporting, monitoring, or habitat acquisition obligations) or to prevent the illegal take of an endangered, threatened, or candidate species. The project owner shall comply with the stop work order immediately upon receipt thereof.

Verification: No later than two calendar days following the above-required notification of a sighting, kill, injury, or relocation of a listed species, the project owner

shall deliver to the CPM, BLM, CDFG, and USFWS via FAX or electronic communication the written report from the Designated Biologist describing all reported incidents of the sighting, injury, kill, or relocation of a listed species, identifying who was notified and explaining when the incidents occurred. In the case of a sighting in an active construction area, the project owner shall, at the same time, submit a map (e.g., using Geographic Information Systems) depicting both the limits of construction and sighting location to the CPM, BLM, CDFG, and USFWS.

No later than January 31st of every year the Calico Solar Project facility remains in operation, provide the CPM and BLM an annual Listed Species Status Report as described above, and a summary of desert tortoise exclusion fence inspections and repairs conducted in the course of the year.

REVEGETATION PLAN AND COMPENSATION FOR IMPACTS TO NATIVE VEGETATION COMMUNITIES

BIO-10 The project owner shall provide restoration/compensation for impacts to native vegetation communities and develop and implement a Revegetation Plan for all areas subject to temporary project disturbance. Upon completion of construction, all temporarily disturbed areas shall be restored to pre-project grade and revegetated according to the measures described below. Temporarily disturbed areas within the project area include, but are not limited to: all areas where underground infrastructure was installed, temporary access roads, construction work temporary lay-down areas, and construction equipment staging areas. For the purpose of this mitigation measure, "temporarily disturbed areas" shall include disturbances that are considered permanent impacts in the analyses above (i.e., would take more than 5 years to recover) but would benefit from the revegetation activities identified here. The following measures shall be implemented for all temporarily disturbed areas, excluding areas immediately around facilities which may be landscaped according to a separate Landscape Plan. These measures will include:

1. Plan Details. The plans shall include at minimum: (a) locations and details for top soil storage; (b) methods to salvage and replant cacti and the plant species to be used in restoration; (c) seed collection guidelines; (d) a schematic depicting the mitigation area; (e) time of year that the planting will occur and the methodology of the planting; (f) a description of the irrigation methodology if used; (g) measures to control exotic vegetation on site; (h) performance standards (see below); and (i) a detailed monitoring program. All habitats dominated by non-native species prior to project disturbance shall be revegetated using appropriate native species. This plan shall also contain contingency measures for failed restoration efforts (efforts not meeting success criteria).
2. Topsoil Salvage. Topsoil shall be stockpiled from the project site for use in revegetation of the disturbed soils. The topsoil excavated shall be segregated, kept intact, and protected, under conditions shown to sustain seed bank viability. The upper 1 inch of topsoil which contains the seed bank shall be scraped and stockpiled for use as the top-dressing for the

revegetation area. An additional 6 to 8 inches of soil below the top 1 inch of soil shall also be scraped and separately stockpiled for use in revegetation areas. Topsoil shall be replaced in its original vertical orientation following ground disturbance, ensuring the integrity of the top one inch in particular. All other elements of soil stockpiling shall be conducted as described on pages 39-40 of *Rehabilitation of Disturbed Lands in California* (Newton and Claassen 2003).

3. Seed Stock. Only seed of locally occurring native species shall be used for revegetation. Seeds shall contain a mix of short-lived early pioneer species such as native annuals and perennials and subshrubs. Seeding shall be conducted as described in Chapter 5 of *Rehabilitation of Disturbed Lands in California* (Newton and Claassen 2003). A list of plant species suitable for Mojave Desert region revegetation projects, including recommended seed treatments, are included in Appendix A-8 of the same report. The list of plants observed during the 2010 special-status plant surveys of the Project area can also be used as a guide to site-specific plant selection for revegetation.

4. Monitoring Requirement and Performance Standards. Post-seeding and planting monitoring will be yearly and shall continue for a period of no less than 10 years or until the defined performance standards are achieved (whichever is later). Remediation activities (e.g., additional planting, removal of non-native invasive species, or erosion control) shall be taken during the 10-year period if necessary to ensure the success of the restoration effort. If the mitigation fails to meet the established performance standards after the 10-year maintenance and monitoring period, monitoring and remedial activities shall extend beyond the 10-year period until the performance standards are met, unless otherwise specified by the Energy Commission and BLM. As needed to achieve performance standards, the project owner shall be responsible for replacement planting or other remedial action as agreed to by BLM and CPM. Replacement plants shall be monitored with the same survival and growth requirements as required for original revegetation plantings. The following performance standards must be met by the end of the monitoring period: (a) at least 80% of the species and vegetative cover observed within the temporarily disturbed areas shall be native species that naturally occur in desert scrub habitats; (b) absolute cover and density of native plant species within the revegetated areas shall equal at least 60% of the pre-disturbance or reference vegetation cover; and (c) the site shall have gone without irrigation or remedial planting for a minimum of three years prior to completion of monitoring.

   If a fire or flood damages a revegetation area within the 10-year monitoring period, the owner shall be responsible for a one-time replacement. If a second fire or flood occurs, no replanting is required, unless the event is caused by the owner's activity (e.g., as determined by BLM or other firefighting agency investigation).

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP and implemented. Within 90 days after completion of each year

of project construction, the project owner shall provide to the CPM verification of the total vegetation and community subject to temporary and permanent disturbance. To monitor and evaluate the success of the restoration, the project owner shall submit annual reports of the restoration including the status of the site, percent cover of native and exotics, and any remedial actions conducted by the owner to the CPM and BLM Wildlife Biologist .

No less than 30 days following the publication of the Energy Commission License Decision or the Record of Decision/ROW Issuance, whichever comes first, the project owner shall submit to the CPM and BLM's Wildlife Biologist a final agency-approved Revegetation Plan that has been reviewed and approved by BLM's Wildlife Biologist and the CPM. All modifications to the Revegetation Plan shall be made only after approval from BLM's Wildlife Biologist and the CPM.

Within 30 days after completion of each year of project construction, the project owner shall provide to the CPM for review and approval, a written report identifying which items of the Revegetation Plan have been completed, a summary of all modifications to mitigation measures made during the project's construction phase, and which items are still outstanding.

On January 31st of each year following construction until the completion of the revegetation monitoring specified in the Revegetation Plan, the Designated Biologist shall provide a report to the CPM and BLM's Wildlife Biologist that includes: a summary of revegetation activities for the year, a discussion of whether revegetation performance standards for the year were met; and recommendations for revegetation remedial action, if warranted, are planned for the upcoming year.

WEED MANAGEMENT PLAN

BIO-11 The project owner shall revise and implement a Weed Management Plan that meets the approval of BLM and CPM. The draft Noxious Weed Management Plan submitted by the applicant shall provide the basis for the final plan, subject to review and revisions from BLM, USFWS, CDFG, and the CPM.

The final plan shall include weed control measures with demonstrated records of success, based on the best available information from sources such as: The Nature Conservancy's The Global Invasive Species Team, Cooperative Extension, California Invasive Plant Council http://www.cal-ipc.org/ip/management/plant_profiles/index.php, and the California Department of Food & Agriculture Encycloweedia: http://www.cdfa.ca.gov/phpps/ipc/encycloweedia/encycloweedia_hp.htm. The methods shall meet the following criteria:

1. Manual: well-timed removal of plants or seed heads with hand tools; seed heads and plants must be disposed of in accordance with guidelines from the Riverside County Agricultural Commissioner.
2. Chemical: Herbicides known to have residual toxicity, such as pre-emergents and pellts, shall not be used in natural areas or within the engineered channels. Only the following application methods may be used: wick (wiping onto leaves); inner bark injection; cut stump; frill or hack & squirt (into cuts in the trunk); basal bark girdling; foliar spot

spraying with backpack sprayers or pump sprayers at low pressure or with a shield attachment to control drift, and only on windless days, or with a squeeze bottle for small infestations.

In addition to describing weed eradication and control methods, and a reporting plan for weed management during and after construction, the final Weed Management Plan shall include at least the following Best Management Practices to prevent the spread and propagation of weeds:

- Limit the extent of any vegetation and/or ground disturbance to the absolute minimum needed, and limit ingress and egress to defined routes.
- Install and maintain vehicle wash and inspection stations and closely monitor the types of materials brought onto the site.
- Reestablish vegetation on disturbed sites with native seed mixes (measures and performance standards to be consistent with Revegetation Plan, described in Condition of Certification **BIO-10)**.
- Monitoring and timely implementation of control measures to ensure early detection and eradication for weed invasions. Weed infestations must be controlled or eradicated as soon as possible upon discovery, and before they go to seed, to prevent further expansion.
- Use only weed-free straw or hay bales used for sediment barrier installations, and weed-free seed.
- Reclamation and revegetation shall occur on all temporarily disturbed areas, including, but not limited to, transmission lines, temporary access roads, construction work temporary lay-down areas, and staging areas.
- Control weeds in areas where irrigation and mirror washing take place.
- Prohibit disposal of mulch or green waste from mown weed infestations around the solar generators to prevent inadvertent introduction and spread of invasive plants beyond the immediate vicinity of the project area and possibly into rare plant populations off-site. Mulch or green waste shall be removed from the site in a covered vehicle to prevent seed dispersal, and transported to a landfill or composting facility.
- Indicate where herbicides may be used, which herbicides, and specify techniques to be used to avoid chemical drift or residual toxicity to special-status plants, consistent with guidelines provided by the Nature Conservancy's The Global Invasive Species Team (http://www.invasive.org/gist/products.html).
- Avoid herbicide use or other control methods in or around Environmentally Sensitive Areas (ESAs, see Condition of Certification **BIO-12**) on-site or off-site; prevent any herbicide drift into ESAs.

From the time construction begins and throughout the life of the project , surveying for new invasive weed populations and the monitoring of identified and treated populations shall be required within the project area and surrounding 250-foot buffer area. See also requirements for weed monitoring and treatment in the adjacent Pisgah Crater ACEC described in Condition of

Certification **BIO-12**. Surveying and monitoring for weed infestations shall occur annually. Treatment of all identified weed populations shall occur at a minimum of once annually. When no new seedlings or resprouts are observed at treated sites for three consecutive, average rainfall years, the weed infestation at that site can be considered eradicated and weed control efforts, but not annual monitoring, may cease for that impact site.

Verification: At least 30 days prior to start of any project-related ground disturbance activities, the project owner shall provide the BLM's Wildlife Biologist and the CPM with the revised Weed Management Plan. The project owner shall coordinate with the CPM and BLM's Wildlife Biologist to revise and finalize the Weed Management Plan. Any further modifications to the approved Weed Management Plan shall be made only after consultation with the CPM and BLM's Wildlife Biologist , in consultation with USFWS and CDFG. Within 30 days after completion of project construction, the project owner shall provide to the BLM's Wildlife Biologist and the CPM for review and approval, a written report identifying which items of the Weed Management Plan have been completed, a summary of all modifications to mitigation measures made during the project's construction phase, and which items are still outstanding. A summary report on weed management on the project site shall be submitted in the Annual Compliance Report during plant operations.

SPECIAL-STATUS PLANT IMPACT AVOIDANCE AND MINIMIZATION

BIO-12 This condition contains the following five sections:

- **Section A: White-margined Beardtongue Avoidance and Minimization Measures** describes measures to protect all white-margined beardtongue plants located within the project area or within 250 feet of its boundaries (including access roads, staging areas, laydown areas, parking and storage areas) from accidental and indirect impacts during construction, operation, and closure.
- **Section B: Conduct Late Season Botanical Surveys** describes guidelines for conducting summer-fall 2010 surveys to detect special-status plants that would have been missed during the spring 2010 surveys.
- **Section C: Avoidance Requirements for Special-Status Plants Detected in the Summer/Fall 2010 Surveys** outlines the level of avoidance required for plants detected during the summer-fall surveys, based on the species' rarity and status codes.
- **Section D: Off-Site Compensatory Mitigation for Special-Status Plants** describes performance standards for mitigation for a range of options for compensatory mitigation through acquisition, restoration/ enhancement, or a combination of acquisition and restoration/enhancement.
- **Section E: Conformance with BLM and San Bernardino County Plant Protection Policies** describes measures to salvage and transplant certain cactu, yucca, and other species in conformance with BLM and San Bernardino County policies.

"Project Disturbance Area" encompasses all areas to be temporarily and permanently disturbed by the Project, including the plant site, linear facilities, and areas disturbed by temporary access roads, fence installation, construction work lay-down and staging areas, parking, storage, or by any other activities resulting in disturbance to soil or vegetation.

The Project owner shall implement the following measures in Section A, B, C, D and E to avoid, minimize, and compensate for impacts to special-status plant species:

Section A: White-margined Beardtongue Avoidance and Minimization Measures

To protect all white-margined beardtongue plants located within the project area or within 250 feet of its boundaries (including access roads, staging areas, laydown areas, parking and storage areas) from accidental and indirect impacts during construction, operation, and closure, the Project owner shall implement the following measures:

1. Designated Botanist. An experienced botanist who meets the qualifications described in Section **B-2** below shall oversee compliance with all special-status plant avoidance, minimization, and compensation measures described in this condition throughout construction, operation, and closure. The Designated Botanist shall oversee and train all other Biological Monitors tasked with conducting botanical survey and monitoring work.
2. White-margined Beardtongue Impact Avoidance and Minimization Plan. The Project owner shall prepare and implement a White-margined Beardtongue Impact Avoidance and Minimization Plan and shall incorporate the Plan into the BRMIMP (**BIO-7**). The Plan shall be designed to prevent direct or indirect effects of project construction and operation to all white-margined beardtongue occurrences within the project boundary, and to any other special status plants including small-flowered androstephium located within Environmentally Sensitive Areas (defined below). The Plan shall include the following elements:
    a. Designate Environmentally Sensitive Areas (ESAs). Before construction, designate ESAs to protect all known white-margined beardtongue locations on the project site or within 250 feet of site boundaries. The locations of ESAs shall be clearly depicted on construction drawings, which shall also include all avoidance and minimization measures on the margins of the construction plans. The boundaries of the ESAs shall be provide a minimum of 250 feet buffer area between plan locations and any ground-disturbing project activity. The ESAs shall be clearly delineated in the field with permanent fencing and signs prohibiting movement of the fence under penalty of work stoppages and additional compensatory mitigation. ESAs shall also be permanently marked (with signage or other markers) to ensure that avoided plants are not inadvertently harmed during construction, operation, or closure.

b. Baseline data. Document baseline conditions, including numbers and areal extent of white-margined beardtongue and any other special-status plant occurrences within the ESAs;

c. Success criteria. Specify success standards for protection of special-status plant occurrences within the ESAs, and identify specific triggers for remedial action (e.g., numbers of plants dropping below a threshold);

d. Literature review. Describe and reference any available information about microhabitat preferences and fecundity, essential pollinators, reproductive biology, and propagation and culture requirements for white-margined beardtongue and any other special-status species within the ESAs;

e. Protection and avoidance measures. Describe measures (e.g., fencing, signage) to avoid direct and indirect construction and operation impacts to special-status plants within the ESAs; these shall include but shall not be limited to: (1) training components specific to protection of white-margined beardtongue and surrounding habitat buffer area, which shall be incorporated into the WEAP described in **BIO-6**; (2) detailed specifications for avoiding herbicide and soil stabilizer drift, and shall include a list of herbicides and soil stabilizers that may be used on the Project with manufacturer's guidance on appropriate use; the Plan shall reference the Weed Management Plan (see Condition of Certification **BIO-11**) and shall be consistent with provisions of that Plan; (3) measures to ensure that erosion and sediment control do not inadvertently impact special-status plants (e.g., by using invasive or non-native plants in seed mixes, introducing pest plants through contaminated seed or straw, etc.). Where applicable, these measures shall be incorporated in the Weed Management Plan and Storm Water Pollution Prevention Plan. Also, designate spoil areas; equipment, vehicle, and materials storage areas; parking; equipment and vehicle maintenance areas, and; wash areas at least 100 feet from boundaries of any ESAs;

f. Monitoring and Reporting Requirements. The Designated Botanist shall conduct weekly monitoring of the ESAs during any construction, operation, or decommissioning activities within 100 feet of the ESAs, and quarterly monitoring for the remainder of construction. The Project owner shall also conduct annual monitoring of the avoided occurrences on-site, and off-site occurrences that are adjacent to the Project, for the life of the Project (see Verification, below).

g. Remedial Action Measures. Specify remedial action measures to be implemented if success standards (above) are not met at any time during the life of the project;

h. Seed Collection. Over the life of the project, the project owner shall collect a small proportion of any seed produced by white-margined beardtongue plants protected on-site within ESAs. The collection technique shall follow seed collection and storage guidelines contained

in (Wall 2009a; Bainbridge 2007). Collection of seed shall be done by the Rancho Santa Ana Botanic Garden (RSABG) Conservation Program staff or other qualified seed or restoration specialist. The Project owner shall be responsible for all costs associated with seed collection and storage. All seed storage shall occur at RSABG or other qualified research institution and at least 40% of the collected seed shall remain in long-term storage at RSABG Seed Conservation Program, San Diego Natural History Museum, or other qualified seed conservation program;

i. Propagation research. The project own shall be responsible for evaluating potential white-margined beardtongue propagation and reintroduction methods for eventual implementation on-site or off-site; a portion of seed (above) shall be made available for propagation research which may at some time inform contingency propagation efforts on the project site or elsewhere; propagation experimentation shall be funded by the project owner and conducted by a qualified research institution such as Rancho Santa Ana Botanic Garden.

j. Off-site sand transport monitoring and management. The White-margined Beardtongue Impact Avoidance and Minimization Plan shall include a sand transport monitoring and management to document and manage project effects to eastward sand transport to occupied white-margined beardtongue aeolian sand habitat off-site to the east. At minimum, the plan shall include the following elements (1) quantify baseline eastward sand transport from the project area into the adjacent BLM Pisgah Crater ACEC, following methods described by Etyemesian et al. (2010); (2) specify methods and schedule for annual sand transport monitoring throughout the first five years of the project's life; (3) identification of thresholds which would trigger remediation requirements; and (4) development of adaptive management strategies to supplement eastward sand transport into the ACEC if needed. These strategies may include revisions to project fencing design, importing sand from off-site, or transporting sand across the project site for further dispersal. No sand transport remediation work would be permitted to cause new land disturbance outside the project area as analyzed in this SSA.

k. Off-site weed monitoring and management. The White-margined Beardtongue Impact Avoidance and Minimization Plan shall include methods and schedule to monitor and manage weed abundance in occupied and suitable white-margined beardtongue habitat to the east. At minimum, the plan shall (1) quantify baseline weed abundance in the portion of the ACEC adjacent BLM Pisgah Crater ACEC, adjacent to and within 500 m of the eastern project boundary, north of the BNSF railroad tracks; (2) weed abundance monitoring schedule and methods to implement throughout that area by collecting and analyzing quantitative weed abundance during every year of average or greater rainfall throughout the life of the project; (3) identify weed abundance thresholds which would trigger remediation requirements; and (4)

specify weed control methods to be implemented as needed in occupied and suitable white-margined beardtongue habitat throughout the area described above.

Section B: Conduct Late-Season Botanical Surveys

The Project owner shall conduct late-summer/fall botanical surveys for late-season special-status plants as described below:

1. Survey Timing. To the extent feasible, surveys shall be timed to detect: a) summer annuals triggered to germinate by the warm, tropical summer storms (which may occur any time between June and October), and b) fall-blooming perennials that respond to the cooler, later season storms that originate in the Pacific northwest (typically beginning in September or October). The survey dates shall be based on plant phenology and the timing of a significant storm (i.e., a 10 mm or greater rain or storm event, as measured at or within 1 mile of the Project site) if an event is recorded. Surveys for summer annuals shall be timed to occur approximately 4 to 7 weeks following a warm, tropical storm. Re-surveys shall occur as many times as necessary to ensure that surveys are conducted during the appropriate identification period for the target taxa, which may be blooms, fruit, seed characteristics, or vegetative characteristics, depending on the taxon. However, due to the undependable nature and scattered patterns of summer and early fall rainfall, it is possible that no suitable rain event will be documented in the area. Nevertheless, the project own shall be responsible for conducting late-season botanical surveys along washes and other lowland areas on-site due to the possibility that rainstorms in the Cady Mountains may go undetected, but may initiate summer or fall blooms.

2. Surveyor Qualifications and Training. Surveys shall be conducted by a qualified botanist knowledgeable in the complex biology of the local flora, and consistent with CDFG (2009) and BLM (2009) protocols. The botanical survey crew shall be prepared to mobilize quickly to conduct appropriately timed surveys. Each field botanist shall be equipped with a GPS unit and record a complete tracklog; these data shall be compiled and submitted along with the Summer-Fall Survey Botanical Report (described below). Prior to the start of surveys, all crew members shall, at a minimum, visit reference sites (where available) and/or review herbarium specimens of all BLM Sensitive plants, CNPS List 1B or 2 (Nature Serve rank S1 and S2) or proposed List 1B or 2 taxa, and any new reported or documented taxa, to obtain a search image. Because range extensions are likely to be found, the list of potentially occurring special-status plants shall include all special-status taxa known from the central portion of the Mojave Desert in California. The list shall also include taxa with bloom seasons that begin in fall and extend into the early spring as many of these are reported to be easier to detect in fall, following the start of the fall rains.

3. Survey Coverage. At a minimum, the Applicant shall conduct comprehensive surveys (i.e., 100% visual coverage) of the washes, dune swales, and

other lowlands within the project site. In the intervening uplands (e.g., bajadas and rock outcrops) surveys shall be conducted to ensure a 25% visual coverage. Other special or unique habitats associated with rare plants (such as dunes, washes, and chenopod scrubs) shall also be surveyed at 100% visual coverage. Transects shall be "intuitive controlled" (per BLM 2009b) to ensure a focus on habitat most likely to support rare plants (such as desert washes or dunes), rather than on pre-defined, evenly-spaced survey grids.

4. Documenting Occurrences. If a special-status plant is detected, the full extent of the population shall be assessed, both onsite and offsite. The number of individuals shall be counted (or sub-sampled and the population size estimated in the event of large populations). The boundaries of all occurrences shall be recorded with hand-held GPS units of one meter or better accuracy and then plotted on aerial photo base maps of a scale similar to that used in the AFC (SES 2008). All but the smallest populations (e.g., a population occupying less than 100 square feet) shall be recorded as area polygons; small populations may be recorded as point features. All GPS-recorded occurrences shall include: the number of plants, phenology, observed threats (e.g., OHV or invasive exotics), and habitat or community type. The map of occurrences submitted with the progress reports and final botanical report shall be prepared to ensure consistency with mapping protocol and definitions of occurrences in CNDDB: occurrences found within 0.25 miles of another occurrence of the same taxon, and not separated by significant habitat discontinuities, shall be combined into a single 'occurrence.' The Project Owner shall also submit the raw GPS shape files and metadata.

5. Reporting. Progress Reports shall be submitted during surveys (as described below in verification), and shall include: a) the raw GPS data and metadata; b) a spreadsheet of the data (from the 'dbf' file), and c) a map of the data showing occurrence locations (labeled with their corresponding occurrence number from the GPS files) and Project features on a USGS topographic base map.

   The Final Summer-Fall Botanical Survey Report shall be prepared consistent with CDFG guidelines (CDFG 2009), and BLM guidelines (Lund pers. comm.) and shall include the following components:

   a. the BLM designation, NatureServe Global and State Rank of each species or taxon found (or proposed rank, or CNPS List);

   b. the number or percent of the occurrence that will be directly affected, and indirectly affected by changes in drainage patterns or altered geomorphic processes;

   c. the habitat or plant community that supports the occurrence and the total acres of that habitat or community type that occurs in the Project Disturbance Area;

   d. an indication of whether the occurrence has any local or regional significance (e.g., if it exhibits any unusual morphology, occurs at the periphery of its range in California, represents a significant range

extension or disjunct occurrence, or occurs in an atypical habitat or substrate);

e. a completed CNDDB field form for every occurrence, and;

f. two maps: one that depicts the raw GPS data (as collected in the field) on a topographic base map with Project features; and a second map that follows the CNDDB protocol for occurrence mapping, which lumps two or more occurrences of the same species within one-quarter mile or less of each other into one occurrence.

Section C: Avoidance Requirements for Special-Status Plants Detected in the Summer/Fall 2010 Surveys

The Project owner shall apply the following avoidance standards to special-status plants that might be detected during late summer/fall season surveys. Avoidance and/or the mitigation measures described in Section D below would reduce impacts to special-status plant species to less than significant levels.

Mitigation for CNDDB Rank 1 Plants (Critically Imperiled) – 75% Avoidance Required: If species with a CNDDB rank of 1 are detected within the Project Disturbance Area or are otherwise directly impacted by discharges from or the diversion of streams around the Project, the Project owner shall implement avoidance measures to protect at least 75% of the local population of this species. The local population shall be measured by the number of individuals occurring on the Project site and within the immediate watershed of the project for wash-dependent species or species of unknown dispersal mechanism, or the within the local sand transport corridor for wind-dispersed species. Avoidance shall include protection of the ecosystem processes essential for maintenance of the protected plant occurrence. Isolated 'islands' of protected plants disconnected by the Project from natural fluvial or aeolian processes shall not be considered to be protected and shall not be credited as contributing to the 75% avoidance requirement because such isolated populations are not sustainable. The Project owner shall provide compensatory mitigation as described below in Section D for Project impacts to CNDDB Rank 1 plants (impacts cannot exceed 25% of the local population) that could not be avoided.

Mitigation for CNDDB Rank 2 Plants (Imperiled) – 75% Avoidance Where Feasible: If species with a CNDDB rank of 2 are detected within the Project Disturbance Area, the Project owner shall implement avoidance measures where feasible to protect 75% of the local population of this species. Avoidance is feasible if avoidance results in 10 percent or less loss of electrical output. The Project owner shall provide compensatory mitigation as described below in Section D for impacts to plants that could not be avoided.

Mitigation for CNDDB Rank 3 Plants (Vulnerable) – No On-Site

Mitigation for CNDDB Avoidance Required Unless Local or Regional Significance: If species with a CNDDB rank of 3 are detected within the Project Disturbance Area, no onsite avoidance or compensatory mitigation shall be required unless the occurrence has local or regional significance, in

which case the plant occurrence shall be treated as a CNDDB 2 ranked plant. A plant occurrence would be considered to have local or regional significance if:

a. It occurs at the outermost periphery of its range in California;

b. It occurs in an atypical habitat, region, or elevation for the taxon that suggests that the occurrence may have genetic significance (e.g., that may increase its ability to survive future threats), or;

c. It exhibits any unusual morphology that is not clearly attributable to environmental factors that may indicate a potential new variety or sub-species.

Pre-Construction Notification for State- or Federal-Listed Species, or BLM Sensitive Species. If a state or federal-listed species or BLM Sensitive species is detected, the Project owner shall immediately notify the CDFG, USFWS, BLM, and the CPM.

Preservation of the Germplasm of Affected Special-Status Plants. For all significant impacts to special-status plants, regardless of whether compensatory mitigation is required, mitigation shall include seed collection from the affected special-status plants on-site prior to construction to conserve the germplasm and provide a seed source for restoration efforts. The seed shall be collected under the supervision or guidance of a reputable seed storage facility such as the Rancho Santa Ana Botanical Garden Seed Conservation Program, San Diego Natural History Museum, or the Missouri Botanical Garden. The costs associated with the long-term storage of the seed shall be the responsibility of the Project owner. Any efforts to propagate and reintroduce special-status plants from seeds in the wild shall be carried out under the direct supervision of specialists such as those listed above and as part of a Habitat Restoration/Enhancement Plan approved by the CPM.

Section D: Off-Site Compensatory Mitigation for Special-Status Plants

Where compensatory mitigation is required under the terms of Section C, above, the Project owner shall mitigate Project impacts to special-status plant occurrences with compensatory mitigation. Compensatory mitigation shall consist of acquisition of habitat supporting the target species, restoration/ enhancement of populations of the target species, or a combination of acquisition and restoration/enhancement as provided within this Condition. Compensatory mitigation shall be at a 3:1 ratio, with three acres of habitat acquired or restored/enhanced for every acre of special-status plant habitat disturbed by the Project Disturbance Area. The Project owner shall provide funding for the acquisition and/or restoration/enhancement, initial improvement, and long-term maintenance and management of the acquired or restored lands. The actual costs to comply with this condition will vary depending on the Project Disturbance Area, the actual costs of acquiring compensation habitat, the actual costs of initially improving the habitat, the actual costs of long-term management as determined by a Property Analysis Record (PAR) report, and other transactional costs related to the use of compensatory mitigation.

The Project owner shall comply with other related requirements in this condition:

I. Compensatory Mitigation by Acquisition: The requirements for the acquisition, initial protection and habitat improvement, and long-term maintenance and management of special-status plant compensation lands include all of the following:

Selection Criteria for Acquisition Lands. The compensation lands selected for acquisition may include any of the following three categories:

1. Occupied Habitat, No Habitat Threats: The compensation lands selected for acquisition shall be occupied by the target plant population and shall be characterized by site integrity and habitat quality that are required to support the target species, and shall be of equal or better habitat quality than that of the affected occurrence. The occurrence of the target special-status plant on the proposed acquisition lands should be viable, stable or increasing (in size and reproduction).
2. Occupied Habitat, Habitat Threats. Occupied compensation lands characterized by habitat threats may also be acquired as long as the population could be reasonably expected to recover with minor restoration (e.g., OHV or grazing exclusion, pest plant removal) and is accompanied by a Habitat Enhancement/Restoration Plan as described in Section D.II, below.
3. Unoccupied but Adjacent. The Project owner may also acquire habitat for which occupancy by the target species has not been documented, if the proposed acquisition lands are adjacent to occupied habitat. The Project owner shall provide evidence that acquisitions of such unoccupied lands would improve the defensibility and long-term sustainability of the occupied habitat by providing a protective buffer around the occurrence and by enhancing connectivity with undisturbed habitat.

Review and Approval of Compensation Lands Prior to Acquisition. The Project owner shall submit a formal acquisition proposal to the CPM describing the parcel(s) intended for purchase. This acquisition proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for special-status plants in relation to the criteria listed above, and must be approved by the CPM.

Management Plan. The Project owner or approved third party shall prepare a management plan for the compensation lands in consultation with the entity that will be managing the lands. The goal of the management plan shall be to support and enhance the long-term viability of the target special-status plant occurrences. The Management Plan shall be submitted for review and approval to the CPM.

Integrating Special-Status Plant Mitigation with Other Mitigation lands. If all or any portion of the acquired Desert Tortoise, Waters of the State, or other required compensation lands meets the criteria above for special-status plant compensation lands, the portion of the other species' or habitat compensation

lands that meets any of the criteria above may be used to fulfill that portion of the obligation for special-status plant mitigation.

Compensation Lands Acquisition Requirements. The Project owner shall comply with the following requirements relating to acquisition of the compensation lands after the CPM, has approved the proposed compensation lands:

a. Preliminary Report. The Project owner, or an approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary or requested documents for the proposed compensation land to the CPM. All documents conveying or conserving compensation lands and all conditions of title are subject to review and approval by the CPM. For conveyances to the State, approval may also be required from the California Department of General Services, the Fish and Game Commission and the Wildlife Conservation Board.

b. Title/Conveyance. The Project owner shall acquire and transfer fee title to the compensation lands, a conservation easement over the lands, or both fee title and conservation easement, as required by the CPM. Any transfer of a conservation easement or fee title must be to CDFG, a non-profit organization qualified to hold title to and manage compensation lands (pursuant to California Government Code section 65965), or to BLM or other public agency approved by the CPM. If an approved non-profit organization holds fee title to the compensation lands, a conservation easement shall be recorded in favor of CDFG or another entity approved by the CPM. If an entity other than CDFG holds a conservation easement over the compensation lands, the CPM may require that CDFG or another entity approved by the CPM, in consultation with CDFG, be named a third party beneficiary of the conservation easement. The Project owner shall obtain approval of the CPM of the terms of any transfer of fee title or conservation easement to the compensation lands.

c. Initial Protection and Habitat Improvement. The Project owner shall fund activities that the CPM requires for the initial protection and habitat improvement of the compensation lands. These activities will vary depending on the condition and location of the land acquired, but may include trash removal, construction and repair of fences, invasive plant removal, and similar measures to protect habitat and improve habitat quality on the compensation lands. The costs of these activities are estimated to be $750 per acre ($250 per acre, using the estimated cost per acre for Desert Tortoise mitigation as a best available proxy, at a 3:1 ratio, but actual costs will vary depending on the measures that are required for the compensation lands). A non-profit organization, CDFG or another public agency may hold and expend the habitat improvement funds if it is qualified to manage the compensation lands (pursuant to California Government Code section 65965), if it meets the approval of the CPM in consultation with CDFG, and if it is authorized to participate in implementing the required activities on the compensation lands. If CDFG takes fee title to the compensation lands, the habitat improvement fund must be paid to CDFG or its designee.

d. Property Analysis Record. Upon identification of the compensation lands, the Project owner shall conduct a Property Analysis Record (PAR) or PAR-like analysis to establish the appropriate amount of the long-term maintenance and management fund to pay the in-perpetuity management of the compensation lands. The PAR or PAR-like analysis must be approved by the CPM before it can be used to establish funding levels or management activities for the compensation lands.

e. Long-term Maintenance and Management Funding. The Project owner shall provide money to establish an account with non-wasting capital that will be used to fund the long-term maintenance and management of the compensation lands. The amount of money to be paid will be determined through an approved PAR or PAR-like analysis conducted for the compensation lands. Until an approved PAR or PAR-like analysis is conducted for the compensation lands, the amount of required funding is initially estimated to be $4,350 for every acre of compensation lands, using as the best available proxy the estimated cost of $1,450 per acre for Desert Tortoise compensatory mitigation, at a 3:1 ratio. If compensation lands will not be identified and a PAR or PAR-like analysis completed within the time period specified for this payment (see the verification section at the end of this condition), the Project owner shall either: (i) provide initial payment equal to the amount of $4,350 multiplied by the number of acres the Project owner proposes to acquire for compensatory mitigation; or (ii) provide security to the Energy Commission under subsection (g), "Mitigation Security," below, in an amount equal to $4,350 multiplied by the number of acres the Project owner proposes to acquire for compensatory mitigation. The amount of the required initial payment or security for this item shall be adjusted for any change in the Project Disturbance Area as described above. If an initial payment is made based on the estimated per-acre costs, the Project owner shall deposit additional money as may be needed to provide the full amount of long-term maintenance and management funding indicated by a PAR or PAR-like analysis, once the analysis is completed and approved. If the approved analysis indicates less than $4,350 per acquired acre (at a 3:1 ratio) will be required for long-term maintenance and management, the excess paid will be returned to the Project owner. The Project owner must obtain the CPM's approval of the entity that will receive and hold the long-term maintenance and management fund for the compensation lands. The CPM will consult with CDFG before deciding whether to approve an entity to hold the Project's long-term maintenance and management funds.

The Project owner shall ensure that an agreement is in place with the long-term maintenance and management fund holder/manager to ensure the following requirements are met:

i. Interest. Interest generated from the initial capital long-term maintenance and management fund shall be available for reinvestment into the principal and for the long-term operation, management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to

carrying capacity, law enforcement measures, and any other action that is approved by the CPM and is designed to protect or improve the habitat values of the compensation lands.

ii. Withdrawal of Principal. The long-term maintenance and management fund principal shall not be drawn upon unless such withdrawal is deemed necessary by the CPM or by the approved third-party long-term maintenance and management fund manager, to ensure the continued viability of the species on the compensation lands.

iii. Pooling Long-Term Maintenance and Management Funds. An entity approved to hold long-term maintenance and management funds for the Project may pool those funds with similar non-wasting funds that it holds from other projects for long-term maintenance and management of compensation lands for special-status plants. However, for reporting purposes, the long-term maintenance and management funds for this Project must be tracked and reported individually to the CPM.

f. Other Expenses. In addition to the costs listed above, the Project owner shall be responsible for all other costs related to acquisition of compensation lands and conservation easements, including but not limited to the title and document review costs incurred from other state agency reviews, overhead related to providing compensation lands to CDFG or an approved third party, escrow fees or costs, environmental contaminants clearance, and other site cleanup measures.

g. Mitigation Security. The Project owner shall provide financial assurances to the CPM to guarantee that an adequate level of funding is available to implement any of the mitigation measures required by this condition that are not completed prior to the start of ground-disturbing Project activities. Financial assurances shall be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security") approved by the CPM. The amount of the Security shall be $10,503 per acre ($3,501 per acre, using the estimated cost per acre for Desert Tortoise mitigation as a best available proxy, at a 3:1 ratio; see **Biological Resources Tables 5** and **7**) for every acre of habitat supporting the target special-status plant species which is significantly impacted by the project. The actual costs to comply with this condition will vary depending on the actual costs of acquiring compensation habitat, the costs of initially improving the habitat, and the actual costs of long-term management as determined by a PAR report. Prior to submitting the Security to the CPM, the Project owner shall obtain the CPM's approval of the form of the Security. The CPM may draw on the Security if the CPM determines the Project owner has failed to comply with the requirements specified in this condition. The CPM may use money from the Security solely for implementation of the requirements of this condition. The CPM's use of the Security to implement measures in this condition may not fully satisfy the Project owner's obligations under this condition, and the Project owner remains responsible for satisfying the obligations under this condition if the Security is insufficient. The unused Security shall be

returned to the Project owner in whole or in part upon successful completion of the associated requirements in this condition.

h. The Project owner may elect to comply with the requirements in this condition for acquisition of compensation lands, initial protection and habitat improvement on the compensation lands, or long-term maintenance and management of the compensation lands by funding, or any combination of these three requirements, by providing funds to implement those measures into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF). To use this option, the Project owner must make an initial deposit to the REAT Account in an amount equal to the estimated costs (as set forth in the Security section of this condition) of implementing the requirement. If the actual cost of the acquisition, initial protection and habitat improvements, or long-term funding is more than the estimated amount initially paid by the Project owner, the Project owner shall make an additional deposit into the REAT Account sufficient to cover the actual acquisition costs, the actual costs of initial protection and habitat improvement on the compensation lands, and the long-term funding requirements as established in an approved PAR or PAR-like analysis. If those actual costs or PAR projections are less than the amount initially transferred by the applicant, the remaining balance shall be returned to the Project owner.

i. The responsibility for acquisition of compensation lands may be delegated to a third party other than NFWF, such as a non-governmental organization supportive of desert habitat conservation, by written agreement of the Energy Commission. Such delegation shall be subject to approval by the CPM, in consultation with CDFG, BLM and USFWS, prior to land acquisition, enhancement or management activities. Agreements to delegate land acquisition to an approved third party, or to manage compensation lands, shall be executed and implemented within 18 months of the Energy Commission's certification of the Project.

II. Compensatory Mitigation by Habitat Enhancement/Restoration: As an alternative or adjunct to land acquisition for compensatory mitigation the Project owner may undertake habitat enhancement or restoration for the target special-status plant species. Habitat enhancement or restoration activities must achieve protection at a 3:1 ratio, with improvements applied to three acres of habitat for every acre special-status plant habitat directly or indirectly disturbed by the Project Disturbance Area. Examples of suitable enhancement projects include but are not limited to the following: i) control unauthorized vehicle use into an occurrence (or pedestrian use if clearly damaging to the species); ii) control noxious weeds that infest or pose an immediate threat to an occurrence; iii) exclude grazing by wild burros or livestock from an occurrence; or iv) restore lost or degraded hydrologic or geomorphic functions critical to the species by restoring previously diverted flows, removing obstructions to the wind sand transport corridor above an occurrence, or increasing groundwater availability for dependent species.

If the Project owner elects to undertake a habitat enhancement project for mitigation, the project must meet the following performance standards: The proposed enhancement project shall achieve rescue of an off-site occurrence that is currently assessed, based on the NatureServe threat ranking system (Master et al. 2009; Morse et al. 2004) with one of the following threat ranks: a) long-term decline >30%; b) an immediate threat that affects >30% of the population, or c) has an overall threat impact that is High to Very High. "Rescue" would be considered successful if it achieves an improvement in the occurrence trend to "stable" or "increasing" status, or downgrading of the overall threat rank to slight or low (from "High" to "Very High").

If the Project owner elects to undertake a habitat enhancement project for mitigation, they shall submit a Habitat Enhancement/Restoration Plan to the CPM for review and approval, and shall provide sufficient funding for implementation and monitoring of the Plan. The amount of the Security shall be $10,503 per acre ($3,501 per acre, using the estimated cost per acre for Desert Tortoise mitigation as a best available proxy, at a 3:1 ratio) for every acre of habitat supporting the target special-status plant species which is directly or indirectly impacted by the project. The amount of the security may be adjusted based on the actual costs of implementing the enhancement, restoration and monitoring. The implementation and monitoring of the enhancement/restoration may be undertaken by an appropriate third party such as NFWF, subject to approval by the CPM. The Habitat Enhancement/Restoration Plan shall include each of the following:

1. Goals and Objectives. Define the goals of the restoration or enhancement project and a measurable course of action developed to achieve those goals. The objective of the proposed habitat enhancement plan shall include restoration of a target special-status plant occurrence that is currently threatened with a long-term decline. The proposed enhancement plan shall achieve an improvement in the occurrence trend to "stable" or "increasing" status, or downgrading of the overall threat rank to slight or low (from "High" to "Very High").
2. Historical Conditions. Provide a description of the pre-impact or historical conditions (before the site was degraded by weeds or grazing or ORV, etc.), and the desired conditions.
3. Site Characteristics. Describe other site characteristics relevant to the restoration or enhancement project (e.g., composition of native and pest plants, topography and drainage patterns, soil types, geomorphic and hydrologic processes important to the site or species.
4. Ecological Factors. Describe other important ecological factors of the species being protected, restored, or enhanced such as total population, reproduction, distribution, pollinators, etc.
5. Methods. Describe the restoration methods that will be used (e.g., invasive exotics control, site protection, seedling protection, propagation techniques, etc.) and the long-term maintenance required. The implementation phase of the enhancement must be completed within five years.

6. Budget. Provide a detailed budget and time-line, develop clear, measurable, objective-driven annual success criteria.
7. Monitoring. Develop clear, measurable monitoring methods that can be used to evaluate the effectiveness of the restoration and the benefit to the affected species. The Plan shall include a minimum of five years of quarterly monitoring, and then annual monitoring for the remainder of the enhancement project, and until the performance standards for rescue of a threatened occurrence are met. At a minimum the progress reports shall include: quantitative measurements of the projects progress in meeting the enhancement project success criteria, detailed description of remedial actions taken or proposed, and contact information for the responsible parties.
8. Reporting Program. The Plan shall ensure accountability with a reporting program that includes progress toward goals and success criteria. Include names of responsible parties.
9. Contingency Plan. Describe the contingency plan for failure to meet annual goals.
10. Long-term Protection. Include proof of long-term protection for the restoration site. For private lands this would include conservations easements or other deed restrictions; projects on public lands must be contained in a Desert Wildlife Management Area, Wildlife Habitat Management Area, or other land use protections that will protect the mitigation site and target species.

Section E: Conformance with BLM and San Bernardino County Plant Protection Policies

It is BLM policy to salvage yucca and cactus plants (excluding cholla species, genus *Cylindropuntia*) and transplant them to undisturbed sites within project Rights of Way. The San Bernardino County Plant Protection and Management Ordinance regulates the following where they occur on non-government land (San Bernardino County Code 88.01): desert native plants with stems 2 inches or greater in diameter or 6 feet or greater in height: *Psorothamnus* [*Dalea*] *spinosa* (smoke tree), *Prosopis* spp. (mesquites), all species of the family Agavaceae (century plants, nolinas, yuccas), creosote rings 10 feet or greater in diameter, all Joshua trees; and any part of any of the following species, whether living or dead: *Olneya tesota* (desert ironwood), all species of the genus *Prosopis* (mesquites), and all species of the genus *Cercidium* (palo verdes). Staff recognizes that the project site is on public land and thus not strictly subject to the County ordinance. However, staff notes that the proposed project would convert the site to exclusive private use and is, in effect, a private project. Staff recommends conformance with County standards, as follows:

a. The project owner shall inventory all plants subject to BLM and County policies on the project site that would be removed or damaged by proposed project construction.

b. The project owner shall prepare a Protected Plant Salvage Plan in conformance with BLM and San Bernardino County standards for review and approval by the CPM. The plan shall include detailed descriptions of proposed methods to salvage plants; transport them; store them temporarily (as needed); maintain them in temporary storage (i.e., irrigation, shade protection, etc.); proposed transplantation locations and methods for permanent relocation; proposed irrigation and maintenance methods at transplantation sites; and a monitoring plan to verify survivorship and establishment of translocated plants for a minimum of five years.

c. Prior to initiating any ground-disturbing activities on the project site, the project owner shall implement the Protected Plant Replacement measures as approved by the CPM, BLM's State Botanist, and the County.

Verification: The Special-Status Plant Impact Avoidance and Minimization Measures shall be incorporated into the BRMIMP as required under Condition of Certification **BIO-7**.

Implementation of the special-status plant impact avoidance and minimization measures shall be reported in the Monthly Compliance Reports prepared by the Designated Botanist. Within 30 days after completion of Project construction, the Project owner shall provide to the CPM, for review and approval in consultation with the BLM State Botanist, a written construction termination report identifying how measures have been completed.

The Project owner shall submit a monitoring report every year for the life of the project to monitor effectiveness of protection measures for all avoided special-status plants to the CPM and BLM State Botanist. The monitoring report shall include: dates of worker awareness training sessions and attendees, an inventory of the special-status plant occurrences and description of the habitat conditions, an indication of population and habitat quality trends, and description of the remedial action, if warranted and planned for the upcoming year.

Section A. No less than 30 days prior to the start of ground-disturbing activities the Project owner shall submit grading plans and construction drawings depicting the location of Environmentally Sensitive Areas and the Avoidance and Minimization Measures contained in Section A of this Condition. The project owner shall coordinate with the CPM and BLM's Wildlife Biologist to revise and finalize boundaries of the ESAs.

No less than 30 days prior to the start of ground-disturbing activities the Project owner shall submit to the CPM for review and approval, in consultation with the BLM State Botanist, the name and resume of the project's Designated Botanist. If a Designated Botanist needs to be replaced, the specified information of the proposed replacement must be submitted to BLM's Wildlife Biologist and the CPM as soon as possible prior to the termination or release of the Designated Biologist. In an emergency, the project owner shall immediately notify the BLM's Wildlife Biologist and the CPM to discuss the qualifications and approval of a short-term replacement while a permanent Designated Botanist is proposed to BLM's Wildlife Biologist and the CPM and for consideration.

No less than 30 days prior to ground-disturbing activities the Project owner shall submit a draft White-margined Beardtongue Impact Avoidance and Minimization Plan to the CPM for review and approval, in consultation with the BLM State Botanist. Implementation of the white-margined beardtongue impact avoidance and minimization measures shall be reported in the Monthly Compliance Reports prepared by the Designated Botanist. Within 30 days after completion of Project construction, the Project owner shall provide to the CPM, for review and approval in consultation with the BLM State Botanist, a written construction termination report identifying how measures have been completed.

The Project owner shall submit a monitoring report every year for the life of the project to monitor effectiveness of protection measures for all avoided white-margined beardtongue ESAs to the CPM and BLM State Botanist. The monitoring report shall include: dates of worker awareness training sessions and attendees, an inventory of the special-status plant occurrences and description of the habitat conditions, an indication of population and habitat quality trends, and description of the remedial action, if warranted and planned for the upcoming year. The project owner shall coordinate with the CPM and BLM's Wildlife Biologist to revise and finalize monitoring reports and all reports described in this section, and shall specifically report any difficulties in meeting the protection goals and cooperatively develop adaptive measures as needed.

Section B. Raw GPS data, metadata, and CNDDB field forms shall be submitted to the CPM within two weeks of the completion of each survey. A preliminary summary of results for the late summer/fall botanical surveys shall also be submitted to the CPM and BLM's State Botanist within two weeks following the completion of the surveys. If surveys are split into more than one period, then a summary letter shall be submitted following each survey period. The Final Summer-Fall Botanical Survey Report, GIS shape files and metadata shall be submitted to the BLM State Botanist and the CPM no less than 30 days prior to the start of ground-disturbing activities. The Final Report shall include a detailed accounting of the acreage of Project impacts to special-status plant occurrences.

Section C. The Project owner shall immediately provide written notification to the CPM, CDFG, USFWS, and BLM if it detects a State- or Federal-Listed Species, or BLM Sensitive Species at any time during its late summer/fall botanical surveys or at any time thereafter through the life of the Project, including conclusion of Project decommissioning.

Prior to construction, the project owner shall provide verification that seed of any special status plants on the project site have collected and conveyed to a facility (as described in this measure) and that suitable long-term funding has been provided by the project owner.

Section D. If compensatory mitigation is required, no less than 30 days prior to the start of ground-disturbing activities, the Project owner shall submit to the CPM Security adequate to acquire compensatory mitigation lands and/or undertake habitat enhancement or restoration activities, as described in this condition.

No fewer than 90 days prior to acquisition of compensatory mitigation lands, the Project owner shall submit a formal acquisition proposal and draft Management Plan for the proposed lands to the CPM, with copies to CDFG, USFWS, and BLM, describing the parcels intended for purchase and shall obtain approval from the CPM prior to the acquisition. No fewer than 90 days prior to acquisition of compensatory mitigation lands, the Project owner shall submit to the CPM and obtain CPM approval of any agreements to delegate land acquisition to an approved third party, or to manage compensation lands; such agreement shall be executed and implemented within 18 months of the Energy Commission's certification of the Project.

The Project owner or an approved third party shall complete the acquisition and all required transfers of the compensation lands, and provide written verification to the CPM of such completion no later than 18 months after the start of Project ground-disturbing activities. If NFWF or another approved third party is being used for the acquisition, the Project owner shall ensure that funds needed to accomplish the acquisition are transferred in timely manner to facilitate the planned acquisition and to ensure the land can be acquired and transferred prior to the 18-month deadline. If habitat enhancement is proposed, no later than six months following the start of ground-disturbing activities, the Project owner shall obtain CPM approval of the final Habitat Enhancement/Restoration Plan, prepared in accordance with Section D, and submit to the CPM or a third party approved by the CPM Security adequate for long-term implementation and monitoring of the Habitat Enhancement/Restoration Plan.

Enhancement/restoration activities shall be initiated no later than 12 months from the start of construction. The implementation phase of the enhancement project shall be completed within five years of initiation. Until completion of the five-year implementation portion of the enhancement action, a report shall be prepared and submitted as part of the Annual Compliance Report. This report shall provide, at a minimum: a summary of activities for the preceding year and a summary of activities for the following year; quantitative measurements of the Project's progress in meeting the enhancement project success criteria; detailed description of remedial actions taken or proposed; and contact information for the responsible parties.

Within 18 months of ground-disturbing activities, the Project owner shall transfer to the CPM or an approved third party the difference between the Security paid and the actual costs of (1) acquiring compensatory mitigation lands, completing initial protection and habitat improvement , and funding the long-term maintenance and management of compensatory mitigation lands; and/or (2) implementing and providing for the long-term protection and monitoring of habitat enhancement or restoration activities.

Section E. No more than 90 days following the publication of the Energy Commission Decision the project owner shall submit draft versions of the Protected Plant Salvage measures for review by the CPM. The project owner shall also provide a cost estimate for implementation of the measures which shall be subject to approval by the CPM. The final measures shall be submitted for approval by the CPM within 90 days of the publication of the Commission Decision. The final measures shall be incorporated into the BRMIMP. At this time, the project owner shall also provide security sufficient to fund the implementation of the measures.

Throughout project construction, or at any phase during the project when plants covered in Section E of this Condition are to be salvaged, the Designated Biologist or Designated Botanist shall submit quarterly and annual compliance reports to the CPM, BLM wildlife biologist, , and CDFG describing all project activities pertinent to the Protected Plant Salvage measures. Compliance reports shall include summaries of written and photographic records of the plan implementation described above. Upon completion of all plant salvage and replacement, compliance reports shall be submitted annually for a period not less than 5 years to document irrigation, maintenance, and monitoring results, including plant survival. The Designated Biologist shall maintain written and photographic records of the tasks described above, and make these records available to the CPM, County, BLM State Botanist, and CDFG upon request. The project owner shall coordinate with the CPM and BLM's Wildlife Biologist to revise and finalize all plans and reports named in this section.

MOJAVE FRINGE-TOED LIZARD MITIGATION

BIO-13 The project owner shall provide compensatory land to mitigate for habitat loss and direct impacts to Mojave fringe-toed lizards based on revised estimates of suitable Mojave fringe-toed lizard habitat on-site, to be verified by an expert in this animal's ecology. The project owner shall provide compensatory mitigation at a 3:1 ratio for impacts to breeding habitat (i.e., dune, sand ramp, or fine-sandy wash habitat), and at a 1:1 ratio for impacts to adjacent suitable foraging and cover habitat, such as thin aeolian sand overlying bajada surfaces, or foraging habitat surrounding the breeding habitat. Staff estimates breeding habitat on site as 21.4 acres, and surrounding suitable foraging and cover habitat (i.e., 45 meter buffer) as 143.3 acres. Therefore, staff anticipates this condition would require the acquisition and dedication in perpetuity of at a minimum 207.5 acres of habitat. The project owner shall provide funding for the acquisition, initial habitat improvements, and long-term management of the compensation lands, as described below.

Biological Resources Table 17
Mojave Fringe-toed Lizard Compensation Acreage Summary

Habitat Function	Project Impact Acreage	Mitigation Ratio	Compensation Acreage
Foraging and cover	143.3 acres	1:1	143.3 acres
Breeding	21.4 acres	3:1	64.2 acres
Total	164.7 acres		207.5 acres

To more accurately assess the extent of breeding habitat and adjacent foraging and cover habitat on the Project site, the Project owner shall provide a delineation of habitat for Mojave fringe-toed lizards to the CPM. The delineation shall be prepared by an expert on the species' ecology, whose qualifications have been approved by the CPM,

This compensation acreage may be included ("nested") within the acreage acquired and managed as desert tortoise habitat compensation (Condition of Certification **BIO-17**) only if:

- Adequate acreage of qualifying desert tortoise compensation lands also meet the Selection Criteria (below) as habitat for Mojave fringe-toed lizard;
- The desert tortoise habitat compensation lands are acquired and dedicated as permanent conservation lands within 18 months of the start of project construction.

If these two criteria are not met, then the project owner shall provide the required number of acres of Mojave fringe-toed lizard habitat compensation lands, adjusted to reflect the final project footprint and additional delineation of suitable habitat, independent of any compensation land required under other conditions of certification, and shall also provide funding for the initial improvement and long-term maintenance and management of the acquired lands, and shall comply with other related requirements this condition. Costs of these requirements are estimated to be $725,416.25 based on the acquisition of 207.5 acres (see **Biological Resources Tables 5** and **6** for a complete breakdown of estimated costs).

In lieu of acquiring lands itself, the Project owner may satisfy the requirements of this condition by providing funds for the acquisition to the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF), as described in Section 3.i., below. Funding through the NFWF would require additional administrative costs estimated at $15,744.99, bringing the total required deposit to $741,161.24. See **Biological Resources Table 6**, above. If the Project owner elects to use the REAT Account with NFWF, the Project owner will be responsible for providing sufficient funds to cover actual acquisition costs and fees, even if those costs exceed the estimates in this condition, and will also need to pay NFWF fees to establish and manage the project-specific account for the land transfer and management.

The actual costs to comply with this condition will vary depending on the final footprint of the Project, the number of acres of Mojave fringe-toed lizard breeding and forging or cover habitat identified in the final delineation of suitable habitat, the actual costs of acquiring compensation habitat, the costs of initially improving the habitat, and the actual costs of long-term management as determined by a Property Analysis Report (PAR, 3. d., below). Regardless of actual cost, the project owner shall be responsible for implementing all aspects of this condition.

The requirements for the acquisition, initial improvement, protection, and long term management of the compensation lands shall include the following:

1. <u>Selection Criteria for Compensation Lands</u>. The compensation lands selected for acquisition to meet Energy Commission requirements shall:
    a. Be sand dune or partially stabilized sand dune habitat with potential to contribute to Mojave fringe-toed lizard habitat connectivity and build linkages between known populations of Mojave fringe-toed lizards and preserve lands with suitable habitat;
    b. Be biologically contiguous to lands currently occupied by Mojave fringe-toed lizard;

c. Be near larger blocks of lands that are either already protected or planned for protection, or which could feasibly be protected long-term by a public resource agency or a non-governmental organization dedicated to habitat preservation;

d. Provide quality habitat for Mojave fringe-toed lizard, that has the capacity to regenerate naturally when disturbances are removed;

e. Not have a history of intensive recreational use or other disturbance that might make habitat recovery and restoration infeasible;

f. Not be characterized by high densities of invasive species, either on or immediately adjacent to the parcels under consideration, that might jeopardize habitat recovery and restoration;

g. Not contain hazardous wastes;

h. Have water and mineral rights included as part of the acquisition, unless the CPM, in consultation with CDFG, BLM and USFWS, agrees in writing to the acceptability of land without these rights; and

i. Be on land for which long-term habitat management for Mojave fringe-toed lizard and other native biological resources is feasible.

2. Review and Approval of Compensation Lands Prior to Acquisition. The project owner shall submit a formal acquisition proposal to the CPM describing the parcel(s) intended for purchase. This acquisition proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for Mojave fringe-toed lizard in relation to the criteria listed above and must be approved by the CPM. The CPM will share the proposal with and consult with CDFG, BLM, and the USFWS before deciding whether to approve or disapprove the proposed acquisition.

3. Compensation Lands Acquisition Conditions: The project owner shall comply with the following conditions relating to acquisition of the compensation lands after the CPM, in consultation with CDFG, BLM and the USFWS, have approved the proposed compensation lands:

   a. Preliminary Report: The Project owner, or approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary or requested documents for the proposed compensation land to the CPM. All documents conveying or conserving compensation lands and all conditions of title are subject to review and approval by the CPM, in consultation with CDFG, BLM and the USFWS. For conveyances to the State, approval may also be required from the California Department of General Services, the Fish and Game Commission and the Wildlife Conservation Board.

   b. Title/Conveyance: The Project owner shall acquire and transfer fee title to the compensation lands, a conservation easement over the lands, or both fee title and conservation easement as required by the CPM in consultation with CDFG. Any transfer of a conservation easement or fee title must be to CDFG, a non-profit organization qualified to hold

title to and manage compensation lands (pursuant to California Government Code section 65965), or to BLM or other public agency approved by the CPM in consultation with CDFG. If an approved non-profit organization holds fee title to the compensation lands, a conservation easement shall be recorded in favor of CDFG or another entity approved by the CPM. If an approved non-profit holds a conservation easement, CDFG shall be named a third party beneficiary. If an entity other than CDFG holds a conservation easement over the compensation lands, the CPM may require that CDFG or another entity approved by the CPM, in consultation with CDFG, be named a third party beneficiary of the conservation easement. The Project owner shall obtain approval of the CPM, in consultation with CDFG, of the terms of any transfer of fee title or conservation easement to the compensation lands.

c. Initial Habitat Improvement Fund. The Project owner shall fund activities that the CPM, in consultation with the CDFG, USFWS and BLM, requires for the initial protection and habitat improvement of the compensation lands. These activities will vary depending on the condition and location of the land acquired, but may include trash removal, construction and repair of fences, invasive plant removal, and similar measures to protect habitat and improve habitat quality on the compensation lands. The costs of these activities are estimated at $250 an acre, but will vary depending on the measures that are required for the compensation lands. A non-profit organization, CDFG or another public agency may hold and expend the habitat improvement funds if it is qualified to manage the compensation lands (pursuant to California Government Code section 65965), if it meets the approval of the CPM in consultation with CDFG, and if it is authorized to participate in implementing the required activities on the compensation lands. If CDFG takes fee title to the compensation lands, the habitat improvement fund must be paid to CDFG or its designee.

d. Property Analysis Record. Upon identification of the compensation lands, the Project owner shall conduct a Property Analysis Record (PAR) or PAR-like analysis to establish the appropriate amount of the long-term maintenance and management fund to pay the in-perpetuity management of the compensation lands. The PAR or PAR-like analysis must be approved by the CPM, in consultation with CDFG, before it can be used to establish funding levels or management activities for the compensation lands.

e. Long-Term Maintenance and Management Funding. The Project owner shall provide money to establish an account with a non-wasting capital that will be used to fund the long-term maintenance and management of the compensation lands. The amount of money to be paid will be determined through an approved PAR or PAR-like analysis conducted for the compensation lands. The amount of required funding is initially estimated to be $1,450 for every acre of compensation lands.

If compensation lands will not be identified and a PAR or PAR-like analysis completed within the time period specified for this payment (see the verification section at the end of this condition), the project owner shall provide initial payment of $1,450 an acre for the acres identified in the verified and approved delineation of habitat required by this condition, or if the delineation is not completed, shall provide $300,875 calculated at $1,450 an acre for 207.5 acres or as an alternative to initial payment of funds for long-term maintenance and management, the project owner shall include an amount equal to this initial payment in the security that is provided to the Energy Commission under section 3.h. of this condition. The amount of the required initial payment or security for this item shall be adjusted for any change in the Project footprint as described above. If an initial payment is made based on the estimated per-acre costs, the project owner shall deposit additional money as may be needed to provide the full amount of long-term maintenance and management funding indicated by a PAR or PAR-like analysis, once the analysis is completed and approved. If the approved analysis indicates less than $1,450 an acre will be required for long-term maintenance and management, the excess paid will be returned to the Project owner. The project owner must obtain the CPM's approval of the entity that will receive and hold the long-term maintenance and management fund for the compensation lands. The CPM will consult with CDFG before deciding whether to approve an entity to hold the project's long-term maintenance and management funds. The CPM, in consultation with CDFG, may designate another non-profit organization to hold the long-term maintenance and management fee if the organization is qualified to manage the compensation lands in perpetuity. If CDFG takes fee title to the compensation lands, CDFG shall determine whether it will hold the long-term management fee in the special deposit fund, leave the money in the REAT Account, or designate another entity to manage the long-term maintenance and management fee for CDFG and with CDFG supervision.

The Project owner shall ensure that an agreement is in place with the long-term maintenance and management fee holder/manager to ensure the following conditions:

i. Interest. Interest generated from the initial capital shall be available for reinvestment into the principal and for the long-term operation, management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action designed to protect or improve the habitat values of the compensation lands.

ii. Withdrawal of Principal. The long-term maintenance and management fee principal shall not be drawn upon unless such withdrawal is deemed necessary by the CPM, in consultation with CDFG, or the approved third-party long-term maintenance and

management fee manager to ensure the continued viability of the species on the compensation lands. If CDFG takes fee title to the compensation lands, monies received by CDFG pursuant to this provision shall be deposited in a special deposit fund established solely for the purpose to manage lands in perpetuity unless CDFG designates NFWF or another entity to manage the long-term maintenance and management fee for CDFG.

iii. Pooling Funds. A CPM-approved non-profit organization qualified to hold long-term maintenance and management fees solely for the purpose to manage lands in perpetuity, may pool the fund with other funds for the operation, management, and protection of the compensation lands for local populations of desert tortoise. However, for reporting purposes, the long-term maintenance and management fee fund must be tracked and reported individually to the CPM.

iv. Reimbursement Fund. The project owner shall provide reimbursement to CDFG or an approved third party for reasonable expenses incurred during title, easement, and documentation review; expenses incurred from other State or State-approved federal agency reviews; and overhead related to providing compensation lands.

f. Other expenses. In addition to the costs listed above, the Project owner shall be responsible for all other costs related to acquisition of compensation lands and conservation easements, including but not limited to title and document review costs, expenses incurred from other state agency reviews, and overhead related to providing compensation lands to CDFG or an approved third party; escrow fees or costs; environmental contaminants clearance; and other site cleanup measures.

g. Management Plan. The project owner shall prepare a Management Plan for the compensation lands in consultation with the entity that will be managing the lands. The Management Plan shall reflect site-specific enhancement measures on the acquired compensation lands. The plan shall be submitted for approval of the CPM, in consultation with CDFG, BLM and USFWS.

h. Mitigation Security. The Project owner shall provide financial assurances to the CPM with copies of the document(s) to BLM, CDFG and the USFWS, to guarantee that an adequate level of funding is available to implement any of the mitigation measures required by this condition that are not completed prior to the start of ground-disturbing activities. The CPM may use money from the Security solely for implementation of the requirements of this condition. The CPM's use of the security to implement measures in this condition may not fully satisfy the Project owner's obligations under this condition. Security not used to implement mitigation measures shall be returned to the Project owner upon successful completion of the associated requirements in this

condition. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security"). Prior to submitting the Security to the CPM, the Project owner shall obtain the CPM's approval, in consultation with CDFG of the form of the Security.

Security for the requirements of this condition shall be provided in the amount of $725,416.25 (or ($741,161.24 if the project owner elects to use the REAT Account with NFWF pursuant to paragraph 3.h.i. of this condition, below). The security is calculated in part, from the items that follow but adjusted as specified below (consult **Biological Resources Table 14** for the complete breakdown of estimated costs). However, regardless of the amount of the security or actual cost of implementation, the project owner shall be responsible for implementing all aspects of this condition.

i. land acquisition costs for compensation land, calculated at $1,000/acre;

ii. Site assessments, appraisals, biological surveys, transaction closing and escrow costs, calculated as $18,000 total per parcel (presuming 40-acres per parcel)

iii. Initial site clean-up, restoration, or enhancement, calculated at $250/acre;

iv. Third-party and agency administrative transaction costs and overhead, calculated as percentages of land cost;

v. Long-term management and maintenance fund, calculated at $1,450 per acre;

vi. NFWF fees to establish a project-specific account; manage the sub-account for acquisition and initial site work; and manage the sub-account for long term management and maintenance.

The project owner may elect to comply with the requirements in this condition for acquisition of compensation lands, initial protection and habitat improvement on the compensation lands, or long-term maintenance and management of the compensation lands, or any combination of these three requirements, by providing funds to implement those measures into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF). To use this option, the Project owner must make an initial deposit to the REAT Account in an amount equal to the estimated costs (as set forth in the Security section of this condition) of implementing the requirement. If the actual cost of the acquisition, initial protection and habitat improvements, or long-term funding is more than the estimated amount initially paid by the project owner, the project owner shall make an additional deposit into the REAT Account sufficient to cover the actual acquisition costs, the actual costs of initial protection and habitat improvement on the compensation lands, or the long-term funding requirements as established in an approved PAR or PAR-like analysis. If those actual costs or PAR projections are less than the amount initially

transferred by the applicant, the remaining balance shall be returned to the project owner.

The responsibility for acquisition of compensation lands may be delegated to a third party other than NFWF, such as a non-governmental organization supportive of desert habitat conservation, by written agreement of the Energy Commission. Such delegation shall be subject to approval by the CPM, in consultation with CDFG, BLM and USFWS, prior to land acquisition, enhancement or management activities. Agreements to delegate land acquisition to an approved third party, or to manage compensation lands, shall be executed and implemented within 18 months of the Energy Commission's certification of the project.

Verification: The project owner shall provide the CPM with written notice of intent to start ground disturbance at least 30 days prior to the start of ground-disturbing activities on the project site.

If the mitigation actions required under this condition are not completed at least 30 days prior to the start of ground-disturbing activities, the Project owner shall provide the CPM and CDFG with an approved Security (as described above in section 3.h., Mitigation Security) in accordance with this condition of certification no later than 30 days prior to beginning Project ground-disturbing activities. Prior to submitting the Security to the CPM, the project owner shall obtain the CPM's approval, in consultation with CDFG, BLM and the USFWS, of the form of the Security. The project owner, or an approved third party, shall complete and provide written verification to the CPM, CDFG, BLM and USFWS of the compensation lands acquisition and transfer within 18 months of the start of Project ground-disturbing activities.

No later than 12 months after the start of ground-disturbing project activities, the project owner shall submit a formal acquisition proposal to the CPM describing the parcels intended for purchase, and shall obtain approval from the CPM, in consultation with CDFG, BLM and USFWS, prior to the acquisition. If NFWF or another approved third party is handling the acquisition, the project owner shall fully cooperate with the third party to ensure the proposal is submitted within this time period. The project owner or an approved third party shall complete the acquisition and all required transfers of the compensation lands, and provide written verification to the CPM, CDFG, BLM and USFWS of such completion, no later than 18 months after the issuance of the Energy Commission Decision. If NFWF or another approved third party is being used for the acquisition, the project owner shall ensure that funds needed to accomplish the acquisition are transferred in timely manner to facilitate the planned acquisition and to ensure the land can be acquired and transferred prior to the 18-month deadline,

The project owner shall complete and submit to the CPM a PAR or PAR-like analysis no later than 60 days after the CPM approves compensation lands for acquisition. The project owner shall fully fund the required amount for long-term maintenance and management of the compensation lands no later than 30 days after the CPM approves a PAR or PAR-like analysis of the anticipated long-term maintenance and management costs of the compensation lands. Written verification shall be provided to the CPM and CDFG to confirm payment of the long-term maintenance and management funds.

No later than 60 days after the CPM determines what activities are required to provide for initial protection and habitat improvement on the compensation lands, the project owner shall make funding available for those activities and provide written verification to the CPM of what funds are available and how costs will be paid. Initial protection and habitat improvement activities on the compensation lands shall be completed, and written verification provided to the CPM, no later than six months after the CPM's determination of what activities are required on the compensation lands.

The project owner, or an approved third party, shall provide the CPM, CDFG, BLM and USFWS with a management plan for the compensation lands within 180 days of the land or easement purchase, as determined by the date on the title. The CPM, in consultation with CDFG, BLM and the USFWS, shall approve the management plan after its content is acceptable to the CPM.

Within 90 days after completion of all project related ground disturbance, the project owner shall provide to the CPM, CDFG, BLM and USFWS an analysis, based on aerial photography, with the final accounting of the amount of habitat disturbed during Project construction. This shall be the basis for the final number of acres required to be acquired.

If electing to satisfy the requirements of this condition by utilizing the options created by CDFG pursuant to SBX8 34, the Project owner shall notify the Commission that it would like a determination that the Project's in-lieu fee proposal meets CEQA and CESA requirements.

GILA MONSTER MITIGATION

BIO-14 Concurrent with Desert Tortoise Clearance surveys (**BIO-15**, below), the project owner shall conduct pre-construction surveys for Gila monsters. If a Gila monster is encountered during clearance surveys or during construction, a qualified biologist experienced with Gila monster survey and capture techniques shall capture and maintain it in a cool (<85 degrees F) environment until it can be released to a safe, suitable area beyond the construction impact zone. The biologist shall coordinate with staff and CDFG biologists in the transport and relocation of any Gila monsters encountered during project surveys, construction, or operation. A written report documenting any Gila monsters relocated shall be provided to the CPM within 30 days of relocation.

Verification: Within 30 days after completion of clearance surveys the Designated Biologist shall submit a report to BLM's Wildlife Biologist, the CPM, USFWS, and CDFG describing implementation and results, including description of any relocation of Gila monsters. The report shall include the number of Gila monsters moved; their state of health, including wounds or visible signs of illness; and the location of relocation.

DESERT TORTOISE CLEARANCE SURVEYS AND EXCLUSION FENCING

BIO-15 The project owner shall undertake appropriate measures to manage the construction site and related facilities in a manner to avoid or minimize impacts to desert tortoise. Methods for clearance surveys, fence specification

and installation, tortoise handling, artificial burrow construction, egg handling and other procedures shall be consistent with those described in the USFWS' 2009 *Desert Tortoise Field Manual* (http://www.fws.gov/ventura/speciesinfo/protocols_guidelines) or more current guidance provided by CDFG and USFWS. The project owner shall also implement all terms and conditions described in the Biological Opinion for the Project prepared by USFWS. These measures include, but are not limited to, the following:

1. Desert Tortoise Exclusion Fence Installation. To avoid impacts to desert tortoises, permanent desert tortoise exclusion fencing shall be installed along the permanent perimeter security fence and temporarily installed along the utility corridors. Tortoise exclusion fencing shall also be installed as necessary to prevent tortoises on the southern NAP (not a part) area (between the project site and Interstate 40) to prevent tortoises from entering the highway. If the culvert areas cannot be fenced due to restrictions associated with highway maintenance, the two tortoises would be translocated off the site (see **BIO-16**). The proposed alignments for the permanent perimeter fence and utility rights-of-way fencing shall be flagged and surveyed within 24 hours prior to the initiation of fence construction. Clearance surveys of the perimeter fence and utility rights-of-way alignments shall be conducted by the Designated Biologist(s) using techniques approved by the USFWS and CDFG and may be conducted in any season with USFWS and CDFG approval. Biological Monitors may assist the Designated Biologist under his or her supervision with the approval of the CPM, BLM, USFWS, and CDFG. These fence clearance surveys shall provide 100-percent coverage of all areas to be disturbed and an additional transect along both sides of the fence line. This fence line transect shall cover an area approximately 90 feet wide centered on the fence alignment. Transects shall be no greater than 15 feet apart. All desert tortoise burrows, and burrows constructed by other species that might be used by desert tortoises, shall be examined to assess occupancy of each burrow by desert tortoises and handled in accordance with the USFWS' 2009 *Desert Tortoise Field Manual*. Any desert tortoise located during fence clearance surveys shall be handled by the Designated Biologist(s) in accordance with the USFWS' 2009 *Desert Tortoise Field Manual*.

    a. Timing, Supervision of Fence Installation. The exclusion fencing shall be installed prior to the onset of site clearing and grubbing. Fencing shall also be placed along both sides of any construction access roads within tortoise habitat but outside the fenced construction area, and maintained throughout the construction phase of the project, unless otherwise approved by the CPM, BLM Wildlife Biologist, USFWS, and CDFG. The fence installation shall be supervised by the Designated Biologist and monitored by the Biological Monitors to ensure the safety of any tortoise present.

    b. Fence Material and Installation. The permanent tortoise exclusionary fencing shall be constructed in accordance with the USFWS' 2009

Desert Tortoise Field Manual (Chapter 8 – Desert Tortoise Exclusion Fence).

c. Security Gates. Security gates shall be designed with minimal ground clearance to deter ingress by tortoises. The gates may be electronically activated to open and close immediately after the vehicle(s) have entered or exited to prevent the gates from being kept open for long periods of time. Cattle grating designed to safely exclude desert tortoise shall be installed at the gated entries to discourage tortoises from gaining entry

d. Fence Inspections. Following installation of the desert tortoise exclusion fencing for both the permanent site fencing and temporary fencing in the utility corridors, the fencing shall be regularly inspected. If tortoise were moved out of harm's way during fence construction, permanent and temporary fencing shall be inspected at least two times a day for the first 7 days to ensure a recently moved tortoise has not been trapped within the fence. Thereafter, permanent fencing shall be inspected monthly and during and within 24 hours following all major rainfall events. A major rainfall event is defined as one for which surface flow is detectable within the fenced drainage during the storm, or for which channels on-site show any evidence of newly deposited sediments, bank erosion, or channel reworking following the storm. The project owner shall be responsible for monitoring storm flows and changes to channels to evaluate need for fence inspection. Any damage to the fencing shall be temporarily repaired immediately to keep tortoises out of the site, and permanently repaired within 48 hours of observing damage. Inspections of permanent site fencing shall occur for the life of the project. Temporary fencing shall be inspected weekly and, where drainages intersect the fencing, during and within 24 hours following major rainfall events. All temporary fencing shall be repaired immediately upon discovery and, if the fence may have permitted tortoise entry while damaged, the Designated Biologist shall inspect the area for tortoise.

2. Desert Tortoise Clearance Surveys within the Plant Site. Following construction of the permanent perimeter security fence and the attached tortoise exclusion fence, the permanently fenced power plant site shall be cleared of tortoises by the Designated Biologist, who may be assisted by the Biological Monitors. Clearance surveys shall be conducted in accordance with the USFWS' 2009 *Desert Tortoise Field Manual* (Chapter 6 – Clearance Survey Protocol for the Desert Tortoise – Mojave Population) and shall consist of two surveys covering 100% the project area by walking transects no more than 15-feet apart. If a desert tortoise is located on the second survey, a third survey shall be conducted. Each separate survey shall be walked in a different direction to allow opposing angles of observation. Clearance surveys of the power plant site may only be conducted when tortoises are most active (April through May or September through October). Surveys outside of these time periods require approval by USFWS and CDFG. Any tortoise located during clearance surveys of

the power plant site shall be relocated and monitored in accordance with the Desert Tortoise Translocation Plan (Condition of Certification **BIO-16**).

a. Burrow Searches. During clearance surveys all desert tortoise burrows, and burrows constructed by other species that might be used by desert tortoises, shall be examined by the Designated Biologist, who may be assisted by the Biological Monitors, to assess occupancy of each burrow by desert tortoises and handled in accordance with the USFWS' 2009 *Desert Tortoise Field Manual*. To prevent reentry by a tortoise or other wildlife, all burrows shall be collapsed once absence has been determined. Tortoises taken from burrows and from elsewhere on the power plant site shall be translocated as described in the Desert Tortoise Translocation Plan.

b. Burrow Excavation/Handling. All potential desert tortoise burrows located during clearance surveys would be excavated by hand, tortoises removed, and collapsed or blocked to prevent occupation by desert tortoises. All desert tortoise handling and removal, and burrow excavations, including nests, would be conducted by the Designated Biologist, who may be assisted by a Biological Monitor in accordance with the USFWS' 2009 *Desert Tortoise Field Manual.*

3. Monitoring Following Clearing. Following the desert tortoise clearance and removal from the power plant site and utility corridors and initial memo or verbal completion report to BLM's Wildlife Biologist, the CPM, USFWS, and CDFG (below), workers and heavy equipment shall be allowed to enter the project site to perform clearing, grubbing, leveling, and trenching. A Designated Biologist shall monitor clearing and grading activities to find and move tortoises missed during the initial tortoise clearance survey. Should a tortoise be discovered, it shall be translocated as described in the Desert Tortoise Translocation Plan to an area approved by the Designated Biologist.

4. Reporting. The Designated Biologist shall record the following information for any desert tortoises handled: a) the locations (narrative and maps) and dates of observation; b) general condition and health, including injuries, state of healing and whether desert tortoise voided their bladders; c) location moved from and location moved to (using GPS technology); d) gender, carapace length, and diagnostic markings (i.e., identification numbers or marked lateral scutes); e) ambient temperature when handled and released; and f) digital photograph of each handled desert tortoise as described in the paragraph below. Desert tortoise moved from within project areas shall be marked and monitored in accordance with the Desert Tortoise Translocation Plan.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP and implemented. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist. Immediately upon completion of clearance surveys and desert tortoise removal from the site, the Designated Biologist shall provide an initial memo or verbal report of the results to BLM's Wildlife Biologist, the CPM, USFWS, and CDFG. Within 30 days after completion

of desert tortoise clearance surveys the Designated Biologist shall submit a report to BLM's Wildlife Biologist, the CPM, USFWS, and CDFG describing implementation of each of the mitigation measures listed above and compliance with Gila monster clearance survey (**BIO-14**). The report shall include the desert tortoise survey results, capture and release locations of any relocated desert tortoises, and any other information needed to demonstrate compliance with the measures described above.

DESERT TORTOISE TRANSLOCATION PLAN

BIO-16 The project owner shall develop and implement a final Desert Tortoise Translocation Plan (Plan) in conformance with standards and guidelines described in *Translocation of Desert Tortoises (Mojave Population) From Project Sites: Plan Development Guidance* (USFWS 2010), any more current guidance or recommendations as available from CDFG or USFWS, and meets the approval of USFWS, CDFG, BLM's Wildlife Biologist and the CPM. The goal of the Plan shall be to safely exclude desert tortoises from within the fenced project area and translocate them to suitable habitat capable of supporting them, while minimizing stress and potential for disease transmission. Tortoises to be moved farther than 500 meters shall be tested for disease prior to translocation. The Plan shall include written correspondence with Caltrans indicating whether tortoise exclusion fencing may be installed to prevent tortoises on the southern NAP area (between the project site and Interstate 40) to prevent tortoises from entering the highway. If Caltrans does not permit that fencing, then desert tortoises shall be translocated off the NAP site (see **BIO-15**). The final Plan shall be based on the draft Desert Tortoise Translocation Plan prepared by the applicant and shall include all revisions deemed necessary by USFWS, CDFG, BLM'S Wildlife Biologist, and staff. The Plan shall include but not be limited to, a list of the authorized handlers, protocols for disease testing and assessing tortoise health, proposed translocation locations and procedures, schedule of translocations, a habitat assessment of translocation lands, monitoring and reporting, and contingency planning (e.g., handling an injured or diseased tortoise).

Verification: Within 30 days of publication of the Energy Commission License Decision or BLM's Record of Decision/ROW Issuance, whichever comes first, the project owner shall provide BLM's Wildlife Biologist and the CPM with the final version of a Desert Tortoise Translocation Plan that has been reviewed and approved by BLM's Wildlife Biologist and the CPM in consultation with USFWS and CDFG. All modifications to the approved Plan shall be made only after approval by BLM's Wildlife Biologist and the CPM, in consultation with USFWS and CDFG.

Within 30 days after initiation of translocation activities, the Designated Biologist shall provide to BLM's Wildlife Biologist and the CPM for review and approval, a written report identifying which items of the Plan have been completed, and a summary of all modifications to measures made during implementation of the Plan. Written monthly progress reports shall be provided to the BLM's Wildlife Biologist and CPM for the duration of the Plan implementation, including the duration of monitoring of translocated tortoises.

DESERT TORTOISE COMPENSATORY MITIGATION

BIO-17 To fully mitigate for habitat loss and potential take of desert tortoise, the project owner shall provide compensatory mitigation acreage of 14,365 acres of desert tortoise habitat lands, adjusted to reflect the final project footprint, as specified in this condition. This figure was calculated as follows: a ratio of 1:1 for the entire project area (6,215 acres) and an additional 2:1 ratio for 4,075 acres of the project area north of the BNSF railroad tracks (i.e., a total ratio of 1:1 on 2,140 acres and a total ratio of 3:1 on 4,075 acres). See **Biological Resources Table 18**, below. These impact acreages are to be adjusted to reflect the final project footprint. For purposes of this condition, the Project footprint means all lands disturbed in the construction and operation of the Calico Solar Project, including all linear project components, as well as undeveloped areas inside the Project's boundaries that will no longer provide viable long-term habitat for the desert tortoise.

Biological Resources Table 18
Desert Tortoise Compensation Acreage Summary

Location	Project Impact Acreage	Mitigation Ratio	Compensation Acreage
South of BNSF RR	2,140 acres	1:1	2,140 acres
North of BNSF RR	4,075 acres	3:1	12,225 acres
Total	6,215 acres		14,365 acres

To satisfy this condition, the project owner shall acquire, protect, and transfer no fewer than 14,365 acres of desert tortoise habitat lands (adjusted to reflect the final Project footprint), and shall also provide funding for the initial improvement and long-term maintenance and management of the acquired lands, and comply with other related requirements of this condition, although a portion of the lands requirement may be satisfied with mitigation provided to BLM, as provided below. Costs of these requirements are estimated to be $49,223,057.50 based on the acquisition of 14,365 acres (see **Biological Resources Tables 5** and **7** for a complete breakdown of costs and acreage).

In lieu of acquiring lands itself, the Project owner may satisfy the requirements of this condition by depositing funds into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF), as described in Section 3.i., below. If the Project owner elects to use the REAT Account, then the total estimated cost of fulfilling this condition to $50,295,164.23.

Funds that the Project owner provides to satisfy BLM's mitigation requirements for the Project will also partially satisfy the requirements of this condition, up to a maximum of 6,215 acres of the 14,365-acre requirement, adjusted to reflect the final project footprint. Mitigation to BLM is expected to be in the form of payment in the amount of staff's estimated cost for the purchase, protection initial improvement, maintenance, and management of 6,215 acres of desert tortoise habitat, ,which BLM will use to implement habitat enhancement measures and other activities it identifies. The remainder of the mitigation requirement, at least 8,150 acres based on an additional 2:1

compensation ratio for the 4,075 project site acres north of the BNSF railroad tracks (adjusted to reflect the final project footprint), shall be acquired, protected, improved, maintained and managed as specified in this condition.

The actual costs to comply with this condition will vary depending on the final footprint of the Project, the actual costs of acquiring compensation habitat, the costs of initially improving the habitat, and the actual costs of long-term management as determined by a Property Analysis Report (PAR, 3.d., below). The 14,365-acre habitat requirement, and associated funding requirements based on that acreage, will be adjusted up or down if there are changes in the final footprint of the project. Regardless of actual cost, the project owner shall be responsible for implementing all aspects of this condition.

The requirements for the acquisition, initial improvement, protection, and long term management of the 14,365 acres of compensation lands shall include the following:

1. Selection Criteria for Compensation Lands. The compensation lands selected for acquisition to meet Energy Commission and CESA requirements shall be equal to or better than the quality and function of the habitat impacted and:

    a. be within the Western Mojave Recovery Unit, with potential to contribute to desert tortoise habitat connectivity and build linkages between desert tortoise designated critical habitat, known populations of desert tortoise, and/or other preserve lands;

    b. provide habitat for desert tortoise with capacity to regenerate naturally when disturbances are removed;

    c. be near larger blocks of lands that are either already protected or planned for protection, or which could feasibly be protected long-term by a public resource agency or a non-governmental organization dedicated to habitat preservation;

    d. be contiguous and biologically connected to lands currently occupied by desert tortoise, ideally with populations that are stable, recovering, or likely to recover;

    e. not have a history of intensive recreational use or other disturbance that might cause future erosional damage or other habitat damage, and make habitat recovery and restoration infeasible;

    f. not be characterized by high densities of invasive species, either on or immediately adjacent to the parcels under consideration, that might jeopardize habitat recovery and restoration; and

    g. not contain hazardous wastes that cannot be removed to the extent that the site could not provide suitable habitat; and

    h. have water and mineral rights included as part of the acquisition, unless the CPM, in consultation with CDFG, BLM and USFWS, agrees in writing to the acceptability of land without these rights.

2. Review and Approval of Compensation Lands Prior to Acquisition. The project owner shall submit a formal acquisition proposal to the CPM describing the parcel(s) intended for purchase. This acquisition proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for desert tortoise in relation to the criteria listed above and must be approved by the CPM. The CPM will share the proposal with and consult with CDFG, BLM and the USFWS before deciding whether to approve or disapprove the proposed acquisition.

3. Compensation Lands Acquisition Conditions: The project owner shall comply with the following conditions relating to acquisition of the compensation lands after the CPM, in consultation with CDFG, BLM and the USFWS, have approved the proposed compensation lands:

   a. Preliminary Report: The Project owner, or approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary or requested documents for the proposed compensation land to the CPM. All documents conveying or conserving compensation lands and all conditions of title are subject to review and approval by the CPM, in consultation with CDFG, BLM and the USFWS. For conveyances to the State, approval may also be required from the California Department of General Services, the Fish and Game Commission and the Wildlife Conservation Board.

   b. Title/Conveyance: The Project owner shall acquire and transfer fee title to the compensation lands, a conservation easement over the lands, or both fee title and conservation easement as required by the CPM in consultation with CDFG. Any transfer of a conservation easement or fee title must be to CDFG, a non-profit organization qualified to hold title to and manage compensation lands (pursuant to California Government Code section 65965), or to BLM or other public agency approved by the CPM in consultation with CDFG. If an approved non-profit organization holds fee title to the compensation lands, a conservation easement shall be recorded in favor of CDFG or another entity approved by the CPM. If an approved non-profit holds a conservation easement, CDFG shall be named a third party beneficiary. If an entity other than CDFG holds a conservation easement over the compensation lands, the CPM may require that CDFG or another entity approved by the CPM, in consultation with CDFG, be named a third party beneficiary of the conservation easement. The Project owner shall obtain approval of the CPM, in consultation with CDFG, of the terms of any transfer of fee title or conservation easement to the compensation lands.

   c. Initial Habitat Improvement Fund. The Project owner shall fund activities that the CPM, in consultation with the CDFG, USFWS and BLM, requires for the initial protection and habitat improvement of the compensation lands. These activities will vary depending on the condition and location of the land acquired, but may include trash removal, construction and repair of fences, invasive plant removal, and

similar measures to protect habitat and improve habitat quality on the compensation lands. The costs of these activities are estimated at $250 an acre, but will vary depending on the measures that are required for the compensation lands. A non-profit organization, CDFG or another public agency may hold and expend the habitat improvement funds if it is qualified to manage the compensation lands (pursuant to California Government Code section 65965), if it meets the approval of the CPM in consultation with CDFG, and if it is authorized to participate in implementing the required activities on the compensation lands. If CDFG takes fee title to the compensation lands, the habitat improvement fund must be paid to CDFG or its designee.

d. Property Analysis Record. Upon identification of the compensation lands, the Project owner shall conduct a Property Analysis Record (PAR) or PAR-like analysis to establish the appropriate amount of the long-term maintenance and management fund to pay the in-perpetuity management of the compensation lands. The PAR or PAR-like analysis must be approved by the CPM, in consultation with CDFG, before it can be used to establish funding levels or management activities for the compensation lands.

e. Long-Term Maintenance and Management Funding. The Project owner shall provide money to establish an account with a non-wasting capital that will be used to fund the long-term maintenance and management of the compensation lands. The amount of money to be paid will be determined through an approved PAR or PAR-like analysis conducted for the compensation lands. The amount of required funding is initially estimated to be $1,450 for every acre of compensation lands. If compensation lands will not be identified and a PAR or PAR-like analysis completed within the time period specified for this payment (see the verification section at the end of this condition), the Project owner shall either provide initial payment of $20,829,250 calculated at $1,450 an acre for 14,365 acres or the Project owner shall include $20,829,250 to reflect this amount in the security that is provided to the Energy Commission under section 3.h. of this condition. The amount of the required initial payment or security for this item shall be adjusted for any change in the Project footprint as described above. If an initial payment is made based on the estimated per-acre costs, the project owner shall deposit additional money as may be needed to provide the full amount of long-term maintenance and management funding indicated by a PAR or PAR-like analysis, once the analysis is completed and approved. If the approved analysis indicates less than $1,450 an acre will be required for long-term maintenance and management, the excess paid will be returned to the Project owner. The project owner must obtain the CPM's approval of the entity that will receive and hold the long-term maintenance and management fund for the compensation lands. The CPM will consult with CDFG before deciding whether to approve an entity to hold the project's long-term maintenance and management funds. The CPM, in consultation with

CDFG, may designate another non-profit organization to hold the long-term maintenance and management fee if the organization is qualified to manage the compensation lands in perpetuity. If CDFG takes fee title to the compensation lands, CDFG shall determine whether it will hold the long-term management fee in the special deposit fund, leave the money in the REAT Account, or designate another entity to manage the long-term maintenance and management fee for CDFG and with CDFG supervision.

The Project owner shall ensure that an agreement is in place with the long-term maintenance and management fee holder/manager to ensure the following conditions:

i. Interest. Interest generated from the initial capital shall be available for reinvestment into the principal and for the long-term operation, management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action approved by CDFG designed to protect or improve the habitat values of the compensation lands.

ii. Withdrawal of Principal. The long-term maintenance and management fee principal shall not be drawn upon unless such withdrawal is deemed necessary by the CPM, in consultation with CDFG, or the approved third-party long-term maintenance and management fee manager to ensure the continued viability of the species on the compensation lands. If CDFG takes fee title to the compensation lands, monies received by CDFG pursuant to this provision shall be deposited in a special deposit fund established solely for the purpose to manage lands in perpetuity unless CDFG designates NFWF or another entity to manage the long-term maintenance and management fee for CDFG.

iii. Pooling Funds. A CPM- approved non-profit organization qualified to hold long-term maintenance and management fees solely for the purpose to manage lands in perpetuity, may pool the fund with other funds for the operation, management, and protection of the compensation lands for local populations of desert tortoise. However, for reporting purposes, the long-term maintenance and management fee fund must be tracked and reported individually to the CDFG and CPM.

iv. Reimbursement Fund. The project owner shall provide reimbursement to CDFG or an approved third party for reasonable expenses incurred during title, easement, and documentation review; expenses incurred from other State or State-approved federal agency reviews; and overhead related to providing compensation lands.

f. Other expenses. In addition to the costs listed above, the Project owner shall be responsible for all other costs related to acquisition of compensation lands and conservation easements, including but not limited to title and document review costs, expenses incurred from

other state agency reviews, and overhead related to providing compensation lands to CDFG or an approved third party; escrow fees or costs; environmental contaminants clearance; and other site cleanup measures.

g. Management Plan. The project owner shall prepare a Management Plan for the compensation lands in consultation with the entity that will be managing the lands. The Management Plan shall reflect site-specific enhancement measures on the acquired compensation lands. The plan shall be submitted for approval of the CPM, in consultation with CDFG, BLM and USFWS.

h. Mitigation Security. The Project owner shall provide financial assurances to the CPM with copies of the document(s) to BLM, CDFG and the USFWS, to guarantee that an adequate level of funding is available to implement any of the mitigation measures required by this condition that are not completed prior to the start of ground-disturbing activities described in Section A of this condition. The CPM may use money from the Security solely for implementation of the requirements of this condition. The CPM's use of the security to implement measures in this condition may not fully satisfy the Project owner's obligations under this condition. Any amount of the Security that is not used to carry out mitigation shall be returned to the Project owner upon successful completion of the associated requirements in this condition. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security"). Prior to submitting the Security to the CPM, the Project owner shall obtain the CPM's approval, in consultation with CDFG, BLM and the USFWS, of the form of the Security.

Security for the requirements of this condition shall be provided in the amount of $49,223,057.50 or ($50,295,164.23 if the project owner elects to use the REAT Account with NFWF pursuant to paragraph 3.h.i. of this condition, below). The Security is calculated in part, from the items that follow but adjusted as specified below (consult **Biological Resources Tables 5** and **7** for the complete breakdown of estimated costs). However, regardless of the amount of the security or actual cost of implementation, the project owner shall be responsible for implementing all aspects of this condition.

i. land acquisition costs for compensation land, calculated at $1,000/acre;

ii. Site assessments, appraisals, biological surveys, transaction closing and escrow costs, calculated as $18,000 total per parcel (presuming 40-acres per parcel)

iii. Initial site clean-up, restoration, or enhancement, calculated at $250/acre;

iv. Third-party and agency administrative transaction costs and overhead, calculated as percentages of land cost;

v. Long-term management and maintenance fund, calculated at $1,450 per acre;

vi. NFWF fees to establish a project-specific account; manage the sub-account for acquisition and initial site work; and manage the sub-account for long term management and maintenance.

i. The project owner may elect to comply with the requirements in this condition for acquisition of compensation lands, initial protection and habitat improvement on the compensation lands, or long-term maintenance and management of the compensation lands by funding, or any combination of these three requirements, by providing funds to implement those measures into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF). To use this option, the Project owner must make an initial deposit to the REAT Account in an amount equal to the estimated costs (as set forth in the Security section of this condition) of implementing the requirement. If the actual cost of the acquisition, initial protection and habitat improvements, or long-term funding is more than the estimated amount initially paid by the project owner, the project owner shall make an additional deposit into the REAT Account sufficient to cover the actual acquisition costs, the actual costs of initial protection and habitat improvement on the compensation lands, or the long-term funding requirements as established in an approved PAR or PAR-like analysis. If those actual costs or PAR projections are less than the amount initially transferred by the applicant, the remaining balance shall be returned to the project owner.

The responsibility for acquisition of compensation lands may be delegated to a third party other than NFWF, such as a non-governmental organization supportive of desert habitat conservation, by written agreement of the Energy Commission. Such delegation shall be subject to approval by the CPM, in consultation with CDFG, BLM and USFWS, prior to land acquisition, enhancement or management activities. Agreements to delegate land acquisition to an approved third party, or to manage compensation lands, shall be executed and implemented within 18 months of the Energy Commission's certification of the project.

Verification: The project owner shall provide the CPM with written notice of intent to start ground disturbance at least 30 days prior to the start of ground-disturbing activities on the project site.

If the mitigation actions required under this condition are not completed at least 30 days prior to the start of ground-disturbing activities, the Project owner shall provide the CPM and CDFG with an approved Security in accordance with this condition of certification no later than 30 days prior to beginning Project ground-disturbing activities. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security"). Prior to submitting the Security to the CPM, the project owner shall obtain the CPM's approval, in consultation with CDFG, BLM and the USFWS, of the form of the Security. The project owner, or an

approved third party, shall complete and provide written verification to the CPM, CDFG, BLM and USFWS of the compensation lands acquisition and transfer within 18 months of the start of Project ground-disturbing activities.

No later than 12 months after the start of ground-disturbing project activities, the project owner shall submit a formal acquisition proposal to the CPM describing the parcels intended for purchase, and shall obtain approval from the CPM, in consultation with CDFG, BLM and USFWS, prior to the acquisition. If NFWF or another approved third party is handling the acquisition, the project owner shall fully cooperate with the third party to ensure the proposal is submitted within this time period. The project owner or an approved third party shall complete the acquisition and all required transfers of the compensation lands, and provide written verification to the CPM, CDFG, BLM and USFWS of such completion, no later than 18 months after the issuance of the Energy Commission Decision. If NFWF or another approved third party is being used for the acquisition, the project owner shall ensure that funds needed to accomplish the acquisition are transferred in timely manner to facilitate the planned acquisition and to ensure the land can be acquired and transferred prior to the 18-month deadline,

The project owner shall complete and submit to the CPM a PAR or PAR-like analysis no later than 60 days after the CPM approves compensation lands for acquisition. The project owner shall fully fund the required amount for long-term maintenance and management of the compensation lands no later than 30 days after the CPM approves a PAR or PAR-like analysis of the anticipated long-term maintenance and management costs of the compensation lands. Written verification shall be provided to the CPM and CDFG to confirm payment of the long-term maintenance and management funds.

No later than 60 days after the CPM determines what activities are required to provide for initial protection and habitat improvement on the compensation lands, the project owner shall make funding available for those activities and provide written verification to the CPM of what funds are available and how costs will be paid. Initial protection and habitat improvement activities on the compensation lands shall be completed, and written verification provided to the CPM, no later than six months after the CPM's determination of what activities are required on the compensation lands.

The project owner, or an approved third party, shall provide the CPM, CDFG, BLM and USFWS with a management plan for the compensation lands within 180 days of the land or easement purchase, as determined by the date on the title. The CPM, in consultation with CDFG, BLM and the USFWS, shall approve the management plan after its content is acceptable to the CPM.

Within 90 days after completion of all project related ground disturbance, the project owner shall provide to the CPM, CDFG, BLM and USFWS an analysis, based on aerial photography, with the final accounting of the amount of habitat disturbed during Project construction. This shall be the basis for the final number of acres required to be acquired.

RAVEN MONITORING, MANAGEMENT, AND CONTROL PLAN

BIO-18 The project owner shall design and implement a Raven Monitoring, Management, and Control Plan (Raven Plan) that is consistent with the most current USFWS-approved raven management guidelines and that meets the approval of the

USFWS, CDFG, and the CPM. Any subsequent modifications to the approved Raven Plan shall be made only with approval of the CPM in consultation with USFWS and CDFG. The Raven Plan shall include but not be limited to a program to monitor increased raven presence in the Project vicinity and to implement raven control measures as needed based on that monitoring. The purpose of the plan is to avoid any Project-related increases in raven numbers during construction, operation, and decommissioning. The threshold for implementation of raven control measures shall be any increases in raven numbers from baseline conditions, as detected by monitoring to be proposed in the Raven Plan. Regardless of raven monitoring results, the project owner shall be responsible for all other aspects of the Raven Plan, including avoidance and minimization of project-related trash, water sources, or perch/roost sites that could contribute to increased raven numbers. In addition, to offset the cumulative contributions of the Project to desert tortoise from increased raven numbers, the Project owner shall also contribute to the USFWS Regional Raven Management Program. The Project owner shall do all of the following:

1. Prepare and Implement a Raven Management Plan that includes the following:
    a. Identify conditions associated with the Project that might provide raven subsidies or attractants;
    b. Describe management practices to avoid or minimize conditions that might increase raven numbers and predatory activities;
    c. Describe control practices for ravens;
    d. Address monitoring and nest removal during construction and for the life of the Project, and;
    e. Discuss reporting requirements.
2. Contribute to the USFWS Regional Raven Management Program. The project owner shall submit payment to the project sub-account of the REAT Account held by the National Fish and Wildlife Foundation (NFWF) to support the USFWS Regional Raven Management Program. The amount shall be a one-time payment of $105 per acre of permanent disturbance ($652,175).

Verification: No later than 30 days prior to the start of construction, the project owner shall provide written verification to the CPM that NFWF has received and accepted payment into the project's sub-account of the REAT Account to support the USFWS Regional Raven Management Program.

No later than 30 days prior to any construction-related ground disturbance activities, the Project owner shall provide the CPM, USFWS, and CDFG with the final version of a Raven Plan. All modifications to the approved Raven Plan shall be made only with approval of the CPM in consultation with USFWS and CDFG.

Within 30 days after completion of Project construction, the Project owner shall provide to the CPM for review and approval, a written report identifying which items of the

Raven Plan have been completed, a summary of all modifications to mitigation measures made during the Project's construction phase, and which items are still outstanding.

On January 31st of each year following construction the Designated Biologist shall provide a report to the CPM that includes: a summary of the results of raven management and control activities for the year; a discussion of whether raven control and management goals for the year were met; and recommendations for raven management activities for the upcoming year.

PRE-CONSTRUCTION NEST SURVEYS AND IMPACT AVOIDANCE MEASURES FOR MIGRATORY BIRDS

BIO-19 Pre-construction nest surveys shall be conducted each year during the construction phase of the project if construction activities will occur during the breeding period (from January 1 through August 1). The Designated Biologist or Biological Monitor conducting the surveys shall be experienced bird surveyors who have demonstrated experience conducting nest searches; are knowledgeable of the nesting habitats of species that may nest on the site; and are familiar with standard nest-locating techniques such as those described in Martin and Guepel (1993). Surveys shall be conducted in accordance with the following guidelines:

1. Surveys shall cover all potential nesting habitat in the project site and within 500 feet of the boundaries of the plant site and linear facilities;
2. At least two pre-construction 100-percent coverage surveys shall be conducted of each proposes construction area, separated by a minimum 10-day interval. One of the surveys shall be conducted within the 10 days preceding initiation of construction activity. Additional follow-up surveys may be required if periods of construction inactivity exceed one week in any given area, an interval during which birds may establish a nesting territory and initiate egg laying and incubation;
3. If active nests are detected during the survey, a 500 foot no-disturbance buffer zone shall be implemented and a monitoring plan shall be developed. This protected area surrounding the nest may be adjusted by the Designated Biologist in consultation with CDFG, BLM, USFWS, and CPM. Nest locations shall be mapped using GPS technology and the location data provided in completion reports (below) to the CPM and BLM Wildlife Biologist; and
4. The Designated Biologist shall monitor the nest until he or she determines that nestlings have fledged and dispersed. Monitoring shall avoid disturbing the nests or causing an increased risk of predation. Activities that might, in the opinion of the Designated Biologist and in consultation with the CPM and BLM, disturb nesting activities shall be prohibited within the buffer zone until such a determination is made.

Verification: Upon completion of the surveys, and prior to initiating any vegetation removal or ground-disturbing activities (i.e., no more than 10 days prior to the start of such activities), the project owner shall provide the CPM and BLM a letter-report

describing the methods and findings of the pre-construction nest surveys, including the time, date, and duration of the survey; identity and qualifications of the surveyor(s); and a list of species observed. If active nests are detected during the survey, the report shall include a map or aerial photo identifying the location of the nest and shall depict the boundaries of the no-disturbance buffer zone around the nest.

PRE-CONSTRUCTION SURVEYS FOR GOLDEN EAGLES

BIO-20 The Project owner shall implement the following measures to avoid or minimize Project-related construction impacts to golden eagles.

1. Annual Inventory During Construction. For each calendar year during which construction will occur an inventory shall be conducted to determine if golden eagle territories occur within one mile of the Project boundaries. Survey methods and surveyor qualifications for the inventory shall be as described in the Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations (Pagel et al. 2010) or more current guidance from the USFWS.
2. Inventory Data: Data collected during the inventory shall include at least the following: territory status (unknown, vacant, occupied, breeding successful, breeding unsuccessful); nest location, nest elevation; age class of golden eagles observed; nesting chronology; number of young at each visit; digital photographs; and substrate upon which nest is placed.
3. Determination of Unoccupied Territory Status: A nesting territory or inventoried habitat shall be considered unoccupied by golden eagles only after completing at least two full surveys in a single breeding season.
4. Monitoring and Adaptive Management Plan: If an occupied nest[2] is detected within one mile of the Project boundaries, the Project owner shall prepare and implement a Golden Eagle Monitoring and Management Plan for the duration of construction to ensure that Project construction activities do not result in injury or disturbance to golden eagles. The monitoring methods shall be consistent with those described in the Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations (Pagel et al. 2010) or more current guidance from the USFWS. The Monitoring and Management Plan shall be prepared in consultation with the USFWS. Triggers for adaptive management shall include any evidence of Project-related disturbance to nesting golden eagles, including but not limited to: agitation behavior (displacement, avoidance, and defense); increased vigilance behavior at nest sites; changes in foraging and feeding behavior, or nest site abandonment. The

[2] An occupied nest is one used for breeding by a pair of golden eagles in the current year. Presence of an adult, eggs, or young, freshly molted feathers or plucked down, or current years' mutes (whitewash) also indicate site occupancy. Additionally, all breeding sites within a breeding territory are deemed occupied while raptors are demonstrating pair bonding activities and developing an affinity to a given area. If this culminates in an individual nest being selected for use by a breeding pair, then the other nests in the nesting territory will no longer be considered occupied for the current breeding season. A nest site is considered occupied throughout the periods of initial courtship and pair-bonding, egg laying, incubation, brooding, fledging, and post-fledging dependency of the young.

Monitoring and Management Plan shall include a description of adaptive management actions, which shall include, but not be limited to, cessation of construction activities that are deemed by the Designated Biologist to be the source of golden eagle disturbance.

Verification: No later than 30 days after completion of the golden eagle inventory the project owner shall submit a report to the CPM, CDFG, and USFWS documenting the results of the inventory.

If an occupied nest is detected within one mile of the Project boundary during the inventory, the Project owner shall contact staff at the USFWS Ventura Office and CDFG within one working day of detection of the nest for interim guidance on monitoring and nest protection. The project owner shall provide the CPM, CDFG, and USFWS with the final version of the Golden Eagle Monitoring and Management Plan within 30 days after detection of the nest. This final Plan shall have been reviewed and approved by the CPM in consultation with USFWS and CDFG.

BURROWING OWL IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-21 The Project owner shall implement the following measures to avoid, minimize and offset impacts to burrowing owls:

1. Pre-Construction Surveys. The Designated Biologist or Biological Monitor shall conduct pre-construction surveys for burrowing owls no more than 30 days prior to initiation of construction activities. Surveys shall be focused exclusively on detecting burrowing owls, and shall be conducted from two hours before sunset to one hour after or from one hour before to two hours after sunrise. The survey area shall include the Project Disturbance Area and surrounding 500 foot survey buffer.
2. Implement Avoidance Measures. If an active burrowing owl burrow is detected within 500 feet from the Project Disturbance Area the following avoidance and minimization measures shall be implemented:
    a. Establish Non-Disturbance Buffer. Fencing shall be installed at a 250-foot radius from the occupied burrow to create a non-disturbance buffer around the burrow. The non-disturbance buffer and fence line may be reduced to 160 feet if all Project-related activities that might disturb burrowing owls would be conducted during the non-breeding season (September 1st through January 31st). Signs shall be posted in English and Spanish at the fence line indicating no entry or disturbance is permitted within the fenced buffer.
    b. Monitoring: If construction activities would occur within 500 feet of the occupied burrow during the nesting season (February 1 – August 31st) the Designated Biologist or Biological Monitor shall monitor to determine if these activities have potential to adversely affect nesting efforts, and shall implement measures to minimize or avoid such disturbance.

3. Passive Relocation of Burrowing Owls. If pre-construction surveys indicate the presence of burrowing owls within the Project Disturbance Area (the Project Disturbance Area means all lands disturbed in the construction and operation of the Genesis Project), the Project owner shall prepare and implement a Burrowing Owl Relocation and Mitigation Plan, in addition to the avoidance measures described above. The final Burrowing Owl Relocation and Mitigation Plan shall be approved by the CPM, in consultation with USFWS, BLM and CDFG, and shall:

    a. Identify and describe suitable relocation sites within 1 mile of the Project Disturbance Area, and describe measures to ensure that burrow installation or improvements would not affect sensitive species habitat or existing burrowing owl colonies in the relocation area;

    b. Provide guidelines for creation or enhancement of at least two natural or artificial burrows per relocated owl, including a discussion of timing of burrow improvements, specific location of burrow installation, and burrow design. Design of the artificial burrows shall be consistent with CDFG guidelines (CDFG 1995) and shall be approved by the CPM in consultation with CDFG, BLM and USFWS;

    c. Passive relocation sites shall be in areas of suitable habitat for burrowing owl nesting, and be characterized by minimal human disturbance and access. Relative cover of non-native plants within the proposed relocation sites shall not exceed the relative cover of non-native plants in the adjacent habitats;

    d. Provide detailed methods and guidance for passive relocation of burrowing owls occurring within the Project Disturbance Area; and

4. Acquire Compensatory Mitigation Lands for Burrowing Owls. The following measures for compensatory mitigation shall apply only if burrowing owls that are detected within the Project Disturbance Area. The Project owner shall acquire, in fee or in easement, 19.5 acres of land for each burrowing owl that is displaced by construction of the Project. This compensation acreage of 19.5 acres per single bird or pair of nesting owls assumes that there is no evidence that the compensation lands are occupied by burrowing owls. If burrowing owls are observed to occupy the compensation lands, then only 9.75 acres per single bird or pair is required, per CDFG (1995) guidelines. If the compensation lands are contiguous to currently occupied habitat, then the replacement ratio will be 13.0 acres per pair or single bird. The Project owner shall provide funding for the enhancement and long-term management of these compensation lands. The acquisition and management of the compensation lands may be delegated by written agreement to CDFG or to a third party, such as a non-governmental organization dedicated to habitat conservation, subject to approval by the CPM, in consultation with CDFG and USFWS prior to land acquisition or management activities. Additional funds shall be based on the adjusted market value of compensation lands at the time of construction to acquire and manage habitat. In lieu of acquiring lands itself, the Project owner may satisfy the requirements of this condition by depositing funds into the

Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF), as described in Section 3.i. of Condition of Certification BIO-17.

a. Criteria for Burrowing Owl Mitigation Lands. The terms and conditions of this acquisition or easement shall be as described in Paragraph 1 of **BIO-17** [Desert Tortoise Compensatory Mitigation], with the additional criteria to include: 1) the mitigation land must provide suitable habitat for burrowing owls, and 2) the acquisition lands must either currently support burrowing owls or be within dispersal distance from an active burrowing owl nesting territory (generally approximately 5 miles). The burrowing owl mitigation lands may be included with the desert tortoise mitigation lands ONLY if these two burrowing owl criteria are met. If the burrowing owl mitigation land is separate from the acquisition required for desert tortoise compensation lands, the Project owner shall fulfill the requirements described below in this condition.

b. Security. If burrowing owl mitigation land is separate from the acreage required for desert tortoise compensation lands the Project owner or an approved third party shall complete acquisition of the proposed compensation lands prior to initiating ground-disturbing Project activities. Alternatively, financial assurance can be provided by the Project owner to the CPM with copies of the document(s) to CDFG, BLM and the USFWS, to guarantee that an adequate level of funding is available to implement the mitigation measure described in this condition. These funds shall be used solely for implementation of the measures associated with the Project. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security") prior to initiating ground-disturbing Project activities. Prior to submittal to the CPM, the Security shall be approved by the CPM, in consultation with CDFG, BLM and the USFWS to ensure funding. The estimated costs of enhancement and endowment (see subsection C.2.4.2, Desert Tortoise, for a discussion of the assumptions used in calculating the Security, which are based on an estimate of $3501.23 per acre to fund acquisition, enhancement, and long-term management). The final amount due will be determined by the PAR analysis conducted pursuant to **BIO-17**.

Verification: If pre-construction surveys detect burrowing owls within 500 feet of proposed construction activities, the Designated Biologist shall provide to the CPM, BLM, CDFG and USFWS documentation indicating that non-disturbance buffer fencing has been installed at least 10 days prior to the start of any construction-related ground disturbance activities. The Project owner shall report monthly to the CPM, CDFG, BLM and USFWS for the duration of construction on the implementation of burrowing owl avoidance and minimization measures. Within 30 days after completion of construction the Project owner shall provide to the CPM, BLM, CDFG and USFWS a written construction termination report identifying how mitigation measures described in the plan have been completed.

If pre-construction surveys detect burrowing owls within the Project Disturbance Area, the Project owner shall notify the CPM, BLM, CDFG and USFWS no less than 10 days of completing the surveys that a relocation of owls is necessary. The Project owner shall do all of the following if relocation of one or more burrowing owls is required:

a. Within 30 days of completion of the burrowing owl pre-construction surveys, submit to the CPM, CDFG and USFWS a Burrowing Owl Relocation and Mitigation Plan.

b. No less than 90 days prior to acquisition of the burrowing owl compensation lands, the Project owner, or an approved third party, shall submit a formal acquisition proposal to the CPM, CDFG, and USFWS describing the 39-acre parcel intended for purchase. At the same time the Project owner shall submit a PAR or PAR-like analysis for the parcels for review and approval by the CPM, CDFG and USFWS.

c. Within 90 days of the land or easement purchase, as determined by the date on the title, the Project owner shall provide the CPM with a management plan for review and approval, in consultation with CDFG, BLM and USFWS, for the compensation lands and associated funds.

d. No later than 30 days prior to the start of construction-related ground disturbing activities, the Project owner shall provide written verification of Security in accordance with this condition of certification.

e. No later than 18 months after the start of construction-related ground disturbance activities, the Project owner shall provide written verification to the CPM, BLM, CDFG and USFWS that the compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient.

f. On January 31st of each year following construction for a period of five years, the Designated Biologist shall provide a report to the CPM, USFWS, BLM and CDFG that describes the results of monitoring and management of the burrowing owl relocation area. The annual report shall provide an assessment of the status of the relocation area with respect to burrow function and weed infestation, and shall include recommendations for actions the following year for maintaining the burrows as functional burrowing owl nesting sites and minimizing the occurrence of weeds.

AVIAN PROTECTION PLAN / MONITORING BIRD IMPACTS FROM SOLAR TECHNOLOGY

BIO-22 The project owner shall prepare and implement an Avian Protection Plan to monitor bird collisions with facility features (study described below). The Project owner shall use the monitoring data to inform and develop an adaptive management program that would avoid and minimize Project-related avian impacts. Project-related bird deaths or injuries shall be reported to the CPM, CDFG and USFWS. The CPM, in consultation with CDFG and USFWS, shall determine if the Project-related bird deaths or injuries warrant implementation of adaptive management measures contained in the Avian Protection Plan. The study design for the Avian Protection Plan shall be approved by the CPM in consultation with CDFG and USFWS, and, once approved, shall be incorporated into the project's BRMIMP and implemented. The Plan shall include adaptive management strategies that include the

placement of bird flight diverters, aerial markers, or other strategies to minimize collisions with the SunCatcher units.

The Avian Protection Plan shall include a Bird Monitoring Study to monitor the death and injury of birds from collisions with facility features such as reflective mirror-like surfaces and from heat, and bright light from concentrating sunlight. The study design shall be approved by BLM's Wildlife Biologist and the CPM in consultation with CDFG and USFWS, and shall be incorporated into the project's BRMIMP and implemented. The Bird Monitoring Study shall be based upon prior studies by McCrary et al. (1986) or other applicable literature, and shall include detailed specifications on data and carcass collection protocol and a rationale justifying the proposed schedule of carcass searches. The study shall also include seasonal trials to assess bias from carcass removal by scavengers as well as searcher bias and proposed disposition of dead or injured birds.

Verification: No more than 30 days following the publication of the Energy Commission License Decision or BLM's Record of Decision/ROW Issuance, whichever comes first, the project owner shall submit to the CPM, BLM's Wildlife Biologist, USFWS and CDFG a final Avian Protection Plan. Modifications to the Avian Protection Plan shall be made only after approval from BLM's Wildlife Biologist and the CPM.

For one year following the beginning of power plant operation, the Designated Biologist shall submit quarterly reports to BLM's Wildlife Biologist , CPM, CDFG, and USFWS describing the methods, dates, durations, and results of monitoring. The quarterly reports shall provide a detailed description of any project-related bird or wildlife deaths or injuries detected during the monitoring study or at any other time. Following the completion of the fourth quarter of monitoring the Designated Biologist shall prepare an Annual Report that summarizes the year's data, analyzes any project-related bird fatalities or injuries detected, and provides recommendations for future monitoring and any adaptive management actions needed. The Annual Report shall be provided to the CPM, BLM's Wildlife Biologist, CDFG, and USFWS. Quarterly reporting shall continue until BLM's Wildlife Biologist and the CPM, in consultation with CDFG and USFWS determine whether more years of monitoring are needed, and whether mitigation and adaptive management measures are necessary. After the Bird Monitoring Study is determined by BLM's Wildlife Biologist and the CPM to be complete, the project owner or contractor shall prepare a paper that describes the study design and monitoring results to be submitted to the CPM, BLM's Wildlife Biologist, CDFG, USFWS, and a peer-reviewed scientific journal. Proof of submittal shall be provided to BLM's Wildlife Biologist and the CPM within one year of concluding the monitoring study.

NELSON'S BIGHORN SHEEP MITIGATION

BIO-23 The Designated Biologist or Biological Monitor shall be responsible for daily binocular scans of the project area and surrounding hills and bajadas to search for Nelson's bighorn sheep. At any time bighorn sheep are seen within 2000 feet of any active construction site, the Designated Biologist or Biological Monitor shall monitor their activity until the animals leave the area. If the bighorn sheep approach within 500 feet of any active construction site, then construction shall cease until the animals have moved farther than 500

feet away from construction activities, even if construction is occurring within an area that had been fenced with tortoise exclusion fencing. This buffer may be modified with the approval of the CPM, BLM, and CDFG. In addition, the project owner shall provide resource agency staff and private conservation foundation staff and volunteers permanent access to the Cady Mountains via Hector Road or another suitable route for any activities related to Nelson's bighorn sheep monitoring or management.

Verification: Impact minimization measures and implementation methods for Nelson's bighorn sheep and their implementation methods shall be included in the final BRMIMP and implemented during construction and operation of the project. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist.

AMERICAN BADGER AND DESERT KIT FOX IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-24 Prior to ground disturbance the project owner shall conduct pre-construction surveys for American badgers and desert kit fox. These surveys may be conducted concurrent with the desert tortoise surveys. Surveys shall be conducted as described below:

Biological Monitors shall perform pre-construction surveys for badger and kit fox dens in the project area, including areas within 90 feet of all project facilities, utility corridors, and access roads. If dens are detected, each den shall be classified as inactive, potentially active, or definitely active.

Inactive dens that would be directly impacted by construction activities shall be excavated by hand and backfilled to prevent reuse by badgers or kit fox. Potentially active dens that would be directly impacted by construction activities shall be monitored by the Biological Monitor for three consecutive nights using a tracking medium (such as diatomaceous earth or fire clay) and/or infrared camera stations at the entrance. If no tracks are observed in the tracking medium or no photos of the target species are captured after three nights, the den shall be excavated and backfilled by hand.

Occupied badger dens shall be flagged and ground-disturbing activities avoided within 50 feet of the occupied den. Maternity dens shall be avoided during the pup-rearing season (15 February through 1 July) and a minimum 200-foot disturbance-free buffer established. Buffers may be modified with the concurrence of CDFG and CPM. Maternity dens shall be flagged for avoidance, identified on construction maps, and a biological monitor shall be present during construction.

If avoidance of a non-maternity den is not feasible, badgers shall be relocated or allowed to escape the project area (e.g., by providing a temporary monitored opening in the tortoise exclusion fence and directing the animal toward the opening with temporary plastic construction fencing). If necessary, dens will be slowly excavated (either by hand or mechanized equipment under the direct supervision of the biologist, removing no more that 4 inches at a time) before or after the rearing season (15 February through 1 July). Any relocation of badgers shall occur only after consultation with the CDFG and

CPM. A written report documenting the badger removal shall be provided to the CPM within 30 days of relocation. In the event that passive relocation techniques fail for badgers, the Applicant will contact CDFG to explore other relocation options, which may include trapping.

Verification: The project owner shall submit a report to the CPM, BLM, and CDFG within 30 days of completion of badger and kit fox surveys. The report shall describe survey methods, results, mitigation measures implemented, and the results of the mitigation.

BAT IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-25 The project owner shall conduct a survey for roosting bats prior to any ground disturbance activities in all areas within 200 feet of rocky outcrops or the existing BNSF railroad trestles. The project owner shall also conduct surveys for roosting bats during the maternity season (1 March to 31 July) within 300 feet of project activities at the existing railroad trestles and rocky outcrops. These areas shall be surveyed by a qualified bat biologist, who shall be approved by the Designated Biologist. Surveys shall include a minimum of one day and one evening visit. If active maternity roosts or hibernacula are found, the rock outcrop or trestle occupied by the roost shall be avoided (i.e., not removed) by the project, if feasible. If avoidance of the maternity roost is not feasible, the bat biologist shall survey (through the use of radio telemetry or other CDFG/CPM/BLM-approved methods) for nearby alternative maternity colony sites. If the bat biologist determines in consultation with and with the approval of the CDFG, BLM Wildlife Biologist, and CPM that there are alternative roost sites used by the maternity colony and young are not present, then no further action is required. However, if there are no alternative roost sites used by the maternity colony, provision of substitute roosting bat habitat is required. If active maternity roosts are absent, but a hibernaculum (i.e., a non-maternity roost) is present, then exclusion of bats prior to demolition of roosts is required.

1. Provision of substitute roosting bat habitat. If a maternity roost will be impacted by the project, and no alternative maternity roosts are in use within 1 mile of the site, substitute roosting habitat for the maternity colony shall be provided on, or in close proximity to, the project site no less than three months prior to the eviction of the colony. Alternative roost sites will be constructed in accordance with the specific bats' requirements in coordination with CDFG, BLM Wildlife Biologist, and the CPM. Alternative roost sites must be of comparable size and proximal in location to the impacted colony. The CDFG shall also be notified of any hibernacula or active nurseries within the construction zone.

2. Exclude bats prior to demolition of roosts. If non-breeding bat hibernacula are found in rocky outcrops scheduled to be removed or in crevices in rock outcrops within the grading footprint, the individuals shall be safely evicted, according to timing and under the direction of the qualified bat biologist, by opening the roosting area to allow airflow through the cavity or other means determined appropriate by the bat biologist (e.g., installation of one-way doors). In situations requiring one-way doors, a minimum of one week shall pass after doors are installed and temperatures should be

sufficiently warm for bats to exit the roost. This action should allow all bats to leave during the course of one week. Roosts that need to be removed in situations where the use of one-way doors is not necessary in the judgment of the qualified bat biologist shall first be disturbed by various means at the direction of the bat biologist at dusk to allow bats to escape during the darker hours, and the roost tree shall be removed or the grading shall occur the next day (i.e., there shall be no less or more than one night between initial disturbance and the grading or tree removal).

If an active maternity roost is located in an area to be impacted by the project, and alternative roosting habitat is available, the demolition of the roost site must commence before maternity colonies form (i.e., prior to 1 March) or after young are flying (i.e., after 31 July) using the exclusion techniques described above.

Verification: The project owner shall submit a report to the CPM, the BLM Wildlife Biologist, and the CDFG within 30 days of completion of roosting bat surveys and any subsequent mitigation. The report shall describe survey methods, results, mitigation measures implemented, and the results of the mitigation.

STREAMBED IMPACT MINIMIZATION AND COMPENSATION MEASURES

BIO-26 The project owner shall implement the following measures to avoid, minimize and mitigate for direct and indirect impacts to jurisdictional waters of the State and to satisfy requirements of California Fish and Game Code sections 1600 and 1607. Throughout this condition, "jurisdictional" refers to streambeds or acreages of streambed meeting CDFG criteria as waters of the State.

Section A: Acquire Off-Site State Waters:

The project owner shall acquire, in fee or in easement, a parcel or parcels of land that includes no fewer than 288.8 acres of State jurisdictional waters. At least 9.9 acres must contain microphyll woodland. Prior to construction the applicant shall map the vegetation with emphasis on desert wash, including mircrophyll woodland, communities within the drainages subject to project disturbance and provide a map to the CPM, CDFG and BLM. Impacts to 3.3 acres of catclaw acacia or smoke tree habitat lost will be mitigated at a minimum 3:1 ratio. The parcel or parcels comprising the 288.8 acres of ephemeral washes shall include the same types of vegetation as mapped in the project footprint.

This compensation acreage may be included ("nested") within the acreage acquired and managed as desert tortoise habitat compensation (Condition of Certification **BIO-17**) only if:

- Adequate acreage of qualifying state-jurisdictional streambed delineated within the desert tortoise compensation lands;
- The desert tortoise habitat compensation lands are acquired and dedicated as permanent conservation lands within 18 months of the start of project construction.

If these two criteria are not met, then the project owner shall provide no fewer than 288.8 acres of state-jurisdictional streambed compensation lands independent of any compensation land required under other conditions of certification (adjusted to reflect the final project footprint and expert's delineation of streambed on the compensation lands), and shall also provide funding for the initial improvement and long-term maintenance and management of the acquired lands, and to comply with other related requirements this condition. Costs of these requirements cannot be estimated in advance because jurisdictional streambed would make up only a small portion of any acquired parcel and might vary widely among available parcels. In general, however, staff anticipates that total costs would include per-acre cost of the land itself at approximately $1,000, pre-acquisition liability surveys, appraisal fees, and other transaction costs, , appraisal fees at $3,000 per parcel, $250 per acre for initial habitat improvement, BLM internal costs for transfer of land, and $1,450 per acre for long-term management, and (if applicable) NFWF management fees. See **Biological Resources Tables 5** and **7**. The terms and conditions of this acquisition or easement shall be as described in Condition of Certification **BIO-17**. Mitigation for impacts to State waters shall occur within the surrounding watersheds, as close to the project site as possible.

The project owner may elect to comply with the requirements in this condition for acquisition of compensation lands, initial protection and habitat improvement on the compensation lands, or long-term maintenance and management of the compensation lands by funding, or any combination of these three requirements, by providing funds to implement those measures into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF). To use this option, the Project owner must make an initial deposit to the REAT Account in an amount equal to the estimated costs of implementing the requirement. If the actual cost of the acquisition, initial protection and habitat improvements, or long-term funding is more than the estimated amount initially paid by the project owner, the project owner shall make an additional deposit into the REAT Account sufficient to cover the actual acquisition costs, the actual costs of initial protection and habitat improvement on the compensation lands, or the long-term funding requirements as established in an approved PAR or PAR-like analysis. If those actual costs or PAR projections are less than the amount initially transferred by the applicant, the remaining balance shall be returned to the project owner.

The responsibility for acquisition of compensation lands may be delegated to a third party other than NFWF, such as a non-governmental organization supportive of desert habitat conservation, by written agreement of the Energy Commission. Such delegation shall be subject to approval by the CPM, in consultation with CDFG, BLM and USFWS, prior to land acquisition, enhancement or management activities. Agreements to delegate land acquisition to an approved third party, or to manage compensation lands, shall be executed and implemented within 18 months of the Energy Commission's certification of the project.

Management Plan for Acquired Lands: The project owner shall prepare and submit to Energy Commission CPM and CDFG a draft Management Plan that reflects site-specific enhancement measures for the drainages on the acquired compensation lands. The objective of the Management Plan shall be to enhance the wildlife value of the drainages, and may include enhancement actions such as weed control, fencing to exclude livestock, or erosion control. Where applicable, the management plan should be integrated with desert tortoise compensation land habitat management planning requirements as described in **BIO-17**.

Section B: On-site Measures:

1. Copies of Requirements, Stop Work Authority: The project owner shall provide a copy of the Streambed Impact Minimization and Compensation Measures to all contractors, subcontractors, and the applicant's project supervisors. Copies shall be readily available at work sites at all times during periods of active work and must be presented to any CDFG personnel or personnel from another agency upon demand. The CPM reserves the right to issue a stop work order after giving notice to the project owner, if the CPM, in consultation with CDFG, determines that the project owner is not in compliance with any of the requirements of this condition, including but not limited to the existence of any of the following:

    a. The information provided by the applicant regarding streambed alteration is incomplete or inaccurate;

    b. New information becomes available that was not known to the Energy Commission at the time of project certification; or

    c. The project or project activities as described in the Supplemental Staff Assessment/Final Environmental Impact Statement have changed.

2. Best Management Practices: The project owner shall comply with the following conditions to protect drainages near the Project Disturbance Area:

    a. The project owner shall not operate vehicles or equipment in ponded or flowing water except as described in this condition.

    b. With the exception of the retention basins and drainage control system installed for the project the installation of bridges, culverts, or other structures shall be such that water flow (velocity and low flow channel width) is not impaired. Bottoms of temporary culverts shall be placed at or below stream channel grade.

    c. When any activity requires moving of equipment across a flowing drainage, such operations shall be conducted without substantially increasing stream turbidity.

    d. Vehicles driven across ephemeral drainages when water is present shall be completely clean of petroleum residue and water levels shall be below the vehicles' axels.

e. The project owner shall minimize road building, construction activities and vegetation clearing within ephemeral drainages to the extent feasible.

f. The project owner shall not allow water containing mud, silt, or other pollutants from grading, aggregate washing, or other activities to enter ephemeral drainages or be placed in locations that may be subjected to high storm flows.

g. The project owner shall comply with all litter and pollution laws. All contractors, subcontractors, and employees shall also obey these laws, and it shall be the responsibility of the project owner to ensure compliance.

h. Spoil sites shall not be located at least 30 feet from the boundaries and drainages or in locations that may be subjected to high storm flows, where spoils might be washed back into drainages.

i. Raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances that could be hazardous to vegetation or wildlife resources, resulting from project-related activities, shall be prevented from contaminating the soil and/or entering waters of the State. These materials, placed within or where they may enter a drainage by the project owner or any party working under contract or with the permission of the project owner, shall be removed immediately.

j. No broken concrete, debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or washings thereof, oil or petroleum products or other organic or earthen material from any construction or associated activity of whatever nature shall be allowed to enter into, or placed where it may be washed by rainfall or runoff into, waters of the State.

k. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any drainage.

l. No equipment maintenance shall occur within 150 feet of any ephemeral drainage where petroleum products or other pollutants from the equipment may enter these areas under any flow.

m. Stationary equipment such as motors, pumps, generators, and welders, located within or adjacent to a drainage shall be positioned over drip pans. Stationary heavy equipment shall have suitable containment to handle a catastrophic spill/leak. Clean up equipment such as booms, absorbent pads, and skimmers, shall be on site prior to the start of construction.

n. The cleanup of all spills shall begin immediately. The CDFG, BLM Wildlife Biologist, and CPM shall be notified immediately by the project owner of any spills and shall be consulted regarding clean-up procedures.

3. Non-Native Vegetation Removal. The owner shall remove any non-native vegetation (Consistent with the Weed Management Plan, see Condition of Certification **BIO-11**) from any on-site portion of any drainage that requires the placement of a bridge, culvert or other structure. Removal shall be done at least twice annually (Spring/Summer) throughout the life of the Project.

4. Reporting of Special-Status Species: If any special-status species are observed on or in proximity to the project site, or during project surveys, the project owner shall submit California Natural Diversity Data Base (CNDDB) forms and maps to the CNDDB within five working days of the sightings and provide the regional CDFG office with copies of the CNDDB forms and survey maps. The CNDDB form is available online at http://www.dfg.ca.gov/whdab/pdfs/natspec.pdf. This information shall be mailed within five days to: California Department of Fish and Game, Natural Diversity Data Base, 1807 13th Street, Suite 202, Sacramento, CA 95814, (916) 324-3812. A copy of this information shall also be mailed within five days to CDFG, BLM Wildlife Biologist, and the CPM.

5. Notification: Prior to any activities that cross or have the potential to impact any jurisdictional drainage, the project owner shall provide a detailed map to the CDFG, BLM Wildlife Biologist, and CPM in a GIS format that identifies all potential crossings of jurisdictional habitats including retention basins, detention basins, reconfigured channels and culverts. The maps shall identify the type of crossing proposed by the owner such as bridges, culverts, or other mechanism and the best management practices that would be employed. The project owner shall notify the CPM, BLM Wildlife Biologist, and CDFG, in writing, at least five days prior to initiation of project activities in jurisdictional areas and at least five days prior to completion of project activities in jurisdictional areas. The project owner shall notify the CPM, BLM Wildlife Biologist, and CDFG of any change of conditions to the project, the jurisdictional impacts, or the mitigation efforts, if the conditions at the site of the proposed project change in a manner which changes risk to biological resources that may be substantially adversely affected by the proposed project. The notifying report shall be provided to the CPM, BLM Wildlife Biologist, and CDFG no later than 7 days after the change of conditions is identified. As used here, change of condition refers to the process, procedures, and methods of operation of a project; the biological and physical characteristics of a project area; or the laws or regulations pertinent to the project, as described below. A copy of the notifying change of conditions report shall be included in the annual reports.

   a. Biological Conditions: a change in biological conditions includes, but is not limited to, the following: 1) the presence of biological resources within or adjacent to the project area, whether native or non-native, not previously known to occur in the area; or 2) the presence of biological resources within or adjacent to the project area, whether native or non-native, the status of which has changed to endangered, rare, or

threatened, as defined in section 15380 of Title 14 of the California Code of Regulations.

b. Physical Conditions: a change in physical conditions includes, but is not limited to, the following: 1) a change in the morphology of a river, stream, or lake, such as the lowering of a bed or scouring of a bank, or changes in stream form and configuration caused by storm events; 2) the movement of a river or stream channel to a different location; 3) a reduction of or other change in vegetation on the bed, channel, or bank of a drainage, or 4) changes to the hydrologic regime such as fluctuations in the timing or volume of water flows in a river or stream.

c. Legal Conditions: a change in legal conditions includes, but is not limited to, a change in Regulations, Statutory Law, a Judicial or Court decision, or the listing of a species, the status of which has changed to endangered, rare, or threatened, as defined in section 15380 of Title 14 of the California Code of Regulations.

Verification: No fewer than 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall implement the mitigation measures described in this condition. No fewer than 30 days prior to the start of work potentially affecting waters of the State, the project owner shall provide written verification (i.e., through incorporation into the BRMIMP) to the CPM and BLM Wildlife Biologist that the above best management practices will be implemented and provide a discussion of work in waters of the State in Compliance Reports for the duration of the project.

Within 30 days after completion of the first year of project construction, the project owner shall provide to the CPM for review and approval a report identifying that appropriate mitigation lands have been obtained, verification of the acreage of state jurisdictional streambeds on the compensation lands (to be delineated using methodology identical to the delineation of on-site jurisdictional streambeds), a draft Management Plan for review and approval by the CPM and CDFG, and verification on ongoing enhancement techniques, and a summary of all modifications made to the existing channels on the project site.

EVAPORATION POND DESIGN, MONITORING, AND MANAGEMENT PLAN

BIO-27 The project owner shall install netting over the evaporation ponds and design and implement an Evaporation Pond Design, Monitoring, and Management Plan (Evaporation Pond Plan) to be based upon the draft Evaporation Pond Plan submitted by the applicant. The Plan shall meet the approval of the USFWS, CDFG, BLM's Wildlife Biologist, and the CPM. The goal of the Evaporation Pond Plan shall be to avoid the potential for wildlife mortality associated with the evaporation ponds. The Evaporation Pond Plan shall include: a discussion of the objectives of the Evaporation Pond Plan; a description of project design features such as side slope specifications, freeboard and depth requirements, covering, and fencing; a discussion on the placement of the evaporation pond as to reduce the potential of collision or electrocution of wildlife near the transmission line; avian, pond, and water quality monitoring for selenium and other Title 20 compounds, management

actions such as bird deterrence/hazing and water level management, triggers for those management actions; and annual reporting requirements.

Verification: At least 30 days prior to start of any project-related ground disturbance activities, the project owner shall provide the CPM, BLM's Wildlife Biologist, USFWS, and CDFG with the final version of the Evaporation Pond Plan that has been reviewed and approved by USFWS, CDFG, and staff. The CPM and BLM's Wildlife Biologist would determine the plan's acceptability within 15 days of receipt of the final plan. All modifications to the approved Evaporation Pond Plan must be made only after consultation the staff, USFWS, and CDFG. The project owner shall notify the CPM and BLM's Wildlife Biologist no less than 5 working days before implementing any BLM- and CPM-approved modifications to the Evaporation Pond Plan.

Within 30 days after completion of evaporation pond construction, the project owner shall provide to the CPM for review and approval a report identifying which items of the Evaporation Pond Plan have been completed, a summary of all modifications to mitigation measures made during the project's construction phase, and as-built drawings of the evaporation ponds. Throughout the life of the project, the project owner shall provide annual reports on results of the previous year's evaporation plan monitoring, including but not limited to description and summary of wildlife mortality, water quality, and management actions taken or proposed.

CHANNEL DECOMMISSIONING AND RECLAMATION PLAN

BIO-28 Upon project closure, the project owner shall implement a final Decommissioning and Reclamation Plan to remove the engineered diversion channels, detention basins, and other sediment control features from the project site. The goal of the plan shall be to restore the site's topography and hydrology to a relatively natural condition and to establish native plant communities within the Project Disturbance Area. The Channel Decommissioning and Reclamation Plan shall include a cost estimate for implementing the proposed decommissioning and reclamation activities. The plan and cost estimate shall be consistent with the guidelines in BLM's 43 CFR 3809.550 et seq., subject to review and revisions from BLM's Wildlife Biologist and the CPM in consultation with USFWS and CDFG.

Verification: No less than 90 days from publication of the Energy Commission Decision or the Record of Decision, whichever comes first, the project owner shall provide to BLM's Wildlife Biologist and the CPM an agency-approved final Channel Decommissioning and Reclamation Plan. Modifications to the approved Channel Decommissioning Plan shall be made only after approval from BLM's Wildlife Biologist and the CPM, in consultation with USFWS, and CDFG.

No more than 10 days prior to initiating project-related ground disturbance activities the project owner shall provide financial assurances to BLM's Wildlife Biologist and the CPM to guarantee that an adequate level of funding would be available to implement measures described in the Channel Decommissioning and Reclamation Plan, pursuant to 43 CFR 3809.550 et seq.

CLOSURE PLAN MEASURES

BIO-29 The project owner shall implement and incorporate into the facility closure plan measures to address the local biological resources related to facility closure. A funding mechanism shall be developed in consultation with staff to ensure sufficient funds are available for revegetation, reclamation, and decommissioning. The facility closure plan shall address biological resources-related mitigation measures. In addition to these measures, the plan must include the following:

1. Removal of transmission conductors when they are no longer used and useful;
2. Removal of all above-ground and subsurface power plant site facilities and related facilities;
3. Methods for restoring wildlife habitat and promoting the re-establishment of native plant and wildlife species;
4. Revegetation of the project site and other disturbed areas utilizing appropriate methods for establishing native vegetation; components of the revegetation plan, including performance standards and monitoring, shall be as described in Condition of Certification **BIO-10**;
5. A cost estimate to complete closure-related activities, to be based upon decommissioning costs required under 43 CFR 3809.550 et seq.
6. An implementation and monitoring plan to ensure successful and satisfactory completion of every element of the Facility Closure Plan.

In addition, the project owner shall secure funding to ensure implementation of the plan and provide to the CPM and BLM Wildlife Biologist written evidence of the dedicated funding mechanism(s). The financial assurances may be in the form of an irrevocable letter of credit, a performance bond, a pledged savings account, or another equivalent form of security, as approved by the CPM and BLM Wildlife Biologist.

Verification: Prior to initiating ground-disturbing project activities, the project owner shall provide financial assurances (as described in this condition, above) to the CPM and BLM Wildlife Biologist to guarantee that an adequate level of funding will be available to implement decommissioning and closure activities described above.

At least 12 months prior to commencement of planned closure activities, the project owner shall address all biological resources-related issues associated with facility closure, and provide final measures, in a Biological Resources Element. The draft planned permanent or unplanned closure measures shall be submitted to the CPM, BLM Wildlife Biologist, CDFG, and USFWS. After revision, final measures shall comprise the Biological Resources Element, which shall include the items listed above as well as written evidence of the dedicated funding mechanism(s) for these measures. The final Biological Resources Element shall become part of the facility closure plan, which is submitted to the CPM and BLM Wildlife Biologist within 90 days of the permanent closure or another period of time agreed to by the CPM and BLM Wildlife Biologist.

In the event of an unplanned permanent closure, or an indeterminate suspension of operations, the project owner shall notify the CPM and BLM Wildlife Biologist , as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan (see **Compliance** Conditions of Certification).

Upon facility closure, the project owner shall implement measures in the Biological Resources Element and provide written status updates on all closure activities to the CPM and BLM Wildlife Biologist at a frequency determined by the CPM and BLM Wildlife Biologist.

IN-LIEU FEE MITIGATION OPTION

BIO-30 The Project owner may choose to satisfy certain compensatory mitigation obligations identified in this Decision by paying an in lieu fee to the Department of Fish and Game pursuant to Fish and Game code sections 2069 and 2099, to the extent the in-lieu fee provision is found by the Commission to be in compliance with CEQA and CESA requirements.

Verification: If electing to use this provision, the Project owner shall notify the Commission that it would like a determination that the in-lieu fee proposal meets CEQA and CESA requirements.

C.2.14 CONCLUSIONS

With implementation of staff's proposed conditions of certification, construction and operation of the Calico Solar Project would comply with all federal, State, and local laws, ordinances, regulations, and standards relating to biological resources.

Many of staff's proposed Conditions of Certification require the submittal of draft plans, proposals, or survey results prior to the start of construction. These reports are necessary for staff to ensure impacts will be minimized, as the proposed project would be located in an area with a rich diversity of sensitive biological resources. **Biological Resources Table 19** summarizes these pre-construction plan requirements.

Biological Resources Table 19
Summary of Pre-Construction Plans and Proposals

Condition of Certification	Plan/Report to be Submitted	Timing
BIO-6	Worker Environmental Awareness Program (WEAP)	Within 7 days of publication of the Energy Commission's License Decision, or the Record of Decision/ROW Issuance, whichever comes first
BIO-7	Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP)	At least 30 days prior to start of any preconstruction site mobilization and construction-related ground disturbance, grading, boring, and trenching.

Condition of Certification	Plan/Report to be Submitted	Timing
BIO-10	Revegetation Plan	No less than 30 days following the publication of the Energy Commission License Decision or the Record of Decision/ROW Issuance, whichever comes first
BIO-11	Weed Management Plan	At least 30 days prior to start of any project-related ground disturbance activities
BIO-12	a. Draft White-margined Beardtongue Impact Avoidance and Protection Plan b. Final Summer-Fall Botanical Survey Report d. Draft Special-Status Plant Mitigation Plan e. Draft Protected Plant Salvage measures	a. No more than 30 days following the publication of the Energy Commission Decision b. No less than 30 days prior to the start of ground-disturbing activities d. No less than 30 days prior to ground-disturbing activities e. Within 90 days of the publication of the Commission Decision
BIO-13	a. Formal acquisition proposal for sand dune/Mojave fringe-toed lizard compensation lands describing the parcel(s) intended for purchase b. Written verification that the compensation lands or conservation easements have been acquired c. As an alternative to (b) above, written verification of Security in accordance with this condition of certification. d. If Security is provided, the project owner, or an approved third party, shall complete and provide written verification of the proposed compensation lands acquisition e. Management plan for the compensation lands and associated funds	a. A minimum of 30 days prior to acquisition of the property b. No later than 18 months following the publication of the Energy Commission License Decision or the Record of Decision/ROW Issuance, whichever comes first c. No later than 30 days prior to beginning project ground-disturbing activities d. Within 18 months of the start of project ground-disturbing activities e. Within 6 months of the land or easement purchase, as determined by the date on the title
BIO-14	Report describing the number of Gila monsters moved, their state of health, including wounds or visible signs of illness, and the location of relocation (to be completed only if Gila monsters are encountered during clearance surveys or construction)	Within 30 days of relocation of Gila monsters
BIO-15	Report describing how each of the mitigation measures described in BIO-15 has been satisfied, including the desert tortoise survey results, capture and release locations of any relocated desert tortoises, and any other information needed to demonstrate compliance with the measures	Within 30 days of completion of desert tortoise clearance surveys

Condition of Certification	Plan/Report to be Submitted	Timing
BIO-16	a. Desert Tortoise Translocation Plan b. Report identifying which items of the Translocation Plan have been completed, and a summary of all modifications to measures made during implementation	a. Within 7 days of publication of the Energy Commission's License Decision, or the Record of Decision/ ROW Issuance, whichever comes first b. Within 30 days after initiation of relocation/translocation activities
BIO-17	a. Formal acquisition proposal for desert tortoise compensation lands describing the parcel(s) intended for purchase b. Written verification that the compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient(s) c. As an alternative to (b) above, written verification of Security in accordance with this condition of certification. d. If Security is provided, the project owner, or an approved third party, shall complete and provide written verification of the proposed compensation lands acquisition e. Management plan for the compensation lands and associated funds	a. No less than 90 days prior to acquisition of the compensation lands b. No later than 18 months following the publication of the Energy Commission License Decision c. No later than 30 days prior to beginning project ground-disturbing activities d. Within 18 months of the start of project ground-disturbing activities e. Within 180 days of the land or easement purchase, as determined by the date on the title
BIO-18	Final Raven Monitoring, Management, and Control Plan	At least 60 days prior to start of any project-related ground disturbance activities
BIO-19	Letter-report describing the results of the pre-construction nesting bird surveys.	At least 10 days prior to the start of any project-related ground disturbance activities
BIO-20	Letter-report describing the results of the pre-construction golden eagle nest surveys.	At least 10 days prior to the start of any project-related ground disturbance activities
BIO-21	a. Report describing results of pre-construction burrowing owl surveys b. Draft Burrowing Owl Relocation Area Management Plan (if burrowing owls will be relocated) c. Final Burrowing Owl Relocation Area Management Plan (if burrowing owls will be relocated) d. Burrowing Owl Monitoring and Mitigation Plan (if pre-construction surveys detect burrowing owls within 500 feet of proposed construction activities)	a. At least 10 days prior to the start of any project-related ground disturbance activities b. Within 30 days of publication of the Energy Commission Decision c. Prior to any ground-disturbing activities on the project site d. At least 30 days prior to the start of any project-related site disturbance activities
BIO-22	Avian Protection Plan / Bird Monitoring Study	No more than 30 days following the publication of the Energy Commission License Decision or the Record of Decision/ROW Issuance, whichever comes first

Condition of Certification	Plan/Report to be Submitted	Timing
BIO-23	a. Draft Bighorn Sheep Mitigation Plan b. Final Bighorn Sheep Mitigation Plan	a. Within 60 days of publication of the Energy Commission Decision b. At least 30 days prior to start of any project-related ground disturbance activities c. No later than 18 months following the publication of the Energy Commission Decision d. No later than 18 months following the publication of the Energy Commission Decision
BIO-24	Report describing results of badger and kit fox surveys and compliance with mitigation measures	Within 30 days of completion of badger and kit fox surveys
BIO-25	Report describing results of roosting bat surveys and compliance with mitigation measures	Within 30 days of completion of roosting bat surveys and any subsequent mitigation
BIO-26	Written verification (i.e., through incorporation into the BRMIMP) that the best management practices outlined in BIO-26 will be implemented	No fewer than 30 days prior to the start of work potentially affecting waters of the State
BIO-27	Evaporation Pond Design, Monitoring, and Management Plan	At least 30 days prior to the start of any project-related ground disturbance activities
BIO-28	a. Channel Decommissioning and Reclamation Plan b. Financial assurances to guarantee that an adequate level of funding would be available to implement measures described in the Channel Decommis-sioning and Reclamation Plan	a. No less than 90 days from publication of the Energy Commission Decision or the Record of Decision, whichever comes first b. No more that 10 days prior to initiating project-related ground disturbance activities
BIO-29	Financial Assurances to guarantee adequate level of funding to implement decommissioning and closure	Prior to initiating ground disturbing activities.

C.2.15 REFERENCES

The tn: 00000 in the references below indicates the transaction number under which the item is catalogued in the Energy Commission's Docket Unit. The transaction number allows for quicker search and retrieval of individual items docketed for a case or used for ease of reference and retrieval of exhibits cited in briefs and used at Evidentiary Hearings.

Abella, S. R., J. E. Spencer, J. Hoines, C. Nazarchyk. 2008 – Assessing an exotic plant surveying program in the Mojave Desert, Clark County, Nevada, USA. In *Environ-mental* Monitoring *and Assessment.* Springer Netherlands. DOI 10.1007/ s10661-008-0263-0.

Ahlborn, G. 2000 – Species Account for Kit Fox (*Vulpes macrotis*). California Wildlife Habitat Relationships System, California Department of Fish and Game, California Interagency Wildlife Task Group.

Allen, Edith B., L. E. Rao, R.J. Steers, G.S. Tonnesen, and Robert F. Johnson. 2010 – Impacts of Anthropogenic Nitrogen Deposition on Invasive Species and Fire Risk in California Deserts. 35th Annual Meeting and Symposium of the Desert Tortoise Council. Ontario, California.

Anderson, J. 2001 – White-margined penstemon, a rare Mojave Desert species, and the Hualapai Mountains land exchange in Mojave County, Arizona. Pages 27-37 in J. Machinski and L. Holter, tech. eds., Southwestern Rare and Endangered Plants: Proceedings of the Third conference. RMRS-P-23. USDA Forest Service, Rocky Mountains Research Station, Fort Collins Colorado. 250 pp.

APLIC 2004 – Avian Power Line Interaction Committee. Mitigating Bird Collisions with Power Lines: the State of the Art in 1994. Edison Electric Institute, Washington, DC.

APLIC 2006 – Avian Power Line Interaction Committee. Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006. Edison Electric Institute, and the California Energy Commission, Washington, D.C. and Sacramento, CA.

Arjo, W. M.; Bennett, T. J.; and A. J. Kozlowski. 2003 – Characteristics of current and historical kit fox (*Vulpes macrotis*) dens in the Great Basin Desert. USDA National Wildlife Research Center – Staff Publications. University of Nebraska, Lincoln.

Arizona Rare Plant Committee. 2004 – Arizona Rare Plant Field Guide. Collaboratively prepared and published by local, State, federal and private organizations. Tucson Arizona.

Averill-Murray, R. C. 2001 – *Program MARK survival analysis of tortoises voiding their bladders during* handling, Proceeding of the 2001 Desert Tortoise Council Symposium. p. 48.

Avery, H. W. 1997 – Effects of cattle grazing on the desert tortoise, Gopherus agassizii: Nutritional and behavioral interactions. Pages 13-20 in J. Van Abbema (ed.), Proceedings of the International Conference on Conservation, Restoration, and Management of Tortoises and Turtles. New York Turtle and Tortoise Society, New York.

Avery, M. L., P. F. Spring, and N. S. Dailey 1978 – Avian mortality at man-made structures: an annotated bibliography. U.S. Fish and Wildlife Service, Biological Services Program, National Power Plant Team. FWS/OBS-75/58. 108 pp.

Baldwin, B., S. Boyd, B. J. Ertter, R. W. Patterson, T. J. Rosatti, D. H. Wilken, and M. Weatherwax (eds.) 2001 – The Jepson Desert Manual: Vascular Plants of Southeastern California. University of California Press, Berkeley, California. 624 pp.

Barber, J.R, Crooks, K.R., and Fristrup, K.M., 2010. The costs of chronic noise exposure for terrestrial organisms. Trends in Ecology and Evolution Vol.25 No.3

Barbour, R. W. and W. H. Davis 1969 – *Bats of America*. Louisville: University of Kentucky Press.

Barrows, C. 1996 – An ecological model for the protection of a dune ecosystem. Conserv. Biol. 10(3):888-891.

Beacham, W. 2000 – Peninsular Bighorn Sheep. In Beacham, W., Castronova, F. V., and Sessine, S., eds. Beacham's Guide to the Endangered Species of North America. Beacham Publishing Corp. Osprey, FL.

Beatley, J. C. 1966 – Ecological status of introduced brome grasses (*Bromus* spp.) in desert vegetation of southern Nevada. *Ecology*, 47, 548–554.

Beatley, T. 1994 – Habitat conservation planning: endangered species and urban growth. Univ. Texas Press, Austin, Texas.

Beier, P. and R. F. Noss 1998 – Do habitat corridors provide connectivity? Conservation Biology. 12(6): 1241-1252.

Berry, K. 2001 (revised 2003). Salvaging Injured, Recently Dead, Ill, and Dying Wild, Free-roaming Desert Tortoises (*Gopherus agassizii*). USGS Western Ecological Research Center. [online]: http://www.werc.usgs.gov/tortoise/salvaging_protocol.htm

Berry et al. 1996 – Berry KH, FG Hoover, and M Walker. The effects of poaching desert tortoises in the western Mojave Desert: Evaluation of landscape and local impacts. In Proceedings of the 1996 Desert Tortoise Council Symposium.

Bertolero, A., D. Oro, and A. Besnard 2007 – Assessing the efficacy of reintroduction programmes by modeling adult survival: the example of Hermann's tortoise. Animal Conservation 10:360–368.

Bleich, V. C., J. D. Wehausen, and S. A. Holl 1990 – Desert-dwelling mountain sheep: conservation implications of a naturally fragmented distribution. Conservation Biology. 4:383-390.

Bleich, V. C., J. D. Wehausen, R. R. Ramey II, and J. L. Rechel 1996 – Metapopulation theory and mountain sheep: implications for conservation. pp. 453-473, In: D. R. McCullough, (ed.), Metapopulations and wildlife conservation management. Island Press, Washington, D.C.

Bleich, V. C., R. T. Bowyer, and J. D. Wehausen 1997 – Sexual segregation in mountain sheep: resources or predation? *Wildlife Monographs* No. 134. 50 pp.

BLM 1980 (Amended 1999) – California Desert Conservation Area Plan. Prepared by the Bureau of Land Management, Sacramento Office. August 17, 1980.

BLM 1990 – Draft raven management plan for the California Desert Conservation Area. Prepared by U.S. Bureau of Land Management, California Desert District, Riverside, California. April 1990.

BLM 2001 – Bureau of Land Management. Lane Mountain Milk Vetch. Pages 38-46 in Biological Evaluation on Effects of CDCA Plan as Amended and Proposed to be Amended by the NEMO and NRCO Preferred Alternatives and with Other Interim Measures on Ten T & E Plants. Bureau of Land Management, California Desert District, Riverside, California.

BLM 2006 – Bureau of Land Management. Record of Decision: West Mojave Plan, Amendment to the California Desert Conservation Area Plan. March 2006. California Desert District.

BLM 2009a – (tn 52620) Letter from J. Abbott, BLM, California State Office, to K. Hunting, CDFG, regarding coordination of mitigation for BrightSource solar development. Dated July 23, 2009. Submitted to California Energy Commission Docket Unit on July 23, 2009.

BLM 2009b – Bureau of Land Management. Survey Protocols Required for NEPA/ESA Compliance for BLM Special Status Plants.

BLM 2010 – Geospatial Data Downloads. U.S. Department of the Interior, Bureau of Land Management, California. [online]: http://www.blm.gov/ca/gis/index.html#lands [accessed February 15, 2010]

BLM et al. 2005 – Bureau of Land Management, County of San Bernardino, and City of Barstow. Final Environmental Impact Report and Statement for the West Mojave Plan, A Habitat Conservation Plan and California Desert Conservation Area Plan Amendment. January 2005. California Desert District.

Bloom, P. H. 1980 – The status of the Swainson's Hawk in California 1979. Wildlife Management Branch, Nongame Wildl. Invest. Job II-80.0. California Department of Fish and Game.

Bloom 2003 – Letter to California Fish and Game Commission. 2 December 2003. [online]: http://www.biologicaldiversity.org/species/birds/western_burrowing_owl/pdfs/bloom-comment.pdf.

Bloom 2009- Electronic communications between Peter Bloom and Amy Golden, California Energy Commission, on December 10, 2009, regarding western burrowing owl relocation.

Bloom 2010 – Personal communication between Chris Huntley and Pete Bloom in February 2010 regarding the status of Swainson's hawk in the Mojave Desert, including the Daggett area and Ivanpah Valley.

Boarman, W. I. 2002 – Threats to desert tortoise populations: A critical review of the literature. U.S. Geological Survey, Western Ecological Research Center, Sacramento, California.

Boarman, W. I., 2003 – Managing a Subsidized Predator Population: Reducing Common Raven Predation on Desert Tortoises. Environmental Management. V32:2 p. 205-217.

Boarman, W. I., and M. Sazaki 2006 – A highway's road-effect zone for desert tortoises (*Gopherus agassizii*). Journal of Arid Environments 65:94-101.

Brown, W. M. 1993 – Avian collisions with utility structures: biological perspectives. EPRI, Proceedings: avian interactions with utility structures, international workshop. Palo Alto, CA.

BRW 2009 – Basin & Range Watch/L. Cunningham/K. Emmeric (tn 54278) Basin & Range Watch Data Request, dated November 25, 2009. Submitted to CEC/Docket Unit on November 30, 2009.

Busch, S. E., and S. S. Smith 1995 – Mechanisms associated with decline of woody species in riparian ecosystems of the southwestern U.S. Ecological Monographs Vol. 65. pp. 374-370.

Bury, R. B., R. A. Luckenbach, and S. D. Busack 1977 – The effects of off-road vehicles on vertebrates in the California desert. Wildlife Res. Repts., No. 8, U.S. Fish and Wildlife Service, Washington, DC.

Cablk, M. E. and J. S. Heaton 2002 – Nov. Mojave fringe-toed lizard surveys at the Marine Corps Air Ground Combat Center at Twentynine Palms, California and nearby lands administered by the Bureau of Land Management. California: Marine Corps Air Ground Combat Center. Report M67399-00-C-0005. 115 p.

Cal-IPC 2006 – California Invasive Plant Inventory. Cal-IPC Publication 2006-02. Berkeley: California Invasive Plant Council.

CBOC 1993 – California Burrowing Owl Consortium. Burrowing Owl Survey Protocol and Mitigation Guidelines. April 1993.

CDFA (California Department of Food and Agriculture) 2007 – List of noxious weeds. [online]: http://www.cdfa.ca.gov/phpps/ipc/noxweedinfo/noxweedinfo_hp.htm

CDFG (California Department of Fish and Game) 1995 – Staff Report on Burrowing Owl Mitigation. Memorandum dated October 17, 1995.

CDFG 2003 – California Department of Fish & Game. List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database. Unpublished report, CDFG Wildlife and Habitat Data Analysis Branch, Sacramento.

CDFG 2005 – California Department of Fish & Game. California Wildlife: Conservation Challenges (California's Wildlife Action Plan). Prepared by the UC Davis Wildlife Health Center. [online]: http://www.dfg.ca.gov/wildlife/WAP/report.html. Accessed 25 January 2010.

CDFG 2007 – California Department of Fish & Game. "List of California Vegetation Alliances." Biogeographic Data Branch – Vegetation Classification and Mapping Program. October 22, 2007.

CDFG 2009 – California Department of Fish & Game. Protocols for surveying and evaluating impacts to special-status native plant populations and natural communities. November 24, 2009. (Revision of 2000 guidelines). Sacramento, CA, 7 pp. [online]: http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/Protocols_for_Surveying_and_Evaluating_Impacts.pdf

CDFG 2009a (tn 53264) – California Department of Fish and Game Recent Land Acquisition Comparables. Submitted to California Energy Commission Docket Unit on September 21, 2009.

CDFG 2010a – California Department of Fish & Game. California Natural Diversity Database (CNDDB), Rarefind, Version 3.1.1.

CDFG 2010b – California Department of Fish & Game. Special vascular plants, bryophytes, and lichens list. California Natural Diversity Database. January 2010. Quarterly publication. 71 pp.

CEC 2009a – California Energy Commission/C. Meyer (tn 52052). CEC and BLM Staff Data Requests Set 1, dated June 17, 2009. Submitted to CEC/Docket Unit on June 17, 2009.

CEC 2009b – California Energy Commission/C. Meyer (tn 52460). CEC and BLM Staff Data Request Set 1, Part 2, dated July 20, 2009. Submitted to CEC/Docket Unit on July 20, 2009.

CEC 2009c – California Energy Commission/C. Meyer (tn 54376). Memo to Applicant Regarding Transmission Line Upgrades, dated October 21, 2009. Submitted to CEC/Docket Unit on December 9, 2009.

CEC 2009d – California Energy Commission/C. Meyer (tn 53729). CEC and BLM Staff Data Requests Set 2, Part 1 (#s 128-141), dated October 22, 2009. Submitted to CEC/Docket Unit on October 22, 2009.

Channell, R. and M. V. Lomolino 2000 – Dynamic biogeography and conservation of endangered species. Nature 403:84–86.

Charlton, D. 2007 – Determining the population boundaries of a narrowly endemic perennial plant, Lane Mountain milk-vetch, in San Bernardino County, California, pp. 24-31 *in* P. Barlow-Irick, J. Anderson, and C. McDonald, tech eds. Southwestern rare and endangered plants: Proceedings of the fourth conference; March 22-26, 2004, Las Cruces, New Mexico. Proceedings RMRS-P-48CD, USDA Forest Service Rocky Mountain Research Station, Fort Collins, Colorado.

Cheatham, N. H., and J. R. Haller 1975 – An annotated list of California habitat types. Unpublished report. University of California, Berkeley, California. Clark, H. O. Jr. & Plumpton, D. L. 2005. A simple one-way door design for passive relocation of Western Burrowing Owls. California Fish and Game 91: 286-289.

CNPS 1992 – California Native Plant Society. CNPS Policy on Appropriate Application of Ex Situ Conservation Techniques. Conservation Policy dated September 1992. [online]: http://www.cnps.org/cnps/conservation/policies.php

CNPS 1998 – California Native Plant Society. Statement Opposing Transplantation as Mitigation for Impacts to Rare Plants. Conservation Policy dated July 9, 1998. [online]: http://www.cnps.org/archives/transplanting2.htm

CNPS 1998a – Policy on Mitigation Guidelines Regarding Impacts to Rare, Threatened, and Endangered Plants. California Native Plant Society Rare Plant Scientific Advisory Committee (February 1991, revised April 1998). [online]: http://www.cnps.org/cnps/archive/mitigation.phpCNPS

CNPS 2001 – California Native Plant Society. *Inventory of Rare and Endangered Plants of California (6th edition)*. Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. California Native Plant Society. Sacramento, California.

CNPS 2010 – California Native Plant Society. Inventory of Rare and Endangered Plants (online edition, v7-10a). California Native Plant Society. Sacramento, CA. Accessed January and February 2010. [online]: http://www.cnps.org/inventory

Conservation Biology Institute 2000 – Review of potential edge effects on the San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*). Unpublished

report prepared for Ahmanson Land Company, West Covina, California, by CBI, San Diego California.

Consortium of California Herbaria 2010 – [online]: http://ucjeps.berkeley.edu/consortium/. Site visited Jan-Feb 2010.

Coulombe, H. N. 1971 – Behavior and Population Ecology of the Burrowing Owl, Speotyto cunicularia, in the Imperial Valley of California. The Condor 73:162-176.

Croft 2008 – Telephone conversation between Brian Croft, US Fish and Wildlife Service biologist, Ventura, California, and Susan Sanders, California Energy Commission. November 12, 2008.

Cronquist, A., A. H. Holmgren, N. H. Holmgren, J. L. Reveal, and P. K. Holmgren 1977 – Intermountain Flora: Vascular Plants of the Intermountain West, USA, vol. 6. Columbia University Press, New York, NY. 584 pp.

CURE 2009a – Adams, Broadwell, Joseph & Cardozo/L. Miles (tn 52177). CURE's Data Requests Set 1, dated June 26, 2009 – Submitted to CEC/Docket Unit on June 26, 2009.

CURE 2009b – Adams, Broadwell, Joseph & Cardozo/L. Miles (tn 52381). CURE's Data Requests, Set Two, dated July 13, 2009. Submitted to CEC/Docket Unit on July 13, 2009.

CURE 2009c – Adams, Broadwell, Joseph & Cardozo/B. Heeley (tn 53674). CURE's Data Requests Set 3 (Nos. 276-380), dated October 15, 2009. Submitted to CEC/Docket Unit on October 15, 2009.

CURE 2009d – Adams, Broadwell, Joseph & Cardozo/L. Miles (tn 53983). CURE's Data Request Set 4, dated November 2, 2009. Submitted to CEC/Docket Unit on November 2, 2009.

CWMW 2009 – California Wetlands Monitoring Workgroup. Using CRAM (California Rapid Assessment Method) to assess wetland projects as an element of regulatory and management programs. Technical Bulletin. October 13, 2009.46 pp.

DW 2009a – Defenders of Wildlife/J. Basofin/J. Aardahl (tn 52473). Scoping Comments from Defenders of Wildlife, dated July 7, 2009. Submitted to CEC/Docket Unit on July 20, 2009.

DW 2009b – Defenders of Wildlife/J. Basofin (tn 54036). Defenders of Wildlife Data Requests Set One, November 5, 2009. Submitted to CEC/Docket Unit on November 5, 2009.

DW 2010 – Defenders of Wildlife/J. Basofin (tn 55789). Defenders of Wildlife's Status Report No. 1, dated February 22, 2010. Submitted to CEC/Docket Unit on March 8, 2010.

Danin, A 1996 – Plants of Desert Dunes. Springer-Verlag, Berlin, Germany. 177 pp.

Dixon, J. B. 1937 – The golden eagle in San Diego County, California. Condor 39:49-56.

Dodd, C. K., and R. A. Seigel 1991 – Relocation, repatriation, and translocation of amphibians and reptiles — Are they conservation strategies that work? Herpetologica 47:336–350.

Dooling R. J. 2006 – Estimating effects of highway noise on the avian auditory system. *In:* Proceedings of the 2005 International Conference on Ecology and Transportation, Eds. Irwin CL, Garrett P, McDermott KP. Center for Transportation and the Environment, North Carolina State University, Raleigh, NC: pp. 30-31.

DTRO 2009 – Desert Tortoise Recovery Office. Science Advisory Committee Meeting Summary, March 13, 2009, [online]: http://www.fws.gov/nevada/desert_tortoise/documents/sac/20090313_SAC_meeting_summary.pdf. Accessed August 22.

Epps, C. W., P. J. Palsbøll, J. D. Wehausen, G. K. Roderick, R. R.Ramey, D. R. McCullough 2005 – Highways block gene flow and cause a rapid decline in genetic diversity of desert bighorn sheep. Ecology Letters, (2005) 8: 1029–1038.

Erickson, W. P., G. D. Johnson, M. D. Strickland, D. P. Young, Jr., K. J. Sernka, and R. E. Good 2001 – Avian Collisions with Wind Turbines: A summary of existing studies and comparisons to other sources of avian collision mortality in the United States. National Wind Coordinating Committee (NWCC) Resource Document. August.

Estep, J. A. 1989 – Biology, movements, and habitat relationships of the Swainson's hawk in the Central Valley of California, 1986-87. California Department of Fish and Game Unnumbered Report.

Etymesian, V., J. King, S. Zitzer, G. Nikolich, J. Gillis, J. Mason, and W. Nickling 2010 – Sediment transport to white-margined penstemon habitat (*Penstemon albomarginatus*). 2005-NSHE-502A-P. Dept. of Air Quality and Environmental Management, Desert Conservation Program, Las Vegas, Nevada.

Evans, R. 2001 – Free-roaming dog issues at the United States Marine Corps Air Ground Combat Center, Twentynine Palms, California. Proceedings of the 2001 Desert Tortoise Council Symposium. p. 61.

Fiedler, P. L. 1991 – Mitigation-related transplantation, relocation and reintroduction projects involving endangered and threatened, and rare plant species in California. California Department of Fish and Game Contract No. FG-8611. Pgs. 144. [online]: rm.dfg.ca.gov/FileHandler.ashx?DocumentVersionID=3689

Field, K. J., C. R. Tracy, P. A. Medica, R. W. Marlow, and P. S. Corn 2007 – Return to the wild: Translocation as a tool in conservation of the desert tortoise (Gopherus agassizii). Biological Conservation 136:232–245.

Findlay, C. S. and J. Bourdages 2000 – Response time of wetland biodiversity to road construction on adjacent lands. Conservation Biology. 14(1): 86-94.

Fitton, S. 2008 – LeConte's Thrasher (*Toxostoma lecontei*). *In* Shuford, W. D., and T. Gardali, eds. California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Germano, J. M., and P. J. Bishop 2009 – Suitability of amphibians and reptiles for translocation. Conservation Biology 23:7–15.

Gervais, J. A., D. K. Rosenberg, and L. A. Comrack 2008 – Burrowing Owl (*Athene cunicularia*). In. Shuford, W. D., and Gardali, T., eds. California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Gibson. A. C., M. R. Sharifi and P. W. Rundel 2004 – Resprout characteristics of creosote bush (*Larrea tridentata*) when subjected to repeated vehicle damage. Journal of Arid Environments Volume 57, Issue 4, June 2004, Pages 411-429.

Gowan, Tim and Kristin Berry 2010 – Health, Behavior, and Survival of 158 Tortoises Translocated from Ft. Irwin: Year 2. 35th Annual Meeting and Symposium of the Desert Tortoise Council. Ontario, California.

Grinnell, J., and A. H. Miller 1944 – The Distribution of the Birds of California. Pac. Coast Avifauna No. 27. 608 pp.

Haas, C. D. 2000 – Distribution, relative abundance, and roadway underpass responses of carnivores throughout the Puente-Chino Hills. Unpubl. M.S. Thesis. California State Polytechnic University, Pomona, CA. 110 pp.

Hamilton, K., S. A. Holland C. L. Douglas 1982 – An evaluation of the effects of recreational activity on bighorn sheep in the San Gabriel Mountains, California. Desert Bighorn Council Transactions 26:50-55.

Hanly, T. A. 1982 – The nutritional basis for food selection by ungulates. *Journal of Range Management*. 35:146-151.

Haskell, D. G. 2000 – Effects of forest roads on macroinvertebrate soil fauna of the southern Appalachian Mountains. Conservation Biology. 14(1): 57-63.

Haug, E. A., B. A. Millsap, and M. S. Martell 1993 – Burrowing Owl (*Athene cunicularia*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online. [online]: http://bna.birds.cornell.edu/bna/species/061

Hermanson, J. W., and T. J. O'Shea 1983 – *Antrozous pallidus*. Mammalian Species, No. 213, (Dec. 15, 1983), pp. 1-8

Hickman, J. C., ed. 1993 – The Jepson Manual: Higher Plants of California. Berkeley: University of California Press. 1400 pp.

Hicks, L. L., and J. M. Elder 1979 – Human disturbances of Sierra Nevada bighorn sheep. J. Wildl. Manage. 43:909-915.

Hoff, K. S. and R. W. Marlow 2002 – Impacts of vehicle road traffic on Desert Tortoise populations with consideration of conservation of tortoise habitat in southern Nevada. *Chelonian Conservation and Biology* 4:449–456.

Holl, S. A. and V. C. Bleich 1987 – Mineral lick use by mountain sheep in the San Gabriel Mountains, California. Journal of Wildlife Management 51(2):381–383.

Holland, R. F. 1986 – Preliminary Description of the Terrestrial Natural Communities of California. California Department of Fish & Game.

Horesji, B. 1976 – Some thoughts and observations on harassment and bighorn sheep. P. 1-12. In: Proc. Northern Wild Sheep Conf. (Jackson, Wyo. Feb 10-12).

Howald, A. M. 1996 – Translocation as a mitigation strategy: lessons from California. In: D. A. Falk, C. I. Millar, and M. Olwell eds. Restoring Diversity: Strategies for Reintroduction of Endangered Plants. Island Press, Washington, DC.

Humple, D. 2008 – Loggerhead Shrike (*Lanius ludovicianus*). In. Shuford, W. D., and Gardali, T., eds. California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Hunting, K. 2002 – A Roadmap for PIER Research on Avian Collisions with Power Lines in California. Energy Commission. P500-02-071F. December.

Jacobson 1992 – E. Jacobson, D.V.M., Ph.D. The desert tortoise and upper respiratory tract disease. A Special Report Prepared for the Desert Tortoise Preserve Committee. [online]: http://www.tortoise-tracks.org/publications/jacobson.html. Accessed January 2010.

Jaeger, E. J. 1941 – Desert Wild Flowers, 2nd ed. Stanford University Press, Stanford, California. 322 pp.

Jansen, B.D., P.R. Krausman, J.R. Heffelfinger, and J.C. De Vos, Jr. 2007. Influence of mining on behavior of bighorn sheep. Southwestern Naturalist 52:418-423.

Jansen, B.D., P.R. Krausman, K.D. Bristow, J.R. Heffelfinger, and J.C. De Vos, Jr. 2009. Surface mining and ecology of desert bighorn sheep. Southwestern Naturalist 54:430-438.

Jennings, W. B. 1997 – Habitat use and food preferences of the desert tortoise, Gopherus agassizii, in the western Mojave Desert and impacts of off-road vehicles. Proceedings: Conservation, Restoration, and Management of Tortoises and Turtles – An International Conference. pp. 42-45.

Jennings, M. R., and M. P. Hayes 1994 – Amphibians and reptile species of special concern in California. Contract 38023, report to the California Department of Fish and Game, Inland Fisheries Division. Sacramento, CA. 255 pp.

Johnson, W. C., R. L. Burgess, and W. R. Keammerer 1976 – Forest overstory vegetation and environment on the Missouri River floodplain in North Dakota. Ecological Monographs 46:59-84.

Johnston, D. S. and M. B. Fenton 2001 – Individual and population-level variability in diets of pallid bats (*Antrozous pallidus*). Journal of Mammalogy 82:362-373.

Jones, J. A.; Swanson, F. J.; Wemble, B. C.; and K. U. Snyder 2000 – Effects of roads on hydrology, geomorphology, and disturbance patches in stream networks. Conservation Biology. 14(1): 76-85.

Karl, A. 1989 – Investigations of the desert tortoise at the California Department of Health Services' proposed low-level radioactive waste facility site in Ward Valley, California. Proceedings of the Desert Tortoise Council Symposium, 1989:190.

Kerlinger, P. 2004 – Attraction of Night Migrating Birds to FAA and Other Types of Lights. Proc. Onshore Wildlife Interactions with Wind Developments: Research Meeting V, Lansdowne, Virginia, November 3–4, 2004, prepared for the Wildlife Subcommittee of the National Wind Coordinating Committee by RESOLVE, Inc., Washington, D.C.

Keator, G. 1993 – *Androstephium.* Page 1170 *in* J. Hickman (ed.) The Jepson Manual: Higher Plants of California. University of California Press, Berkeley, California.

Keator, G. 2001 – *Androstephium.* Page 547 *in* B. Baldwin, et al. (eds.) The Jepson Desert Manual: Vascular Plants of Southeastern California. University of California Press, Berkeley, California.

Keeler-Wolf, T. 2007 – Mojave Desert scrub vegetation. Pages 609-656 *in* M. G. Barbour, T. Keeler-Wolf, and A. A. Schoenherr, eds. Terrestrial Vegetation of California, 2nd ed. University of California Press, Berkeley.

Kochert, M. N., K. Steenhof, C. L. Mcintyre and E. H. Craig 2002 – Golden Eagle (*Aquila chrysaetos*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online. [online]: http://bna.birds.cornell.edu/bna/species/684doi:10.2173/bna.684.

Kovach, S. D. 1979 – An ecological survey of the White Mountain bighorn. Desert Bighorn Council Transactions 23:57-61.

Krausman, P.R., B.D. Leopold, R.K. Seegmiller, and S.G. Torres. 1989 – Relationships between desert bighorn sheep and habitat in western Arizona. Wildlife Monographs 102:1-66.

Krausman, P.R., A.V. Sandoval, and R.C. Etchberger. 1999 – Natural history of desert bighorn sheep. Pages 139-191 in R. Valdez and P. Krausman (eds.), Mountain Sheep of North America. University of Arizona Press, Tucson. 353 pp.

Krausman, P R., M.C. Wallace, C.L. Hayes, and D. W. DeYoung 1998 – Effects of jet aircraft on mountain sheep. *The Journal of Wildlife Management* 62(4): 1246-1254.

Krutzsch, P. H. 1948 – Ecological study of bats in San Diego County, California. M.S. Thesis. University of California, Berkeley. 184 pp.

Lancaster, N., Tchakerian, V.P., 2003 – Late Quaternary aeolian dynamics, Mojave Desert, California. In: Enzel, Y., Wells, S.G., Lancaster, N. (Eds.), Paleoenvironments and Paleohydrology of the Mojave and Southern Great Basin Deserts. Geological Society of America Special Paper 368, pp. 231–249.

Lathrop, E. W., and E. F. Archibald 1980 – Plant responses to utility right of way construction in the Mojave Desert. Environmental Management 4:215–226.

Laudenslayer, W. F., Jr., A. S. England, S. Fitton, and L. Saslaw 1992 – The *Toxostoma* Thrashers of California: Species at Risk? *In* 1992 Transactions of the Western Section of the Wildlife Society 28:22-29. [online]: http://www.fs.fed.us/psw/publications/laudenslayer.psw_1992_laudenslayer_wildlife.pdf. Accessed 07/01/09.

Leppig, G. and J. W. White 2006 – Conservation of peripheral plant populations in California. Madrono, Vol. 53, No. 3, pp. 264–274 (2006).

Lieberman, M and D. Lieberman 1969 – The evolutionary dynamics of the desert woodrat, *Neotoma lepida*. Evolution. 24(3): 560-570.

Light, J. T. 1971 – An ecological view of bighorn habitat on Mt. San Antonio. Transactions of the North American Wild Sheep Conference 1:150-157.

Lill, C. 2010 – Email from Camille Lill (URS Corporation) to Scott White regarding vegetation impacts within revised Calico Solar Project boundary. June 4, 2010.

Long, C. A. 1973 – *Taxidea taxus*. Mammalian Species 26:1-4. American Society of Mammalogists.

Longcore, T. and Rich, C. 2004 – Ecological light pollution. Frontiers in Ecology and the Environment 2: 191–198.

Lovich, J. E. 1998 – Human-induced changes in the Mojave and Colorado Desert ecosystems: recovery and restoration potential. Pages 529–531 in M. J. Mac, P. A. Opler, C. E. Puckett Haecker, and P. D. Doran (eds.). Status and trends of the nation's biological resources. U.S. Department of the Interior, U.S. Geological Survey, Reston, VA.

Lovich et al. 1996.

Lovich, J. E., J. Randall, and M. Kelly 1997 – Proceedings California Exotic Pest Plant Council Symposium '96. California Exotic Pest Plant Council, 110 pp.

Lovich, J. E., and D. Bainbridge 1999 – Anthropogenic Degradation of the Southern California Desert Ecosystem and Prospects for Natural Recovery and Restoration. Environmental Management Vol. 24, No. 3, pp. 309–326.

Lovich, J. E. and K. R. Beaman 2007 – A history of the Gila monster (*Heloderma suspectum cinctum*) records from California with comments on factors affecting their distribution. *Bull.* Southern *California Acad. Sci.* 106(2): 39-58.

Luz (Luz Solar Partners VIII & IX, Ltd.) 2007 – Biological Resources Mitigation Implementation Plan (BRMIP) Third Quarter 2007 Compliance Report for the SEGS VIII and IX Project Area Harper Lake, California dated 10/19/07. Submitted to the California Energy Commission.

Mack, R. N. 2002 – Natural barriers to plant naturalizations and invasion in the Sonoran Desert. Pages 63-76 *in* B. Tellman (ed.), Invasive Exotic Species in the Sonoran Region. University of Arizona Press and Arizona-Sonora Desert Museum, Tucson Arizona.

MacKay, P. No date. White-margined beardtongue. Unpublished report prepared for the Bureau of Land Management, Riverside, California.

MacKay, P. 2003 – Mojave Desert Wildflowers. Falcon Press, Guilford, Connecticut.

Mahoney, J. M. and Rood S. B. 1998 – Streamflow requirements for cottonwood seedling recruitment: an integrative model. Wetlands 18: 634-45.

Manville, A. M. II 2001 – The ABCs of avoiding bird collisions at communication towers: Next steps. Pp. 85–103 in Avian Interactions with Utility and Communication Structures, Proceedings of a workshop held in Charleston, South Carolina, December 2–3, 1999. R. L. Carlton, ed. Concord, California: Electric Power Research Institute.

Martin, D. C. 1973 – Selected Aspects of Burrowing Owl Ecology and Behavior. The Condor 75(4): 446-456.

Martin, T. E. and G. R. Geupel 1993 – Nest monitoring plots: methods for locating nests and monitoring success. J. Field Ornithology 64: 507-519. [online]: http://www.umt.edu/MCWRU/.../Martin%20&%20Geupel%201993.pdf.

Master, L., D. Faber-Langendoen, R. Bittman, G. A., Hammerson, B. Heidel, J. Nichols, L. Ramsay, and A. Tomaino. 2009. NatureServe Conservation Status Assessments: Factors for Assessing Extinction Risk. NatureServe, Arlington, VA. http://www.natureserve.org/publications/ConsStatusAssess_StatusFactors.pdf.

Mayhew, W. W. 1964 – Photoperiodic responses in three species of the lizard genus Uma. Herpetologica 20, pp. 95-113.

McCrary, M. D., R. L. McKernan, R. W. Schreiber, W. D. Wagner and T. C. Sciarrotta 1986 – Avian Mortality at a Solar Energy Power Plant. *Journal of Field Ornithology,* Vol. 57, No. 2 pp. 135-141.

McGahan, J. 1968 – Ecology of the golden eagle. Auk 85:1-12.

McMinn, H. E. 1939 – Illustrated manual of California shrubs. University of California Press, Berkeley.

Meffe, G. and C.R. Carroll (eds.). 1997. Principles of conservation biology, 2nd ed. Sinauer Associates, Inc., Sunderaland, MA. 729 pp.

Miner, K. L., and D. C. Stokes 2005 – Bats in the South Coast Ecoregion: Status, Conservation Issues, and Research Needs. USDA Forest Service General Technical Publication 195.

Minnich, R., A. Sanders, S. Wood, K. Barrows, and J. Lyman 1993 – Natural Resources Management Plan: Marine Corps Air-Ground Combat Center, Twentynine Palms, California. Unpublished report, Dept. of Earth Sciences, University of California, Riverside, California.

Minta, S. C. 1993 – Sexual differences in spatio-temporal interaction among badgers. Oecologia 96:402-409.

Mojave Desert Ecosystem Program. Geospatial Data and Information Portal. [online]: http://www.mojavedata.gov/metadata.php.

Morse, L.E., J.M. Randall, N. Benton, R. Hiebert, and S. Lu. 2004. An Invasive Species Assessment Protocol: Evaluating Non-Native Plants for Their Impact on Biodiversity. Version 1. NatureServe, Arlington, Virginia. http://www.natureserve.org/publications/pubs/invasiveSpecies.pdf.

Mount, Jeffrey F. 1995 – California Rivers and Streams, The Conflict Between Fluvial Process and Land Use. University of California Press, Berkeley and Los Angeles, California.

Munz, P. A. 1974 – Flora of Southern California. University of California Press, Berkeley. 1086 pp.

Murphy, R. W., T. L. Trepanier, and D. J. Morafka 2006 – Conservation genetics, evolution and distinct population segments of the Mojave fringe-toed lizard, *Uma scoparia*. Journal of Arid Environments 67 (Supplement S), pp. 226-247.

Murphy, R. W., K. H. Berry, T. Edwards, A. M. McLuckie 2007 – A Genetic Assessment of the Recovery Units for the Mojave Population of the Desert Tortoise, *Gopherus agassizii* Chelonian Conservation and Biology 6(2):229-251.

Nature Conservancy 2007 – A Conservation Management Strategy for Nine Low Elevation Rare Plants In Clark County, Nevada. TNC Nevada Field Office, Reno.

Newton, G. A. and V. P. Claassen 2003 – Rehabilitation of Disturbed Lands in California: A Manual for Decision-Making. California Department of Conservation, California Geological Survey. 228 p.

Nicholson, L. 1978 – The effects of roads on desert tortoise populations. Proc. Symp., Desert Tort. Council 1978: 127-129.

Norris, K. S. 1958 – The evolution and systematics of the iguanid genus *Uma* and its relation to the evolution of other North American desert reptiles. Bull. Amer. Mus. Nat. Hist. 114, pp. 247-328.

Noss, R. F. 1987 – Corridors in real landscapes: A reply to Simberloff and Cox. Conservation Biology. 1(2): 159-164.

NPS 2002 – National Park Service. Mojave National Preserve General Management Plan. April 2002. [online]: http://www.nps.gov/moja/parkmgmt/gmp.htm

Nussear, K. E., Esque, T. C., Inman, R. D., Gass, Leila, Thomas, K. A., Wallace, C. S. A., Blainey, J. B., Miller, D. M., and Webb, R. H. 2009 – Modeling habitat of the desert tortoise (*Gopherus agassizii*) in the Mojave and parts of the Sonoran Deserts of California, Nevada, Utah, and Arizona: U.S. Geological Survey Open-File Report 2009-1102, 18 p.

Okin, G. S., B. Murray and W. H. Schlesinger 2001 – Degradation of sandy arid shrubland environments: observations, process modeling, and management implications. Journal of Arid Environments Vol. 47, No. 2, pp. 123–144.

Pagel, J.E., D.M. Whittington and G.T. Allen. 2010. Interim Golden Eagle inventory and monitoring protocols; and other recommendations. Division of Migratory Birds, United States Fish and Wildlife Service. February.

Papouchis, C. M., Singer, F. J. & Sloan, W. B. 2001– Responses of desert bighorn sheep to increased human recreation. J. Wildl. Manage., 65: 573-582.

Parendes, L. A. and J. A. Jones 2000 – Role of light availability and dispersal in exotic plant invasion along roads and streams in the H. J. Andrews Experimental Forest, Oregon. Conservation Biology. 14(1): 64-75.

Pavlik, B. M. 1996 – Defining and measuring success. In: D. A. Falk, C. I. Millar, and M. Olwell eds. Restoring Diversity: Strategies for Reintroduction of Endangered Plants. Island Press, Washington, DC.

Polite, C. and J. Pratt 2005 – Prairie Falcon (*Falco mexicanus*). California Wildlife Habitat Relationships System, California Department of Fish and Game, California Inter-agency Wildlife Task Group. [online]: http://www.dfg.ca.gov/whdab/cwhr/A043.html.

Reijnen, R., Foppen, R., Braak, C. T., and J. Thissen 1995 – The effects of car traffic on breeding bird populations in woodland. Journal of Applied Ecology. 32(1): 187-202.

Remsen, J. V., Jr. 1978 – Bird species of special concern in California: An annotated list of declining or vulnerable bird species. Nongame Wild. Invest., Wildl. Mgmt Branch Admin. Rep 78-1, California Dept. Fish & Game, Sacramento.

Rittenhouse, C. D., J. J. Millspaugh, M. W. Hubbard, and S. L. Sheriff 2007 – Movements of translocated and resident three-toed box turtles. Journal of Herpetology 41:115–121.

Rosenblum, E. B.; Hoekstra, H. E.; and M. W. Nachman 2004 – Adaptive reptile color variation and the evolution of the *MC1R* gene. Evolution. 58(8): 1794-1808.

Sanders, A. C. No date. Crucifixion thorn. Unpublished report prepared for the Bureau of Land Management, Riverside, California.

Sawyer, H., R. Neilson, and M. Hicks. 2009 – Distribution and habitat selection patterns of mountain sheep in the Laramie Range. Western Ecosystems Technology, Inc., Cheyanne, Wyoming. 30 pp.

Sawyer, J. O., T. Keeler-Wolf, and J. M. Evans 2009 – Manual of California Vegetation, 2nd ed. California Native Plant Society, Sacramento. 1300 pp.

Schoenherr, A. A. 1992 – A Natural History of California. University of California Press: Berkeley. 772 pp.

Schwartz, O. A., V. C. Bleich, and S. A. Holl 1986 – Genetics and the conservation of mountain sheep *Ovis canadensis nelsoni*. *Biol. Conserv*. 37:179-190.

Scogin, R. 1989 – Studies of *Penstemon albomarginatus* in California. Unpublished report, Rancho Santa Ana Botanic Garden, Claremont, California.

SES 2008. Stirling Energy Systems/R. Liden (tn 49181). Application for Certification, dated December 1, 2008. Submitted to CEC/Docket Unit on December 1, 2008.

SES 2009a – Applicant's Draft Review of Federal and State Surface Waters, March 19, 2009.

SES 2009b – Applicant's Response to BLM and Energy Commission Data Requests 1-3, 5-10, 24-26, 31-33, 36-38, 44, and 111-127, March 19, 2009.

SES 2009c – Applicant's Response to BLM and Energy Commission Data Requests 53-110, March 26, 2009.

SES 2009d – Stirling Energy Systems/C. Champion (tn 50880). Supplement to the Application for Certification, dated April 6, 2009. Submitted to CEC/Docket Unit on April 6, 2009.

SES 2009e – Applicant's Response to California Unions for Reliable Energy Data Requests 1-143, May 6, 2009.

SES 2009f – Applicant's Response to California Unions for Reliable Energy Data Requests 144-178, July 2, 2009.

SES 2009g – Applicant's Response to BLM and Energy Commission Data Requests 31-32 (DESCP/SWPPP, Vol. 1 and 2), July 2, 2009.

SES 2009h – Applicant's Response to BLM and Energy Commission Data Requests 151-155, July 6, 2009.

SES 2009i – Stirling Energy Systems/C. Champion (tn 52457). Applicant's Responses to CURE's Data Requests Set 1, dated July 16, 2009. Submitted to CEC/Docket Unit on July 20, 2009.

SES 2009j – Stirling Energy Systems/C. Champion (tn 52466). Applicant's Responses to Energy Commission and Bureau of Land Management's Data Requests Set 1, Part 1, dated July 17, 2009. Submitted to CEC/Docket Unit on July 20, 2009.

SES 2009k – Stirling Energy Systems/C. Champion (tn 52467). Applicant's Raven Monitoring and Control Plan, dated July 17, 2009. Submitted to CEC/Docket Unit on July 20, 2009.

SES 2009l – Stirling Energy Systems/C. Champion (tn 52468). Applicant's Report to Map Federal and State Surface Waters, dated July 17, 2009. Submitted to CEC/Docket Unit on July 20, 2009.

SES 2009m – URS/C. Lytle (tn 52599). Applicant's Response to CURE Data Requests, dated July 27, 2009. Submitted to CEC/Docket Unit on July 28, 2009.

SES 2009n – Stirling Energy Systems/F. Bellows (tn 52630). Applicant's Response to Public Comments for June 22 Informational Hearing and Site Visit, dated July 30, 2009. Submitted to CEC/Docket Unit on July 30, 2009.

SES 2009o – Stirling Energy Systems/C. Champion (tn 52877). Applicant's Response to CURE Data Requests Set 2 (Data Requests 229-275), dated August 13, 2009. Submitted to CEC/Docket Unit on August 17, 2009.

SES 2009p – Stirling Energy Systems/C. Champion (tn 52956). Applicants' Response to Energy Commission & Bureau of Land Management's Data Requests 113-127 of Data Requests Set 1, Part 2, dated August 20, 2009. Submitted to CEC/Docket Unit on August 24, 2009.

SES 2009q – Stirling Energy Systems/C. Champion (tn 53067). Applicant's Responses to Energy Commission & Bureau of Land Management's Data Request 1-91 of Data Request Set 1, Part 1, dated August 28, 2009. Submitted to CEC/Docket Unit on August 28, 2009.

SES 2009r – Stirling Energy Systems/C. Champion (tn 53093). Applicant's Responses to Energy Commission and Bureau of Land Management's Data Requests 1-48, 81, and 109-112 of Set 1 Parts 1 and 2, dated August 31, 2009. Submitted to CEC/Docket Unit August 31, 2009.

SES 2009s – Stirling Energy Systems/C. Champion (tn 53094). Applicant's Response to Energy Commission and Bureau of Land Management's Data Requests 81 – Drainage, Erosion, and Sediment Control Plan, dated August 31, 2009. Submitted to CEC/Docket Unit on August 31, 2009.

SES 2009t – Stirling Energy Systems/F. Bellows (tn 53678). Applicant's Response to Energy Commission & Bureau of Land Management's Requests During the September 16th Workshop, dated October 15, 2009. Submitted to CEC/Docket Unit on October 19, 2009.

SES 2009u – Stirling Energy Systems/C. Champion (tn 54099). Applicant's Response to CURE Data Requests 276-380 of Set 3, dated November 12, 2009. Submitted to CEC/Docket Unit on November 13, 2009.

SES 2009v – Stirling Energy Systems/C. Champion (tn 54272). Applicant's Response to Energy Commission & Bureau of Land Management's Data Requests Set 1, Part 1 & Set 2, Part 1 Data Requests 71-73, 76-79, 85 & 128-141, dated November 23, 2009. Submitted to CEC/Docket Unit on November 24, 2009.

SES 2009w – URS/C. Lytle (tn 54352). Applicant's Response to CURE Data Requests Set 4, dated December 1, 2009. Submitted to CEC/Docket Unit on December 3, 2009.

SES 2009x – Stirling Energy Systems/C. Champion (tn 54385). Applicant's Response to Defenders of Wildlife Set 1 Data Requests 1-11 and Basin and Range Watch Data Requests Set 1 Data Request 1-3, dated December 4, 2009. Submitted to CEC/Docket Unit on December 4, 2009.

SES 2009y – Stirling Energy Systems/C. Champion (tn 54386). Applicant's Response to Energy Commission & Bureau of Land Management's Data Requests Set 2, dated December 4, 2009. Submitted to CEC/Docket Unit on December 4, 2009.

SES 2009z – Stirling Energy Systems/F. Bellows (tn 54427). Applicant's Updated Project Map, dated December 10, 2009. Submitted to CEC/Docket Unit on December 14, 2009.

SES 2009aa – URS/C. Lytle (tn 54619). Biological(Bio) Resources Technical(Tech) Report(Rpt), Noxious Weed Management(Mgmt) Plan, Biological(Bio) Resources Baseline Survey, dated December 23, 2009. Submitted to CEC/Docket Unit on December 23, 2009.

SES 2010 – Stirling Energy Systems/C. Champion (tn 54869). Applicant Submittal of Additional Information Regarding Project Water Supply, dated January 15, 2010. Submitted to CEC/Docket Unit on January 19, 2010.

Sharifi, M. R., A. C. Gibson, and P. W. Rundel 1997 – Surface dust impacts on gas exchange in Mojave Desert shrubs. Journal of Applied Ecology 34:837-846.

Sharifi, M. R., A. C. Gibson, and P. W. Rundel 1999 – Phenological and physiological responses of heavily dusted creosote bush (Larrea tridentata) to summer irrigation in the Mojave Desert. Flora 194:369-378.

Sheppard, J. M. 1996 – Le Conte's Thrasher (Toxostoma lecontei). In A. Poole and F. Gill (eds.), The Birds of North America, No. 230. The Academy of Natural Sciences, Philadelphia, PA, and the American Ornithologists' Union, Washington, D. C. Retrieved from the Birds of North America Online. [online]: http://bna.birds.cornell.edu/bna/species/230doi:10.2173/bna.230

Shreve, F. and I. L. Wiggins 1964 – Vegetation and Flora of the Sonoran Desert. Stanford University Press, Stanford, California.

Simberloff, D., J. A. Farr, J. Cox, and D. W. Mehlman 1992 – Movement corridors: conservation bargains or poor investments? Conservation Biology 6:493-504.

Smith, S. D. 1984 – Environmental effects of solar thermal power systems (STPS): Analysis of plant invasion into the Barstow 10 MWe STPS. U. S. Department of Energy Contract No. DE-AM03-76-SF00012.

Smith, S. D., D. T. Patten and R. K. Monson 1987 – Effects of artificially imposed shade on a Sonoran Desert ecosystem: microclimate and vegetation. *Journal of Arid Environments* Vol. 13, No. 1, pp. 65–82.

SCBS 2009 – Society for the Conservation of Bighorn Sheep/G. Kerr (tn 52127). Society for the Conservation of Bighorn Sheep's Scoping Comments, dated June 22, 2009. Submitted to CEC/Docket Unit on June 23, 2009.

Sorenson, Peter. Wildlife Biologist, US Fish and Wildlife Service. Telephone conversations with Susan Sanders, California Energy Commission, March 10, 2010, regarding impacts to golden eagles, burrowing owls, and other species for the Genesis Power Project Supplemental Staff Assessment July 2010.

Soulé, M. E., D. T. Bolger, A. C. Alberts, J. Wright, M. Sorice, and S. Hill 1988 – Reconstructed dynamics of rapid extinctions of chaparral-requiring birds in urban habitat islands. Conservation Biology 2:75-92.

Spellenberg, R. 2002 – Nyctaginaceae. Pages 376-382 in B. G. Baldwin et al., The Desert Jepson Manual: Vascular Plants of Southeastern California. University of California Press, Berkeley.

Spencer, W.D., P. Beier, K. Penrod, K. Winters, C. Paulman, H. Rustigian-Romsos, J. Strittholt, M. Parisi, and A. Pettler. 2010. California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California. Prepared for California Department of Transportation, California Department of Fish and Game, and Federal Highways Administration.

Stebbins, Robert C. 1944 – Some aspects of the ecology of the iguanid genus, Uma. Ecological Monographs, vol. 14, no 3, pp. 311-332.

Steenhof, K. 1998 – Prairie Falcon (*Falco mexicanus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online. [online]: http://bna.birds.cornell.edu/bna/species/346

Sterling, J. 2008 – Bendire's Thrasher (*Toxostoma bendirei*). In: Shuford, W. D. and T. Gardali (eds). California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Strassburger, Marie. Regional Migratory Bird Chief, US Fish and Wildlife Service. Electronic Communication with Sara Keeler, California Energy Commission, February 2, 2010, regarding the Eagle Act.

Sullivan, J. 1996 – *Taxidea taxus*. *In* Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). [online]: http://www.fs.fed.us/database/feis/wildlife/mammal/tata/all.html.

Sullivan, C. 2008 – Personal communication between Susan Sanders and Charles Sullivan, Bureau of Land Management. Wildlife Biologist, Needles Office. Meeting on November 5, 2008.

TS 2010a – Tessera Solar/F. Bellows (tn 55391). Drainage Layout Figure, dated February 12, 2010. Submitted to CEC/Docket Unit on February 16, 2010.

TS 2010b – Tessera Solar/F. Bellows (tn 55515). Applicant's Submittal of Burrowing Owl Survey Report, dated February 13, 2010. Submitted to CEC/Docket Unit on February 22, 2010.

TS 2010c – Tessera Solar/F. Bellows (tn 55823). Applicant's Submittal of the Revised Calico Solar Project Layout Figure, date March 8, 2010. Submitted to CEC/Docket Unit on March 10, 2010.

TS 2010d – Tessera Solar/F. Bellows (tn 56536). Applicant's Submittal of Additional Information, date May 4, 2010. Submitted to CEC/Docket Unit on May 5, 2010.

TS 2010e – Tessera Solar/F. Bellows (tn 56789). Applicant's Submittal of Results of 2010 Desert Tortoise Surveys, date May 18, 2010. Submitted to CEC/Docket Unit on May 18, 2010.

TS 2010f – Tessera Solar/F. Bellows (tn 56502). Applicant's Submittal of Results from Helicopter Surveys of Golden Eagle Nests & Bighorn Sheep, date April 30, 2010. Submitted to CEC/Docket Unit on April 30, 2010.

TS 2010g – Tessera Solar/F. Bellows (tn 56100). Applicant's Submittal of Results of the 2010 Burrowing Owl Survey, date March 26, 2010. Submitted to CEC/Docket Unit on March 26, 2010.

TS 2010h – Tessera Solar/F. Bellows (tn 56287). Applicant's Submittal of Comments on the SA/DEIS, date April 14, 2010. Submitted to CEC/Docket Unit on April 15, 2010.

TS 2010i – Tessera Solar/F. Bellows (tn 56786). Applicant's Submittal of Results of First Round of 2010 Spring Botany Surveys, date May 20, 2010. Submitted to CEC/Docket Unit on May 24, 2010.

TS 2010j – Tessera Solar/F. Bellows (tn 57018). Applicant's Submittal of Alternative Site Layout #2, Engineering Figure with SunCatcher Layout, and Revised Project Boundary with 4000' Desert Tortoise Corridor Figure, date June 2, 2010. Submitted to CEC/Docket Unit on June 2, 2010.

Teixeira, C. P., C. S. De Azevedo, M. Mendl, C. F. Cipreste, and R. J. Young 2007 – Revisiting translocation and reintroduction programmes: The importance of considering stress. Animal Behaviour 73:1–13.

Thelander, C. G. 1974 – Nesting territory utilization by Golden Eagles (Aquila chrysaetos) in California during 1974, Spec. Wild. Investigations. California Department of Fish and Game, Sacramento.

Thomas, K., T. Keeler-Wolf, and J. Thorne 2002 – *Central Mojave Field Data. A digital database (Access)*. Flagstaff, AZ: U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center, Colorado Plateau Field Station.

Thomas, K., T. Keeler-Wolf, J. Franklin, and P. Stine 2004 – Mojave Desert Ecosystem Program: Central Mojave Vegetation Database. Prepared for Mojave Desert Ecosystem Program, U.S. Geological Survey Western Ecological Research Center, Sacramento, California and Southwest Biological Science Center,

Flagstaff, Arizona. [online]: http://www.dfg.ca.gov/biogeodata/vegcamp/pdfs/VegMappingRpt_Central_Mojave_Vegetation_Database.pdf

Thorne, R. F. 1982 – The desert and other transmontane plant communities of southern California. Aliso 10:219-257.

Torres, S. G., V. C. Bleich, and J. D. Wehausen 1994 – Status of bighorn sheep in California, 1993. Desert Bighorn Counc. Trans. 38:17-28.

Torres, S. G., V. C. Bleich, and J. D. Wehausen 1996 – Status of bighorn sheep in California, 1995. Desert Bighorn Counc. Trans. 40:27-34.

Trombulak, S. C. and C. A. Frissell 2000 – Review of ecological effects of roads on terrestrial and aquatic communities. Conservation Biology. 14(1): 18-30.

Trulio L.A. 1995. Passive Relocation: A Method to Preserve Burrowing Owls on Disturbed Sites. Journal of Field Ornithology 66: 99-106.

Trulio L.A. 1997. Strategies for protecting western burrowing owls (*Speotyto cunicularia hypugaea*) from human activities. Pp 461-465 in Duncan, Johnson and Nicholls (Eds.). Biology and conservation of owls of the northern hemisphere. USDA Forest Service GTR NC 190.

Turner, R. M., J. E. Bowers, and T. L. Burgess 1995 – Sonoran desert plants: an ecological atlas. University of Arizona Press, Tucson, Arizona. 504 pp.

Turner, F. B., Weaver, D. C. and Rorabaugh, J. C. 1984 – Effects of reduction in windblown sand on the abundance of the fringe-toed lizard (Uma inornata) in the Coachella Valley, California. Copeia 1984, pp. 370-378.

URS 2008 – San Joaquin Solar 1 & 2 – Application for Certification Volume 2, Appendix L, "Glint and Glare Study." [online]: http://www.energy.ca.gov/sitingcases/sjsolar/documents/applicant/afc/AFC_volume_02/. Accessed January 2010.

URS 2010 – Microphyllous species: Calico Solar (map). Dated 16 Jun 2010.

USACE and CDFG 2009 – United States Army Corps of Engineers and California Department of Fish and Game. Newhall Ranch Resource Management and Development Plan and Spineflower Conservation Plan Joint Environmental Impact Statement and Environmental Impact Report. SCH No. 2000011025.

USEPA 2009 – United States Environmental Protection Agency/A. McPherson. (tn 52483). Scoping Comments from the USEPA, dated July 7, 2009. Submitted to CEC/Docket Unit on July 21, 2009.

USFS 2008 – USDA Forest Service. Species Accounts: Animals, Golden Eagle. [online]: http://www.fs.fed.us/r5/scfpr/projects/lmp/read.htm.

USFWS 1994a – United States Fish & Wildlife Service. Endangered and Threatened Wildlife and Plants; Determination of Critical Habitat for the Mojave Population of the Desert Tortoise. Federal Register Vol. 59, No. 26.

USFWS 1994b – United States Fish & Wildlife Service. Desert Tortoise (Mojave Population) Recovery Plan. U.S. Fish and Wildlife Service, Portland, Oregon.

USFWS 2004 – United States Fish and Wildlife Service. Endangered and threatened wildlife and plants; proposed designation of critical habitat for *Astragalus jaegerianus* (Lane Mountain milk-vetch). Federal Register 69:18018-18035.

USFWS 2005 – United States Fish and Wildlife Service. Endangered and threatened wildlife and plants; designation of critical habitat for *Astragalus jaegerianus* (Lane Mountain milk-vetch); final rule. Federal Register 70:18220-18241.

USFWS 2008a – United States Fish and Wildlife Service. Draft revised recovery plan for the Mojave population of the desert tortoise (*Gopherus agassizii*). U.S. Fish and Wildlife Service, California and Nevada Region, Sacramento, California.

USFWS 2008b – United States Fish and Wildlife Service. Environmental Assessment to Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise. Final Report. March 2008. 156 pp.

USFWS 2008c – United States Fish and Wildlife Service. Desert Tortoise Authorized Biologist and Monitor Responsibilities and Qualifications. November 2008. [online]: http://www.fws.gov/ventura/speciesinfo/protocols_guidelines.

USFWS 2009a – United States Fish and Wildlife Service. Final Environmental Assessment – Proposal to Permit Take Provided Under the Bald and Golden Eagle Protection Act. [online]: http://www.fws.gov/migratorybirds/CurrentBirdIssues/BaldEagle/FEA_EagleTakePermit_Final.pdf. Last accessed February 1, 2010.

USFWS 2009b – United States Fish and Wildlife Service. Preparing for Any Action that May Occur Within the Range of the Mojave Desert Tortoise. U.S. Fish and Wildlife Service. April 2009. 16 pp. [online]: http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/. Accessed 7-22-09.

USFWS 2009c – United States Fish and Wildlife Service. *Desert Tortoise Field Manual*. [online]: http://www.fws.gov/Ventura/speciesinfo/protocols_guidelines/

USFWS 2009d – Finding of No Significant Impact. Eagle Permits; Take Necessary to Protect Interest in a Particular Locality. Signed May 19, 2009, Last accessed February 7, 2010. [online]: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Management/BaldEagle/FONSI_EagleRule.09.pdf

USFWS 2009e – United States Fish and Wildlife Service. *Desert TortoiseSpotlight Species 5-year Action Plan*. US Fish and Wildlife Service, Nevada Fish and Wildlife Office, Reno, Nevada.

USFWS 2010 – United States Fish and Wildlife Service. Translocation of Desert Tortoises (Mojave Population) From Project Sites: Plan Development Guidance.

USFWS 2010b. (tn 56936). Renewable Energy Development and Common Raven Predation on the Desert Tortoise -Summary. May 2010.

USGS 2010 – United States Geological Survey. USGS National Hydrographic Dataset. [online]: http://nhd.usgs.gov

Vasek, F. C. 1980 – Creosote bush: long-lived clones in the Mojave Desert. American Journal of Botany 67:246-255.

Vistnes, I. and C. Nellemann 2001 – Avoidance of cabins, roads, and power lines by reindeer during calving. Journal of Wildlife Management. 65(4): 915-925.

von Seckendorff Hoff, K., and R. W. Marlow 1997 – Highways and roads are population sinks for desert tortoises. p. 482 in J. Van Abbema, ed. Proceedings: Conservation, Restoration, and Management of Tortoises and Turtles—An International Conference. New York Turtle and Tortoise Society and WCS Turtle Recovery Program.

von Seckendorff Hoff, K., and R. W. Marlow 2002 – Impacts of vehicle road traffic on desert tortoise populations with consideration of conservation of tortoise habitat in southern Nevada. Chelonian Conservation and Biology 4(2):449–456.

Wall, M. 2009 – Seed Collection Guidelines for California Native Plant Species. Rancho Santa Ana Botanic Garden, Claremont, California. 25 pp. http://rsabg.org/documents/horticulture/Seed%20Collecting%20and%20Storage%20Guidelines.pdf.

Watson, J., S. R. Rae, and R. Stillman 1992 – Nesting density and breeding success of Golden Eagles in relation to food-supply in Scotland. Journal of Animal Ecology 61:543-550.

Weaver, D. C. 1981 – Aeolian sand transport and deposit characteristics at ten sites in Coachella Valley, California. Part II. In: The effect of blowsand reduction on the abundance of the fringe-toed lizard (Uma inornata) in the Coachella Valley, California. A report submitted to U.S. Army Corps of Engineers, Los Angeles District.

Wehausen, J. D. 1980 – Sierra Nevada bighorn sheep: history and population ecology. Ph.D. Diss. Univ. Michigan, Ann Arbor. 240 pp.

Wehausen, J. D., 1992 – Demographic studies of mountain sheep in the Mojave Desert: Report IV. Unpublished report, California Department of Fish and Game, Sacramento. 54 pp.

Wehausen, J. D. 2005 – Nelson Bighorn Sheep *Ovis canadensis nelsoni*. Species Account, West Mojave Plan, Bureau of Land Management. Final environmental impact report and statement for the West Mojave plan: a habitat conservation plan and California desert conservation area plan amendment. Moreno Valley (CA): U.S. Dept. of the Interior, Bureau of Land Management, California Desert District.

Wehausen, J. D., L. L. Hicks, D. P. Garber and J. Elder 1977 – Bighorn sheep management in the Sierra Nevada. Trans. Desert Bighorn Council 21:30-32.

Welles, R. F. and F. B. Welles 1961 – The bighorn of Death Valley. Fauna of the national parks of the United States. USDI, NPS Fauna series No. 6, 242 p.

WWP 2009a – Western Watersheds Project/M. Conor (tn 52476). Western Watersheds' NEPA/CEQA Scoping Comments for Staff Assessment/Environmental Statement and CDCA Plan Amendment, dated July 7, 2009. Submitted to CEC/Docket Unit on Submitted to CEC/Docket Unit on July 20, 2009.

White, S. D., A. C. Sanders and M. Wilcox 1996 – Noteworthy collection: *Androstephium breviflorum*. Madrono 43:334-335.

White, P. J. and R. A. Garrott 1999 – Population dynamics of kit foxes. Canadian Journal of Zoology. 77(3): 486-493.

Whitfield D.P., Fielding, A.H., McLeod, D.R.A. and Haworth, P.F. 2008. A conservation framework for golden eagles: implications for their conservation and management in Scotland. Scottish Natural Heritage Commissioned Report No.193 (ROAME No. F05AC306).

Wijayratne, U. C.; Scoles-Sciulla, S. J.; and L. A. Defalco 2009 – Dust deposition effects on growth and physiology of the endangered *Astragalus jaegerianus* (Fabaceae). Madroño 56:2, 81-88

WC 2009a – Wildlands Conservancy (tn 52471). Scoping Comments from Wildlands Conservancy with Memo on Renewable Siting Criteria for CDCA, dated July 7, 2009. Submitted to CEC/Docket Unit on

WC 2009b – Wildlands Conservancy Mojave Desert Trails National Monument Proposal. [online]: http://www.wildlandsconservancy.org/pdf/MRNM12-16-09.pdf. Accessed January 26, 2010.

Williams, D. F. 1986 – Mammalian Species of Special Concern in California. California Department of Fish and Game, Wildlife Management Division, Administrative Report 86-1:1-112.

Wilson, D. E., and S. Ruff 1999 – The Smithsonian Book of North American Mammals. Smithsonian Institution Press, Washington D.C.

WRCC 2010 – Western Regional Climate Center. "Western U.S. Climate Historical Summaries." Report for Daggett FAA Airport, California (042257). [online]: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca2257. Accessed January 8.

WS 2009 – The Wilderness Society (tn 52470). The Wilderness Society's NEPA/CEQA Scoping Comments for Staff Assessment/Draft Environmental Impact Statement and CDCA Plan Amendment, dated July 7, 2009. Submitted to CEC/Docket Unit on July 20, 2009.

Yosef, R. 1996 – Loggerhead Shrike (*Lanius ludovicianus*). In: The Birds of North America, No. 231 (A. Poole and F. Gill [*eds*.]). The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D.C.

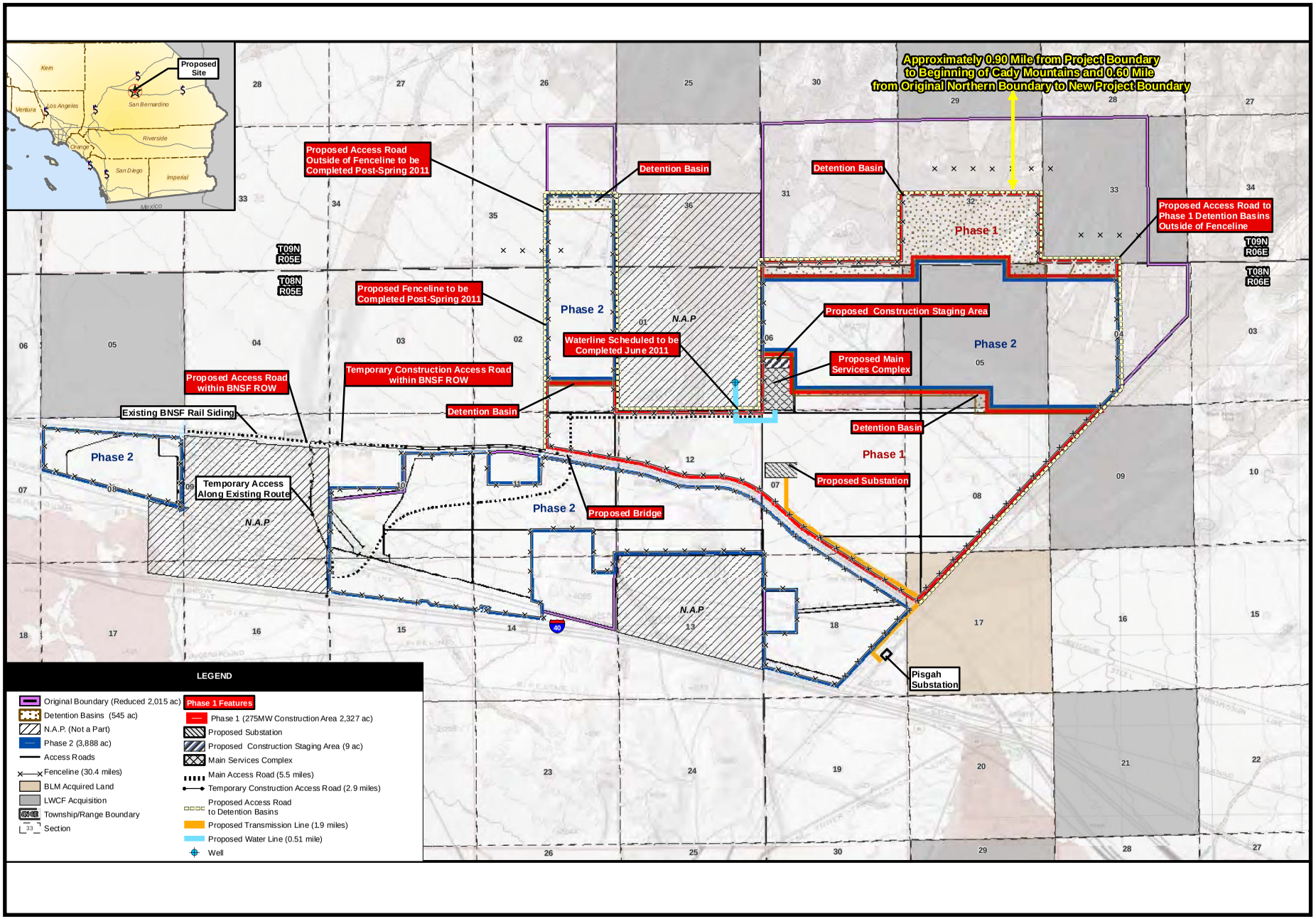
Zeiner, D. C., W. F. Laudenslayer, K. E. Mayer, and M. White 1990 – California's Wildlife: Mammals, Vol. III: Mammals. California Statewide Habitat Relationships System. The State of California, The Resources Agency, Department of Fish and Game. Sacramento, CA.

Zoellick, B. W. and N. S. Smith 1992 – Size and spatial organization of home ranges of kit foxes in Arizona. Journal of Mammalogy. 73(1): 83-88.

Zouhar, Kristin, Jane K. Smith, Steve Sutherland, and Matthew L. Brooks 2008 – Wildland Fire in Ecosystems: Fire and Nonnative Invasive Plants. General Technical Report RMRSGTR-42-Vol. 6, USDA Forest Service Rocky Mountain Research Station, Ogden, Utah: 355 pp.

BIOLOGICAL RESOURCES - FIGURE 1

Calico Solar Project - Proposed Project Footprint

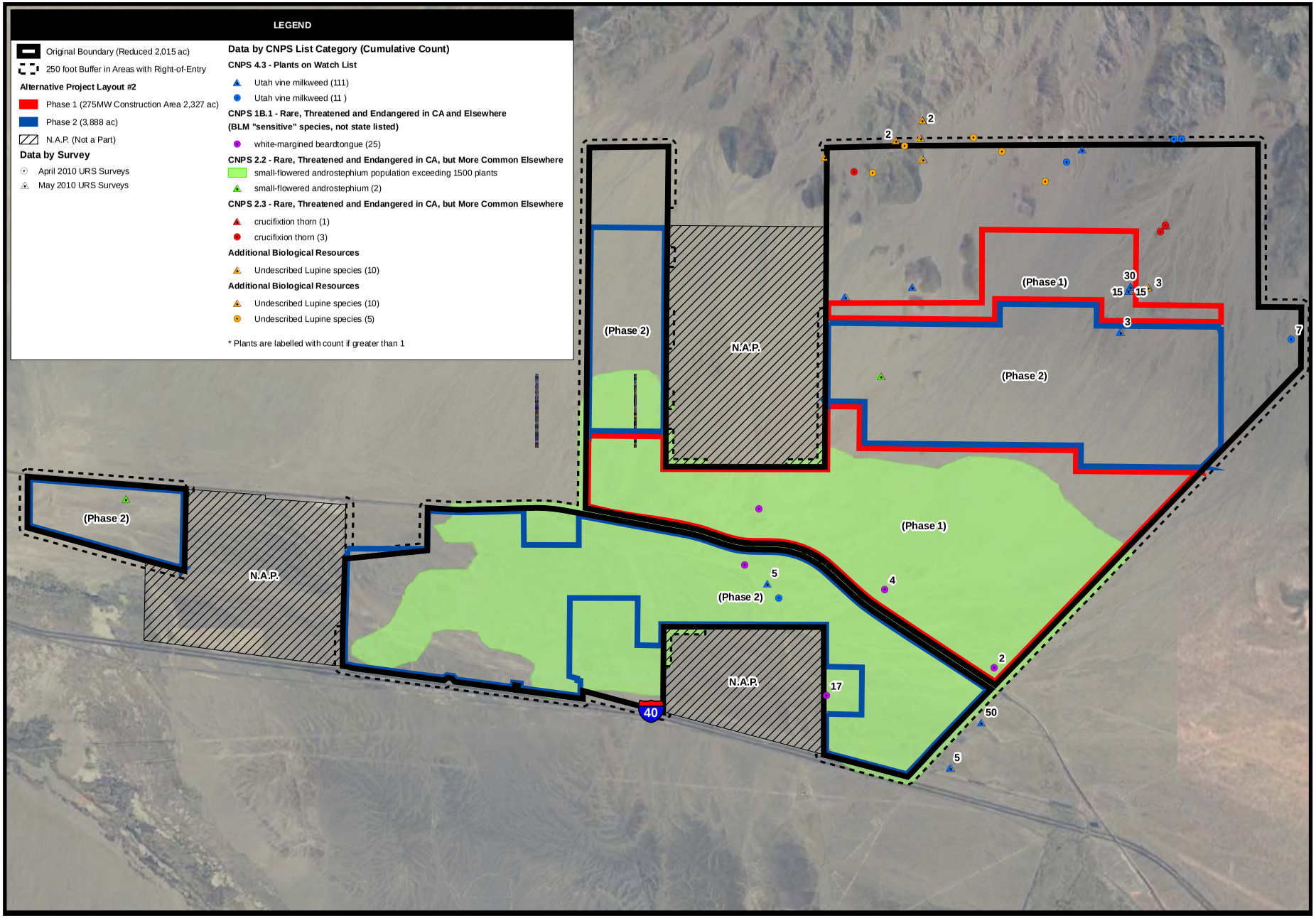


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: URS

BIOLOGICAL RESOURCES - FIGURE 2

Calico Solar Project - Rare Plant Locations

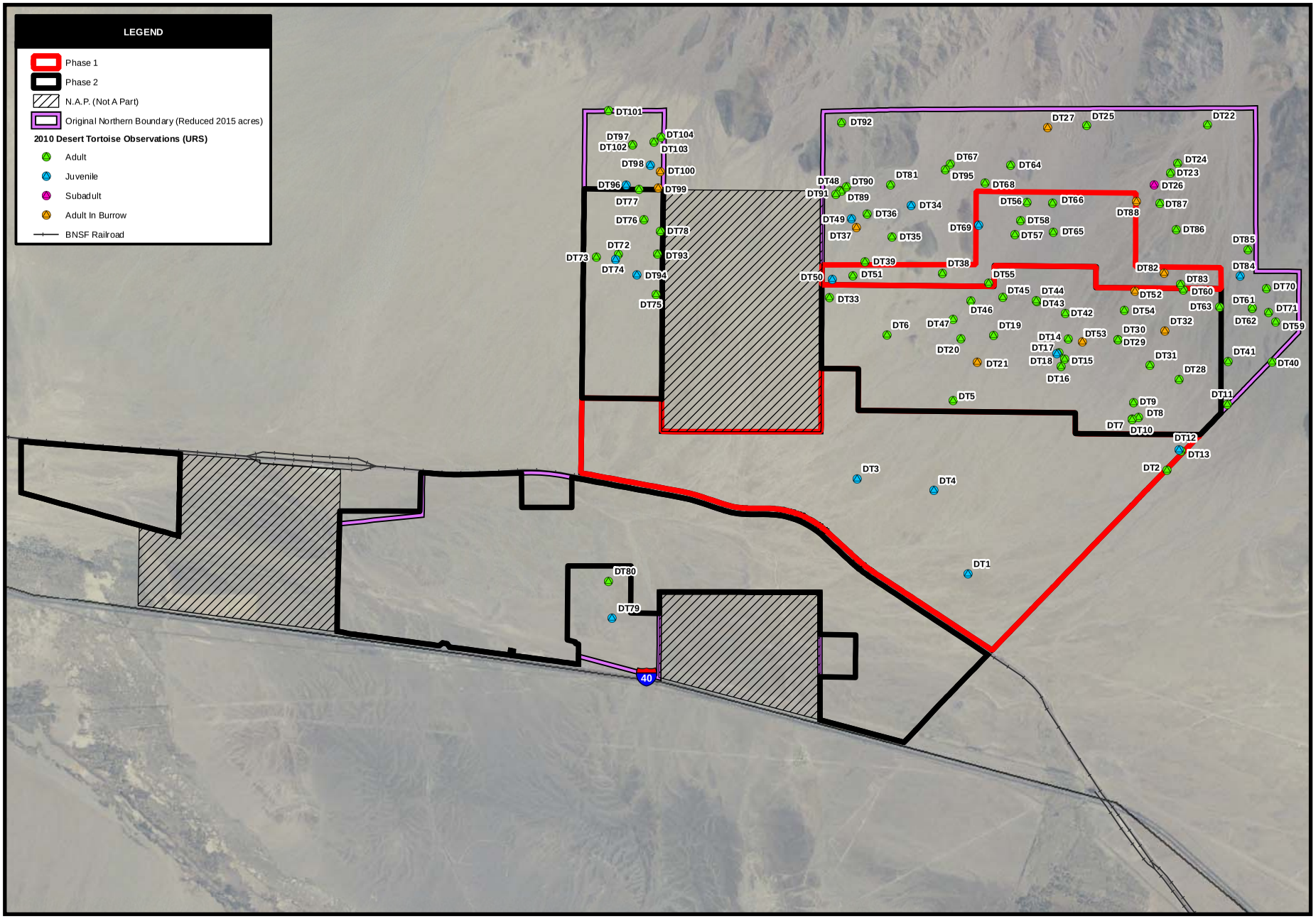


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: URS

BIOLOGICAL RESOURCES - FIGURE 3

Calico Solar Project - Desert Tortoise Sightings

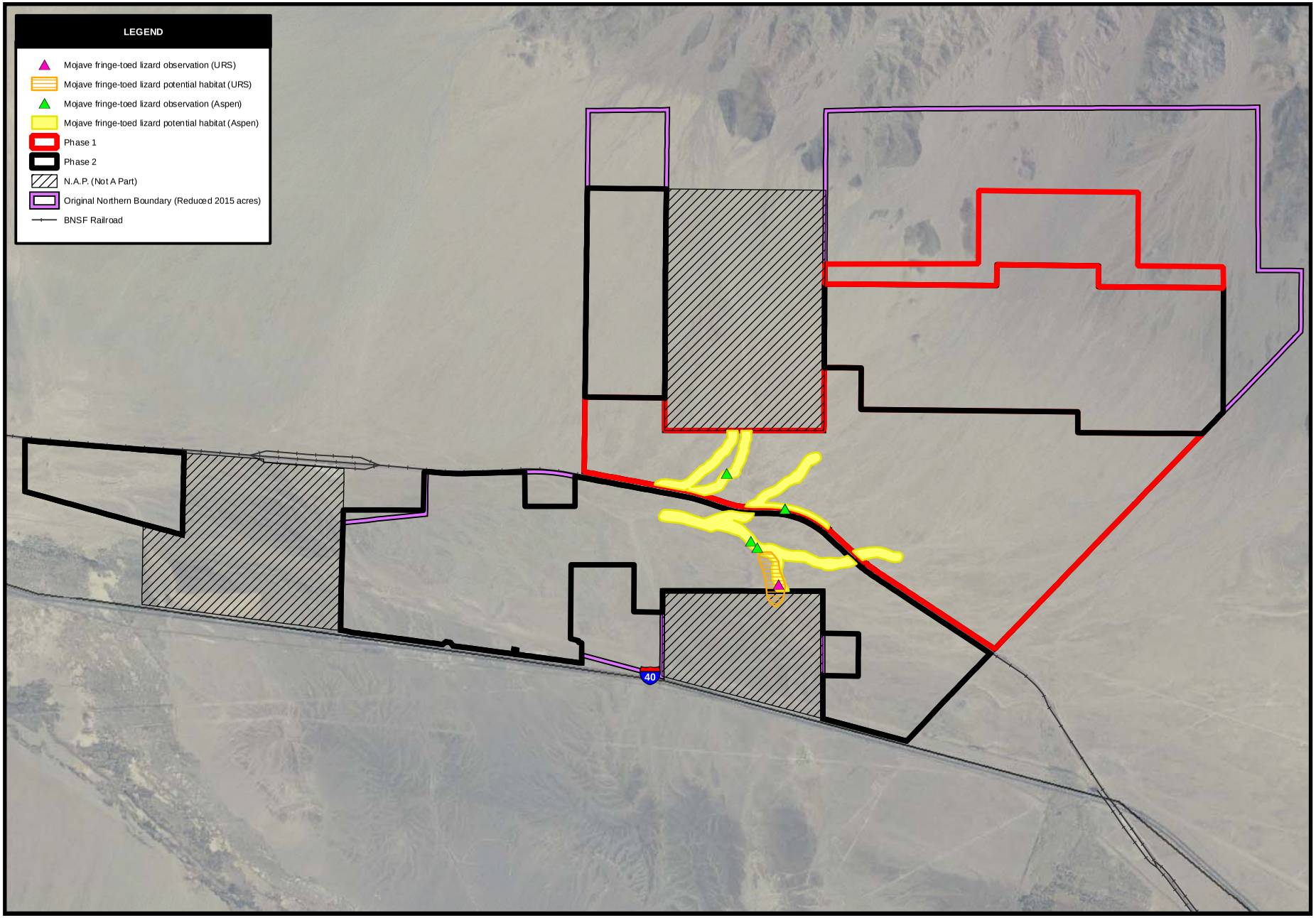


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: URS

BIOLOGICAL RESOURCES - FIGURE 4

Calico Solar Project - Mojave Fringe-Toed Lizard Observations and Habitat

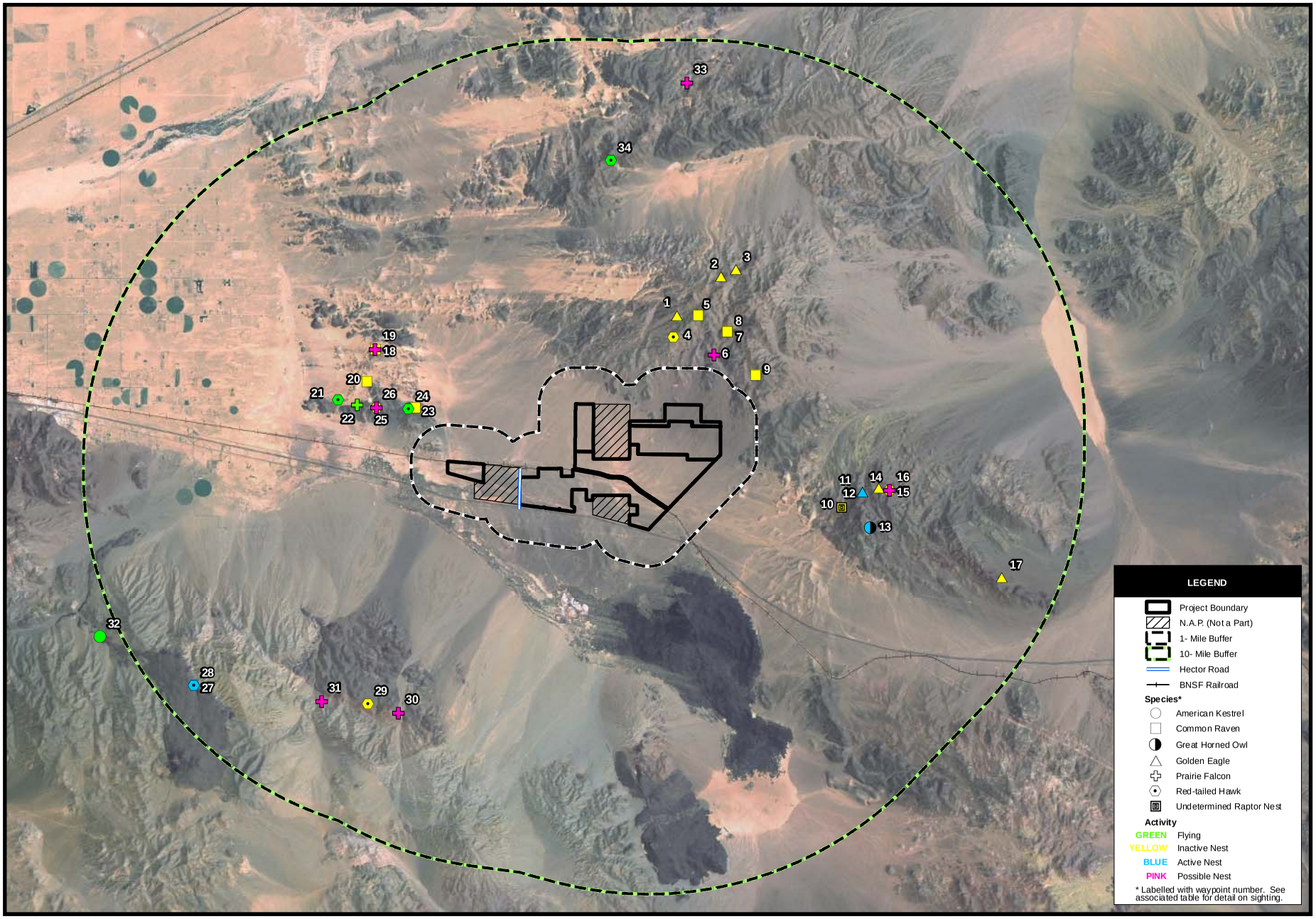


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: URS

BIOLOGICAL RESOURCES - FIGURE 5

Calico Solar Project - Golden Eagle Nest Locations

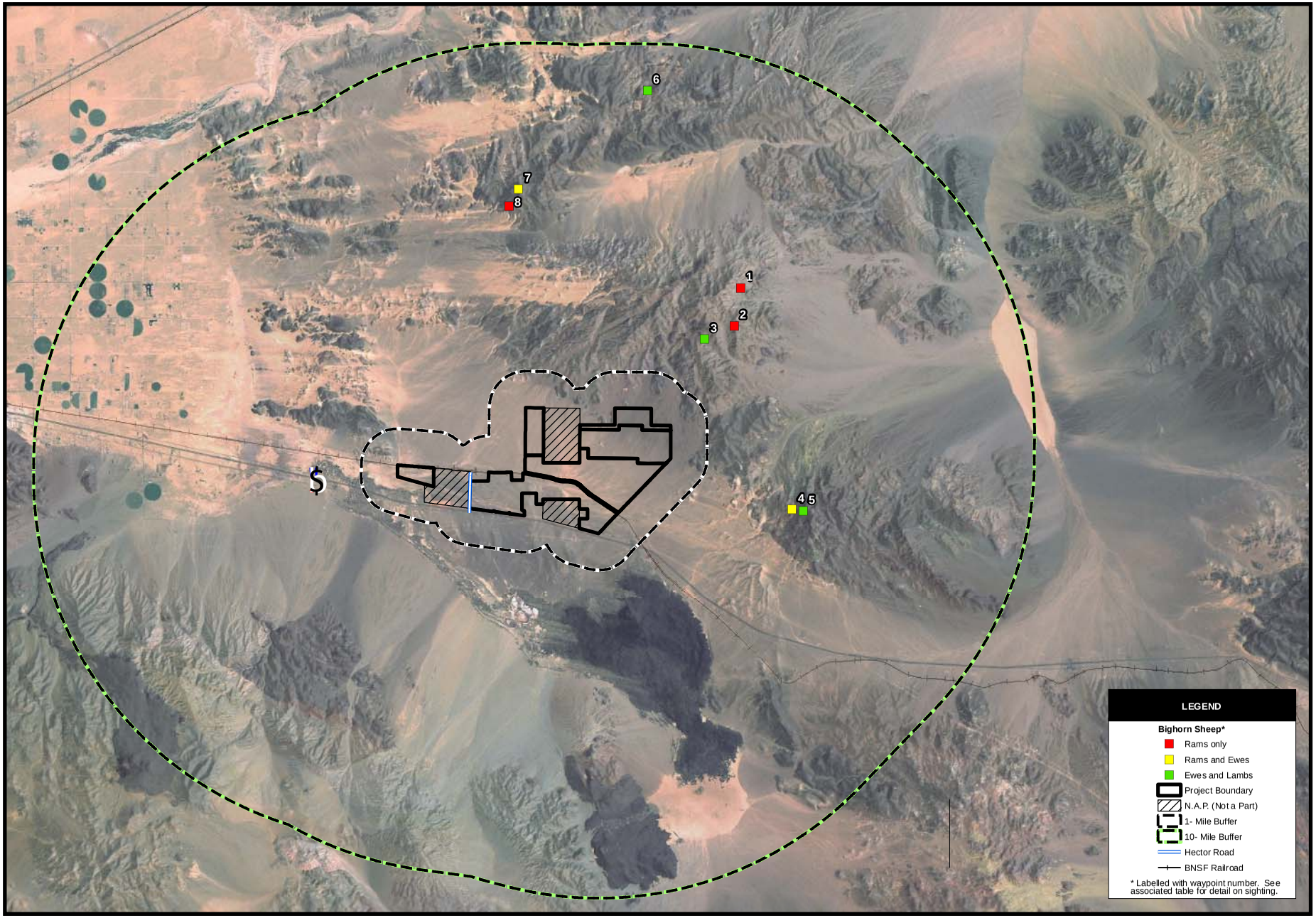


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: URS

BIOLOGICAL RESOURCES - FIGURE 6

Calico Solar Project - Nelson's Bighorn Sheep Locations

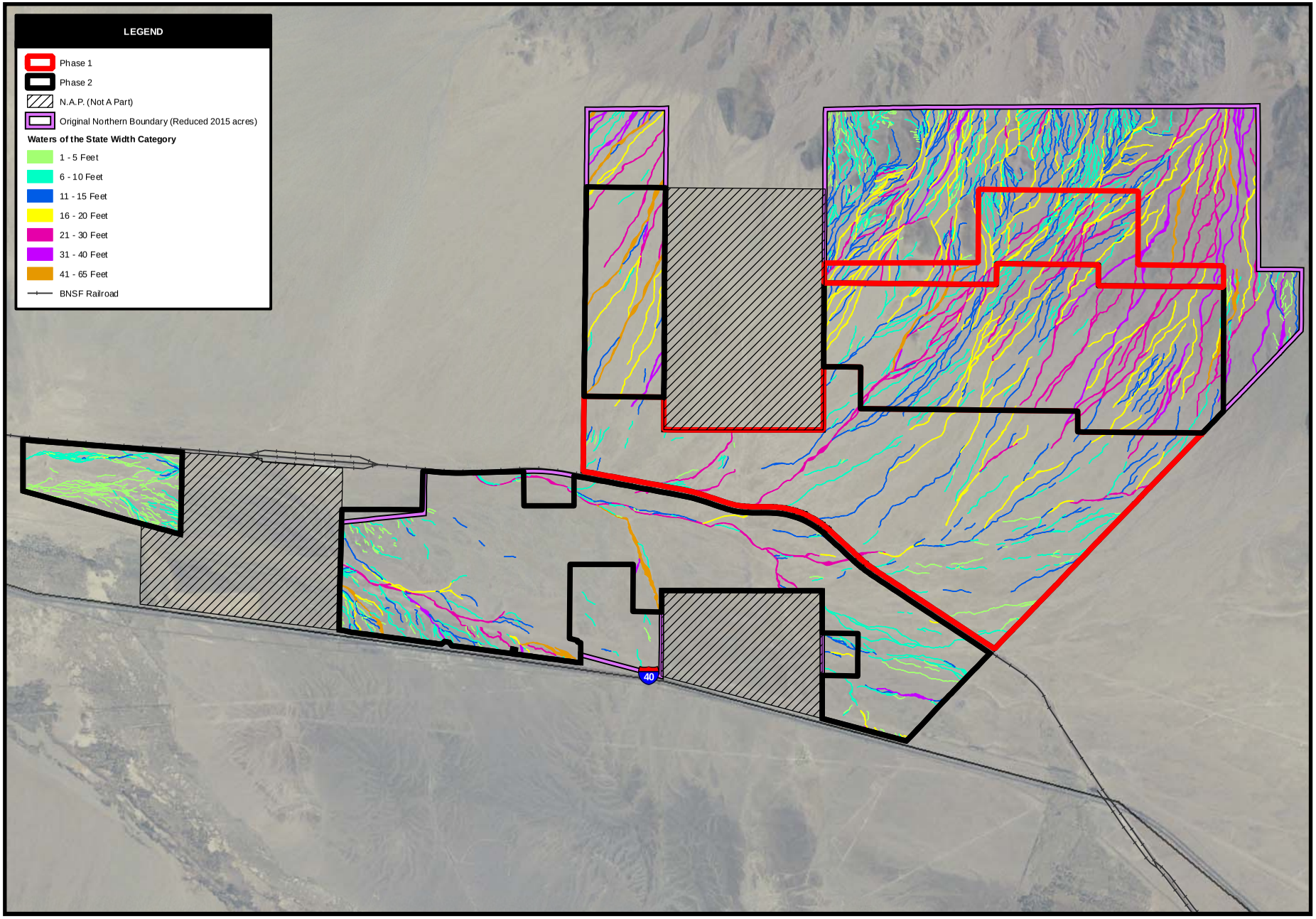


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: URS

BIOLOGICAL RESOURCES - FIGURE 7

Calico Solar Project - State Jurisdictional Waters

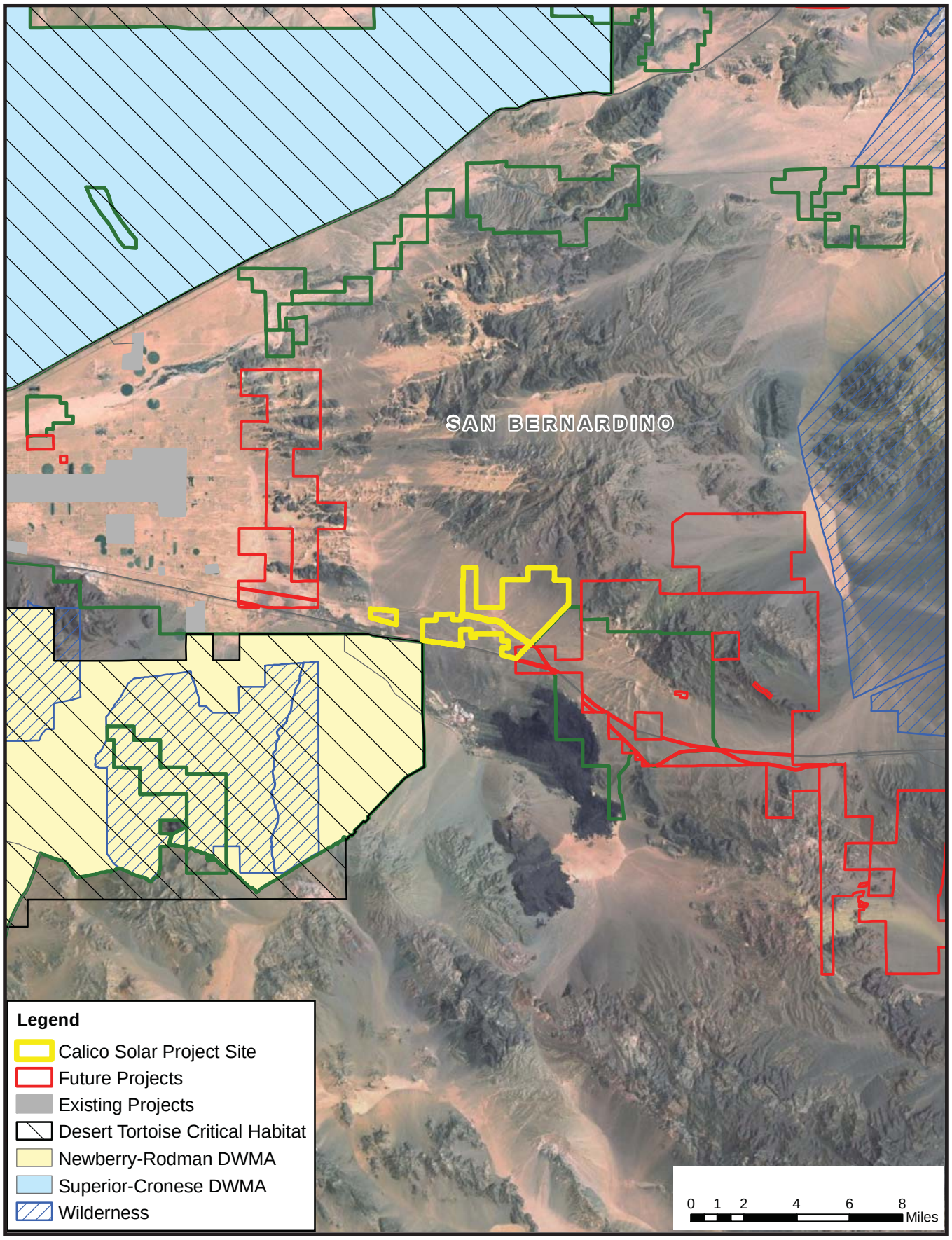


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: URS

BIOLOGICAL RESOURCES - FIGURE 8

Calico Solar Project - Existing Projects/Forseeable Future Projects

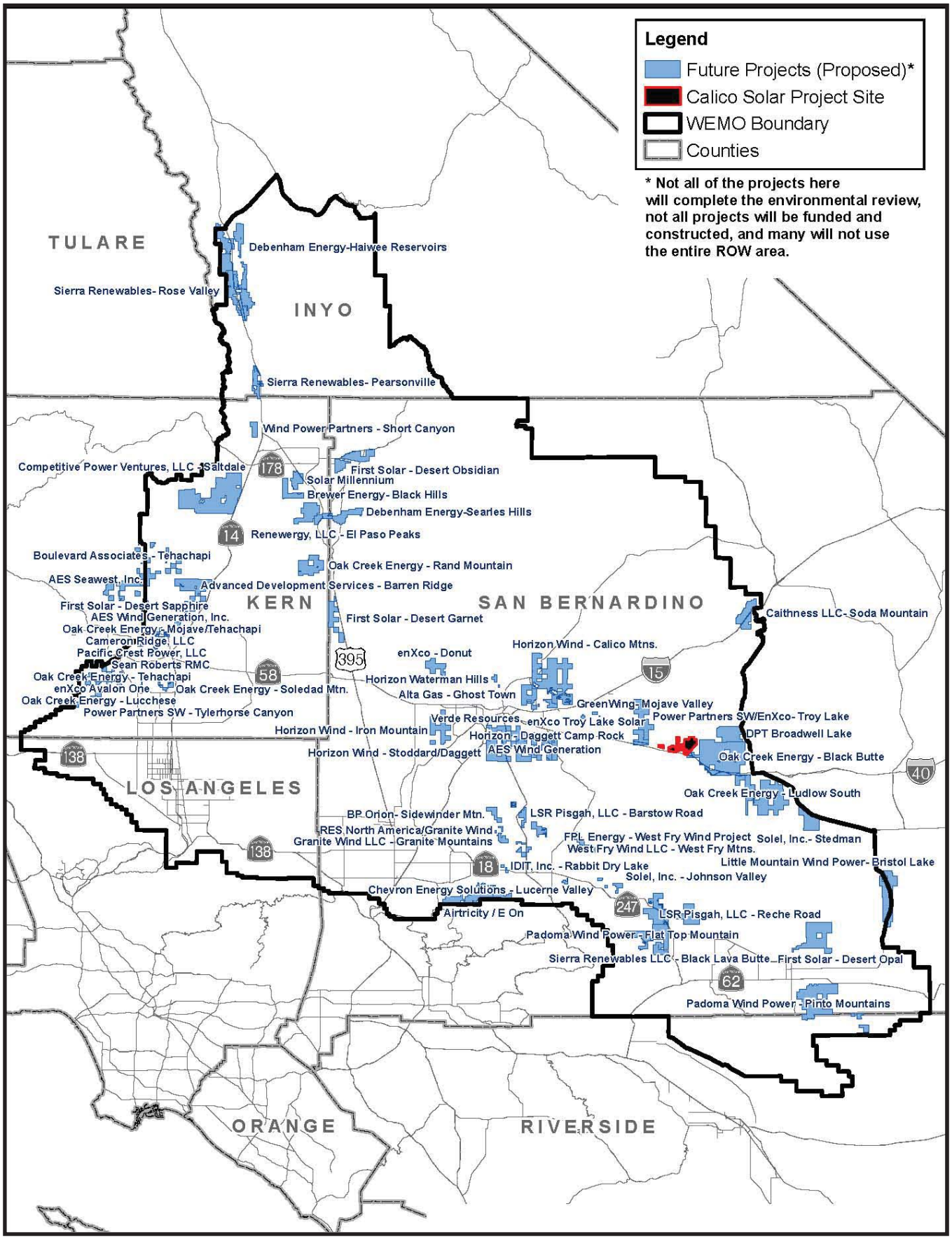


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: BLM, CEC

BIOLOGICAL RESOURCES - FIGURE 9

Calico Solar Project - Forseeable Future Projects (Proposed)

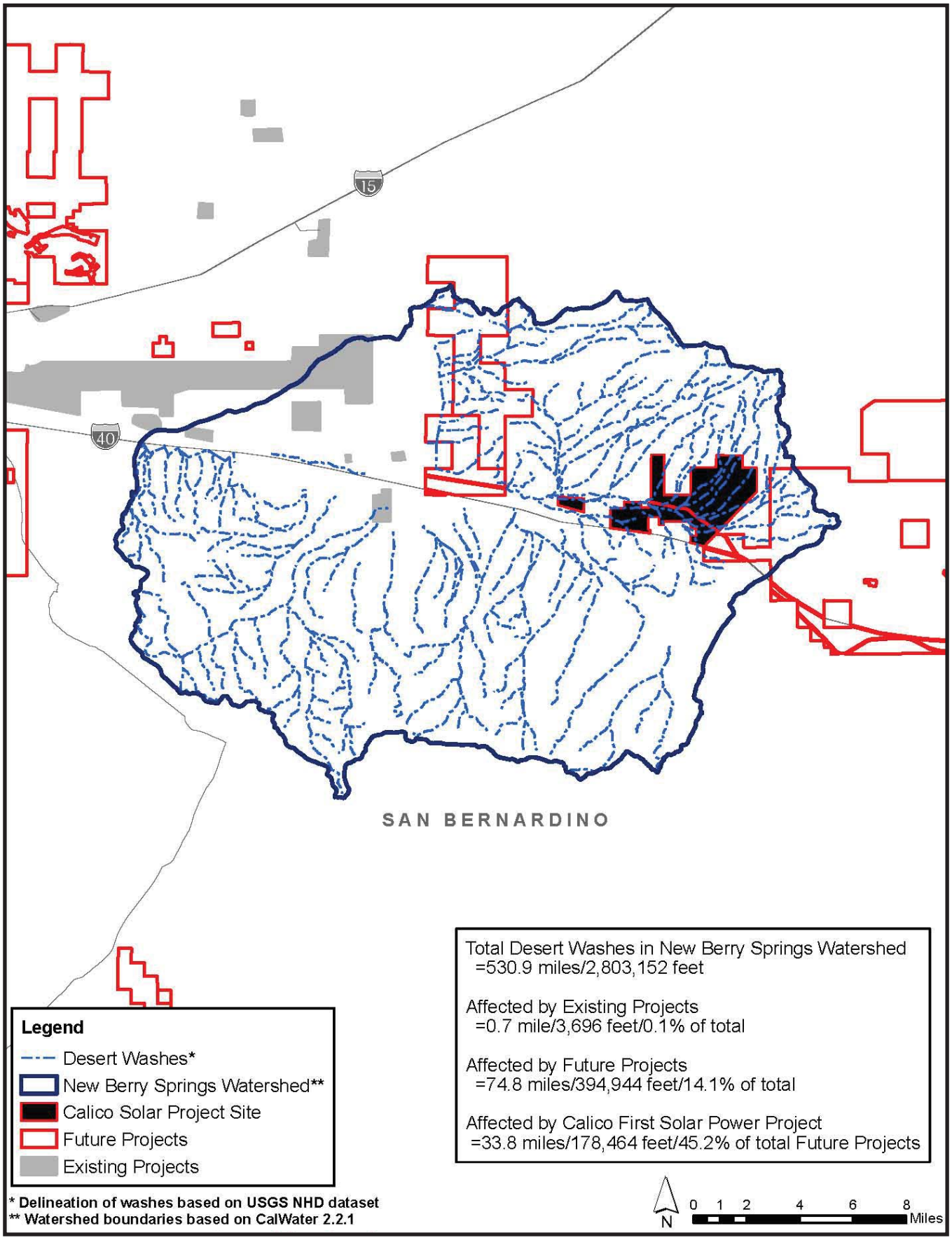


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: BLM, CEC

BIOLOGICAL RESOURCES - FIGURE 10

Calico Solar Project - Desert Washes - New Berry Springs Watershed

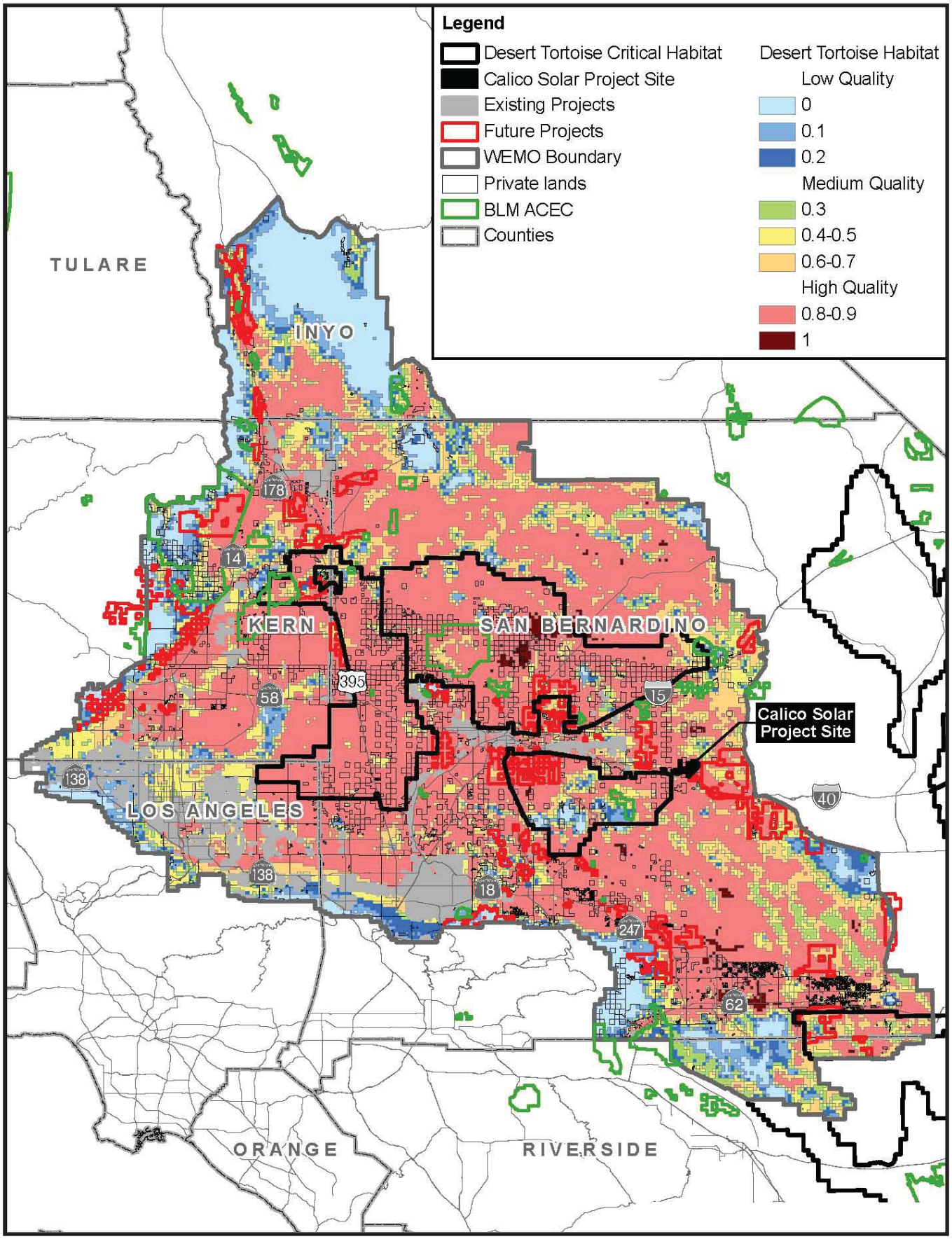


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: BLM, CEC

BIOLOGICAL RESOURCES - FIGURE 11

Calico Solar Project - Desert Tortoise - Habitat Quality and Critical Habitat

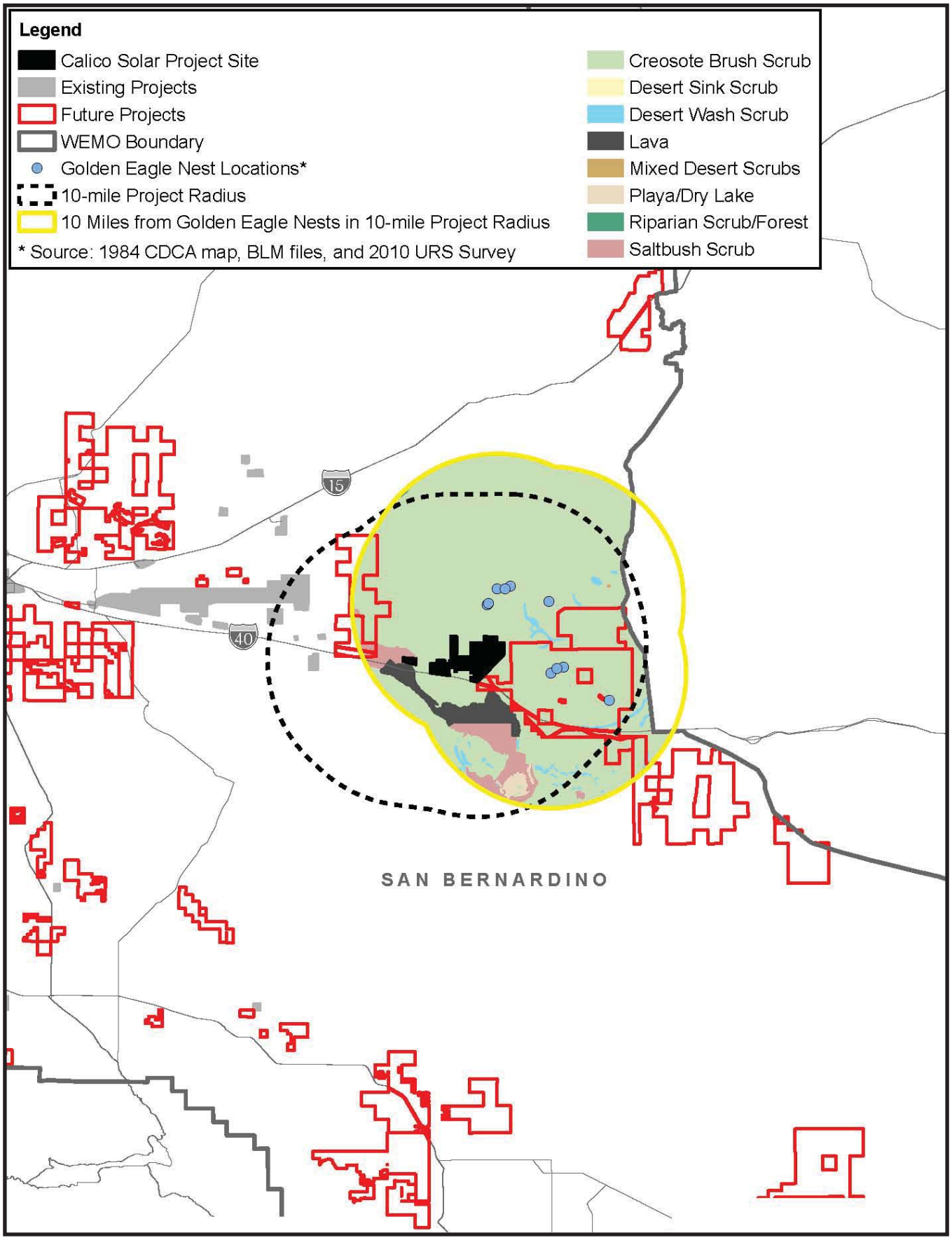


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: BLM, CEC

BIOLOGICAL RESOURCES - FIGURE 12

Calico Solar Project - Golden Eagle Foraging Habitat Within 10 Miles of Nests

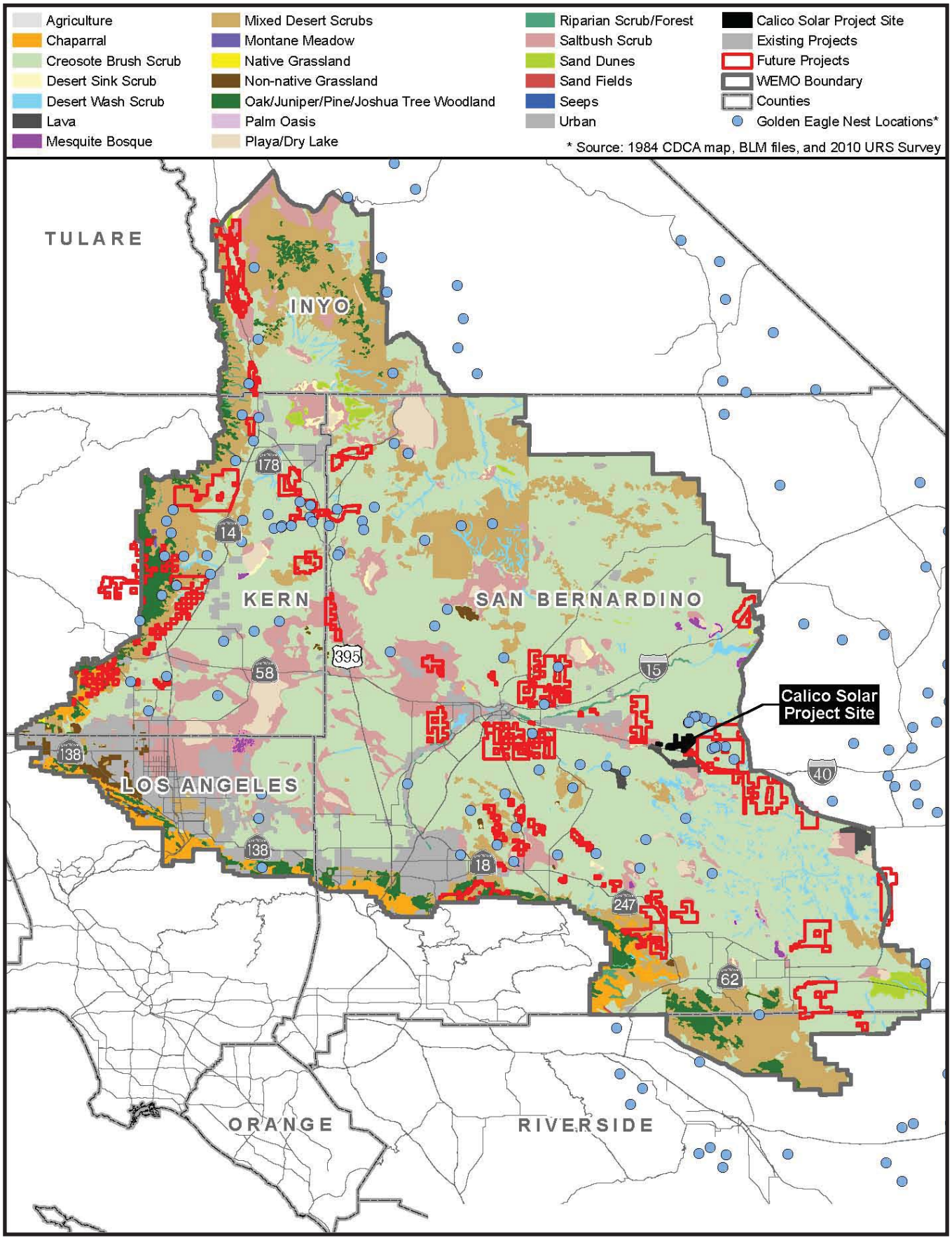


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: BLM, CEC

BIOLOGICAL RESOURCES - FIGURE 13

Calico Solar Project - Golden Eagle Nest Locations

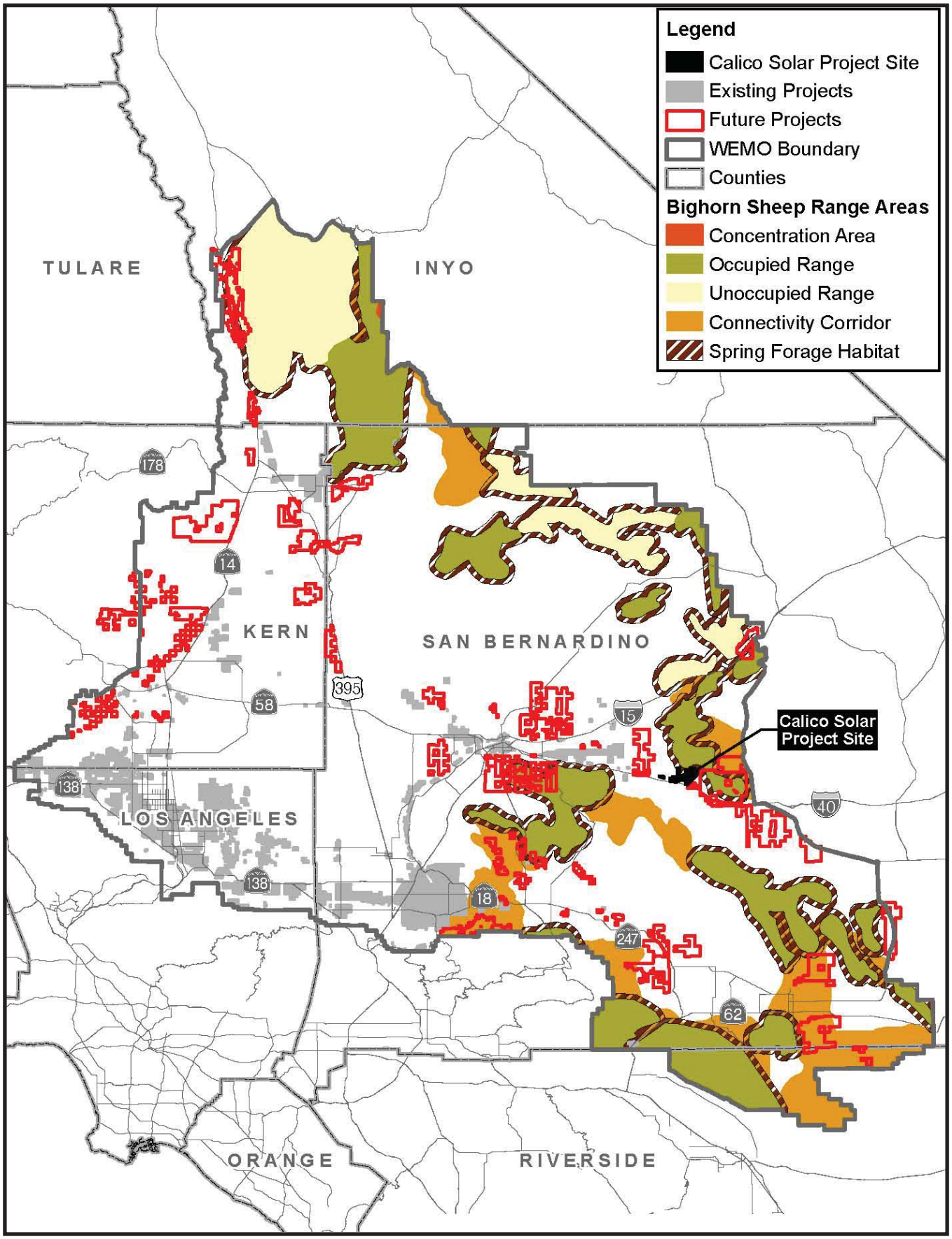


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: BLM, CEC

BIOLOGICAL RESOURCES - FIGURE 14

Calico Solar Project - Bighorn Sheep Habitat

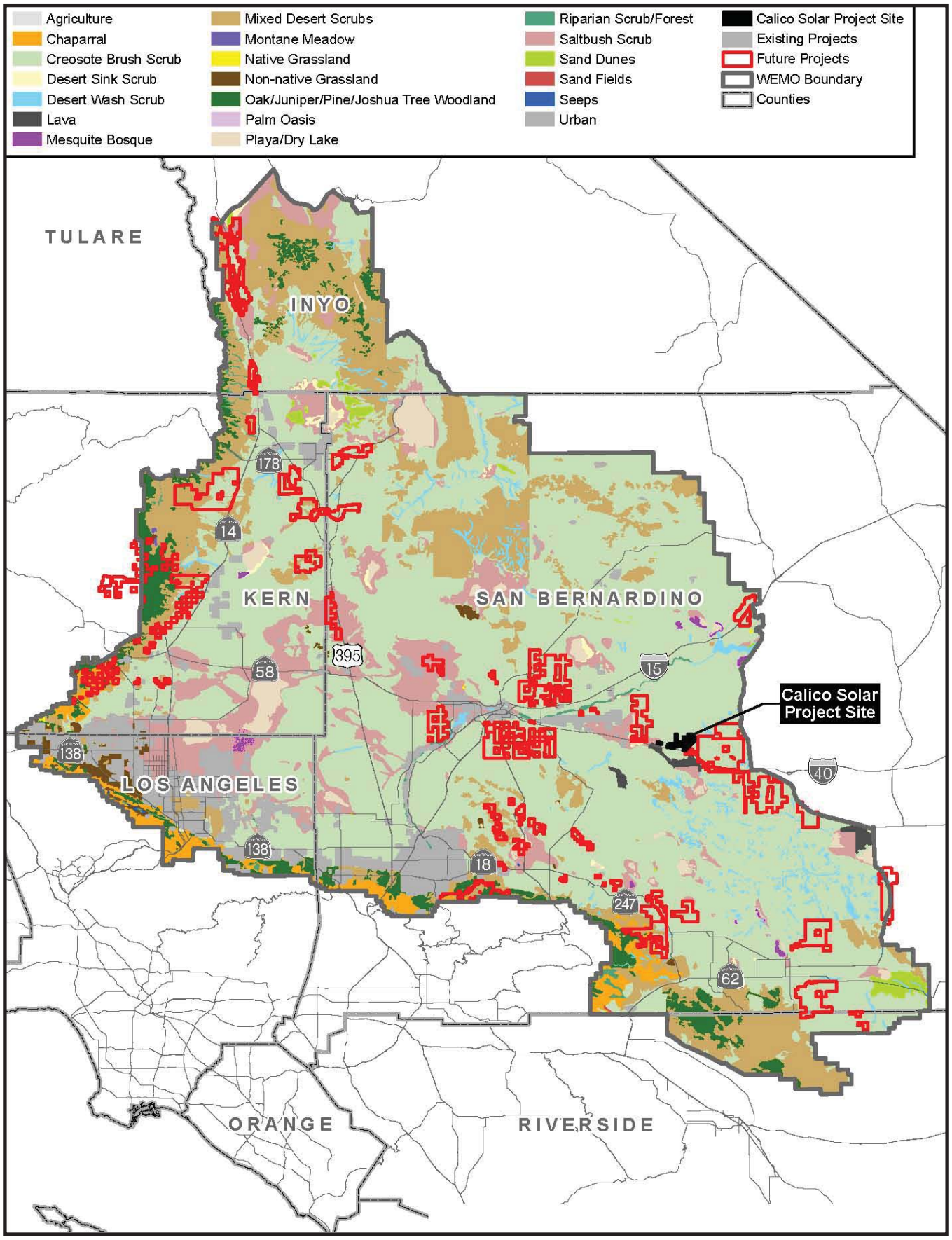


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: BLM, CEC

BIOLOGICAL RESOURCES - FIGURE 15

Calico Solar Project - Plant Communities

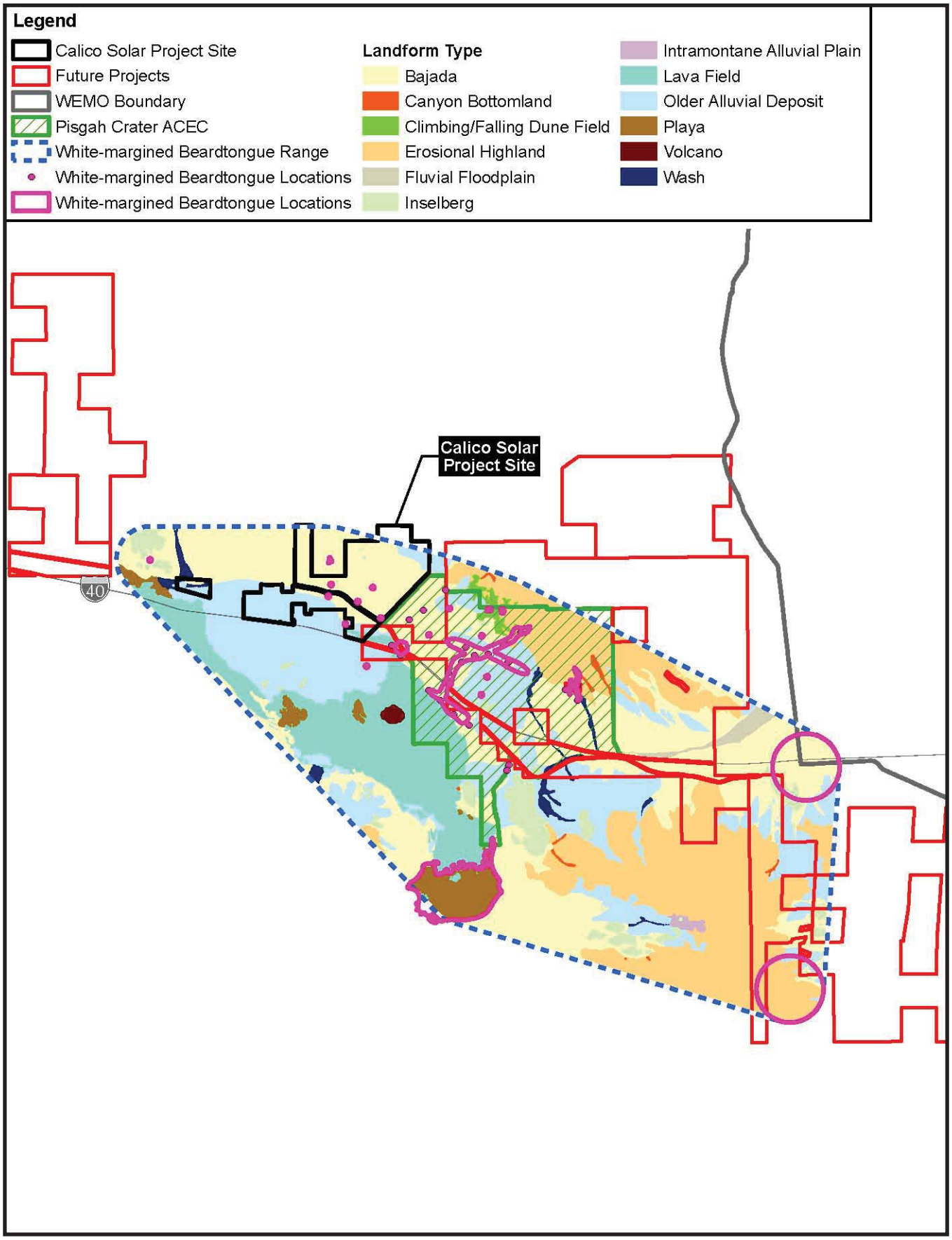


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: BLM, CEC

BIOLOGICAL RESOURCES - FIGURE 16

Calico Solar Project - White-Margined Beardtongue Range in California



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: BLM, CEC

Exhibit 304

B.3 – Cumulative Scenario and Project-Related Future Actions

B.3 – CUMULATIVE SCENARIO AND PROJECT-RELATED FUTURE ACTIONS

Testimony of Susan V. Lee

B.3.1 INTRODUCTION

The following section addresses two components. First it addresses the cumulative scenario for the cumulative impact analysis, and secondly it describes a this downstream impacts analysis for the Calico Solar Project to examine the potential indirect impacts of future transmission line construction, line removal, substation expansion, and other upgrades that may be required by Southern California Edison Company (SCE) as a result of the Calico Solar Project. This project-related future action is described in Section B.3.5.

Preparation of a cumulative impact analysis is required under CEQA. Under CEQA Guidelines, "a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts" (14 Cal Code Regs §15130(a)(1)). Cumulative impacts must be addressed if the incremental effect of a project, combined with the effects of other projects is "cumulatively considerable" (14 Cal Code Regs §15130(a)). Such incremental effects are to be "viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects" (14 Cal Code Regs §15164(b)(1)). Together, these projects comprise the cumulative scenario which forms the basis of the cumulative impact analysis.

CEQA also states that both the severity of impacts and the likelihood of their occurrence are to be reflected in the discussion, "but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion of cumulative impacts shall be guided by standards of practicality and reasonableness, and shall focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact" (14 Cal Code Regs §15130(b)).

B.3.2 RENEWABLE RESOURCES IN CALIFORNIA

A large number of renewable projects have been proposed on BLM managed land, State land, and private land in California. As of January 2010, there were 244 renewable projects proposed in California and in various stages of the environmental review process or under construction. As of December 2009, *49* of these projects, representing approximately 10,500 MW, were planning on requesting American Recovery and Reinvestment Act funds from the Federal government. Solar, wind, and geothermal development applications have requested use of BLM land, including approximately 1 million acres of the California desert. State and private lands have also been targeted for renewable solar and wind projects.

Cumulative Figures 1 and 2 and **Cumulative Tables 1A and 1B** illustrate the numerous proposed renewable projects on BLM, State and private land in California. In addition,

nearly 80 applications for solar and wind projects are being considered on BLM land in Nevada and Arizona.

Likelihood of Development. The large renewable projects now described in applications to the BLM and on private land are competing for utility Power Purchase Agreements, which will allow utilities to meet state-required Renewable Portfolio Standards. Not all of the projects listed in **Tables 1A** and **1B** will complete the environmental review, and not all projects will be funded and constructed. It is unlikely that all of these projects will be constructed for the following reasons:

- Not all developers will develop the detailed information necessary to meet BLM and Energy Commission standards. Most of the solar projects with pending applications are proposing generation technologies that have not been implemented at large scales. As a result, preparing complete and detailed plans of development (PODs) is difficult, and completing the required NEPA and CEQA documents is especially time-consuming and costly.
- As part of approval by the appropriate Lead Agency under CEQA and/or NEPA (generally the Energy Commission and/or BLM), all regulatory permits must be obtained by the applicant or the prescriptions required by the regulatory authorities incorporated into the Lead Agency's license, permit or right-of-way grant. The large size of these projects may result in permitting challenges related to endangered species, mitigation measures or requirements, and other issues.
- Also after project approval, construction financing must be obtained (if it has not been obtained earlier in the process). The availability of financing will be dependent on the status of competing projects, the laws and regulations related to renewable project investment, and the time required for obtaining permits.

Incentives for Renewable Development. A number of existing policies and incentives encourage renewable energy development. These incentives lead to a greater number of renewable energy proposals. Examples of incentives for developers to propose renewable energy projects on private and public lands in California, Nevada and Arizona, include the following:

- **U.S. Treasury Department's Payments for Specified Energy Property in Lieu of Tax Credits** under §1603 of the American Recovery and Reinvestment Act of 2009 (Public Law 111-5) – Offers a grant (in lieu of investment tax credit) to receive funding for 30% of their total capital cost at such time as a project achieves commercial operation (currently applies to projects that begin construction by December 31, 2010 and begin commercial operation before January 1, 2017).
- **U.S. Department of Energy (DOE) Loan Guarantee Program** pursuant to §1703 of Title XVII of the Energy Policy Act of 2005 – Offers a loan guarantee that is also a low interest loan to finance up to 80% of the capital cost at an interest rate much lower than conventional financing. The lower interest rate can reduce the cost of financing and the gross project cost on the order of several hundred million dollars over the life of the project, depending on the capital cost of the project.

B.3.3 DEFINITION OF THE CUMULATIVE PROJECT SCENARIO

Cumulative impacts analysis is intended to highlight past actions that are closely related either in time or location to the project being considered, catalogue past projects and discuss how they have harmed the environment, and discuss past actions even if they were undertaken by another agency or another person. Most of the projects listed in the cumulative projects tables (**Cumulative Tables 1, 2, and 3** at the end of this section) have, are, or will be required to undergo their own independent environmental review under either CEQA.

Under CEQA, there are two acceptable and commonly used methodologies for establishing the cumulative impact setting or scenario: the "list approach" and the "projections approach". The first approach would use a "list of past, present, and probable future projects producing related or cumulative impacts." 14 Cal Code Regs §15130(b)(1)(A). The second approach is to use a "summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact" (14 Cal Code Regs §15130(b)(1)(B)). This Supplemental Staff Assessment (SSA) uses the "list approach" for purposes of state law to provide a tangible understanding and context for analyzing the potential cumulative effects of a Project.

In order to provide a basis for cumulative analysis for each discipline, this section provides information on other projects in both maps and tables. The Energy Commission and the BLM have identified the California desert as the largest area within which cumulative effects should be assessed for all disciplines, as shown in three maps and accompanying tables. However, within the desert region, the specific area of cumulative effect varies by resource. For this reason, each discipline has identified the geographic scope for the discipline's analysis of cumulative impacts. **Cumulative Figures 1, 2, and 3** are on the following pages, and **Cumulative Tables 1, 2, and 3** are presented at the end of this section.

Cumulative Figure 3 (Newberry Springs/Ludlow Area Existing and Future/Foreseeable Projects) and **Cumulative Tables 2 and 3** define the projects in the immediate vicinity of the Calico Solar Project (formerly the Stirling Energy Systems Solar One Project). The area included on these tables consists of an approximate 15 to 20-mile radius around the project site. Table 2 presents existing projects and Table 3 presents future foreseeable projects. Both tables indicate project name, type, location, and status. This data is presented for consideration within each discipline.

B.3.4 APPROACH TO CUMULATIVE IMPACT ANALYSIS

This SSA evaluates cumulative impacts within the analysis of each resource area, following these steps:

1. Define the geographic scope of cumulative impact analysis for each discipline, based on the potential area within which impacts of the Calico Solar Project could combine with those of other projects.

2. Evaluate the effects of the Calico Solar Project in combination with past and present (existing) projects within the area of geographic effect defined for each discipline.
3. Evaluate the effects of the Calico Solar Project with foreseeable future projects that occur within the area of geographic effect defined for each discipline.

Each of these steps is described below.

GEOGRAPHIC SCOPE OF CUMULATIVE ANALYSIS

The area of cumulative effect varies by resource. For example, air quality impacts tend to disperse over a large area, while traffic impacts are typically more localized. For this reason, the geographic scope for the analysis of cumulative impacts must be identified for each resource area.

The analysis of cumulative effects considers a number of variables including geographic (spatial) limits, time (temporal) limits, and the characteristics of the resource being evaluated. The geographic scope of each analysis is based on the topography surrounding the Calico Solar Project and the natural boundaries of the resource affected, rather than jurisdictional boundaries. The geographic scope of cumulative effects will often extend beyond the scope of the direct effects, but not beyond the scope of the direct and indirect effects of the proposed action and alternatives.

In addition, each project in a region will have its own implementation schedule, which may or may not coincide or overlap with the Calico Solar Project's schedule. This is a consideration for short-term impacts from the Calico Solar Project. However, to be conservative, the cumulative analysis assumes that all projects in the cumulative scenario are built and operating during the operating lifetime of the Calico Solar Project.

PROJECT EFFECTS IN COMBINATION WITH FORESEEABLE FUTURE PROJECTS

The intensity, or severity, of the cumulative effects should consider the magnitude, geographic extent, duration and frequency of the effects (CEQ, 1997). The magnitude of the effect reflects the relative size or amount of the effect; the geographic extent considers how widespread the effect may be; and the duration and frequency refer to whether the effect is a one-time event, intermittent, or chronic (CEQ, 1997).

Each discipline evaluates the impacts of the proposed project on top of the current baseline; the past, present (existing) and reasonably foreseeable or probable future projects in the Calico Solar Project vicinity as illustrated in **Cumulative Figure 3 (Newberry Springs/Ludlow Area Existing and Future/Foreseeable Projects)** and **Cumulative Tables 2 (Existing Projects) and 3 (Future/Foreseeable Projects)**.

Reasonably foreseeable projects that could contribute to the cumulative effects scenario depend on the extent of resource effects, but could include projects in the immediate Ludlow area as well as other large renewable projects in the California, Nevada, and Arizona desert regions. These projects are illustrated in **Cumulative Figures 1, 2, and 3**. As shown in the map and table, there are a number of projects in the immediate area around Calico Solar Project whose impacts could combine with those of the proposed project. As shown on **Cumulative Figure 1** and in **Table 1**, solar and wind

development applications for use of BLM land have been submitted for approximately 1 million acres of the California Desert Conservation Area. Additional BLM land in Nevada and Arizona also has applications for solar and wind projects.

Cumulative Table 1A
Renewable Energy Projects on BLM Land in the California Desert

BLM Field Office	Number of Projects & Acres	Total MW
SOLAR ENERGY		
Barstow Field Office	18 projects 132,560 acres	12,875 MW
El Centro Field Office	7 projects 50,707 acres	3,950 MW
Needles Field Office	17 projects 230,480 acres	15,700 MW
Palm Springs Field Office	17 projects 123,592 acres	11,873 MW
Ridgecrest Field Office	4 projects 30,543 acres	2,835 MW
TOTAL – CA Desert District	**63 projects** **567,882 acres**	**47,233 MW**
WIND ENERGY		
Barstow Field Office	25 projects 171,560 acres	n/a
El Centro Field Office	9 projects (acreage not given for 3 of the projects) 48,001 acres	n/a
Needles Field Office	8 projects 115,233 acres	n/a
Palm Springs Field Office	4 projects 5,851 acres	n/a
Ridgecrest Field Office	16 projects 123,379 acres	n/a
TOTAL – CA Desert District	**62 projects** **433,721 acres**	n/a

Source: Renewable Energy Projects in the California Desert Conservation Area identifies solar and wind renewable projects as listed on the BLM California Desert District Alternative Energy Website (BLM 2009)

Cumulative Table 1B
Renewable Energy Projects on State and Private Lands

Project Name	Location	Status
SOLAR PROJECTS		
Solargen Panoche Valley Solar Farm (400 MW Solar PV)	San Benito County	EIR in progress
Maricopa Sun Solar Complex (350 MW Solar PV)	Kern County	Information not available
Panoche Ranch Solar Farm (250 MW Solar PV)	Kern County	Information not available
Gray Butte Solar PV (150 MW Solar PV)	Los Angeles County	Information not available
Monte Vista (126 MW Solar PV)	Kern County	Information not available
San Joaquin Solar 1 and 2 (107 MW Solar hybrid)	Fresno	Under environmental review
NRG Alpine Suntower (40 MW solar PV and 46 MW solar thermal)	Los Angeles	Information not available
Palmdale Hybrid Power Project Unit 1 (50 MW solar thermal, part of a hybrid project)	City of Palmdale	Under environmental review
Lucerne Valley Solar (50 MW solar PV)	San Bernardino	Under environmental review
Lost Hills (32.5 solar PV)	Kern County	Information not available
Tehachapi Photovoltaic Project (20 MW solar PV)	Kern County	Information not available
Sun City Project Phase 1 (20 MW solar PV)	Kings County	Information not available
Boulevard Associates (20 MW solar PV)	San Bernardino County	Information not available
Stanislaus Solar Project I (20 MW solar PV)	Stanislaus County	Information not available
Stanislaus Solar Project II (20 MW solar PV)	Stanislaus County	Information not available
Synapse Solar 2 (20 MW solar PV/solar thermal)	Kings	Information not available
T, squared, Inc. (19 MW solar PV)	Kern County	Information not available
Rancho Seco Solar Thermal (15-17 MW solar trough)	Sacramento County	Information not available
Global Real Estate Investment Partners, LLC (solar PV)	Kern County	Information not available
Recurrent Energy (solar PV)	Kern County	Information not available

Project Name	Location	Status
Man-Wei Solar (solar PV)	Kern County	Information not available
Regenesis Power for Kern County Airports Dept.	Kern County	Information not available
Abengoa Mojave Solar Project (250 MW solar thermal)	San Bernardino County, Harper Lake	Under environmental review
Rice Solar Energy Project (150 MW solar thermal)	Riverside County, north of Blythe	Under environmental review
3 MW solar PV energy generating facility	San Bernardino County, Newberry Springs	MND published for public review
Blythe Airport Solar 1 Project (100 MW solar PV)	Blythe, California	MND published for public review
First Solar's Blythe (21 MW solar PV)	Blythe, California	Under construction
California Valley Solar Ranch (SunPower) (250 MW solar PV)	Carrizo Valley, San Luis Obispo County	Under environmental review
LADWP and OptiSolar Power Plant (68 MW solar PV)	Imperial County, SR 111	Under environmental review
Topaz Solar Farm (First Solar) (550 MW solar PV)	Carrizo Valley, San Luis Obispo County	Under environmental review
AV Solar Ranch One (230 MW solar PV)	Antelope Valley, Los Angeles County	Under environmental review
Bethel Solar Hybrid Power Plant (49.4 MW hybrid solar thermal and biomass)	Seeley, Imperial County	Under environmental review
Mt. Signal Solar Power Station (49.4 MW hybrid solar thermal and biomass)	8 miles southwest of El Centro, Imperial County	Under environmental review
WIND PROJECTS		
Alta-Oak Creek Mojave Project (up to 800 MW)	Kern County, west of Mojave	Under environmental review
PdV Wind Energy Project (up to 300 MW)	Kern County, Tehachapi Mountains	Approved
City of Vernon Wind Energy Project (300 MW)	City of Vernon	Information not available
Manzana Wind Project (246 MW)	Kern County	Information not available
Iberdrola Tule Wind (200 MW)	San Diego County, McCain Valley	EIR/EIS in progress
Padoma Wind Energy (175 MW)	Shasta County	Information not available
Pine Canyon (150 MW)	Kern County	Information not available
Shiloh III (200 MW)	Montezuma Hills, Solano County	Information not available
AES Daggett Ridge (84 MW)	San Bernardino	EIS in progress

Project Name	Location	Status
Granite Wind, LLC (81 MW)	San Bernardino	EIR/EIS in progress
Bear River Ridge (70 MW)	Humboldt County	Information not available
Aero Tehachapi (65 MW)	Kern County	Information not available
Montezuma Wind II (52-60)	Montezuma Hills, Solano County	Information not available
Tres Vaqueros (42 MW wind repower)	Contra Costa County	Information not available
Montezuma Hills Wind Project (34-37 MW)	Solano County	Information not available
Solano Wind Project Phase 3 (up to 128 MW)	Montezuma Hills, Solano County	Under environmental review
Hatchet Ridge Wind Project	Shasta County, Burney	Under construction
Lompoc Wind Energy Project	Lompoc, Santa Barbara County	Approved
Pacific Wind (Iberdrola)	McCain Valley, San Diego County	Under environmental review
TelStar Energies, LLC (300 MW)	Ocotillo Wells, Imperial County	Under environmental review
GEOTHERMAL PROJECTS		
Buckeye Development Project	Geyserville, Sonoma	Under environmental review
Orni 18, LLC Geothermal Power Plant (49.9 MW)	Brawley, Imperial County	Information not available
Black Rock Geothermal 1,2,and 3	Imperial County	Information not available

* This list is compiled from the projects on CEQAnet as of November 2009 and the projects located on private or State lands that are listed on the Energy Commission Renewable Action Team website as requesting ARRA funding. Additional renewable projects proposed on private and State lands but not requesting ARRA funds are listed on the website.

Source: CEQAnet [http://www.ceqanet.ca.gov/ProjectList.asp], November 2009 and CEC Renewable Action Team – Generation Tracking for ARRA Projects 12/29/2009 [http://www.energy.ca.gov/33by2020/documents/2009-12-29/2009-12-29_Proposed_ARRA_Renewable_Projects.pdf]

Cumulative Table 2
Existing Projects in the Newberry Springs/Ludlow Area

ID	Project Name	Location	Agency/ Owner	Status	Project Description
1	Twentynine Palms Marine Corps Air Ground Combat Center (MCAGCC)	Morongo Basin (to the south of project site)	U.S. Marine Corps	Existing	The Marine Corps' service-level facility for Marine Air Ground Task Force training. It covers 596,000 acres to the south of the Calico Solar Project site and north of the city of Twentynine Palms
2	SEGS I and II	Near Daggett (17 miles west of project site)	Sunray Energy, Inc.	Existing	Solar parabolic trough facilities generating 13.8 MW and 30 MW, respectively.
3	CACTUS (formerly Solar One and Solar Two)	Near Daggett (to the west of project site)	University of California Davis	Existing	A non-working 10 MW solar power tower plant converted by UC Davis into an Air Cherenkov Telescope to measure gamma rays hitting the atmosphere. The site is comprised of 144 heliostats. This project had its last observational run in 2005. SCE has requested funds from the California Public Utilities Commission to decommission the Solar Two project. (UC Davis 2009)
4	Mine	2 miles west of project site along I-40		Existing	Small-scale aggregate operation (AFC p. 5.3-12)
5	Mine	14 miles west of project site along I-40		Existing	Larger aggregate mining operation that produced less than 500,000 tons per year in 2005 (AFC p. 5.3-12)

Source: These projects were identified through a variety of sources including the project AFC (Section 5.18) and websites of the San Bernardino County Land Use Services Department, BLM, CEC and individual projects.

Cumulative Table 3
Future Foreseeable Projects in the Newberry Springs/Ludlow Area

ID	Project Name	Location	Agency/ Owner	Status	Project Description
A	SES Solar Three (CACA 47702)	T's. 8, 9N., R5E (Immediately west of project site)	SES Solar Three, LLC	BLM received completed amended application June 2007. SES withdrew the application for Solar Three in December 2009. As there was a second-in-line application, this application becomes the project proposed at this location. .	914 MW Stirling solar plant on 6,779-acre site.
B	Broadwell BrightSource (CACA 48875)	Broadwell Valley (T'8N and 9N; R7E) – in northeast direction of project site	Bright-Source Energy, Inc.	Application filed with BLM. Potential conflict with proposed National Monument. Plans withdrawn/put on hold in September 2009.	5,130-acre solar thermal facility using power tower technology.
C	SCE Pisgah Substation expansion	Immediately southeast of project site	Southern California Edison		Substation upgrade from 220 kV to 500 kV

ID	Project Name	Location	Agency/ Owner	Status	Project Description
D	Lugo-Pisgah transmission upgrade	Pisgah Substation (SE side of project site) to Lugo Substation (near Hesperia)	Southern California Edison		The proposed 850 MW Calico Solar Project would require removal of 65 miles of existing 220-kV transmission line and reinstallation with a 500-kV line. The Reduced Acreage Alternative (275 MW) would require an upgrade of the telecommunication facilities serving the existing 200-kV Lugo-Pisgah transmission line. Specifically, it would require: • Replacement of a portion of existing Eldorado-Lugo 500 kV overhead ground wire with new optical ground wire between the Lugo and Pisgah Substations • Installation of a new fiber-optic line between the Pisgah Substation and Cool Water Substation (new fiber to be installed on approximately 20 miles of existing electric distribution poles).
E	Twentynine Palms Expansion	Morongo Basin (south of project site)	U.S. Marine Corps	NOI to prepare EIS to study alternatives published in Oct. 2009. Draft EIS expected September 2010.	400,000-acre expansion on the east, west, and south of the existing 596,000-acre Twentynine Palms Marine Corps base. In June 2009, approximately 60,000 acres in all study areas were removed from further study, leaving 360,000 acres under study (USMC 2009).

ID	Project Name	Location	Agency/ Owner	Status	Project Description
F	Solel, Inc. (CACA 049424)	Southwest of proposed site, immediately north of Twentynine Palms MCAGCC	Solel, Inc.	BLM received application in July 2007, POD is under review.	600 MW solar thermal plant proposed on 7,453 acres.
G	Wind project (CACA 48629)	Black Lava T2N, R5E, T1N, R5E	Oak Creek Energy	BLM received application December 2006. Issues with partial location in ACEC.	Wind project on 17,920 acres
H	Wind Project (CACA 48667)	South Ludlow T6N/R6E, T7N/R6E, T6N/R7E, T7N/R7E, T6N/R8E, T7N/R8E (In southeast direction of project site)	Oak Creek Energy	Pending	Wind project on 25,600 acres
I	Wind project (CACA 48472)	Troy Lake T9N&10N, R4E (In west direction of project site)	Power Partners SW (enXco)	Pending review of EA.	Wind project on 10,240 acres
J	Twin Mountain Rock Venture	10 miles west of Ludlow and 1 mile south of I-40; APN 0552-011-10-0000	Rinker Materials	Permit granted to extend permit to 2018	Plan to re-permit a cinder quarry on approximately 72 acres of leased land. No development activity has occurred on project site.
K	Solar thermal (CACA 49429)	Stedman (in southeast direction of project site)	Solel, Inc.	Application filed with BLM.	600 MW solar project on 14,080 acres. POD under review.

ID	Project Name	Location	Agency/ Owner	Status	Project Description
L	Proposed National Monument (former Catellus Lands)	Between Joshua Tree National Park and Mojave National Preserve		In December 2009, Sen. Feinstein introduced bill S.2921 that would designate 2 new national monuments including the Mojave Trails National Monument.	The proposed Mojave Trails National Monument would protect approximately 941,000 acres of federal land, including approximately 266,000 acres of the former railroad lands along historic Route 66. The BLM would be given the authority to conserve the monument lands and also to maintain existing recreational uses, including hunting, vehicular travel on open roads and trails, camping, horseback riding and rockhounding.
M	BLM Renewable Energy Study Areas	Along the I-10 corridor between Desert Center and Blythe	BLM	Proposed, under environmental review	The DOE and BLM identified 24 tracts of land as Solar Energy Study Areas in the BLM and DOE Solar PEIS. These areas have been identified for in-depth study of solar development and may be found appropriate for designation as solar energy zones in the future.

Source: Projects were identified through a variety of sources including the project AFC (Section 5.18) and Applicant's Submittal of CAISO Reports, SES 2010e and websites of the San Bernardino County Land Use Services Department, BLM, CEC and individual projects.

B.3.5 PROJECT-RELATED FUTURE ACTIONS

B.3.5.1 Introduction and Purpose

Energy Commission staff has prepared this downstream impacts analysis for the Calico Solar Project to examine the potential indirect impacts of future transmission line construction, line removal, substation expansion, and other upgrades that may be required by Southern California Edison Company (SCE) as a result of the Calico Project.

The SCE upgrades are a reasonably foreseeable event if the Calico Solar Project is approved and constructed. The California Environmental Quality Act (CEQA) requires

examination of foreseeable subsequent projects that result from a project under consideration, so Energy Commission staff has analyzed the general impacts of the SCE project based on available information. Because the SCE project itself is not before the Energy Commission for approval and it is in the preliminary planning stages, the level of impact analysis presented for the SCE project is based on available information. The purpose of this analysis is to inform the Energy Commission Committee, interested parties and the general public of the potential indirect environmental and public health effects that may result from the approval of the Calico Project.

This analysis examines the construction and operational impacts of two upgrade scenarios and the nature and scope of the probable impacts of each scenario, should they occur as a result of approval of the Calico Project. The 275 MW Early Interconnection option would include upgrades to the existing SCE system that would result in 275 MW of additional latent system capacity. The 850 megawatt [MW] Full Build-Out option would include replacement of a SCE transmission line, substation expansion and other upgrades to allow for additional transmission system capacity to support the operation of the full Calico Solar Project.

As part of the 850 MW Full Build-Out, SCE will need to file an application for a Certificate of Public Convenience and Necessity (CPCN) with the California Public Utilities Commission (CPUC) to construct the Lugo-Pisgah Transmission Line Upgrade Project. In addition, SCE will apply to the Bureau of Land Management (BLM) for a Right-of-Way Grant. Those agencies will be responsible for compliance with CEQA and NEPA, and preparation of the appropriate environmental documents to fully evaluate the project's impacts. The CPUC and BLM will be the lead agencies for compliance with CEQA and NEPA, respectively.

This analysis identifies potentially significant impacts and identifies types of mitigation measures that could be enacted to reduce impacts or to ensure the project would not cause significant impacts.

Background

As part of the proposed Calico Solar Project, the applicant asked SCE to review how much latent system capacity would be available for use on SCE's existing system prior to completion of the system facilities proposed for interconnection of the 850 MW for the Calico Solar Project. The applicant also applied to the California Independent System Operator (CAISO) for the interconnection of their 850 MW Solar One Project to the CAISO Grid at the existing SCE Pisgah Substation 220 kV bus under the terms of SCE's Transmission Owner (TO) Tariff.

SCE prepared a System Impact Study (SIS) dated March 7, 2006, to analyze the impact of the 850 MW project to SCE's transmission system. In addition, SCE prepared a Technical Study (TAS I) to evaluate transient stability associated with the interconnection of the 850 MW Calico Project. Subsequent to these two studies, a number of queued ahead generation projects withdrew from the CAISO Interconnection Queue resulting in a need to perform a reassessment of the impacts originally identified in the SIS and the TAS I. SCE prepared a new Technical Assessment II (TAS II) dated

June 13, 2008, to analyze the impact of the 850 MW project to the SCE transmission system reflecting the withdrawal of previously-queued projects. The Interconnection Facilities Study dated November 6, 2008, addressed the scope of work and the cost estimate for the construction of all the interconnection facilities and system upgrades required for the interconnection of the 850 MW project.

During the preparation of the several reports discussed above, the applicant requested that SCE investigate the possibility of interconnecting a portion of its 850 MW generation to the existing Pisgah Substation and the related 220 kV system before the completion of the 500 kV upgrades. In compliance with this request, SCE prepared an LGIP Optional Interconnection Study Report (Optional Study) that was submitted to the CAISO in January 2008 and analyzed the maximum amount of generation that could be interconnected to the existing Pisgah 220 kV bus and related 220 kV transmission lines. On January 9, 2008, the CAISO issued the Optional Study Report indicating that that Calico Project could be allowed to interconnect up to 275 MW generation to the existing Pisgah 220 kV bus and related 220 kV transmission system contingent on the installation of a new Special Protection Scheme to drop the Calico Solar Project's generation under certain contingencies.

The intent of the early interconnection of up to 275 MW is that it would be a temporary interconnection until the 500 kV upgrades identified in the Interconnection Facilities Study are in service, and the full requested generation output of 850 MW could be connected to the upgraded transmission system. When completed, the 500 kV upgrades would allow for the export of approximately 1,400 MW of additional generating capacity between the Lugo and Pisgah substations. This will accommodate not only all of the power produced by the Calico Solar Project, but other proposed generation facilities as well.

A second Optional Study Agreement (Interconnection Optional Study) dated October 12, 2009, detailed the scope of work and cost estimate for the early interconnection of 275 MW of the Calico Solar Project generation to the existing Pisgah Substation 220 kV bus and related 220 kV transmission lines. Final engineering has not been performed for the 275 MW Early Interconnection, and it is pending the execution of a Large Generator Interconnection Agreement (LGIA) for the proposed Calico Project. Negotiations for the LGIA are underway and it is expected to be finalized in early 2010.

For the system facilities required to interconnect the 850 MW project, SCE would review what real estate rights would need to be obtained upon completion of the final siting analysis. Such siting analysis would commence subsequent to the execution of the LGIA. SCE also anticipates commencing thorough environmental reviews upon execution of the LGIA. A detailed assessment of the environmental impacts and requirements for mitigation associated with the substation and transmission line upgrades associated with the 850-MW interconnection is expected to be included in the CPCN application and Proponent's Environmental Assessment (PEA) that will be submitted by SCE to the CPUC.

B.3.5.2 Description of Future Actions

Two SCE upgrade options are considered in this analysis based on information included in Appendix EE of the Calico Solar Project's Application for Certification (AFC) and from SCE (SES 2008a; SCE 2009). The **275 MW Early Interconnection Option** includes upgrades to the SCE system that would result in 275 MW of additional capacity, allowing for interconnection of an initial 275 MW phase of Calico Solar Project or incorporation of the Reduced Acreage Alternative facility within the existing transmission system. The Reduced Acreage Alternative would be a 275 MW solar facility located within the boundaries of Phase 2 of the proposed project as defined by the applicant and it is described in the **Alternatives** section of this Supplemental Staff Assessment.

Under the **850 MW Full Build-Out Option**, SCE would construct a new Lugo-Pisgah No. 2 500 kV (single circuit) within the existing right-of-way (ROW) of the existing Lugo-Pisgah No. 2 220 kV transmission line (see Figure 1 (project area map) from Appendix EE of the AFC) for 57.1 miles of the approximately 67 miles of the ROW. The last 9.8 miles south of Victorville would be constructed within a new ROW area. There would also be two new transmission line loops constructed in the vicinity of the existing Pisgah Substation. The existing Pisgah Substation (approximately 5 acres) would be expanded to approximately 40 acres to accommodate new electrical and communication facilities. However, the substation may be sized up to 100 acres to accommodate for future growth.

The proposed 850 MW Full Build-Out option would serve current and projected demand for electricity and maintain electric system reliability in this portion of the Mojave Desert where numerous renewable (solar and wind) projects are being proposed, including Calico Solar. According to the Large Generator Interconnection Agreement, the full build-out is expected to be operational on or before January 1, 2016 to ensure that safe and reliable electric service is available to meet existing and projected customer electrical demands.

Both options are described in detail in the following sections.

B.3.5.2.1 275 MW Early Interconnection Option

The following upgrades to the SCE system would be required for the Early Interconnection Option:

- Expand Pisgah 220 kV bus one position and equip with two circuit breakers;
- At Pisgah Substation, add motor-operated disconnects on existing Lugo-Pisgah 220 kV transmission lines (no circuit breakers are currently installed on these lines);
- New telecommunication facilities:
  a. Install Optical Protection Ground Wire (OPGW) on existing 65-mile portion of Eldorado-Lugo 500 kV transmission line. Approximately 70 towers would need to be retrofitted in order to support the OPGW;
  b. Install digital fiber on mostly existing distribution (new facilities needed) back to Cool Water Substation;
  c. Use Microwave out of Cool Water Substation to Lugo Substation;

- Add proposed the Calico Solar Project to Special Protection System (SPS) under the following contingencies:

  a. Loss of one Lugo AA-Bank;

  b. Loss of Lugo-Pisgah 220 kV transmission line.

Additional details on the Engineering Plan, Description and Location are described below.

Pisgah Substation Expansion

The following upgrades to the Pisgah Substation would be required for the 275 MW Early Interconnection Option (SCE 2009):

- Expand SCE's existing Pisgah 220 kV Substation (northwest area of the substation to create a new area of approximately 270 feet by 100 feet) within SCE's existing 220 kV ROW;
- Install a new double-breaker 220 kV line position to terminate the new Calico Solar Project 220 kV gen-tie line;
- Install motorized disconnect switches on each of the existing SCE Lugo No.1 and No.2 220 kV line positions at the substation;
- Install special protection scheme (SPS) relays inside the existing mechanical electrical equipment rooms (MEER);
- Install new remote terminal unit (RTU) inside the existing MEER; and
- Install miscellaneous telecommunications equipment inside the existing MEER.

SCE 220 kV Gen-Tie Configuration

SCE would build approximately one to two new 220 kV structures within the existing 220 kV ROW and/or within the expanded Pisgah Substation fence line to support the gen-tie line coming from the Calico Solar Project to facilitate the 220 kV service drop from the last Calico Project's gen-tie structure into the Pisgah Substation. Actual structure types, configurations and locations have not yet been determined or engineered and would be subject to further engineering and coordination between SCE and the applicant.

Telecommunications Facilities

Two telecommunication paths would be required for the Calico Solar Project early interconnection of 275 MW. The two separate paths are needed due to 220 kV line protection and SPS requirements. The two separate telecommunications paths would be (SCE 2009):

- **Pisgah-Gale Fiber Optic Cable**. Constructing a new fiber optic communication line on existing poles between SCE's Pisgah and Gale substations; and
- **OPGW Installation on Eldorado – Lugo 500 kV transmission line**. Replacing existing Overhead Ground Wires (OHGW) with new OPGW on a 65-mile segment of SCE's Eldorado-Lugo 500 kV line between SCE's Lugo and Pisgah substations.

With respect to the OPGW installation mentioned above, SCE has stated that it anticipates installing a repeater station shelter within the Eldorado-Lugo 500 kV transmission line ROW, which would require an approximate area of 15 feet by 20 feet. This repeater station shelter would likely require a distribution power connection that could involve the installation of several wood distribution poles. The repeater station and distribution poles would involve minimal permanent ground disturbance in addition to temporary ground disturbance during construction. However, because final engineering has not yet been completed, the exact location for facilities has not been determined.

In addition, two separate telecommunications paths would be required from the Calico Solar Project Substation to SCE's Pisgah Substation. The OPGW path between Calico Solar Project and Pisgah Substation would be constructed by the applicant. The paths are as follows:

- The applicant would install OPGW on its 220 kV gen-tie line between the Calico Solar Project Substation and SCE's Pisgah Substation;
- SCE would install fiber optic cable between the Calico Solar Project Substation and SCE's Pisgah Substation on a combination of existing distribution and new communication poles and/or within new underground conduits.

Additional information regarding the major communications paths (Pisgah-Gale Fiber Optic Cable and OPGW Installation on Eldorado–Lugo 500 kV transmission line), which is based on preliminary engineering, follows below. Detailed project information on the communication paths required between the Calico Solar Project Substation and Pisgah Substation is not yet available.

Pisgah-Gale Fiber Optic Cable

The Pisgah-Gale fiber optic cable would consist of one All-Dielectric Self-Supporting (ADSS) 48 strand single mode fiber optic cable between SCE's Pisgah and Gale substations to provide for telecommunication interconnection between Pisgah Substation and Gale Substation, including protective relay circuits, Supervisory Control and Data Acquisition (SCADA) circuits, data, and telecommunication services.

Approximately 151,141 feet of new fiber optic cable would be installed between the MEER at Pisgah and Gale substations. Portions of the fiber optic cable would be constructed on existing overhead transmission, distribution and communication wood pole structures. In addition portions of the cable would be constructed within newly constructed underground conduit system(s). On average, all existing overhead structures are approximately between 40 feet and 55 feet tall. Any new structures would likely be the same height, but this would be dependent on wind-loading analysis and further engineering.

The proposed Pisgah-Gale fiber optic cable route would begin at the existing Gale Substation in San Bernardino County. The route would proceed east from the MEER building for approximately 200 feet as underground cable in an existing underground cable trench. It would continue east approximately 150 feet as underground cable in existing underground conduit to an existing riser pole located on SCE ROW. The route

would transition to overhead cable and would continue south on SCE ROW for approximately 210 feet on existing overhead distribution poles. The overhead fiber optic cable route would continue east on National Trails Highway on existing overhead distribution poles for approximately 16,588 feet before continuing south approximately 90 feet, east for approximately 34,678 feet, north for approximately 110 feet on National Trails Highway/Pioneer Road, and east for approximately 10,935 feet. The route would briefly diverge from National Trails Highway to continue south on Newberry Road for approximately 1,800 feet on existing overhead distribution poles. Turning east on National Trails Highway the overhead fiber optic cable route would continue for approximately 83,200 feet on existing overhead distribution poles. Continuing north, the route would cross Interstate Highway 40 and on the SCE ROW approximately 2,580 feet installing overhead cable on existing overhead distribution poles to pole #429143S. A new riser would be installed on pole #429143S and the cable would transition to underground, continuing northeast for approximately 600 feet in a new underground conduit into the MEER in Pisgah Substation.

OPGW Installation on Eldorado – Lugo 500 kV Transmission Line

Approximately 60 miles of the existing SCE Eldorado-Lugo 500 kV transmission line between Lugo and Pisgah substations would need to have one of the two existing half-inch steel overhead ground wires (OHGW) replaced with OPGW in order to accommodate the early 275 MW interconnection of SES Solar One. The replacement of the OHGW with OPGW on the existing 500 kV steel lattice towers (LST) would require some modifications on the existing LSTs. The loading capacity of modified tower structures with the new OPGW would conform to the California Public Utilities Commission (CPUC) General Order (GO) 95 loading criteria.

Currently, SCE has stated that it anticipates approximately 70 single-circuit LSTs would need to be modified (SCE 2009). Various types of tower modifications would be needed for the various different types of LSTs; however, detailed engineering on the OPGW installation has not yet occurred. The strengthening of the LSTs for the new OPGW could require any combinations of modifications, and that each modification would consist of different steel member bundles or configurations. The modifications of the existing 500 kV LSTs may include the static peaks, tower body reinforcement, body extension, installation of horizontal diaphragms, and tower leg reinforcement. Detailed drawings and procedures for each of the tower modifications would be developed for fabrication and installation. The modifications to be performed on each tower are identified by bundles. Each bundle would contain those components necessary to complete the required modifications, such as new steel angles to form back to back angles to the existing leg diagonals, redundant braces to the longitudinal and transverse faces, oblique braces between leg diagonals, and a new horizontal diaphragm. New redundant members would also be designed and installed at the ground peaks to support the OPGW clip-in hardware. The loading capacity of the upgraded tower structures would be able to support the loads for the new OPGW installation and meets the requirements of CPUC GO 95.

B.3.5.2.2 850 MW Full Build-Out Option

In addition to the upgrades under the 275 MW Early Interconnection option, the scope of work for the full 850 MW of additional capacity in SCE's transmission system would consist of the following:

- Expand Pisgah Substation to 500 kV:
  a. Design for up to four AA-Banks;
  b. Initially install two AA-Banks for proposed Calico Project;
  c. Include new 500 kV and 220 kV switchracks;
- Remove existing Lugo-Pisgah No. 2 220 kV transmission line between Pisgah Substation and Mojave River;
- Construct new 500 kV transmission line in the ROW vacated with removal of 220 kV transmission line;
- Complete 500 kV transmission line into Lugo Substation on new ROW west of the Mojave River;
- Loop existing Eldorado-Lugo 500 kV transmission line into new Pisgah 500 kV Substation;
- Install new telecommunication facilities:
  a. Install OPGW on existing 65-mile portion of Eldorado-Lugo 500 kV transmission line;
  b. Install OPGW on new 67-mile 500 kV transmission line;
- Add Calico Project to Special Protection System under the following contingency:
  a. Trip Calico Project under loss of both new Lugo-Pisgah 500 kV transmission lines.

Pisgah Substation Expansion

The existing 5-acre Pisgah Substation would be expanded to approximately 40 acres to accommodate new electrical and communication facilities, including up to four AA-banks (two AA-banks would initially be installed for the proposed Calico Solar Project) and new 500 kV and 220 kV switchracks. However, once final engineering is completed, the substation may be sized up to 100 acres to accommodate for future growth.

Depending on land availability[1] and engineering, the expanded/new Pisgah Substation would likely be constructed along the existing ROW in the approximately 6-mile area between the existing Pisgah Substation and the mountains to the southwest. However,

[1] On December 21, 2009, Sen. Dianne Feinstein (D-Calif.) introduced legislation to establish the Mojave Trails National Monument, which would prohibit development on 941,000 acres of federal land and former railroad company property along a 105-mile stretch of old Route 66, between Ludlow and Needles. The southwestern boundary this proposed monument would be directly northeast and east of the Pisgah Substation expansion and transmission line upgrades, but the project is not expected to be affected.

the exact location of the new/expanded substation has not been determined and so a full analysis of its impacts is not possible at this time.

Transmission Line Facilities

500 kV Transmission Line Scope (Lugo-Pisgah No. 2)

The proposed 850 MW Full Build-Out option would consist of the construction of a single-circuit 500 kV transmission line on 57.1 miles of existing ROW and 9.8 miles of new ROW. The existing 220 kV Lugo-Pisgah No. 2 transmission line would be replaced with the new 500 kV single-circuit structures.

The Lugo–Pisgah No. 2 500 kV transmission line would begin at the new Pisgah 500 kV/220 kV Substation. The proposed line would exit the substation to the northeast, and then wrap around the south side of the substation for approximately 0.6 miles before joining the existing Lugo-Pisgah No. 2 ROW. The line would then head southwest along the existing Lugo-Pisgah No. 2 ROW for approximately 56.7 miles until it would reach the eastern edge of the Mojave River. The proposed line would then head south on a new ROW along the east side of the river for approximately 1.6 miles before crossing to the west side of the river. The line would then continue west on new ROW for approximately 7.6 miles before rejoining the existing Lugo-Pisgah No. 2 ROW for another 0.4 miles into the existing Lugo Substation where it would terminate.

The existing 220 kV structures on the Lugo-Pisgah No. 2 220 kV transmission line would be removed for the entire length of the ROW.

The new approximately 67 miles of 500 kV transmission line would use two-bundled nonspecular 2156 kcmil aluminum conductor steel reinforced (ACSR) “Bluebird” conductor on single-circuit lattice steel towers (LSTs). It is currently estimated that approximately 220 new dulled galvanized 500 kV towers would be installed in the existing ROW and 38 new dulled galvanized 500 kV towers would be installed in the new ROW. The single-circuit towers would range in height between 91 feet and 194 feet. Within the existing ROW, the new 500 kV structures would be spaced to match the existing 500 kV structures where feasible. Most of the structure sites would require minor to substantial grading and new or re-developed access and spur roads.

500 kV Transmission Line Scope (Eldorado-Lugo)

The existing 500 kV Eldorado-Lugo single-circuit transmission line would be looped into the new/expanded Pisgah Substation. The northern leg of the loop would turn southeast and cross over the existing 220 kV Cima–Eldorado No. 1 and No. 2 circuits before turning into the new Pisgah Substation. The southern leg of the loop would exit the Pisgah Substation and turn northwest over the existing 220 kV Cima–Eldorado No. 1 and No. 2 circuits before rejoining the existing ROW.

The northern leg would be approximately 1,220 feet in length and the southern leg would be approximately 1,000 feet in length. Two existing 500 kV structures on the Eldorado-Lugo transmission line would be removed.

Telecommunication Facilities and Special Protection System

New OPGW telecomm facilities would be installed on an existing 65-mile portion of Eldorado-Lugo 500 kV transmission line and on the new Lugo-Pisgah 500 kV transmission line. The proposed telecomm upgrades would include construction of fully diverse and redundant communication paths to support a special protection system as well as the operating and monitoring of the substation and transmission line equipment.

Calico Project would also be added to the Special Protection System so that the Calico Solar Project would be tripped under loss of both new Lugo-Pisgah 500 kV transmission lines.

B.3.5.3 Construction Activities

B.3.5.3.1 275 MW Early Interconnection Option

SCE 220 kV Gen-Tie Configuration

The interconnection facilities necessary to accommodate the 275 MW Early Interconnection would likely be contained within existing SCE ROWs. However, SCE would upgrade SCE's existing rights or acquire new rights where necessary based upon the proposed final engineering of the 275 MW Early Interconnection. The target operating date for the 275 MW Early Interconnection upgrades is mid-to-late 2011.

Staging Area

The establishment of a marshalling yard would not be necessary for the construction of the transmission structures and the stringing of the conductor to complete the gen-tie circuit from the Calico Solar Project into Pisgah Substation. However, a temporary equipment and material staging area would be established for short-term utilization within the existing SCE ROW near the new transmission structure locations and/or at Pisgah Substation. Equipment and materials to be stored at the temporary equipment and material staging area may include:

- Construction trailer
- Construction equipment
- Conductor/wire reels
- Transmission structure components
- Overhead ground wire/Optical ground wire cable
- Hardware
- Insulators
- Signage
- Consumables, such as fuel and joint compound
- Portable sanitation facilities
- Waste materials for salvaging, recycling, and/or disposal
- Stormwater Pollution Prevention Plan materials, such as straw wattles, gravel, and silt fences

The size of the temporary equipment and material staging area may require 0.5 to 1.5 acres; however, the size would be dependent upon a detailed site inspection and would take into account, where practical, suggestions by the SCE crew foreman or the SCE contractor selected to do the work. Land disturbed at the temporary equipment and material staging area, if any, would be restored to preconstruction conditions following the completion of construction.

Access Roads and Spur Roads

The 275 Early Interconnection Option would involve construction within an existing SCE ROW. It is assumed that existing public roads as well as existing transmission line roads would be used during construction. Transmission line roads are classified into two groups: access roads and spur roads; access roads are through roads that run between tower sites along a ROW and serve as the main transportation route along line ROWs; spur roads are roads that lead from access roads and terminate at one or more structure sites. However, it is also assumed that rehabilitation work may be necessary in some locations for existing transmission line roads to accommodate construction activities.

The construction of the 275 Early Interconnection option may require re-grading and repair of existing access and spur roads and/or new spur roads to access the new transmission line structure locations. Similar to rehabilitation of existing roads, all new spur road alignments would first be cleared and grubbed of vegetation. Roads would be blade-graded to remove potholes, ruts, and other surface irregularities, and re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The graded road would have a minimum drivable width of 14 feet (preferably with 2 feet of shoulder on each side), but may be wider depending on final engineering requirements and field conditions. Access and spur road gradients would be leveled so that any sustained grade does not exceed 12 percent. All curves would have a radius of curvature of not less than 50 feet, measured at the center line of the usable road surface. Spur roads would usually have turnaround areas near the structure locations.

Site Preparation

New structure locations would first be graded and/or cleared of vegetation as required to provide a reasonably level and vegetation-free surface for footing and structure construction. Sites would be graded such that water would run toward the direction of the natural drainage. In addition, drainage would be designed to prevent ponding and erosive water flows that could cause damage to the tower footings. The graded area would be compacted, and would be capable of supporting heavy vehicular traffic.

Site preparation for the temporary laydown area required for the assembly of the structure would first be cleared of vegetation and graded as required to provide a reasonably level and vegetation-free surface for footing and structure construction. The area needed for the laydown and the assembly of the structure would be approximately 200 feet by 200 feet (0.92 acre). In locations where the terrain in the laydown area is already reasonably level (for example, at a removed tower location), only vegetation removal would occur to prepare the site for construction. In locations where a level

surface is not present (for example, a new tower site), both vegetation clearing and grading would be necessary to prepare the laydown area for construction.

Erection of the structures may also require establishment of a crane pad to allow an erection crane to set up adjacent to and 60 feet from the centerline of each structure. The crane pad would be located transversely from each applicable structure location. The crane pad would be located within the laydown area used for structure assembly. The pad would be cleared of vegetation and also graded as necessary to provide a level surface for crane operation. If the existing terrain is not suitable to support crane activities, a temporary 50 feet by 50 feet (0.06 acre) crane pad would be constructed.

In mountainous areas, benching may be required to provide access for footing construction, assembly, erection, and wire-stringing activities during line construction. It would be used minimally to help ensure the safety of personnel during construction activities.

Foundation Installation

The structure would require drilled, poured-in-place, concrete footings that would form the structure foundation. Actual footing diameters and depths for each of the structure foundations would depend on the soil conditions and topography at the site and would be determined by SCE during final engineering.

The foundation process would begin with the drilling of the hole for the structure. The hole would be drilled using truck or track-mounted excavators with various diameter augers to match the diameter requirements of the structure. The excavated material would be distributed at the structure site or used in the rehabilitation of existing access roads. Alternatively, the excavated soil may be disposed of at an off-site disposal facility in accordance with all applicable laws.

Following excavation of the foundation footing for each structure, steel reinforced rebar cage(s) would be set, survey positioning of the anchor bolts and/or stub angles would be verified, and concrete would then be placed. The steel reinforced rebar cage(s) would be assembled off site and delivered to the structure location by flatbed truck. A typical transmission structure would require approximately 15 to 80 cubic yards of concrete delivered to the structure location depending upon the type of structure being constructed, soil conditions, and topography at each site. The transmission structure footings would project approximately 1 to 3 feet above the ground level.

Foundations in soft or loose soil and that extend below the groundwater level may be stabilized with drilling mud slurry. Mud slurry would be placed in the hole after drilling to prevent the sidewalls from sloughing. The concrete for the foundation would then be pumped to the bottom of the hole, displacing the mud slurry. The mud slurry brought to the surface would typically be collected in a pit adjacent to the foundation, and then pumped out of the pit to be reused or discarded at an off-site disposal facility in accordance with all applicable laws.

Concrete samples would be drawn at time of pour and tested to ensure engineered strengths were achieved. A normally specified SCE concrete mix typically takes approximately 28 days to cure to an engineered strength. This strength would be

verified by controlled testing of sampled concrete. Once this strength has been achieved, crews would be permitted to begin the erection of the structure.

During construction, existing concrete supply facilities would be used where feasible. If concrete supply facilities do not exist in certain areas, a temporary concrete batch plant would be set up. If necessary, approximately 2 acres of property would be sub-partitioned from a staging area for a temporary concrete batch plant. Equipment would include a central mixer unit (drum type); three silos for injecting concrete additives, fly ash, and cement; a water tank; portable pumps; a pneumatic injector; and a loader for handling concrete additives not in the silos. Dust emissions would be controlled by watering the area and by sealing the silos and transferring the fine particulates pneumatically between the silos and the mixers.

Conventional construction techniques would generally be used as described above for new footing installation. In certain cases, equipment and material may be deposited at structure sites using helicopters or by workers on foot, and crews may prepare the footings using hand labor assisted by hydraulic or pneumatic equipment, or other methods. Prior to drilling for foundations, SCE would contact Underground Service Alert to identify any underground utilities in the construction zone.

Structure Assembly and Erection

Structure assembly would consist of hauling the structure components from the staging yard to their designated laydown site using semi-trucks with 40-foot trailers. Crews would then assemble portions of each structure on the ground at the structure location, while on the ground, the top section may be pre-configured with the necessary insulators and wire-stringing hardware before being set in place. An 80-ton all-terrain or rough terrain crane would be used to position the base section on top of previously prepared foundation. When the base section is secured, the remaining portions of the structure would then be placed upon the base section and bolted together.

After construction is completed, the transmission structure site would be graded such that water would run toward the direction of the natural drainage. In addition, drainage would be designed to prevent ponding and erosive water flows that could cause damage to the structure footing. The graded area would be compacted and would be capable of supporting heavy vehicular traffic.

Stringing Activities

Wire-stringing includes all activities associated with the installation of conductors. This activity would include the installation of primary conductor and OPGW or ground wire, vibration dampeners, weights, spacers, and suspension and dead-end hardware assemblies. Insulators and stringing sheaves (rollers or travelers) are typically attached during the steel erection process.

A standard wire-stringing plan would include a sequenced program of events starting with determination of wire pulls and wire pull equipment set-up positions. Advanced planning by supervision would determine circuit outages, pulling times, and safety protocols needed for ensuring that safe and quick installation of wire would be accomplished.

Wire-stringing activities would be conducted in accordance with SCE specifications, which would be similar to process methods detailed in Institute of Electrical and Electronics Engineers Standard 524-2003, Guide to the Installation of Overhead Transmission Line Conductors.

Wire pulls are the length of any given continuous wire installation process between two selected points along the line. Wire pulls are selected, where possible, based on availability of dead-end structures at the ends of each pull, geometry of the line as affected by points of inflection, terrain, and suitability of stringing and splicing equipment setups. In some cases, it may be preferable to select an equipment setup position between two suspension structures. Anchor rods would then be installed to provide dead-ending capability for wire sagging purposes, and also to provide a convenient splicing area.

To ensure the safety of workers and the public, safety devices such as traveling grounds, guard structures, and radio-equipped public safety roving vehicles and linemen would be in place prior to the initiation of wire-stringing activities.

The following four steps describe the wire installation activities proposed by SCE:

- **Step 1: *Sock Line, Threading***: Typically, a lightweight sock line is passed from structure to structure, which would be threaded through the wire rollers in order to engage a camlock device that would secure the pulling sock in the roller. This threading process would continue between all structures through the rollers of a particular set of spans selected for a conductor pull.
- **Step 2: *Pulling*:** The sock line would be used to pull in the conductor pulling cable. The conductor pulling cable would be attached to the conductor using a special swivel joint to prevent damage to the wire and to allow the wire to rotate freely to prevent complications from twisting as the conductor unwinds off the reel. A piece of hardware known as a running board would be installed to properly feed the conductor into the roller; this device keeps the bundle conductor from wrapping during installation.
- **Step 3: *Splicing, Sagging, and Dead-ending*:** After the conductor is pulled in, the conductor would be sagged to proper tension and dead-ended to structures.
- **Step 4: *Clipping-in, Spacers*:** After the conductor is dead-ended, the conductors would be secured to all tangent structures; a process called clipping in. Once this is complete, spacers would be attached between the bundled conductors of each phase to keep uniform separation between each conductor.

The dimensions of the area needed for the stringing setups associated with wire installation would be variable and dependent upon terrain. The preferred minimum area needed for tensioning equipment set-up sites would require approximately an area of 150 feet by 500 feet (1.72 acres); the preferred minimum area needed for pulling equipment set-up sites would require approximately an area of 150 feet by 300 feet (1.03 acres); however, crews can work from within slightly smaller areas when space is limited. Each stringing operation would include one puller positioned at one end and one tensioner and wire reel stand truck positioned at the other end.

For stringing equipment that cannot be positioned at either side of a dead-end transmission structure, field snubs (i.e., anchoring and dead-end hardware) would be temporarily installed to sag conductor wire to the correct tension.

Pulling and splicing locations would be determined at a later date, but would generally be located within the existing ROW area. The dimensions of the area needed for the stringing setups associated with wire installation are variable and depends upon terrain. Splicing sites would be strategically located to support the stringing operations; splicing sites include specialized support equipment such as skidders and wire crimping equipment.

The puller and tensioner set-up locations require level areas to allow for maneuvering of the equipment. When possible, these locations would be located on existing level areas and existing roads to minimize the need for grading and cleanup.

The puller and tensioner set-up locations associated with the transmission structures would be temporary and the land would be restored to its previous condition following completion of conductor stringing activities. The final number and locations of the puller and tensioner sites would be determined during final engineering and the construction methods chosen by SCE or its contractor.

An OHGW for shielding or an OPGW for shielding and communication purposes would be installed on the transmission line. Final engineering would determine which configuration is installed. The OHGW/OPGW would be installed in the same manner as the conductor; it is typically installed in conjunction with the conductor, depending upon various factors, including line direction, inclination, and accessibility. Following installation of the OPGW, the strands in each segment are spliced together to form a continuous length from one end of a transmission line to the other. On the last structure at each end of a transmission line, the overhead fiber is spliced to another section of fiber cable that runs in underground conduit from the splice box into the communication room inside the adjacent substation.

Pisgah Substation Expansion

The expansion of Pisgah Substation would require extending the graded substation pad to the west of the existing substation. It is estimated that the grading activities would disturb an area approximately 300 feet by 125 feet (0.9 acre) to provide the proposed 270-foot by 100-foot internal expansion. Because the surface elevation of the new expansion area would be higher than the surface elevation of the surrounding desert floor, it is anticipated that approximately 10,000 cubic yards of new soil would be required to achieve the desired level.

After the area has been graded, new chain-link fencing would be installed and the portion of the old fencing would be removed.

Following the completion of the site improvements, below grade construction would begin with the expansion of the substation ground grid into the new area, followed by the excavation for conduits and for equipment and structure foundations. Above grade construction would include the erection of steel structures, the installation of the new

220 kV circuit breaker and ancillary electrical equipment, the installation of overhead connecting cables and of new control and monitoring devices within the control building.

Once the installation of the substation equipment has been completed, a four-inch thick layer of crushed rock would be placed on the surface of the expansion area. There would be no asphalt concrete paving as part of this project element.

Upon completion of these activities, extensive testing would be required to insure safe and reliable operation prior to the energization of the new position.

Telecommunications Facilities

Pisgah-Gale Fiber Optic Cable

The Pisgah-Gale fiber optic cable would be a newly constructed fiber optic cable line, approximately 151,141 feet in length, on existing overhead SCE distribution wood pole structures between and into SCE's Pisgah and Gale substation MEERs. In addition, as noted earlier, portions of the cable would be constructed on newly constructed underground conduit system(s).

For the attachments (pole framing) to existing and overhead wood pole structures the fiber optic cable will utilize a five foot wood cable arm and Fiberlign high-strength engineered dielectric suspension support block. This suspension support block is oriented vertically and attached to the cable arm. One suspension support block would be required per overhead structure.

For the installation in the new underground conduit and underground structures entering Pisgah Substation, the fiber optic cable would utilize a high density polyethylene smoothwall innerduct, which would provide protection and identification for the cable. The fiber optic cable would be installed in and throughout the length of the new underground conduit structure.

The construction of the fiber optic cable would utilize existing franchise (public ROW) locations, and existing access and spur roads. Access roads are through roads that run between and along overhead wood pole structures form the main transport route along the major extent of the fiber optic cable. Spur roads are roads that lead from the access road and dead-end into one or more overhead structure sites. The existing and new overhead structures that do not have vehicle access would be walked-in to each location by SCE crews.

Fiber optic cable stringing would include all activities associated with the installation of cables onto the overhead wood pole structures. This activity would include the installation of vibration dampeners, and suspension and dead-end hardware assemblies. Stringing sheaves (rollers or travelers) would be attached during the framing process. A standard wire stringing plan would include a sequenced program of events starting with determination of cable pulls and cable pulling equipment set-up positions. At this time, exact locations of the pulling locations have not yet been determined.

Typically, fiber optic cable pulls occur every 6,000 feet to 10,000 feet on flat and mountainous terrain. Fiber optic cable splices are required at the end and beginning of

each cable pull. Fiber optic cable pulls are the length of any given continuous cable installation process between two selected points along the overhead or underground structure line. Fiber optic cable pulls would be selected, where possible, based on availability of pulling equipment and designated dead-end structures at the ends of each pull, geometry of the line as affected by points of inflection, terrain, and suitability of fiber optic cable stringing and splicing equipment set ups. The dimensions of the area needed for stringing set ups varies depending upon the terrain, however a typical stringing set up is usually 40 feet by 60 feet. Where necessary due to suitable space limitations, crews can work from within a substantially smaller area.

The crews would utilize Pisgah and Gale Substations as a laydown area for all material for the proposed fiber optic cable which would be delivered by truck. Material would be placed inside the perimeter of the fenced substation in a designated area during construction. The majority of the truck traffic would use major streets and would be scheduled for off-peak traffic hours. All construction debris would be placed in appropriate onsite containers and periodically disposed of in accordance with all applicable local jurisdiction regulations.

The primary marshalling yard for the Pisgah-Gale fiber optic cable component would be established inside Gale Substation, or, if room is not available, a suitable existing manned SCE facility outside the substation would be located. Materials and equipment to be staged to this yard include but are not limited to: fiber optic cable reels and hardware, heavy equipment, light trucks, and portable sanitation facilities. In addition to the materials and equipment already detailed for new construction, the following may be routed through this yard: empty fiber optic cable and innerduct reels, and other debris associated with the installation of the fiber optic cable process.

OPGW Installation on Eldorado–Lugo 500 kV Transmission Line

Modifications to approximately 70 of the existing Eldorado-Lugo 500 kV towers may include the static peaks, structure body reinforcement, body extension, installation of horizontal diaphragms, and structure legs reinforcement. Detail drawings and procedures for each of the structure modifications would be developed for fabrication and installation. All construction work for the 500 k LST modifications to accommodate the new OPGW would be performed within the existing transmission line ROW.

The modifications to be performed on each structure would be identified by bundles. Each bundle would contain those components necessary to complete the required modifications, such as new steel angles to form back to back angles to the existing leg diagonals, redundant braces to the longitudinal and transverse faces, oblique braces between leg diagonals, and a new horizontal diaphragm. New redundant members would also be designed and installed at the ground peaks to support the OPGW clip-in hardware. The loading capacity of the upgraded structure structures would be able to support the loads for the new OPGW installation and meet the requirements of CPUC GO 95. Final structure modification and associated construction activities would be determined once final engineering is completed by the contractor.

Tower modifications and installation of a new OPGW line would require access to each existing tower site for construction crews, materials, and equipment. Because the work would occur in an existing ROW, all of the existing tower sites have existing access and

spur roads, which would be used for construction. Although no new roads would be needed to perform the work, where needed, the existing access roads would be improved. After project construction, these roads would continue to be used by maintenance crews and repair vehicles for access to each tower for inspection and maintenance activities. At the end of project construction, these roads would be left in a condition equal to or better than the condition that existed prior to the start of construction. Loose rock and slide material would be removed from existing roads and used to construct dikes, fill washouts, or flatten fill slopes; all washouts, ruts, and irregularities would be filled or obliterated.

During re-grading and repair of existing access and spur roads, the roads would be cleared of vegetation, blade-graded to remove potholes, ruts, and other surface irregularities, and re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The graded road would have a minimum drivable width of 14 feet (preferably with 2 feet of shoulder on each side).

Drainage structures such as wet crossings, water bars, overside drains and pipe culverts would be installed to allow for construction traffic usage, as well as prevent road damage due to uncontrolled water flow.

Slides, washouts, and other slope failures would be repaired and stabilized by installing retaining walls or other means necessary to prevent future failures. The type of structure to be used would be based on specific site conditions.

The tower modifications begin with hauling and stacking bundles of steel at tower locations per engineering drawing requirements. This activity requires use of several tractors with 40-foot trailers and a rough terrain forklift. After steel is delivered and stacked, crews would proceed with the structure modification to leg extensions, body panels, boxed sections, bridges, and peaks, as necessary. The various steel components used to reinforce the towers would be lifted into place with a minimum 80-ton all-terrain or rough terrain crane and the tower modification work would be performed by a combined erection and torquing crew.

The OPGW is typically installed in continuous segments of 19,000 feet or less depending upon various factors including line direction, inclination, and accessibility. Following installation of the OPGW, the strands in each segment are spliced together to form a continuous length from one end of a transmission line to the other.

To ensure the safety of workers and the public, safety devices such as traveling grounds, guard structures, and radio-equipped public safety roving vehicles and linemen would be in place prior to the initiation of OPGW stringing activities.

The following three steps describe the OPGW installation activities proposed by SCE:

- **Step 1: *Pulling*:** To minimize ground disturbance and insure controlled conditions during the OPGW installation activities, the existing static ground wire would be used to pull in the new OPGW. The existing static ground wire would be attached to the OPGW using a special swivel joint to prevent damage to the OPGW and to allow it to rotate freely to prevent complications from twisting as it unwinds off the reel. The existing static ground wire is wound onto “breakaway” reels as it is

removed. The existing static ground would be transported to a marshalling yard where it would be prepared for recycling.

- **Step 2: *Sagging, and Dead-ending*:** After the OPGW is pulled in; it would be sagged to proper tension and dead-ended to structures.
- **Step 3: *Clipping-in*:** After the OPGW is dead-ended, it would be secured to all tangent structures; a process called clipping in.

The dimensions of the area needed for the OPGW stringing setups associated with installation are variable and depends upon the terrain, however a typical stringing set up is 75 feet by 100 feet, however, and crews can work from within slightly smaller areas when space is limited.

Each OPGW segment stringing operation would include one puller positioned at one end and one tensioner and wire reel stand truck positioned at the other end. The puller and tensioner set-up locations require level areas to allow for maneuvering of the equipment. When possible, these locations would be located on existing level areas and existing roads to minimize the need for grading and cleanup.

The puller and tensioner set-up locations would be temporary and the land would be restored to its previous condition following completion of pulling activities. The final number and locations of the puller and tensioner sites would be determined during final engineering.

At the towers where the segments terminate, the OPGW cables are routed down a tower leg where the segments are spliced together. For splicing OPGW cables, special splicing lab vehicles would be used to travel to the various splicing locations. The area required for each splicing crew would be 30 feet by 40 feet. The crew would bring the OPGW cable ends into the special splicing lab vehicles and splice together the two ends. The splices are then transferred to and housed in a splice box (a 3-feet by 3-feet by 1-foot metal enclosure) that would be mounted to one of the tower legs some distance above the ground. On the last tower at each end of a transmission line, the overhead fiber would be spliced to another section of fiber cable that runs in underground conduit from the splice box into the communication room inside the adjacent substation.

The retrofitting of the existing 500 kV LSTs, removal of existing OHGW, and installation of the OPGW would require the establishment of approximately 3 to 5 temporary marshalling yards located at strategic points along the route. Each yard would be used as a reporting location for workers and may have offices for supervisory and clerical personnel; the yards would also be used for the storage and staging of materials, the parking of private vehicles, and the parking of construction vehicles and equipment. Each yard would be approximately 2.5 to 5.0 acres in size, depending on land availability and intended use. Preparation of the marshalling yards may include the application of road base, depending on existing ground conditions at the yard site, and the installation of perimeter fencing.

Crews would load materials onto work trucks and drive to the line position being worked on that specific day. At the end of the day, they would return to the yard in their work vehicles and depart in their private vehicles. Materials stored at the marshalling yards

would be similar to the items stored at staging areas discussed under the SCE 220 kV gen-tie above.

In addition to the primary marshalling yards, approximately 4 to 8 temporary secondary material staging yards would be established for short-term utilization near construction sites. Where possible, the secondary staging yards would be sited in areas of previous disturbance along and/or adjacent to the transmission line ROW. Typically, an area approximately 1 to 3 acres would be required. Preparation of the secondary staging yards may include installation of perimeter fencing and the application of road base, depending on existing ground conditions at the yard site. Land disturbed at the temporary material staging areas, if any, would be restored to preconstruction conditions or to the landowner's requirements following the completion of construction.

The location, size, and total number of the temporary marshalling yards and temporary secondary material staging yards are not known at this time. The selection of the location and size of these yards would be dependent upon a detailed ROW inspection and would take into account, where practical, suggestions by SCE crew foreman or the SCE contractor selected to do the work, and the availability of appropriately zoned property.

B.3.5.3.2 850 MW Full Build-Out Option

A general description of construction activities is based on information from Appendix EE of the Calico Project AFC and from past SCE transmission and substation projects (SES 2008a). Additional information will be included in SCE's CPCN application and PEA that will be submitted to the CPUC.

Transmission Line Facilities

Construction activities associated with the proposed transmission line facilities would be generally similar to the activities described for the SCE 220 kV Gen-Tie Configuration under the 275 MW Early Interconnection option above.

Work activities would commence upon approval of the proposed project by the CPUC, BLM and other permitting agencies. Terms of the LGIA state that the project would be operational by January 1, 2016; however SCE has a target operating date of 2014 depending on permitting.

Proposed Construction and Restoration Measures

Appendix EE of the Calico Project AFC recommends potential mitigation measures that could be implemented to reduce environmental impacts. However, Applicant Proposed Measures (APMs) dealing with general construction procedures, as well as those dealing with environmental resources and site-specific mitigation measures developed as the result of SCE's environmental analysis of the project, will be presented in SCE's Proponent's Environmental Assessment that will be submitted to the CPUC. In addition, the CPUC and BLM will also develop and implement mitigation measures for the proposed project.

Labor and Equipment

Construction of the proposed transmission line would be performed by contract personnel with SCE responsible for project administration and inspection. Standard construction equipment would be used and at some stages of the project, multiple locations would be under construction simultaneously. This may involve independent construction teams. The following activities would likely be required to construct the 500 kV transmission line:

- Survey (entire existing and new ROW);
- Marshalling Yard;
- Roads and Landing Work;
- Guard Structure Installation;
- Install LST Foundations (258 500 kV structures);
- LST Steel Haul;
- LST Steel Assembly;
- LST Erection;
- Install Conductor & OHGW;
- Guard Structure Removal;
- Remove Existing Conductor & OHGW;
- Remove Existing 220 kV Structures;
- Remove Existing Foundations; and
- Restoration.

ROW and Siting

Depending on final routing, approximately 9.8 miles of new ROW would be required for the Lugo-Pisgah No. 2 500 kV transmission line upgrade project. This includes 0.6 miles around the new/expanded Pisgah Substation and 9.2 miles from the Mojave River to the Lugo Substation. The existing ROW for the Lugo-Pisgah No. 2 220 kV transmission line would be used for the remaining 57.1 miles of the 500 kV transmission line. Approximately 0.3 miles of new ROW would be required for the Eldorado–Lugo loop into Pisgah Substation.

For siting, SCE would conduct a detailed survey, acquire additional ROW, and begin detailed engineering designs. A control centerline would be established based on field survey measurements. Control monuments, consisting of 2-inch-diameter iron pipes sealed with a stamped brass cap would be set at maximum intervals of approximately 2 miles. Visual reference points parallel and perpendicular to the control line would be established so that photogrammetric profiles of the area's topography could be compiled. Approximate structure locations would be spotted on the profiles according to the engineering design criteria. Once approximate structure locations have been selected, exact positions would be field surveyed.

During this phase of the work, site adjustments would be made to avoid an environmental sensitivity or to maintain structure integrity and sustainability. Generally, these site adjustments would only be a few feet. Structure location approval and clearance procedures are discussed in the following section. Survey crews would also locate spur road centerlines, grades, and soil boring locations. Final determinations of road location curvature, cuts and fills, grades and drainage, and necessary erosion controls would be made in accordance with design standards and practices and/or landowner requirements.

Tower Location Approval and Clearance Procedure

An SCE team made up of SCE personnel and their contractors would visit each proposed structure site following the completion of preliminary engineering and prior to the commencement of detailed, final engineering of the structures. Each tower site and associated spur road would be reviewed by the team to assess the suitability of the site and a buffer area along each spur road and around each tower site would be inspected. If no environmental sensitivities are identified and there are no other issues affecting construction, maintenance, or real estate, the site would be marked as approved and the team would move to the next tower site and spur road. Final engineering would proceed on that tower at the approved location. If an environmental sensitivity is identified, SCE would move the proposed structure site in-line to avoid the sensitivity (in general, towers would not be moved side to side, but only in-line). In most cases, SCE would be able to move a tower site away from sensitivities to a new site.

Typically, this could be accomplished with a move of 50 feet or less. The recommended new tower site would then be inspected by the team. If no environmental sensitivities and no construction, maintenance or real estate issues are identified, preliminary engineering for this new site would be checked and the new tower site and associated spur road route would be approved by the team. Once proposed structure sites are approved, final detailed engineering would proceed. During detailed engineering, no further tower site adjustments would occur without consultation with the interdisciplinary team.

The foundations for the 500 kV towers could require up to four drilled, cast-in-place concrete piles or foundations. The size of the excavation for LSTs would depend on the soil conditions at each tower site. With excavations for structure foundations, tower sites may, on rare occasion, need to be moved due to excavation difficulties or discovery of some new sensitivity. During this phase of the work, site adjustments would be made only if necessary to avoid an environmental sensitivity or to maintain structure integrity and sustainability. Generally, these site adjustments would only be a few feet.

Construction Yards

Construction of the project transmission line would begin with the establishment of temporary construction yards located at strategic points along the route. Each yard would be used as a reporting location for workers, and for vehicle and equipment parking and material storage. The yards would have offices for supervisory and clerical personnel. Normal maintenance of construction equipment would be conducted at these yards. The size of each yard would depend on land availability and intended use and would generally vary from a few acres to approximately 30 acres. Expansion of the

Pisgah Substation would not require an additional temporary laydown area outside of the new substation fenced area.

At peak construction, most of the construction and private commuting vehicles usually occupy the existing yards. Crews would load materials onto work trucks and drive to the line position being worked. At the end of the day, they would return to the yard in their work vehicles and depart in their private vehicles.

Materials stored at the construction yards would be similar to what was described to be stored at temporary equipment and material staging areas under the 275 MW Early Interconnection option above.

Guard Structures

Guard structures may be installed at transportation, flood control, and utility crossings. Guard structures are temporary facilities designed to stop the movement of a conductor should it momentarily drop below a conventional stringing height. Temporary netting could be installed to protect some types of under-built infrastructure. Typical guard structures are standard wood poles, 60 to 80 feet tall, and depending on the width of the conductor being constructed, the number of guard poles installed on either side of a crossing would be between two and four. The guard structures would be removed after the conductor is clipped into place. In some cases, the wood poles could be substituted with the use of specifically equipped boom-type trucks with heavy outriggers staged to prevent the conductor from dropping.

Public agencies differ on their policies for preferred methods to public safety during conductor stringing operations. For highway and open channel aqueduct crossings, SCE would work closely with the applicable jurisdiction to secure the applicable ministerial permits to string conductor across the applicable infrastructure. For major roadway crossings, typically one of the following four methods is employed to protect the public:

- Erection of a highway net guard structure system;
- Detour of all traffic off a highway at the crossing position;
- Implementation of a controlled continuous traffic break while stringing operations are performed; or
- Strategic placement of special line trucks with extension booms on the highway deck.

The number of guard structures required would be based on a review of the number of road crossings that would be needed along the currently proposed route. The types of guard structures that would be required for crossings and the number of crossings necessary would be field verified upon completion of final design.

Access Roads and Spur Roads

Where possible, existing access and spur roads would be utilized. At a number of structure sites, access roads, and spur roads would be extended from existing roads to access the new structure locations adjacent to the existing or removed structures.

Drainage structures would be installed where necessary to allow for control of runoff and crossing of large washes.

New spur roads would be constructed to tower locations along the new ROW and to locations that are not nearby to the removed 220 kV structures. As discussed under the 275 MW Early Interconnection option, they are usually a minimum of 14 feet wide. It is anticipated that most of the spur roads constructed to accommodate new construction would be left in place to facilitate future access for operations and maintenance purposes.

Site Preparation

General construction activities related to site preparation are described under the 275 MW Early Interconnection option above.

Foundation Installation

It is currently anticipated that the Lugo-Pisgah No. 2 line would utilize 500 kV four-legged single-circuit towers. Each four-legged LST would be built on four drilled pier concrete footings using truck or track-mounted excavators with various diameter augers to match the diameter requirements of the structure type. The dimensions of each footing are dependent on variables such as topography, tower height, span lengths, and soil properties. LSTs typically require an excavated hole of 3 to 4 feet in diameter and 20 to 45 feet deep. On average, a typical footing would have an above ground projection of approximately 3 feet. Actual footing depths for the structure foundation would depend on the soil conditions and topography at each site and would be determined by SCE during final engineering.

Following excavation of the foundation footings, steel reinforced cages and stub angles would be set, survey positioning would be verified, and concrete would then be placed. Steel reinforced cages and stub angles would be assembled at laydown yards and delivered to each structure location by flatbed truck. Typically, LSTs would require 25 to 100 cubic yards of concrete delivered to each structure location, depending upon the type of structure being constructed.

General construction activities related to foundation installation are described under the 275 MW Early Interconnection option above.

Structure Assembly and Erection

It is currently estimated that approximately 258 single-circuit 500 kV towers would be constructed of dulled galvanized lattice steel angle members connected by steel bolts. The single-circuit 500 kV towers would range in heights between 91 feet and 194 feet.

The tangent and angle 500 kV insulator assemblies would consist of two strings of insulators in the form of a “V.” Each leg of the “V” assembly would contain one or two one-piece gray polymer insulators, depending on the load. On dead-end structures, the insulators would be arranged in a “barrel” configuration consisting of four polymer insulators.

At the structure fabrication plant, structural members would be bundled and shipped by rail or truck to the construction yards, and then trucked to the individual sites. LSTs would be assembled at laydown areas at each site, and then erected and bolted to the foundations.

Tower assembly would begin with the hauling and stacking bundles of steel at tower location per engineering drawing requirements. This activity requires use of several tractors with 40-foot trailers and a rough terrain forklift. After steel is delivered and stacked, crews would proceed with assembly of leg extensions, body panels, boxed sections and the bridges. The steel work would be completed by a combined erection and torquing crew with a lattice boom crane. The construction crew may opt to install insulators and wire rollers (travelers) at this time. Ground disturbance would generally be limited to the laydown areas.

Where road access is available, assembled sections would be lifted into place with a minimum 80-ton crane. The crane pad would be would be located transversely and set up approximately 60 feet from the centerline of each structure. The crane would move along the ROW for structure erection purposes.

Where structure sites would be located in terrain inaccessible by a crane, a helicopter may be used for installation of structures and for line stringing. The final decision on helicopter use would be made by SCE and the construction contractor. The use of helicopters for the erection of structures would be in accordance with SCE specifications and would be similar to methods detailed in Institute of Electrical and Electronic Engineers (IEEE) 951-1996, Guide to the Assembly and Erection of Metal Transmission Structures, Section 9, Helicopter Methods of Construction.

Use of helicopters for installation eliminates land disturbance associated with crane pads, structure laydown areas, and the trucks and tractors used for steel delivery to structure sites. All construction work in remote work sites would be completed by hand with the assistance of portable compressors, portable hydraulic accumulators, and portable concrete mixers that would be flown into the tower sites.

The operations area of the helicopters would be limited to helicopter staging areas near construction locations that are considered safe locations for landing. Final siting of staging areas would be conducted with the input of the helicopter contractor, and affected private landowners and land management agencies. The size of each staging area would be dependent upon the size and number of structures to be installed. Staging areas would likely change as work progresses.

Helicopter fueling would occur at staging areas or at a local airport using the helicopter contractor's fuel truck, would be supervised by the helicopter fuel service provider, and SWPPP measures would be followed, as applicable. The helicopter and fuel truck would stay overnight at a local airport or at a staging area if adequate security is in place.

Stringing Activities

The Lugo-Pisgah No. 2 500 kV transmission line would be strung with two-bundled 2156 kcmil ACSR "Bluebird" conductors with nonspecular finish. Approximately 2,226,000 feet of conductor would be strung. The Eldorado-Lugo 500 kV transmission

line loop into Pisgah Substation would be strung with two-bundled 2156 kcmil ACSR "Bluebird" conductors with nonspecular finish. Approximately 13,000 feet of conductor would be strung.

Prior to stringing activities, bucket trucks, wood pole guard structures, or temporary protective netting systems that were erected at the crossings for roads, streets, railroads, highways, or other transmission, distribution, or communication facilities, for 220 kV conductor removal would be inspected or reinstalled. The stringing of conductor and overhead ground wire on new transmission lines typically would commence once a number of structures had been erected and inspected. General construction activities and steps related to stringing activities are described under the 275 MW Early Interconnection option above.

The threading step of wire installation may require helicopter use. While only one small helicopter is needed, additional helicopters may be used to shorten the time for this phase. On average, each helicopter would operate 6 hours per day during stringing operations.

The operations area of the small helicopter would be limited to helicopter staging areas and are considered safe locations for landing. Final siting of staging areas for the proposed project would be conducted with the input of the helicopter contractor, and affected private landowners and land management agencies. The size of each staging area would be dependent upon the size and number of towers to be removed and installed. Staging areas would likely change as work would progress along the transmission lines.

Helicopter fueling would occur at staging areas or at a local airport using the helicopter contractor's fuel truck, and would be supervised by the helicopter fuel service provider. The helicopter and fuel truck would stay overnight at a local airport or at a staging area if adequate security is in place.

OPGW would be installed in the same manner as the conductor, depending upon various factors, including line direction, inclination, and accessibility, and is discussed under construction activities for the telecomm facilities upgrades for the 275 MW Early Interconnection option.

Decommissioning of Existing 220 kV Transmission Facilities

All existing 220 kV structures on the Lugo-Pisgah No. 2 220 kV transmission line would be de-energized and removed prior to construction of the Lugo-Pisgah No. 2 500 kV transmission line. This would include the 57.1 miles of ROW that would contain the new 500 kV transmission line and the section of line that would be bypassed by the new ROW. Two existing 500 kV structures on the Eldorado-Lugo transmission line would be removed.

Transmission line equipment to be removed would include existing lattice steel towers and associated hardware (i.e., cross arms, insulators, vibration dampeners, suspension clamps, ground wire clamps, shackles, links, nuts, bolts, washers, cotters pins, insulator weights, and bond wires), as well as the transmission line conductor. Any access roads

not required for access to the new 500 kV transmission line would also be reclaimed per the associated ROW conditions.

SCE would likely remove the existing 220 kV and two 500 kV structures through the following activities:

- **Set Up**: Existing access routes would be used to reach structure sites, but some rehabilitation work on these routes may be necessary before removal activities begin. In addition, grading may be necessary to establish temporary crane pads for tower removal.
- **Structure Removal**: Towers would be dismantled and removed from the ROW area. For each structure, a crane truck or rough terrain crane would be used to support structure during removal; a crane pad of approximately 50 feet by 50 feet may be required to allow a removal crane to be setup at a distance of 60 feet from the structure center line. The crane rail would be located transversely from the structure locations.
- **Footing Removal**: The foundations for the towers would be removed to below grade and the locations of the towers would be reclaimed per the associated ROW grant or easement permit conditions.

The existing 220 kV conductor would be removed through the following activities:

- **Wire Pulling Locations**: Wire-pulling locations would be sited no more than every 15,000 feet along the utility corridor, and would include dead-end towers and turning points. It is anticipated that many of the same locations would be used for installation of the new 500 kV lines that would be used for the removal of existing lines. Wire-pulling equipment would be placed intermittently along utility corridor.
- **Pulling Cable:** A pulling cable would replace the old conductor as it is being removed, this allows complete control of the conductor during its removal. The line would then be removed under controlled conditions to minimize ground disturbance, and all wire-pulling equipment would be removed.
- **Breakaway Reels:** The old conductor wire would be wound onto “breakaway” reels as it is removed. The old conductor would be transported to a marshalling yard where it would be prepared for recycling.

Housekeeping and Site Cleanup

During construction, water trucks may be used to minimize the quantity of airborne dust created by construction activities. Any damage to existing roads as a result of construction would be repaired once construction is complete.

SCE would restore all areas that are temporarily disturbed by project activities (including material staging yards, pull and tension sites, and splicing sites) to preconstruction conditions following the completion of construction. Restoration would include grading and restoration of sites to preconstruction contours and reseeding where appropriate. In addition, all construction materials and debris would be removed from the area and recycled or properly disposed of offsite.

SCE would conduct a final survey to ensure that cleanup activities are successfully completed.

Pisgah Substation Expansion

The existing Pisgah Substation (approximately 5 acres) would be expanded to approximately 40 to 100 acres to accommodate new electrical and communication facilities and future growth.

Foundation Excavation

Foundations of various sizes would be constructed throughout the substation pad to support equipment and steel structures. In addition, a network of partially buried concrete trenches and a buried grounding grid would be installed. Excavations of these foundations and trenches would commence following the completion of grading and other yard improvements, and would continue for several weeks. The estimated total volume of soil that would need to be excavated for foundation and trenches would be determined following project engineering and included in SCE's PEA to the CPUC.

Drainage

Site drainage is an integral component of grading. Therefore, during final engineering measures to control drainage off the improved pad would likely be developed that would be in compliance with regulations regarding the alteration of natural drainage patterns. All new site drainage installations would be consistent with the National Pollution Discharge Elimination System (NPDES) and the Storm Water Pollution Prevention Plan (SWPPP) prepared for the site. Typical drainage improvements usually consist of concrete swales, ditches and culverts.

Access

If the substation is located adjacent to the existing Pisgah Substation then the existing access road could be utilized. If the expanded Pisgah Substation is constructed in a new location along the existing ROW then the existing access roads may be able to be improved and utilized. For a new 220/500 kV substation, SCE generally constructs a 24-foot wide road with asphalt concrete paving over a compacted aggregate base over compacted sub-grade with compacted shoulders on each side; however, an exact description of access to the substation site would be included in SCE's PEA to the CPUC.

Geotechnical Testing

Soils testing would be conducted and analyzed by a professional, licensed Geotechnical Engineer or Geologist, to determine existing soil conditions. Borings in a sufficient quantity to adequately gather variations in the site soils would be conducted to remove sample cores for testing. The type of soils, soil pressure, relative compaction, resistively and percolation factor are among the items that are usually tested for. If contaminants are encountered, special studies and remediation measures in compliance with environmental regulations would be implemented by qualified professionals. The results of the geotechnical investigation are applied as needed by various engineering disciplines during the course of final engineering design.

Paving

Asphalt concrete paving would be applied to all designated internal driveways over an aggregate base material and a properly compacted sub-grade as recommended by the geotechnical investigation during final engineering. Asphalt concrete paving would be installed after all major construction had been completed.

Rock Surfacing

All areas within the substation perimeter that are not paved or covered with concrete foundations or trenches may be surfaced with a 4-inch layer of untreated, 0.75-inch nominal crusher run rock. The rock would be applied to the finished grade surface after all construction has been completed.

Spill Prevention Control and Countermeasures (SPCC)

The presence of oil in a quantity greater than 1,320 gallons invokes SPCC regulations. The quantity of oil contained in any one of the planned 500/220 kV transformers would be in excess of the minimum quantity required by law.

The control of oils spills through secondary containment would be designed by a licensed California Registered Professional Engineer. The permanent or temporary SPCC measures would be in place prior to the delivery of transformers to the site. Improvements may consist of, but not be limited to, trenches, holding areas, retention basins and curbs.

An SPCC plan would be prepared and maintained onsite. Substation operating personnel would be trained in the execution of the plan.

Storm Water Pollution Prevention Plan (SWPPP)

During construction activities, measures would likely be in place to insure that contaminates are not discharged from the construction site.

An SWPPP would be developed that would define areas where hazardous materials such as concrete are to be stored; where trash will be placed; where rolling equipment shall be parked, fueled and serviced and where construction materials such as reinforcing bars and structural steel members are staged.

Erosion control during grading of the unfinished site and during subsequent construction shall be in place and monitored as specified by the SWPPP. A silting basin(s) would be established to capture silt and other materials which might otherwise be carried from the site by rainwater surface runoff.

Perimeter Security

The entire expanded substation area would be enclosed by perimeter gates and fencing as determined during project engineering by SCE. Perimeter chain link fencing would conform to the requirements for electrical substations and have a minimum height of 8 feet above the adjacent finished grade to the outside of the substation. All perimeter fences and gates would be fitted with barbed wire. A motion sensing system would be attached to the fence chain link fabric to detect attempted unauthorized entry.

Telecommunications Facilities: Optical Ground Wire Installation on Structures

An OPGW would be installed on the existing 65-mile portion of Eldorado-Lugo 500 kV transmission line as well as on the new Lugo-Pisgah No. 2 500 kV transmission line for communication purposes. The OPGW would be installed in the same manner as the conductor discussed under the 275 MW Early Interconnection above. It is typically installed in continuous segments of 19,000 feet or less depending upon various factors including line direction, inclination, and accessibility.

Following installation of the OPGW, the strands in each segment are spliced together to form a continuous length from one end of a transmission line to the other. At a splice structure, the fiber cables are routed down a structure leg where the splicing occurs. The splices are housed in a splice box (typically a 3-foot by 3-foot by 1-foot metal enclosure) that is mounted to one of the structure legs some distance above the ground. On the last tower at each end of a transmission line, the overhead fiber is spliced to another section of fiber cable that runs in underground conduit from the splice box into the communication room inside the adjacent substation.

B.3.5.4 Operation and Maintenance

Following the completion of project construction, operation and maintenance of the new lines would commence. Inspection and maintenance activities would include the following:

- Routine line patrols by both aircraft and truck;
- Routine, patrol identified, tower and wire maintenance;
- Routine line washing;
- Routine, patrol identified, earth and sand abatement from footings; and
- Routine right-of-way road maintenance.

The frequency of inspection and maintenance would depend on various conditions, including length of the line and weather effects. Inspection and maintenance activities typically include senior patrolman, foreman, lead lineman, journeyman lineman, apprentices, groundmen, helicopter pilots, equipment operators, and laborers. If the magnitude of repairs identified by routine patrols is substantial, other specialized employees such as surveyors, engineers, clerical personnel, and technicians would be attached to maintenance crews, as required, to address any unique problem that may arise due to such variables as substantial storm damage or vandalism.

In general, SCE operates two types of helicopters for patrols of transmission lines: American Eurocopter AS-350D (B-2) (B-3) and Hughes 500. During a typical patrol, a helicopter would fly at or near the elevation of the point of support of the conductor. In populated areas, patrols would fly at higher elevations or away from the centerline of the transmission lines, in order to avoid flying close to houses or penned animals.

In cases where flying near a populated area cannot be avoided, the patrolman would use gyrobinoculars so as to increase the inspection distance between the structures and the helicopter to the greatest extent possible. In rural areas, unless designated

otherwise, proximity to the ground is not restricted with the exception of safety and environmental concerns.

The entire Lugo-Pisgah No. 2 transmission line corridor would likely be patrolled every year. The yearly patrol alternates each year between helicopter and truck. In one year, the patrol would be by helicopters and would take approximately one day (8 hours) to accomplish. The next year, the patrol would be performed by truck and would take several days. A yearly patrol is a minimum patrol requirement. Increases in pollution and population density in the vicinity of the proposed transmission line corridor may cause SCE to increase the patrol frequency of the line. Currently, there is no consistency between helicopter and truck patrol for these additional patrols, although patrols are handled by each approximately 50 percent of the time. In some cases crews prefer to use a helicopter and in other cases, the preference is to use a patrol truck. This decision would be made based on availability of resources and criticality of time.

Starting approximately 15 years after the operational date, maintenance on the proposed line would be expected to increase. Initial additional corridor maintenance would be due principally to weather and vandalism to the new line. As insulators and steel age on the line, the frequency of lattice steel tower hardware maintenance activities such as bolt torquing would increase. However, no significant increase in patrols or grading would be required.

B.3.5.5 Removal and Restoration

Prior to removal or abandonment of the facilities that would be permitted to be constructed on BLM lands or within a reasonable time following termination of the BLM ROW grant, SCE would prepare a removal and restoration plan. The removal and restoration plan would address removal of SCE facilities from the permitted area, and any requirements for habitat restoration and revegetation. The removal and restoration plan would then be approved by the BLM before implementation.

B.3.5.6 Analysis of Reasonably Foreseeable Actions

This analysis of Reasonably Foreseeable Impacts, which is included under each issue area in Sections C and D of this SSA, is based on best available routing and project information provided in Appendix EE of the Calico Solar Project AFC, SCE's Project Description for SES Solar One 275 MW Early Interconnection Facilities, and on descriptions of other recent similar projects proposed by SCE (SES 2008a; SCE 2009).

The final project design for the 850 MW Full Build-Out Option has not been engineered. While the majority of the new 500 kV transmission line alignment would be proposed along existing transmission lines with existing access roads, portions of the route would require new ROW and access roads as part of the project. Likewise, depending on land availability and engineering, the expanded/new Pisgah Substation would likely be constructed along the existing Lugo-Pisgah ROW in the approximately 6-mile area between the existing Pisgah Substation and the mountains to the southwest. However, the exact size and location of the new/expanded substation has not been determined and so a complete analysis of its impacts is not possible at this time.

REFERENCES

Cumulative Scenario

BLM 2009 – Bureau of Land Management. 2009. Wind Energy Applications & Solar Energy Applications – California Desert District http://www.blm.gov/ca/st/en/fo/cdd/alternative_energy.html. Accessed October 16, 2009.

BLM 2008c – Bureau of Land Management. 2008. BLM National Environmental Policy Act Handbook H-1790-1. January 2008.

California Public Utilities Commission 2008 – Resolution E-4176: September 18, 2008. http://docs.cpuc.ca.gov/word_pdf/FINAL_RESOLUTION/91113.doc. Accessed November 18, 2008.

CEQ 1997 – Council on Environmental Quality. 1997. Considering Cumulative Effects Under the National Environmental Policy Act. http://ceq.hss.doe.gov/NEPA/ccenepa/ccenepa.htm. Accessed February 2, 2009.

E3 2008 – Energy and Environmental Economics, Inc. 2008. 33% Staff Analysis: Methodology and Timeline. August 26, 2008. http://www.cpuc.ca.gov/PUC/energy/Renewables/33percentworkshop.htm. Accessed March 11, 2009.

RETI 2009 – Renewable Energy Transmission Initiative. 2009. RETI Phase 1B Final Report Update Net Short Recalculation and New PV Assumptions. http://www.energy.ca.gov/reti/documents/phase1B/PHASE_1B_UPDATE_NET_SHORT_RECALC_ADOPTED_02-24-2009.PDF. Accessed March 16, 2009.

RETI 2009a – Renewable Energy Transmission Initiative. 2009. Renewable Energy Transmission Initiative Phase 1B Final Report. RETI-1000-2008-003-F.

SES 2008a – Stirling Energy Systems/R. Liden (tn: 49181). Application for Certification, dated December 1, 2008. Submitted to CEC/Docket Unit on December 1, 2008.

SES 2010e – URS/C. Lytle (tn: 54739). Applicant's Submittal of CAISO Reports, dated January 8, 2010. Submitted to CEC/Docket Unit on January 8, 2010.

UC Davis 2009 – CACTUS. http://ucdcms.ucdavis.edu/solar2/ Accessed October 14, 2009.

USMC 2009 – Twentynine Palms Training Land/Airspace Acquisition Study. http://www.29palms.usmc.mil/las/. Accessed October 14, 2009.

Project-Related Future Action

APLIC 2006—Avian Power Line Interaction Committee 2006. Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006. Edison Electric Institute, APLIC, and the CEC. Washington D.C. and Sacramento, CA.

Caltrans 2010—California Department of Transportation. 2010. Caltrans California Scenic Mapping System. <http://www.dot.ca.gov/hq/LandArch/scenic_highways/index.htm> Accessed January 4, 2010.

Caltrans 2008—California Department of Transportation. 2008. Traffic and Vehicle Data Systems Unit: 2008 All Traffic Volumes on CSHS. <http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/2008all.htm> Accessed on December 29, 2009.

CIWMB 2009—California Integrated Waste Management Board. 2009. Solid Waste Information System (SWIS) Database. <http://www.ciwmb.ca.gov/SWIS/> Accessed December 29, 2009.

CSU 2009—Colorado State University. 2009. Colorado State University – College of Veterinary Medicine and Biomedical Sciences: Occupational Health and Safety Consultation. <http://www.bernardino.colostate.edu/public/Industries/General.htm> Accessed on December 29, 2009.

MDAQMD 1996—Mojave Desert Air Quality Management District. 1996. Rule 403.2 Fugitive Dust Control for the Mojave Desert Planning Area. Victorville, CA.

MDAQMD 2007—Mojave Desert Air Quality Management District. 2007. California Environmental Quality Act (CEQA) and Federal Conformity Guidelines. Planning and Rule Making Section, Surveillance Section. Victorville, CA.

San Bernardino 2007—San Bernardino County. 2007. County of San Bernardino General Plan. <http://www.sbcounty.gov/landuseservices/General%20Plan%20Update/General%20Plan%20Text/FINAL%20General%20Plan%20Text%20-%203-1-07_w_Images.pdf> Accessed December 28, 2009.

SANBAG 2008—San Bernardino Associated Governments. 2008. Victor Valley Area Transportation Study. <http://www.sanbag.ca.gov/planning/subr_corridor_vville.html#info> Prepared by Kimley-Horn and Associates, Inc. Dated March. Accessed on January 4, 2010.

SBCFD 2010—San Bernardino County Fire Department. 2010. San Bernardino County Fire Department. <http://www.sbcfire.org> Accessed on January 4, 2010.

SCOG 2008—State of California Office of the Governor. 2008. Press Release. Governor Schwarzenegger Advances State's Renewable Energy Development. <http://gov.ca.gov/index.php?/press-release/11073/> Dated November 17, 2008. Accessed on December 29, 2009.

SES 2008a—Stirling Energy Systems, Inc. 2008. Stirling Energy Systems, Inc. Application for Certification, Volumes I and II, for the SES Solar One Project. Dated December 2008. Submitted to CEC/Docket Unit on December 2, 2008.

SES 2009—Stirling Energy Systems, Inc. 2009. Response to CURE Data Requests, Set Four, Data Requests 378-402. Dated December 2, 2009. Filed by CEC/Docket Unit on December 16, 2009.

SCE 2009—Southern California Edison. 2009. Southern California Edison Project Description for SES Solar One 275 MW Early Interconnection Facilities. Submitted by SCE on December 16, 2009.

U.S. EPA 2009—United States Environmental Protection Agency. 2009. Accessed PCBs Laws and Regulations. <http://www.epa.gov/pcb/laws.html> Accessed December 29, 2009.

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DOCKET
08-AFC-13
DATE AUG 05 2010
RECD. AUG 05 2010

August 5, 2010

NOTICE OF AVAILABILITY RELATED TO THE SUPPLEMENTAL STAFF ASSESSMENT FOR THE PROPOSED CALICO SOLAR PROJECT (08-AFC-13)

This notice is to inform you of the availability of the Supplemental Staff Assessment (SSA) for the proposed Calico Solar Project. The SSA contains the California Energy Commission staff's environmental, public health and engineering evaluation of the proposed Calico Solar Project. The California Energy Commission encourages public and agency participation in the review of the Calico Solar Application for Certification and the SSA.

The SSA is available for public review. Written comments on the SSA should be provided by August 17, 2010 at 5:00 p.m. to Christopher Meyer, Project Manager at the address on this letterhead (please add "Mail Stop 15") or by email to cmeyer@energy.state.ca.us. Technical or project schedule questions should also be directed to Christopher Meyer at (916) 653-1639, or by email. The Calico Solar Project is scheduled for evidentiary hearings before the Energy Commission committee on August 4-6, 2010 in Barstow, CA and on August 18, 2010 in Sacramento, CA.

The SSA will serve as the Energy Commission staff's testimony during the Commission's evidentiary hearings. The Energy Commission Committee assigned to the Calico Solar Project proceedings will consider and weigh the testimony, comments, and recommendations of all interested parties, including Energy Commission staff, the applicant, intervenors, members of the public, and other local, state, and federal agencies, before issuing the Presiding Member's Proposed Decision (PMPD) for a 30-day public comment review before consideration by the full Energy Commission. The public, intervenors, local, state and federal agencies are encouraged to participate in this process.

Background

On December 1, 2008, the California Energy Commission received an Application for Certification (AFC) from the applicant Calico Solar, LLC to construct and operate the Calico Solar Project. Following the augmentation of the AFC with additional data and information in Supplements, the AFC was deemed complete by the Energy Commission on May 6, 2009, beginning staff's analysis of the proposed project. The project is proposed to be developed on approximately 6,275 acres of public land in San Bernardino County managed by the BLM. The project site is along Interstate 40 (I-40) approximately 115 miles east of Los Angeles, 37 miles east of Barstow, 17 miles east of Newberry Springs, and 57 miles northeast of Victorville.

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PROOF OF SERVICE (REVISED 8/3/10) FILED WITH
ORIGINAL MAILED FROM SACRAMENTO ON 8/5/10
SS

August 5, 2010

Project Description
The proposed Calico Solar Project would be a nominal 850-megawatt (MW) Solar Stirling Engine project, with construction planned to begin in late 2010. Although construction would take approximately 40 months to complete, power would be available to the grid as each of the 567 1.5-MW, three-phase, 60-hertz, 60-unit groups of Stirling Engine modules is completed. The primary equipment for the generating facility would include approximately 34,000, 25-kilowatt solar dish Stirling systems (referred to as SunCatchers), their associated equipment and systems, and their support infrastructure. Each SunCatcher consists of a solar receiver heat exchanger and a closed-cycle, high-efficiency Solar Stirling Engine specifically designed to convert solar power to rotary power then driving an electrical generator to produce electricity.

Energy Commission Review Process
The Energy Commission is responsible for reviewing and ultimately approving or denying all applications to construct and operate thermal electric power plants, 50 MW and greater, in California. The Energy Commission's facility certification process carefully examines public health and safety, environmental impacts and engineering aspects of proposed power plants and all related facilities such as electric transmission lines and natural gas and water pipelines.

The Energy Commission is the lead agency under the California Environmental Quality Act (CEQA). Because the project is proposed to be developed on land administered by the Bureau of Land Management (BLM), the BLM is reviewing the project as the lead agency under the National Environmental Policy Act (NEPA). The initial environmental review document for the Calico Solar Project , the Staff Assessment/Draft Environmental Impact Study (SA/DEIS), was conducted jointly by the Energy Commission and the BLM and published on March 30, 2010. The final environmental review documents for this project will be published separately (the SSA for the Energy Commission and a Final EIS for the BLM).

Public Resources, Contact Information and Additional Sources for Information
Please direct your technical or project schedule questions to Christopher Meyer, Energy Commission Project Manager, at (916) 653-1639, or by email at cmeyer@energy.state.ca.us. If you desire information on participating in the Energy Commission's review of the proposed project, please contact the Energy Commission's Public Adviser's Office, at (916) 654-4701, or toll free in California at (800) 822-6228, or by email at publicadviser@energy.state.ca.us. News media inquiries should be directed to (916) 654-4989, or by email at mediaoffice@energy.state.ca.us.

The status of the proposed project, copies of notices, an electronic version of the AFC, SA/DEIS, SSA, and other relevant documents are available on the Energy Commission's Internet web site at: http://www.energy.ca.gov/sitingcases/calicosolar/index.html. You can also subscribe to receive email notification of all notices at http://www.energy.ca.gov/listservers.

If you have any questions related to the automatic email notification list, please contact Sabrina Savala, Project Assistant, at (916) 654-4498, or by email at: SSavala@energy.state.ca.us

August 5, 2010

Availability of the AFC and SA/DEIS, and SSA Documents

Copies of the AFC, SA/DEIS and SSA are available for public inspection at the following libraries:

San Bernardino County Library
Barstow Branch
304 East Buena Vista
Barstow, CA 92311

San Bernardino County Library
Needles Branch
1111 Bailey
Needles, CA 92363

Victorville Public Library
15011 Circle Drive
Victorville, CA 92395

Copies are also available at the Energy Commission's Library in Sacramento, the California State Library in Sacramento, and at public libraries in Eureka, San Francisco, Fresno, Los Angeles, and San Diego. In addition, copies will be distributed to those public agencies that would normally have jurisdiction except for the Energy Commission's exclusive authority to certify sites and related facilities.

Sincerely,

Date: _____

_____
ROGER JOHNSON, Siting Office Manager
Siting, Transmission and Environmental Protection Division

Please send me a CD of the California Energy Commission staff's Supplemental Staff Assessment for the Calico Solar Project Application for Certification (08-AFC-13).

Name:

Address:

City/State/Zip:

FOLD HERE

California Energy Commission
Attention: Sabrina Savala
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Staple or Tape closed.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION

For the CALICO SOLAR (Formerly SES Solar One)

Docket No. 08-AFC-13

PROOF OF SERVICE
(Revised 8/3/10)

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DECLARATION OF SERVICE

I, Sabrina Savala, declare that on August 5, 2010, I served and filed copies of the attached Notice of Availability Related to the Supplemental Staff Assessment for the Proposed Calico Solar Project, dated August 5, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [www.energy.ca.gov/sitingcases/solarone].

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

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x____ sent electronically to all email addresses on the Proof of Service list;

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x____ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses NOT marked "email preferred."

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x____ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

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Attn: Docket No. 08-AFC-13
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

Original Signed by:
Sabrina Savala

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DOCKET
08-AFC-13
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CALICO SOLAR POWER PROJECT

Supplemental Staff Assessment, Part II

CALIFORNIA
ENERGY COMMISSION
Arnold Schwarzenegger, Governor

AUGUST 2010
CEC-700-2010-009-SSA-2

DOCKET NUMBER 08-AFC-13

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DISCLAIMER

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CALICO SOLAR PROJECT (08-AFC-13)
SUPPLEMENTAL STAFF ASSESSMENT, PART II

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EXECUTIVE SUMMARY

Christopher Meyer

INTRODUCTION

Calico Solar, LLC (applicant) is seeking approval to construct and operate the Calico Solar Project (formerly the Stirling Energy Systems Solar One Project) and its ancillary facilities (Calico Solar Project). The applicant is a private party that is a wholly owned subsidiary of Tessera Solar. The main objective of the Calico Solar Project is to provide clean, renewable, solar-powered electricity to the State of California. The electricity from the Calico Solar Project will assist the State in meeting its objectives as mandated by the California Renewable Portfolio Standard (RPS) Program and the California Global Warming Solutions Act. The Calico Solar Project will also address other state and local mandates adopted by California's electric utilities for the provision of renewable energy.

The applicant submitted an Application for Certification (AFC) to the California Energy Commission (Energy Commission) for the proposed project on December 2, 2008. (The application was originally submitted by SES Solar One, LLC, SES Solar Three, LLC and SES Solar Six, LLC for the SES Solar One Project. In January 2010, the above entities merged into Calico Solar, LLC, and the name of the SES Solar One Project was changed to the Calico Solar Project. The Energy Commission is the lead State agency responsible for evaluating the environmental effects of project and for complying with the California Environmental Quality Act (CEQA). The project proposes the use of land managed by the United States Department of the Interior, Bureau of Land Management (BLM); therefore the applicant has submitted a request for a right-of-way grant to the BLM. The BLM is the federal lead agency for the evaluation of project effects and compliance of the proposed project with the requirements of the National Environmental Policy Act (NEPA) related to possible BLM discretionary actions related to the right-of-way grant request.

The BLM and the Energy Commission prepared separate final documents for compliance with NEPA and CEQA, respectively. Specifically, the Energy Commission published Part I of the Supplemental Staff Assessment (SSA) on July 21, 2010 and the BLM published the Final Environmental Impact Statement (FEIS) on August 6, 2010. Additional time was necessary for the completion of the Cultural Resources and Traffic and Transportation sections of the SSA, which are being published here as the SSA, Part II.

This document is only the Cultural Resources and Traffic and Transportation sections of the SSA. All other technical areas and summaries of Energy Commission staff's analysis can be found in the July 21, 2010 Supplemental Staff Assessment.

SUMMARY OF PROJECT RELATED IMPACTS

Executive Summary Table 1 (comparable to Executive Summary Table 4 in the SSA Part I) summarizes the potential short-term, long-term and cumulative adverse impacts of the proposed Calico Project, the anticipated mitigation and conditions of certification, and the level of significance of the impacts after mitigation, under CEQA.

Executive Summary Table 1
Summary of Potential Short-Term, Long-Term, and Cumulative Adverse Impacts

Environmental Parameter	Complies with Applicable LORS	Short and Long Term Adverse Impacts	Cumulative Adverse Impacts	Mitigation and Conditions of Certification	CEQA Level of Significance After Mitigation
Cultural Resources	Yes	**Significant short term or long term adverse impacts with mitigation/ Conditions of Certification incorporated**	**Cumulative adverse impacts**	**CUL-1** through **CUL-10**	**Significant and unavoidable**
Traffic and Transportation	Yes	No significant short term or long term adverse impacts with mitigation/Conditions of Certification incorporated	No cumulative adverse impacts	**TRANS-1** through **TRANS-7**	Less than significant

C. ENVIRONMENTAL ANALYSIS

C.3 - CULTURAL RESOURCES AND NATIVE AMERICAN VALUES

Testimony of Sarah Allred, Michael McGuirt, and Kathleen Forrest[1]

C.3.1 SUMMARY OF CONCLUSIONS

The proposed Calico Solar Project would entail the construction of one of the world's largest solar power facilities within a 6,215-acre project site in the Central Mojave Desert in eastern San Bernadino County. The project, which would be constructed in two separate phases, would consist of approximately 34,000 solar dish systems (SunCatchers™), a new substation, an electrical transmission line, an administration building and maintenance complex, and other associated facilities, with a generating capacity of up to 850 mega watts (MW).

A total of 119 archaeological sites and ten built-environment (architectural) resources were identified within the Calico Solar project's cultural resources area of analysis. The applicant has recommended, and the BLM has made the determination, that three (3) archaeological sites and five (5) built-environment properties within the project area are eligible for the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR). The BLM further appears to have found, under the National Environmental Policy Act (NEPA), that the proposed action would not have a significant impact on the environment, as that action relates to cultural resources, and that, under Section 106 of the National Historic Preservation Act (NHPA), the proposed action, or undertaking, would not adversely affect significant cultural resources, or historic properties. Energy Commission staff, by contrast, believes that the data on which the applicant's and the BLM's conclusions are based are not adequate to definitively draw conclusions regarding resource eligibility. Energy Commission staff, therefore, believes that an as yet unquantified number of individual archaeological sites are potentially eligible for listing in the California Register of Historical Resources (CRHR), that three archaeological districts and landscapes have the potential to be eligible, that the effects of the proposed action on any of these resources that are conclusively recommended to be eligible would be significant, and that the Commission's adoption of proposed conditions of certification **CUL–1** through **CUL–5** and **CUL–7** through **CUL–10** would reduce these effects to a less than significant level. Energy Commission staff more definitively recommends that four built-environment resources are eligible for listing in the CRHR; however, notwithstanding the Commission's adoption of condition of certification **CUL–6** to reduce significant visual effects to one of those built-environment resources (a segment of historic U.S. Route 66), the effects are unmitigable and would not be reduced to a less than significant level.

[1] Sarah Allred and Michael McGuirt are responsible for all testimony pertaining to the archaeological resources, and Kathleen Forrest is responsible for all testimony pertaining to built environment resources.

C.3.2 INTRODUCTION

In an effort to provide an efficient joint NEPA and CEQA review for the innundation of solar projects in this region, the BLM and the CEC entered into a Memorandum of Understanding (MOU) in August 2007 (http://www.energy.ca.gov/siting/solar/BLM_CEC_MOU.PDF). As parties to the MOU, the BLM and the CEC committed to sharing in the preparation of an environmental analysis in a public process to avoid duplication of staff efforts, to share staff expertise and information, to promote intergovernmental coordination at the local, state, and federal levels, and to facilitate public review. Regarding the sharing of information, as it pertains to cultural resources, the National Historic Preservation Act (Section 304) and the Archaeological Resources Protection Act (Section 9) mandate that Federal agencies (in this case, the BLM) to only disclose archaeological site location information if no harm, theft, or destruction of cultural resources would result from disclosure. Due to the BLM's concerns about potential harm to archaeological sites resulting from the disclosure of that information to parties in the Energy Commission proceeding (see: http://www.energy.ca.gov/2010-CRD-1/documents/2010-06-09_Transcript.pdf), some cultural resource data, namely site record forms and site location information, have been withheld from Energy Commission staff. Staff was, provided with the June 2010 Draft Final Class III Cultural Resources Technical Report (minus the appendices and all site location information), which serves as the primary source of information for the conclusions of this staff assessment, in conjunction with personal communications with BLM Archaeologist, Jim Shearer. Therefore, staff has concluded that the information received was adequate for the purposes of this analysis in assessing historical significance, impacts, and mitigation for cultural resources.

This cultural resources assessment identifies the potential impacts of the Calico Solar Project on cultural resources located within the proposed project area. Cultural resources are defined under federal and state law as including archaeological sites, buildings, structures, objects, and districts. Three categories of cultural resources, classified by their origins, are considered in this assessment: (1) prehistoric, (2) historic, and (3) ethnographic. Prehistoric archaeological resources are associated with the human occupation and use of California prior to enforced European contact. These resources may include sites and deposits, structures, artifacts, rock art, trails, and other traces of Native American human behavior. In California, the prehistoric period began over 12,000 years ago and extended through the eighteenth century until 1769, when the first Europeans began to settle in the state. Historic-period resources include both architecture and archaeological remains and are associated with Euro-American exploration and settlement of an area and the beginning of a written historical record. They may include archaeological deposits, sites, structures, traveled ways, artifacts, or other evidence of human activity. Under federal and state historic preservation law, historic-period cultural resources must, under most circumstances, be at least 50 years old to have the potential to be of sufficient historical importance to merit eligibility for the National Register of Historic Places and the California Register of Historical Resources. A resource less than 50 years of age must be of exceptional historical importance to be considered for the National Register of Historic Places. Groupings of historic-period resources are also recognized as historic districts and as historic vernacular landscapes. Under federal and state laws, historic cultural resources must be greater than fifty years old to be considered of potential historic importance. A resource less

than fifty years of age may be historically important if the resource is of exceptional importance in history. Ethnographic resources represent the heritage of a particular ethnic or cultural group, such as Native Americans or African, European, or Asian immigrants. Ethnographic resources may include traditional resource collecting areas, ceremonial sites, topographic features, cemeteries, shrines, or ethnic neighborhoods and/or structures.

For the Calico Solar Project, staff provides an overview of the environmental setting and history of the project area, an inventory of the cultural resources identified in the project area and the nearby vicinity, and an analysis of the potential impacts to cultural resources from the proposed project using criteria from the California Environmental Quality Act (CEQA).

C.3.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

This analysis addresses five basic analytic phases. The initial phase is the determination of the appropriate geographic extent of the analysis for the proposed action. The second phase is to produce an inventory of the cultural resources in each such geographic area. The third phase is to determine whether particular cultural resources in an inventory are historically significant, unless resources can be avoided by construction. The fourth phase is to assess the character and the severity of the effects of the proposed or alternative actions on the historically significant cultural resources that cannot be avoided in each respective inventory. The final phase is to propose measures that would resolve or mitigate significant effects. The details of each of these phases follow below and provide the parameters of the present analysis.

C.3.3.1 THE PROJECT AREA OF ANALYSIS AND THE AREA OF POTENTIAL EFFECTS (APE)

A useful precursor to a cultural resources analysis is to define the appropriate geographic limits for an analysis. The area that Energy Commission staff typically considers when identifying and assessing impacts to cultural resources under CEQA is referred to here as the “project area of analysis.” Energy Commission staff defines the project area of analysis as the area within and surrounding a project site, as well as all associated linear facility corridors. The area reflects the minimum standards set out in the Energy Commission Power Plant Site Certification Regulations (Cal. Code Regs., tit. 20, § 1701 et seq., appen. B, subd. (g)(2)) and is sufficiently large and comprehensive in geographic area to facilitate and encompass considerations of both direct and indirect effects to archaeological, ethnographic, and built-environment resources. The project area of analysis is a composite, though not necessarily contiguous, geographic area that accommodates the analysis of each of these resource types:

- For archaeological resources, the project area of analysis is minimally defined as the project site footprint, plus a buffer of 200 feet, and all project linear facilities routes, plus a buffer of 50 feet to either side of the rights-of way for these linear routes.
- For built-environment resources, the project area of analysis is confined to one parcel deep from the project site footprint in urban areas, but in rural areas is

expanded to include a half-mile buffer from the project site and above-ground linear facilities to encompass resources whose setting could be adversely affected by industrial development.

- For a historic district or a cultural landscape, staff defines the project area of analysis based on the particulars of each siting case (i.e., specific to that project).
- For ethnographic resources, the project area of analysis is expanded to take into account traditional use areas and traditional cultural properties which may be far-ranging, including views that contribute to the significance of the property. These resources are often identified in consultation with Native Americans and other ethnic groups, and issues that are raised by these groups may define the area of analysis.

The project area of analysis concept provides an appropriate areal scope for the consideration of cultural resources under NEPA and is consistent with the definition of the area of potential effects (APE) in the Section 106 process (36 CFR § 800.16(d)). The project area of analysis is, therefore, equivalent to the BLM's APE for the purpose of the present discussion and analysis.

C.3.3.2 INVENTORY OF CULTURAL RESOURCES IN PROJECT AREA OF ANALYSIS

A cultural resources inventory of the project area of analysis/APE is a necessary step in the staff effort to determine whether the action may cause, under CEQA, a substantial adverse change in the significance of any cultural resources that are on or would qualify for the California Register of Historical Resources (CRHR).

The development of a cultural resources inventory entails working through a sequence of investigatory phases to establish the universe of cultural resources that will be the focus of the analyses for the proposed project. These phases typically involve doing background research to identify known cultural resources, conducting fieldwork to collect requisite primary data on cultural resources both within and near the proposed project. Geotechnical studies are also conducted to provide a clearer understanding of the landforms within the project area. The results of this work helps support the development of determinations of historical significance for the cultural resources that are identified.

C.3.3.3 DETERMINING THE HISTORICAL SIGNIFICANCE OF CULTURAL RESOURCES

A key part of a cultural resources analysis under CEQA (and for the BLM under NEPA and Section 106) is to determine which of the cultural resources within the project area of analysis/APE are important or historically significant (each of the three regulatory programs uses slightly different terminology to refer to historically significant cultural resources; clarifications on the use of the terms "*historical resource*," "*important historic and cultural aspects of our national heritage*," and "*historic property*" may be found in the "Cultural Resources Glossary" subsection of this report). Effects assessments are only made for those cultural resources that are determined to be historically significant. Cultural resources that can be avoided by construction may remain unevaluated. Unevaluated cultural resources that cannot be avoided are treated as eligible when

determining effects. The criteria for evaluation and the requisite thresholds of resource integrity that are, taken together, the measures of historical significance, vary among the three regulatory programs (CEQA, NEPA, and Section 106).

Evaluation of Historical Significance under CEQA

CEQA requires the Energy Commission, as a lead agency, to evaluate the historical significance of cultural resources by determining whether or not they meet several sets of specified criteria. Under CEQA, the definition of a historically significant cultural resource, referred to as a "historical resource," is one that is "listed or determined to be eligible by the State Historical Resources Commission for listing in the CRHR", or "a resource listed in a local register of historical resources or identified as significant in a historical resource survey meeting the requirements of section 5024.1(g) of the Public Resources Code," or "any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the agency's determination is supported by substantial evidence in light of the whole record" (Cal. Code Regs., tit. 14, § 15064.5(a)). The term, "historical resource," therefore, indicates a cultural resource that is historically significant and eligible for listing in the CRHR.

Consequently, under the CEQA Guidelines, to be historically significant, a cultural resource must meet the criteria for listing in the CRHR. These criteria are essentially the same as the eligibility criteria for the NRHP. In addition to being minimum of 50 years old,[2] a resource must meet at least one (and may meet more than one) of the following four criteria (Pub. Resources Code, § 5024.1):

- Criterion 1, is associated with events that have made a significant contribution to the broad patterns of our history;
- Criterion 2, is associated with the lives of persons significant in our past;
- Criterion 3, embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values; or
- Criterion 4, has yielded, or may be likely to yield, information important to history or prehistory.

In addition, historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association (Cal. Code Regs., tit. 14, § 4852(c)).

Cultural resources listed in or formally determined eligible for the National Register of Historical Places (NRHP) and California Registered Historical Landmarks numbered No. 770 and up are automatically listed in the CRHR and, therefore, are also historical resources (Pub. Resources Code, § 5024.1(d)). Even if a cultural resource is not listed or determined to be eligible for listing in the CRHR, CEQA allows a lead agency to make

[2] The Office of Historic Preservation's Instructions for Recording Historical Resources (1995) endorses recording and evaluating resources over 45 years of age to accommodate a potential five-year lag in the planning process.

a determination as to whether it is a historical resource (Pub. Resources Code, § 21084.1).

Evaluation of Historical Significance under NEPA

NEPA establishes national policy for the protection and enhancement of the environment. Part of the function of the Federal Government in protecting the environment is to "preserve important historic, cultural, and natural aspects of our national heritage." Cultural resources need not be determined eligible for the National Register of Historic Places as in the National Historic Preservation Act (NHPA) of 1966 (as amended) to receive consideration under NEPA. NEPA is implemented by regulations of the Council on Environmental Quality, 40 CFR 1500-1508. NEPA provides for public participation in the consideration of cultural resources issues, among others, during agency decision-making.

Evaluation of Historical Significance under Section 106 (Eligibility of Cultural Resources for Inclusion in the NRHP)

The federal government has developed laws and regulations designed to protect cultural resources that may be affected by actions undertaken, regulated, or funded by federal agencies. Cultural resources are considered during federal undertakings chiefly under Section 106 of NHPA of 1966 (as amended) through one of its implementing regulations, 36 Code of Federal Regulations (CFR) CFR 800 (Protection of Historic Properties). Properties of traditional religious and cultural importance to Native Americans are considered under Section 101(d)(6)(A) of NHPA.

Section 106 of NHPA (16 United States Code [USC] 470f) requires federal agencies to consider the effects of their undertakings on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places (NRHP) and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on such undertakings (36 CFR Part 800.1). Under Section 106, the significance of any adversely affected cultural resource is assessed and mitigation measures are proposed to resolve such effects. Significant cultural resources (historic properties) are those resources that are listed in or are eligible for listing on the NRHP per the criteria listed at 36 CFR 60.4 (Advisory Council on Historic Preservation 2000) and are presented in the next subsection below.

NHPA of 1966 established the ACHP and State Historic Preservation Officers (SHPO) to assist federal and State officials regarding matters related to historic preservation. As previously mentioned above, the administering agency, the ACHP, has authored regulations implementing Section 106 that are located in 36 CFR Part 800, *Protection of Historic Properties* (recently revised, effective January 11, 2001). 36 CFR Part 800 provides detailed procedures, called the Section 106 process, by which the assessment of impacts on archaeological and historical resources, as required by the Act, is implemented.

Given that the proposed Calico Solar Project is located on lands managed by BLM and requires authorization by the BLM, the proposed action is considered a federal undertaking, and therefore must comply with the NHPA and implementing regulations. NEPA addresses compliance with the NHPA, and the required environmental

documentation, whether it is an Environmental Assessment (EA) or an Environmental Impact Statement (EIS), must discuss cultural resources. It is important to recognize, however, that project compliance with NEPA does not mean the project is in compliance with the NHPA.

According to the NHPA (36 CFR Part 800), three steps are required for compliance: (1) identification of significant resources that may be affected by an undertaking; (2) assessment of project impacts on those resources; and (3) development and implementation of mitigation measures to offset or eliminate adverse impacts. All three steps require consultation with interested Native American tribes, local governments, and other interested parties.

Identification and National Register of Historic Places Evaluation

36 CFR Part 800.3 discusses the consultation process. Section 800.4 sets out the steps the ACHP must follow to identify historic properties. 36 CFR Part 800.4(c)(1) outlines the process for National Register of Historic Places (NRHP) eligibility determinations.

The Historic Sites, Buildings and Antiquities Act of 1935 required the survey, documentation, and maintenance of historic and archaeological sites in an effort to determine which resources commemorate and illustrate the history and prehistory of the United States. The NHPA expanded on this legislation and assigned the responsibility for carrying out this policy to the United States Department of the Interior, National Park Service (NPS). Per NPS regulations, 36 CFR Part 60.4, and guidance published by the NPS, *National Register Bulletin, Number 15, How to Apply the National Register Criteria for Evaluation*, different types of values embodied in districts, sites, buildings, structures, and objects are recognized. These values fall into the following categories:

1. Associate Value (Criteria A and B): Properties significant for their association with or linkage to events (Criterion A) or persons (Criterion B) important in the past.

2. Design or Construction Value (Criterion C): Properties significant as representatives of the man-made expression of culture or technology.

3. Information Value (Criterion D): Properties significant for their ability to yield important information about prehistory or history.

The quality of *significance* in American history, architecture, archaeology, engineering and culture is present in districts, sites, buildings, structures, and objects that possess *integrity* of location, design, setting, materials, workmanship, feeling and association. Cultural resources that are determined eligible for listing in the NRHP, along with SHPO concurrence, are termed “historic properties” under Section 106, and are afforded the same protection as sites listed in the NRHP.

C.3.3.4 ASSESSING PROJECT IMPACTS

The core of a cultural resources analysis under CEQA, NEPA, or Section 106 is to assess the character of the effects or impacts that a proposed project may have on historically significant cultural resources. The analysis takes into account three primary types of potential impacts, which each of the three above regulatory programs defines and handles in slightly different ways. The three types of potential effects or impacts

include direct, indirect, and cumulative effects or impacts. Once the character of each potential impact of a proposed or alternative action has been assessed, a further assessment is made as to whether each such effect is significant, relative to specific regulatory criteria under CEQA, NEPA, and Section 106.

Direct and Indirect Effects

Direct and indirect effects are those that are more clearly and immediately attributable to the implementation of proposed project. Direct and indirect effects are conceptually similar under CEQA and NEPA. The uses of the concepts vary under Section 106 relative to their uses under CEQA and NEPA as discussed below.

Direct and Indirect Impacts under CEQA

In the abstract, direct impacts to cultural resources are those associated with project development, construction, and co-existence. Construction usually entails surface and subsurface disturbance of the ground, and direct impacts to archaeological resources may result from the immediate disturbance of the deposits, whether from vegetation removal, vehicle travel over the surface, earth-moving activities, excavation, or demolition of overlying structures. Construction can have direct impacts on historic built-environment resources when those structures must be removed to make way for the project or when the vibrations of construction impair the stability of historic structures nearby. New structures can have direct impacts on historic structures when the new structures are stylistically incompatible with their neighbors and the setting, and when the new structures produce something harmful to the materials or structural integrity of the historic structures, such as emissions or vibrations.

Generally speaking, indirect impacts to archaeological resources are those which may result from increased erosion due to site clearance and preparation, or from inadvertent damage or outright vandalism to exposed resource components due to improved accessibility. Similarly, historic structures can suffer indirect impacts when project construction creates improved accessibility and vandalism or greater weather exposure becomes possible.

Ground disturbance accompanying construction at the proposed Calico Solar Project site, along proposed linear facilities, and at a proposed laydown area has the potential to directly impact archaeological resources. The potential direct physical impact of the proposed construction on archaeological resources is commensurate with the extent of ground disturbance entailed in the particular mode of construction. This varies with each component of the proposed project. Placing the proposed plant into this particular setting could have a direct impact on the integrity of association, setting, and feeling of nearby standing historic structures.

Direct and Indirect Effects under NEPA

The concepts of direct and indirect effects under NEPA are almost equivalent to those under CEQA. Direct effects under NEPA are those “which are caused by the [proposed or alternative] action and [which] occur at the same time and place” (40 CFR § 1508.8(a)). Indirect effects are those “which are caused by the [proposed or alternative] action and are later in time or farther removed in distance, but are still reasonably foreseeable” (40 CFR § 1508.8(b)).

Direct and Indirect Effects under Section 106

The Section 106 regulation narrows the range of direct effects and broadens the range of indirect effects relative to the definitions of the same terms under CEQA and NEPA. The regulatory definition of "effect," pursuant to 36 CFR § 800.16(i), is that the term "means alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register." In practice, a "direct effect" under Section 106 is limited to the direct physical disturbance of a historic property. Effects that are immediate but not physical in character, such as visual intrusion, and reasonably foreseeable effects that may occur at some point subsequent to the implementation of the proposed undertaking are referred to in the Section 106 process as "indirect effects."

Cumulative Impacts

Cumulative Impacts are slightly different concepts under CEQA and NEPA, and are, under Section 106, undifferentiated as an aspect of the potential effects of an undertaking, of a proposed or alternative action. The consideration of cumulative impacts reaches beyond the project area of analysis or the area of potential effects. It is a consideration of how the effects of a proposed or alternative action in those areas contributes or does not contribute to the degradation of a resource group or groups that is or are common to the project area of analysis and the surrounding area or vicinity.

Cumulative Impacts under CEQA

A cumulative impact under CEQA refers to a proposed project's incremental effects considered over time and taken together with those of other, nearby, past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project (Pub. Resources Code sec. 21083; Cal. Code Regs., tit. 14, secs. 15064(h), 15065(a)(3), 15130, and 15355). Cumulative impacts to cultural resources in a project vicinity could occur if any other existing or proposed projects, in conjunction with the proposed project, had or would have impacts on cultural resources that, considered together, would be significant. The previous ground disturbance from prior projects and the ground disturbance related to the future construction of a proposed project and other proposed projects in the vicinity could have a cumulatively considerable effect on archaeological deposits, both prehistoric and historic. The alteration of the natural or cultural setting which could be caused by the construction and operation of a proposed project and other proposed projects in the vicinity could be cumulatively considerable, but may or may not be a significant impact to cultural resources.

Cumulative Impacts under NEPA

Under NEPA, a cumulative is the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR § 1508.7). Cumulatively significant impacts are taken into consideration as an aspect of the intensity of a significant effect (40 CFR § 1508.27(b)(7).

Cumulative Effects under Section 106

The Section 106 regulation makes explicit reference to cumulative effects only in the context of a discussion of the criteria of adverse effect (36 CFR § 800.5(a)(1)). Cumulative effects are largely undifferentiated as an aspect of the potential effects of an undertaking. Such effects are enumerated and resolved in conjunction with the consideration of direct and indirect effects.

Assessing the Significance of Action Effects

Once the character of the effects that proposed or alternative actions may have on historically significant cultural resources has been determined, the severity of those effects needs to be assessed. CEQA, NEPA, and Section 106 each have different definitions and tests that factor into decisions about how severe, how significant the effects of particular actions may be.

Significant Impacts under CEQA

Under CEQA, "a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment" (Pub. Resourced Code, § 21084.1). Thus, staff analyzes whether a proposed project would cause a substantial adverse change in the significance, that is, the CRHR eligibility, of the subset of the historical resources in the cultural resources inventory for a project area that the proposed project demonstrably has the potential to effect. The degree of significance of an impact depends on:

- The cultural resource impacted;
- The nature of the resource's historical significance;
- How the resource's historical significance is manifested physically and perceptually;
- Appraisals of those aspects of the resource's integrity that figure importantly in the manifestation of the resource's historical significance; and how much the impact will change those integrity appraisals.

Significant Effects under NEPA

Significant effects under NEPA require considerations of both context and intensity (40 CFR § 1508.27), and the considerations are presented below:

(a) *Context.* This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

(b) *Intensity.* This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

(1) Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.

(2) Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

(3) The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

(4) Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

(5) The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.

(6) Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

Adverse Effects under Section 106

In accordance with 36 CFR Part 800.5 of the ACHP's implementing regulations, which describes criteria for adverse effects, impacts on cultural resources are considered significant if one or more of the following conditions would result from implementation of the proposed action:

An undertaking has an effect on a historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the NRHP. For the purpose of determining the type of effect, alteration to features of a property's location, setting, or use may be relevant, depending on the property's significant characteristics, and should be considered.

An undertaking is considered to have an adverse effect when the effect on a historic property may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects on historic properties include, but are not limited to:

1. Physical destruction, damage, or alteration of all or part of the property

2. Isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the NRHP

3. Introduction of visual, audible, or atmospheric elements that are out of character with the property or that alter its setting

4. Neglect of the property, resulting in its deterioration or destruction

5. Transfer, lease, or sale of the property

Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative. A formal effect finding under Section 106 relates to the proposed or alternative action as a whole rather than relating to individual resources.

C.3.3.5 RESOLVING SIGNIFICANT IMPACTS

The concluding phase in a cultural resources analysis, whether under CEQA, NEPA, or Section 106, is to resolve those effects of a proposed project that have been found to be significant or adverse. The terminology used to describe the process of effects resolution differs among the three regulatory programs. The resolution of significant effects under CEQA involves the development of mitigation measures or project alternatives, the implementation of which would minimize any such effects (14 CCR § 15126.4). Mitigation under NEPA includes proposals that avoid or minimize any potential significant effects of a proposed or alternative action on the quality of the human environment (40 CFR § 1502.4). The definition of mitigation in the NEPA regulation includes the development of measures that would avoid, minimize, or rectify significant effects, progressively reduce or eliminate such effects over time, or provide compensation for such effects (40 CFR § 1508.20). The Section 106 process directs the resolution of adverse effects through the development of proposals to avoid, minimize, or otherwise mitigate such effects (36 CFR § 800.6(a)).

The present analysis seeks to resolve any potentially significant effects on cultural resources (i.e., historical resources/historic properties) within the proposed Calico Solar project area of analyis through the development of cultural resource-specific Conditions of Certification (**CUL-1** through **CUL-10**) that would enable the Energy Commission meet its obligations to comply with CEQA while being consistent with the BLM's obligations under NEPA and Section 106.

C.3.3.6 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Projects licensed by the Energy Commission are reviewed to ensure compliance with all applicable laws. Although the Energy Commission has pre-emptive authority over local laws, it typically ensures compliance with local laws, ordinances, regulations, standards, plans, and policies. The BLM is responsible for compliance with NEPA and Section 106 of the NHPA. LORS applicable to the Calico Solar Project with respect to cultural resources are in Cultural Resources Table 1 below.

Cultural Resources Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
National Historic Preservation Act of 1966, as amended, 16 USC 470(f)	Section 106 of the Act requires Federal agencies to take into account the effects of a proposed action on cultural resources (historic properties) and afford the Advisory Council on Historic Preservation the opportunity to comment.

Applicable Law	Description
36 CFR Part 800 (as amended August 5, 2004),	Implementing regulations of Section 106 of the National Historic Preservation Act
National Environmental Policy Act (NEPA): Title 42, USC, section 4321-et seq.	This statute requires Federal agencies to consider potential environmental impacts of projects with Federal involvement and to consider appropriate mitigation measures.
Federal Land Policy and Management Act (FLPMA): Title 43, USC, section 1701 et seq.	This statute requires the Secretary of the Interior to retain and maintain public lands in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric water resource, and archaeo-logical values [Section 1701(a)(8)]; the Secretary, with respect to the public lands, shall promulgate rules and regulations to carry out the purposes of this Act and of other laws applicable to public lands [Section 1740].
Federal Guidelines for Historic Preservation Projects, Federal Register 44739-44738, 190 (September 30, 1983)	The Secretary of the Interior has published a set of Standards and Guidelines for Archaeology and Historic Preservation. These are considered to be the appropriate professional methods and techniques for the preservation of archaeological and historic properties. The Secretary's standards and guidelines are used by Federal agencies, such as the Forest Service, the Bureau of Land Management, and the National Park Service. The California Office of Historic Preservation refers to these standards in its requirements for selection of qualified personnel and in the mitigation of potential impacts to cultural resources on public lands in California.
Executive Order 11593 May 13, 1971 (36 Federal Register 8921)	This order mandates the protection and enhancement of the cultural environment through providing leadership, establishing state offices of historic preservation, and developing criteria for assessing resource values.
American Indian Religious Freedom Act; Title 42, USC, Section 1996	Protects Native American religious practices, ethnic heritage sites, and land uses.
Native American Graves Protection and Repatriation Act (1990); Title 25, USC Section 3001, et seq.,	The stature defines "cultural items," "sacred objects," and "objects of cultural patrimony;" establishes an ownership hierarchy; provides for review; allows excavation of human remains, but stipulates return of the remains according to ownership; sets penalties; calls for inventories; and provides for the return of specified cultural items.
U.S. Dept. of the Interior, Bureau of Land Management (BLM), the California Desert Conservation Area (CDCA) Plan 1980 as amended – Cultural Resources Element Goals	1. Broaden the archaeological and historical knowledge of the CDCA through continuing efforts and the use of existing data. Continue the effort to identify the full array of the CDCA's cultural resources.
	2. Preserve and protect representative sample of the full array of the CDCA's cultural resources.
	3. Ensure that cultural resources are given full consideration in land use planning and management decisions, and ensure that BLM-authorized actions avoid inadvertent impacts.
	4. Ensure proper data recovery of significant (National Register of Historic Places-quality) cultural resources where adverse impacts can be avoided.

Applicable Law	Description
State	
California Environmental Quality Act (CEQA), Sections 21000 et seq. of the Public Resources Code (PRC) with Guidelines for implementation codified in the California Code of Regulations (CCR), Title 14, Chapter 3, Sections 15000 et seq.	CEQA requires that state and local public agencies to identify the environmental impacts of the proposed discretionary activities or projects, determine if the impacts will be significant, and identify alternatives and mitigation measures that will substantially reduce or eliminate significant impacts to the environment. Historical resources are considered a part of the environment and a project that may cause a substantial adverse effect on the significance of a historical resource is a project that may have a significant effect on the environment. The definition of "historical resources" is contained in Section 15064.5 of the CEQA Guidelines.
AB 4239, 1976	Established the Native American Heritage Commission (NAHC) as the primary government agency responsible for identifying and cataloging Native American cultural resources. The bill authorized the Commission to act in order to prevent damage to and insure Native American access to sacred sites and authorized the commission to prepare an inventory of Native American sacred sites located on public lands.
Public Resources Code 5097.97	No public agency, and no private party using or occupying public property, or operating on public property, under a public license, permit, grant, lease, or contract made on or after July 1, 1977, shall in any manner whatsoever interfere with the free expression or exercise of Native American religion as provided in the United States Constitution and the California Constitution; nor shall any such agency or party cause severe or irreparable damage to any Native American sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine located on public property, except on a clear and convincing showing that the public interest and necessity so require.
Public Resources Code 5097.98 (b) and (e)	Requires a landowner on whose property Native American human remains are found to limit further development activity in the vicinity until he/she confers with the Native American Heritage Commission-identified Most Likely Descendents (MLDs) to consider treatment options. In the absence of MLDs or of a treatment acceptable to all parties, the landowner is required to reinter the remains elsewhere on the property in a location not subject to further disturbance.
California Health and Safety Code, Section 7050.5	This code makes it a misdemeanor to disturb or remove human remains found outside a cemetery. This code also requires a project owner to halt construction if human remains are discovered and to contact the county coroner.

Applicable Law	Description
Local	
County of San Bernardino 2007 General Plan, C. Countywide Goals and Policies of the Conservation Element	GOAL CO 1. The County will maintain to the greatest extent possible natural resources that contribute to the quality of life within the County. GOAL CO 3. The County will preserve and promote its historic and prehistoric cultural heritage. POLICIES CO 3.1 Identify and protect important archaeological and historic cultural resources in areas of the County that have been determined to have known cultural resource sensitivity. CO 3.2 Identify and protect important archaeological and historic cultural resources in all lands that involves disturbance of previously undisturbed ground. CO 3.3 Establish programs to preserve the information and heritage value of cultural and historical resources. CO 3.4 The County will comply with Government Code Section 65352.2 (SB18) by consulting with tribes as identified by the California Native American Heritage Commission on all General Plan and specific plan actions. CO 3.5 Ensure that important cultural resources are avoided or minimized to protect Native American beliefs and traditions.
County of San Bernardino 2007 Development Code	82.12.010 Purpose (a) Many of the resources are unique and non-renewable; and (b) The preservation of cultural resources provides a greater knowledge of County history, thus promoting County identity and conserving historic and scientific amenities for the benefit of future generations. 82.12.040 Development Standards Archaeological and historical resources determined by qualified professionals to be extremely important should be preserved as open space or dedicated to a public institution when possible.

C.3.4 PROPOSED PROJECT

C.3.4.1 SETTING AND EXISTING CONDITIONS

Information regarding the setting of the proposed project places it in both its geographic and natural context and specifies the technical description of the project. Additionally, the prehistoric, ethnographic, and historical backgrounds provide the context for the evaluation of the significance of any cultural resources identified within staff's area of analysis for this project.

Geographic Setting and Existing Conditions

The proposed Calico Solar Project is located in rural eastern San Bernadino County within the central Mojave Desert approximately 115 miles east of Los Angeles and 37 miles east of Barstow, California, along Interstate Highway 40 (I-40) where it intersects with Hector Road. Nearby towns include the small communities of Newberry Springs

and Ludlow, both approximately twelve miles to the west and east, respectively, of the project site. The project area is situated on the north side of I-40, primarily east of Hector Road; the southern project boundary borders I-40; the western boundary borders open undeveloped BLM land; the southeastern boundary borders an existing transmission line; and the northern and eastern boundaries border the base of the Cady Mountain range. The Cady Mountain Wilderness Study Area (WSA) and the Sleeping Beauty Proposed Wilderness Area are located north and northeast, respectively, of the project area. Pisgah Crater, located within the Pisgah Area of Critical Environmental Concern (ACEC), is located south of the proposed project. The Cady Mountains border the northern and eastern boundaries of the Calico Solar project area of analysis. Cady Peak is approximately four miles northeast and Sleeping Beauty Mountain is five miles to the east. Although portions of the project area are currently under private ownership, the majority of the lands are owned and administered by the BLM (Barstow Field Office) and can be found on the following on the following United States Geological Survey (USGS) 7.5-minute series topographic quadrangle maps: Hector (1982 Provisional); Lavic Lake (1955, Photorevised 1973); Sleeping Beauty (1982, Provisional minor changes 1993); Sunshine Peak (1955, Photorevised 1982); and Troy Lake (1982, Provisional minor changes 1993).

The project area is rural; however, a number of prior land use activities have occurred in the area, as evidenced by dilapidated mining-related structures, mining processing equipment, corrals, water tanks, barbed wire fencing, and several underground and above-ground utilities. The primary sources of previous surface and subsurface disturbance within and adjacent to the project area include cattle grazing, off-road vehicle use, historic mining activities, construction of a series of underground pipelines, construction and use of the Pisgah Substation, including associated transmission lines, and the construction and use of a number of transportation routes, including the Burlington Northern Santa Fe (BNSF) railroad tracks, the National Old Trails Road, U.S. Route 66, and I-40. Historic Route 66 roughly follows a similar route as I-40, though both are discrete features within the Project area. The BNSF Railway tracks bisect project site resulting in a north-south division of the study area. Transmission towers occur along the eastern-southeastern project limits. These towers include a pair of historic steel towers, a wooden transmission tower line, and a modern transmission tower. The Pisgah Substation is located within a triangular shaped parcel to the north of an I-40 temporary access route. The series of underground pipelines within the project area are situated south of the BNSF railroad tracks and north of I-40. Three well sites, which are depicted on the USGS maps, were also observed in the project area during the pedestrian survey. Historic mines occur throughout the region, and include the Black Butte Mine to the east and the Logan Mine to the north. Both the Logan and Black Butte Mines were used for the extraction of the mineral manganese and both are located within one-mile of the Calico Solar Project. No springs are indicated on the USGS quad maps for the Calico Solar Project area. The nearest reliable water source existing outside the Calico Solar Project area occurs approximately 12 miles to the west, in the Mojave Valley; numerous springs and wells surround the dry lake bed of ancient Troy Lake, which is just west of the Calico Solar Project area. Water is seasonally available in the form of rain swollen drainages, as indicated by the existence of numerous washes originating in the Cady Mountains and off-site to the east.

Calico Solar Project Description

The proposed Calico Solar Project would entail the construction, operation, and maintenance of one of the world's largest solar power facilities within a 6,215-acre area in the central Mojave Desert with a generating capacity of up to 850-megawatts (MW). The project would consist of approximately 34,000 solar dish systems (referred to as SunCatchers™) and would include a new 230-kV) Calico Solar Substation, 2.0 miles of electrical transmission line, an administration building, a maintenance complex, onsite routes interior to the project boundaries, a site access road, and a bridge over the Burlington Northern Santa Fe railroad tracks. Approximately 739 feet of the single – circuit 230-kV generation interconnection transmission line would be constructed off the project site, but still on BLM managed land. The transmission line would connect the proposed Calico Solar Substation to the existing Southern California Edison (SCE) Pisgah Substation. The project is proposed for development in two phases. Phase I would include 11,000 SunCatchers located on approximately 2,320 acres (3.6 square miles) to produce 275 MW. Phase II would include an additional 23,000 SunCatchers on an additional approximately 5,910 acres (9.2 square miles) to produce an additional 575 MW for the total 850 MW planned production. The total area required for both phases, including the area for the operation and administration building, the maintenance building, and the substation building, was originally 8,230 acres, but has been reduced to 6,215 acres (TS 2010ag). Approval of the Project ROW Grant Application (Form 299, Applications CACA 49539 and 49537) would result in the issuance of a ROW Grant Permit for use of federal lands administered by the BLM. The Project would require an amendment to the 1980 California Desert Conservation Area (CDCA) Plan.

The on-site substation (*i.e.,* Calico Solar Substation [approximately 15 acres]) would be constructed to deliver the electrical power generated by the project to Southern California Edison's (SCE) Pisgah Substation. Approximately twelve to fifteen 220-kilovolt (kV) transmission line structures (90 to 110 feet tall) would be required to make the interconnection from the Calico Solar to the SCE Pisgah Substation. Each of these structures would be constructed within the Project site.

The centrally located Main Services Complex (37.6 acres) would include three SunCatcher™ assembly buildings, administrative offices, operations control room, maintenance facilities, and a water treatment complex including a water treatment structure, raw water storage tank, demineralized water storage tank, basins, and potable water tank. A 15-acre temporary construction laydown area would be developed adjacent to the Main Services Complex.

Tessera Solar's Supplemental Filing dated January 2010 had proposed that water for the Project would be supplied by groundwater from a well located within the Cadiz basin and brought onsite by rail. However, the favorable results of the groundwater exploratory program demonstrate that groundwater is a viable water source for the Project, and water supplied by the well in the Cadiz basin would not be needed as a primary supply. The well that has been installed and tested as part of this investigation (Well #3) would serve as the primary water supply. Based on groundwater quality information collected for this project, it would require treatment to meet facility operations requirements. The water would be treated by a reverse osmosis system to remove the majority of the dissolved solids. A demineralization stage may be required

for mirror washing water and the hydrogen generator. To prevent bacterial growth in the raw water storage tank at the facility, chlorine would be added. Wastewater generated as a result of treatment would be discharged to evaporation ponds located at the Main Services Complex. The size of the evaporation ponds is currently estimated to be approximately 0.5 acres. Sanitary waste water would be discharged to a septic tank and leachfield system located adjacent to the Main Services Complex.

Project Construction

The Calico Solar Project would be developed in two phases. The schedule would be approximately 58 months in duration. Construction would require approximately 40 months. Construction is tentatively scheduled to occur over an approximate three-year period beginning in late 2010 through 2012 for Phase 1 and a two-year period between 2013 and 2015 for Phase 2, assuming Southern California Edison (SCE) completes the full transmission build-out necessary for Phase 2 by December 31, 2013.

Project facilities and amenities would be established during the first month of the build-out. The majority of these facilities would be located in the construction laydown area adjacent to the Main Services Complex. Project amenities would consist of site offices, restroom facilities, meal rooms, limited parking areas, vehicle marshalling areas/traffic staging, and construction material/equipment storage areas. Construction power to the project site facilities would be provided by mobile diesel-driven generator sets and/or temporary service(s) from SCE.

Site preparation would be based on avoiding major washes and minimizing surface-disturbing activities. Also, areas of sensitive habitat and cultural resources would be avoided wherever possible. Brush trimming would be conducted between alternating rows of SunCatchers™. Brush trimming consists of cutting the top of the existing brush while leaving the existing native plant root system in place to minimize soil erosion. After brush has been trimmed, blading for roadways and foundations will be conducted between alternating rows of SunCatchers™ to provide access to individual SunCatchers™. Blading would consist of removing terrain undulations and would be limited to 3 feet in cut and 3 feet in fill. The blading operations would keep native soils within 100 feet of the pre-development location, with no hauling of soils across the site. Paved roadways would be constructed as close to the existing topography as possible, with limited cut-and-fill operations to maintain roadway design slope to within a maximum of 10%. Minor grading would also be required for building foundations and pads and parking areas in the Main Services Complex and substation areas. The clearing, blading, and grading operations would be undertaken using standard contractor heavy equipment. This equipment would consist of, but not be limited to, motorgraders, bulldozers, elevating scrapers, hydraulic excavators, tired loaders, compacting rollers, and dump trucks.

From the preliminary geotechnical investigations, it is expected that lightly loaded equipment and structures, including some of the equipment foundations in the substation yard, small equipment such as the fire water pump and standby generator, the support structures for the water treatment plant and hydrogen storage area, and the transmission line lattice steel towers would be supported on shallow footings. Shallow footings would be continuous strip and isolated spread footings.

The majority of each SunCatcher™ would be supported by a single metal pipe foundation that is hydraulically driven into the ground. These foundations are expected to be approximately 20 feet long and 24 inches in diameter. Shallow drilled pier concrete foundations of approximately 36 inches in diameter and an embedment depth with a minimum socketed depth into rock of 6 feet would be used for hard and rock-like ground conditions.The buildings and major structures such as yard tanks would be supported on shallow spread and continuous footings or mat-type foundations. Deep foundations would be required for heavy items, such as the power transformers at the electrical substation.

Project Operations

It is expected that the Calico Solar Project would be operated with a staff of approximately 164 full-time employees. The project would operate 7 days per week, generating electricity during normal daylight hours when the solar energy is available. Maintenance activities would occur 7 days a week, 24 hours a day to ensure SunCatcher™ availability when solar energy is available.

Operation of the Project would generate wastes resulting from processes, routine maintenance, and office activities typical of solar electric generation operations. Non-hazardous wastes generated during operation of the project would be recycled to the greatest extent practical and the remainder of the wastes would be removed on a regular basis by a certified waste-handling contractor.

Inert solid wastes generated at the project site during operation would be predominantly office wastes and routine maintenance wastes, such as scrap metal, wood and plastic from surplus and deactivated equipment and parts. Scrap materials such as paper, packing materials, glass, metals, and plastics would be segregated and managed for recycling. Non-recyclable inert wastes would be stored in covered trash bins in accordance with local ordinances and picked up by an authorized local trash hauler on a regular basis for transport to and disposal in a suitable landfill.

Project operations would consist of few inputs, most of which would be associated with the day-to-day operations and maintenance of the facilities, and the resulting energy production would decrease the area’s reliance on imported non-renewable electricity. The existing transmission lines, which traverse the project site, are convenient to this project, and adhere to the goals and policies of the Geothermal/Alternative Energy and Transmission Element. There are no recently proposed zone changes that affect this project, and no changes to the general provisions for development of solar energy are in the planning area.

Project Closure and Decommissioning

Project closure can be temporary or permanent. Temporary closure is defined as a shutdown for a period exceeding the time required for normal maintenance, including closure for overhaul or replacement of the major components, such as major transformers, switchgear, etc. Causes for temporary closure include inclement weather and/or natural hazards (e.g., winds in excess of 35 mph, or cloudy conditions limiting solar insolation values to below the minimum solar insolation required for positive power generation, etc.), or damage to the Calico Solar Project from earthquake, fire, storm, or

other natural acts. Permanent closure is defined as a cessation in operations with no intent to restart operations owing to project age, damage to the project that is beyond repair, adverse economic conditions, or other significant reasons.

In the unforeseen event that the project is temporarily closed, a contingency plan for the temporary cessation of operations would be implemented. The contingency plan would be followed to ensure conformance with applicable LORS and to protect public health, safety, and the environment. The plan, depending on the expected duration of the shutdown, may include the draining of chemicals from storage tanks and other equipment and the safe shutdown of equipment. Wastes would be disposed of according to applicable LORS.

The planned life of the Calico Solar Project is 40 years; however, if the project is still economically viable, it could be operated longer. It is also possible that the project could become economically noncompetitive before 40 years have passed, forcing early decommissioning. Whenever the project is permanently closed, the closure procedure would follow a plan that would be developed as described below.

The removal of the project from service, or decommissioning, may range from “mothballing” to the removal of equipment and appurtenant facilities, depending on conditions at the time. Because the conditions that would affect the decommissioning decision are largely unknown at this time, these conditions would be presented to the Energy Commission, the BLM, and other applicable agencies.

To ensure that public health, safety, and the environment are protected during decommissioning, a decommissioning plan would be submitted to the Energy Commission for approval before decommissioning. The plan would discuss the following:

- Proposed decommissioning activities for the project and appurtenant facilities constructed as part of the project,
- Conformance of the proposed decommissioning activities with applicable LORS and local/regional plans,
- Activities necessary to restore the project site if the plan requires removal of equipment and appurtenant facilities,
- Decommissioning alternatives other than complete restoration to the original condition, and
- Associated costs of the proposed decommissioning and the source of funds to pay for the decommissioning.

In general, the decommissioning plan for the project would attempt to maximize the recycling of project components. Calico Solar would attempt to sell unused chemicals back to the suppliers or other purchasers or users. Equipment containing chemicals would be drained and shut down to ensure public health and safety and to protect the environment. Nonhazardous wastes would be collected and disposed of in appropriate landfills or waste collection facilities. Hazardous wastes would be disposed of according to applicable LORS. The site would be secured 24 hours per day during the decommis-

sioning activities, and Calico Solar would provide periodic update reports to the Energy Commission, the BLM, and other appropriate parties.

Premature closure or unexpected cessation of project operations would be outlined in the Project Closure Plan. The plan would outline steps to secure hazardous and non-hazardous materials and wastes. Such steps would be consistent with Best Management Practices, the HMBP, the RMP, and according to applicable LORS. The plan would include monitoring of vessels and receptacles of hazardous material and wastes, safe cessation of processes using hazardous materials or hazardous wastes, and inspection of secondary containment structures.

Planned permanent closure effects would be incorporated into the Project Closure Plan and evaluated at the end of the project's economic operation. The Project Closure Plan would document non-hazardous and hazardous waste management practices including the inventory, management, and disposal of hazardous materials and wastes and the permanent closure of permitted hazardous materials and waste storage units.

C.3.4.2 CALICO SOLAR PROJECT AREA OF ANALYSIS / APE

A project's potential to affect cultural resources is analyzed in terms of the maximum area of disturbance that would occur as a result of the project's construction, operation, and potential future decommissioning. Therefore, staff's project area of analysis for cultural resources includes all temporary and permanent construction areas and ultimate proposed rights-of-way established for the project. The vertical extent of potential project effects is also taken into consideration, including the depths of project excavation (for buried archaeological deposits), as well as the height of any permanent project facilities (which could affect the setting for built-environment and/or ethnographic resources).

The inventory of cultural resources within what staff defines as the appropriate area for the analysis of a project's potential impacts is the first step toward the assessment of whether or not the proposed project would cause a significant impact to an important cultural resource and, therefore, have an adverse effect on the environment. The area that staff considers when identifying and assessing impacts to historical resources, referred to as the "project area of anlaysis", is usually defined as the area within and surrounding the project site and associated linear facility corridors. The area is sufficiently large to facilitate considerations of archaeological, ethnographic, and built-environment resources.

Staff's project area of analysis for the Calico Solar Project is, therefore, a composite geographic area that encompasses all project construction and/or operation areas. The project area of analysis for built-environment resources extends an additional half-mile beyond the project footprint to account for potential effects related to resource setting.

C.3.4.3 ENVIRONMENTAL SETTING

Geology

The proposed Calico Solar Project area is located within the geomorphic province of the Mojave Desert, which occupies approximately 25,000 square miles of southeastern

California (Norris and Webb 1976, p. 123). The Mojave Desert is a wedge shaped area largely bound by major faults and structurally referred to as the Mojave Block. The Mojave Desert Geomorphic Province is characterized by broad expanses of desert with localized mountains and dry lakebeds and is bound by the San Bernardino Mountains and the Pinto fault to the south, the San Andreas fault to the west, the Garlock fault to the north and the Basin and Range Province to the east. The block itself is cut by a series of northwest to southeast striking faults including the Helendale, Lenwood, Johnson Valley, Camp Rock, Emerson, Calico, Pisgah, Bullion and Lavic Lake faults. Collectively, the strike slip faults in the Mojave Block are referred to as the Eastern California Shear Zone (ECSZ).The project area of analysis is within a broad valley between the Southwestern and Southeastern Cady mountains, in the central portion of the Mojave Desert Geomorphic Province.

The project area is characterized by Holocene-age and Pleistocene-age alluvial deposition. Alluvial deposits from the adjacent highlands are composed of silty sands and gravels with localized gravel and cobble channels. These sandy alluvial deposits may be locally intertwined with finer-grained basin deposits. The bounding highlands, which include a small portion along the northern project boundary, are underlain by granitic and metamorphic terrain and along the southern edge by younger volcanic deposits (Dibblee and Bassett 1966).

Geomorphology

Present Process Geomorphology

The deposition history is dominated by older (Pleistocene) and younger (Holocene) fanglomerates consisting of sands and gravels flowing in a generally southern direction, derived from the uplifted granitic and andesitic Cady Mountains (Dibblee and Bassett 1966). The older alluvium dominates the upper reaches of the fanglomerate, whereas the younger deposits dominate the lower reaches of the slope. This younger alluvium includes materials associated with a substantial east to west drainage that crosses the southern portion of the project. Although limited data are available, field observations indicate a substantial depth to the fanglomerate deposits. Older fanglomerates and alluvium form low hills in the southern-most extent of the Calico Solar project area of analysis and are separated from the remainder of the Calico Solar project area of analysis by the drainage noted above. These hills, and a northward extension of the Pisgah lava flow, channel the drainage towards Troy Lake to the west.

A major factor affecting the geomorphology of the Mojave, and specifically the Calico Solar project area of analysis and its environs, is the Mojave River itself. This river and its drainage system represent the largest present-day hydrological system in the Mojave Desert (Enzel, et al. 2003:62). Fluctuations in the paleoclimate between wet and dry periods, coupled with the changing path of the sizable Mojave River, resulted in the formation of several freshwater lakes, the most notable of which are Lake Manix and Lake Mojave. As the river changed its course, the overabundance of freshwater would be transported and deposited into naturally occurring basins along or at the terminus of the Mojave River. Marith Reheis and co-authors (2007) note that Lake Manix consists of several subbasins, which are referred to as Coyote Lake, Troy Lake, Manix, and Afton. As the lake developed, “fluvial and deltaic sediments were deposited progressively eastward into the lake” and that studies have hypothesized that there were at least four

major lake cycles (Reheis, et al. 2007:5). Based on geological and geomorphological studies the Lake Manix shoreline reached an elevation of 557 meters (m). At this level, the southern extent of the lake itself would have pushed east, potentially abutting the westernmost Calico Solar project area of analysis (Enzel 2003; Reheis *et al.,* 2007). Extensive prehistoric remains are found along the shores of the lake and it is thought to have been a major element in a regional network involving the inhabitants of the project and the project area of analysis.

The occurrence of desert pavements within the Calico Solar project area of analysis reflects the context as described above. In particular, the pavements on the slopes of the Cady Mountains are broader and better developed atop the older, up-slope Pleistocene fanglomerates rather than on the younger surfaces at lower elevations. The older surfaces, and likely the younger ones as well, predate the accepted presence of man in the new world. The most stable pavements, and likely the oldest, lie atop Quaternary alluvium woven among the fanglomerate hills and lava flows within the southern portion of the project area of analysis. Buried cultural deposits would not lilely be found beneath these stable surfaces. The cryptocrystalline silicate nodules that occur as part of the desert pavement matrix may be secondarily sourced to the fanglomerate deposits, though their original matrix remains unknown. Holocene alluvial deposits within and adjacent to the east-west drainage are the most likely source for buried deposits. The loose sandy matrix and the seasonal rain and flood events are likely to have obscured portions of cultural deposits.

Paleoecology

The Calico Solar Project is located within the Mojave Valley-Granite Mountains ecological subsection (Subsection 322Ah) of the broader Mojave Desert (Miles and Goudey 1997). The general environmental setting is that of a wide valley within arid desert, along which is an expansive alluvial fan that is dissected by numerous unnamed south-southwest trending washes and ephemeral drainages.

The project area of analysis is composed of multiple Life Zones whose animal and plant communities attracted and tempered the settlement and adaptations of a long sequence of prehistoric and historic populations. The Life Zones are (from the highest altitude to the lowest): Arctic/Alpine (10,000 feet and above), Canadian/Hudsonian (7,000 to 10,000 feet), Transition (5,000 to 7,000 feet), Upper Sonoran (3,300 to 5,000 feet), and Lower Sonoran (3,300 feet and below). Although some prehistoric and historic inhabitants of the project visited one of more of these Life Zones at one time or another, most settlement and subsistence activities were concentrated in the Transition, Upper Sonoran, and Lower Sonoran Zones, that is, between 5,000 feet and -227 feet in altitude (approximately a mile vertical distance).

The inhabitants of the project area would likely have lived primarily in the Lower Sonoran Life Zone, where acorns and piñon nuts were gathered by groups in the foothills; honey mesquite, piñon nuts, yucca roots, mesquite and cacti fruits were gathered by groups in or near the desert (Bean and Smith 1978) when Troy Lake, Lavic Lake, and Broadwell Lake were wet During times when the lakes were dry, settlement and subsistence were focused on the Upper Sonoran Life Zone in the Cady Mountains and even father distant. Edible varieties of agave cactus grow naturally on the rocky slopes of the Cady Mountains. Acorns and pinyon nuts were traded from Cahuilla bands

of the mountains and passes of the Upper Sonoran Life Zone and Transition Life Zone, and mesquite beans were often received in return. There is no archaeological evidence that dried fish from the lakes or the Colorado River were traded beyond the immediate area.

A substantial east to west drainage crosses the southern portion of the Calico Solar Project area, eventually emptying into Troy Lake. The presence of water in drainages and lakes was certainly greater during the terminal Pleistocene and early Holocene periods. Numerous dry stream drainages and lake remnants (*i.e.,* Troy Lake, Lavic Lake, and Broadwell Lake) are located in the vicinity of the Calico Solar Project and attest to this increased presence of water. Based on paleoenvironmental data, the general climatic pattern in the Mojave Desert seems to be that of cool and wet periods, followed by warmer and drier conditions, from the Late Pleistocene through the Late Holocene periods, as reflected in the numerous dry lake beds that are interspersed throughout the area (Sutton, *et al.,* 2007; S. Hall 1985; Spaulding 1991).

Biology

California's diverse environment is separated into ten different bioregions. The Calico Solar Project area of analysis lies within the Mojave Bioregion. The Mojave Bioregion is an arid desert environment which covers over 25 million acres of Southern California, Southern Nevada and the Southwestern Utah and is characterized by desert washes, high plateaus, mountain peaks, palm oases, and large dry prehistoric lake beds called playas. These playas usually consist of sand and gravel basins surrounding central salt flats and were formed by pluvial lakes which once dominated the Mojave Bioregion. The Mojave is bordered on the north by the Sierra Nevada Bioregion, on the west by the Transverse and Peninsular ranges and is separated from the Great Basin, on the east, by the Garlock Fault (Moratto 1984:16, 17). Elevations in the bioregion average between 2,000 to 3,000 feet above sea level and contain isolated peaks of 6,000 to 7,000 feet above sea level.

Although the desert appears barren and remote, it contains a large variety of plant and animal life. Vegetation in the Mojave Bioregion includes Mojave creosote bush, scattered desert saltbush, Joshua tree scrub, alkali scrub, juniper pinyon woodland, numerous varieties of cacti, and hardwood and conifer forests in the higher elevations. Rare plants in the bioregion include white bear poppy, Barstow woolly sunflower, alkali mariposa lily, Red Rock poppy, Mojave monkey flower, and Stephen's beartongue. (Ceres, n.d.). The Mojave Bioregion is characterized by hot dry summers followed by cool winters with occasional rainstorms that often develop into flash floods. Much of the land within the Mojave Bioregion is owned and managed by the BLM or contained in one of the three National Parks: Death Valley, Eastern Mojave, and Joshua Tree and several other recreational areas (Ceres, n.d.).

Geoarchaeological Investigation for the Calico Project Area

Over the span of human occupation in California (approximately the past 13,000 years), some parts of the landscape have remained stable, while others have either been removed by erosion or buried by the deposition of sediments. The processes of erosion and deposition play an important role in the integrity and surface visibility of archaeological remains. As a result, archaeologists must consider the age and

depositional history of the various landforms within a given study area in order to assess the potential for buried archaeological deposits to be present and intact within the study area.

As part of the effort to understand the setting of the Calico Project area, the applicant conducted a geoarchaeological sensitivity analysis to assess the potential for the presence of buried archaeological sites that would otherwise have no surface manifestations (SES 2009dd). In order to assess the sensitivity of the project area to contain buried archaeological deposits that could be affected by the project, the investigation entailed the identification of major landforms within the project area and a determination of the age and depositional history of those landforms. The following is excerpted from the Geoarchaeological anlaysis conducted for the Calico Project.

Major landforms within the project area were initially identified using both color and black-and-white aerial photography in combination with existing geologic maps of the area. Certain broad assumptions could be made about the age and depositional history of each portion of the project area.The mapping and assumptions were then verified and modified during an initial field reconnaissance consisting of an on-the-ground examination of the landscape and key indicators such as relative slope, desert pavement development, and subsoil formation.

Subsurface examinations within the project area were also undertaken in three ways. During the initial field reconnaissance, numerous existing cuts were identified where on-fan drainages and larger channels had incised alluvial deposits and exposed subsurface soil profiles. Although there are innumerable drainage features, the majority, particularly in the northern portions of the project area, are relatively small with only minor incision. To augment this data, the geoarchaeologist was present during geotechnical investigations involving *Modified California Sampler* borings and backhoe-excavated test pits. Borings were advanced between 25 and 50 feet below surface, while test pits extended 15 feet. Soils and contacts relevant to this study (i.e., late Pleistocene age or younger) occurred within the upper approximately 6.5 feet (2 meters) throughout the study area and typically much shallower. All excavated deposits were actively sorted through for archaeological materials, and the excavations were monitored for depositional changes that may suggest greater potential for buried archaeology. Additionally, a sample of any depositional contacts considered to have archaeological potential was screened through ¼-inch hardware mesh. No archaeological materials were observed during any of the geotechnical borings or test pits.

Identification of Major Landforms within the Project Area

The Calico Solar Project study area is bounded to the north and east by the granitic/quartz monzonite/basaltic pluton that forms the Cady Mountains, and to the south by the Pisgah Lava flows. The rock outcrops of the Cady Mountains are heavily eroded and mantled by Quaternary fan piedmonts[3], with more recent fan aprons issuing from the leading edge of these piedmonts. Alternatively, the Pisgah Lava flows have largely created a barrier to the introduction of more recent alluvial material from the mountains and fans to the south, and have served to preserve older deposits at the

[3] A piedmont is an area of land formed or lying at the foot of a mountain or mountain range. A *piedmont flat* is a slightly undulating, residual landscape formed around a mountainous upland.

surface. All of these Quaternary landforms are actually comprised of numerous remnants and more recent deposits of varying ages. By examining the relationship between the landform components one can develop relative age estimates, conclusions as to the depositional history of that landform, and the potential of each landform to harbor buried paleosols of appropriate age.

Before beginning such a discussion, however, a common set of descriptive landscape terms and definitions is necessary. Many different terms are used to describe desert geomorphology, with vastly different implications of scale, accuracy, and implied formation processes. “Alluvial fan” and “bajada” are two common terms that are often misleading because they are used to refer to different types of depositional and erosional landscapes and subsume numerous smaller landform components. The terminology adopted in this study follows after Peterson (1981) because the classification system emphasizes the temporal and spatial relationship between landform components, and was devised in relation to the study and classification of Basin and Range soils− making it highly relevant to the current geoarchaeological study. A discussion of these various landforms is provided in the following sections, with direct reference to the Calico Solar study area.

At the broadest scale, the Calico Solar project study area—including the surrounding piedmonts to the north, east, and south—can be classified as a “semi-bolson[4].” Common in desert regions of the Basin and Range, semi-bolsons differ from true bolsons[5] in that they lack a playa or floodplain, on which alluvial fans normally terminate, and instead are cut through by an axial drainage that marks the termination of the various piedmont landforms. The Calico Solar project area is similar to portions of the semi-bolson in that it lacks many of the distinct depositional features of the larger down-stream axial channel (e.g., terrace, floodplain). The typical axial channel eventually opens out into a true bolson and associated playa. In the case of the Calico Solar study area, this is represented by Troy Lake, several miles west of the project area near the western extent of the Cady Mountains.

The Calico Solar project area semi-bolson can be further divided into two dominant structural sections, one comprising the northern portion of the project area, and the other comprising the southern portion. The larger of these structural sections consists of the Cady Mountains and associated coalescing alluvial fan piedmont—gradually sloping down to the southwest—that dominates the northern approximately two-thirds of the project area. The second structural section in the southern portion of the project area is formed by several different component landforms that are generally lower but more topographically diverse, including the Pisgah Lava flows (functionally related to the Lava Bed Mountains, further to the south), several old remnant fans, inset fans, and associated alluvial flats. These northern and southern sections are divided by the axial

[4] A semi-bolson is a wide desert basin or valley whose central playa is absent or poorly developed, and which is drained by an intermittent stream that flows through canyons at each end and reaches a surface outlet.

[5] A bolson is a semiarid, flat-floored desert valley or depression, usually centred on a playa or salt pan and entirely surrounded by hills or mountains. It is a type of basin characteristic of basin-and-range terrain. The term is usually applied only to certain basins of the southwestern United States and northern Mexico.

channel, which runs roughly east–west, and which has likely been significantly altered by the Burlington Northern Santa Fe rail line that generally follows the same course.

The combined results of this study regarding landform type/age and buried site sensitivity are summarized in Cultural Resources Table 2 below. The following is a discussion of these results.

CULTURAL RESOURCES TABLE 2:
Summary of Geoarchaeological Sensitivity of Landforms within the Calico Solar Project Study Area

Area	Landform	Age	Depositional Regime*	Sensitivity
Northern Section	Rock Outcrops	Tertiary or older	Erosional	None
	Upper Alluvial Fan Piedmont	Pleistocene to Mid-Holocene	Erosional	Very Low
	Lower Alluvial Fan Apron	Pleistocene to Holocene	Variable	Low
Southern Section	Pisgah Lava	Late Pleistocene	Stable	None to very low
	Erosional Fan Remnant (fanglomerate)	Pleistocene	Erosional	Very Low
	Inset Fans	Pleistocene to Holocene	Variable	Very Low to Low
	Relict Alluvial Flat	Pleistocene (?)	Erosional (variable)	Very Low
	Axial Channel (and associated minor landforms)	Late Holocene	Variable	Very Low to Moderate

*Represents the dominant regime since the terminal Pleistocene

Northern Section. The northern portion of the study area is the simpler of the two. This area consists of a fan piedmont that is comprised of numerous coalescing alluvial fans issuing from the mouths of small mountain valleys within the Cady Mountains. The piedmont is composed of the upper alluvial fans themselves, as well as more recent fan aprons at lower elevations. The surfaces of these landforms typically consist of numerous active and abandoned channels and intervening surfaces that range from Early Pleistocene to Holocene in age (Dohrenwend et al. 1991:327). Given the punctuated deposition and erosion of these landforms during the Holocene, however, the archaeological record represented on these landforms may be incomplete.

The most distinct, well-developed desert pavement observed on the alluvial fan piedmont is located in the northeast portion of the piedmont, which has the largest proportion of andesite bedrock (Dibblee 2008). This andesite is generally more resistant than the coarse grain granite and monzonite, and appears to form a more distinct varnish. Given the predominance of granitic parent material, we can expect that desert pavements within the northern portion of the project area will generally be much weaker

than in other areas of the Mojave Desert, where more resistant parent material may be present (including the southern portion of the project area). Additionally, comparison of pavement surfaces within the project area may be tenuous, especially between the northern and southern portions, which consist of very different parent materials and geomorphic histories. While a well-developed pavement is invariably indicative of an old land surface, a poorly developed pavement is not inherently young. None the less, an initial field reconnaissance, and a general understanding of the development of alluvial fans within the Basin and Range, suggested that the majority of surfaces within the northern fan piedmont are late Pleistocene to Holocene in age. Given these constraints, an examination of subsurface conditions was considered necessary to evaluate landform ages and to determine the potential for buried archaeological deposits.

- **Rock Outcrops** (Sensitivity: None). At the higher reaches of the piedmont (the northern extent of the project area), rock outcrops are present. These are limited exposures of highly dissected Tertiary andesite and basalt bedrock which form steep, highly-eroded hills (inselbergs) sticking up out of the alluvial fans (Dibblee 2008). While these limited andesite and basalt outcrops provide some of the parent material that make up the alluvial fans, the vast majority appears to be granite and quartz monzonites, which also form the majority of the southern Cady Mountains and into which extend the mountain valleys that transport the material that forms the alluvial fans (Dibblee 2008). Of course, these rock outcrops have little or no potential for harboring buried archaeological deposits.
- **Upper Alluvial Fan Piedmont** (Sensitivity: Very Low). In general, there appears to be a trend of decreasing sediment size as one moves downslope along the piedmont gradient. This is typical of alluvial fans, with bouldery material near the fan head and fine sands at the distal toe (Peterson 1981:22). Test pits and borings within the northern portion of the Calico Solar project area (e.g., TP 016, 026, 027, and 040 through 047) consistently revealed profiles dominated by angular to sub-angular cobbles and gravels, with a clast supported matrix of sandy loam. Different weathering profiles laterally (east–west) across the piedmont indicate that the various fans that make up the piedmont are of different ages– as is expected given the results from other mountain fronts in the Mojave Desert (e.g., Bull 1991; Eppes, et al. 2003; McFadden and Wells 2003). However, no buried soils were identified and the very coarse clast size indicates a very high-energy colluvial/debris flow depositional environment that precludes the preservation of paleo-surfaces and associated archaeological remains.

  The oldest major alluvial fan structure on the piedmont appears to be located along the eastern boundary. Very well-developed varnish and rubification on the desert pavement in the upper portion of the fan, and well-developed subsurface weathering profiles throughout the fan suggest a late Pleistocene age or older. The subsurface profile exhibits very strong pedogenic development, with an upper vesicular horizon, a Btk-horizon with strong reddening (5YR 5/4), and multiple calcic horizons, the strongest exhibiting Stage IV cementation. Coarse high-energy angular and sub-angular colluvial/debris flow material is apparent throughout the profile, and is consistent with other profiles observed across the upper fan piedmont.

  The lithology of the northern coalescing fan piedmont is important for two reasons: the parent material of the alluvial fans directly affects the ability of distinct desert

pavements to form and, thus, determination of surface age (as discussed above); and it dictates the availability of usable lithic raw materials for prehistoric populations. Coarse grained granites and monzonites have very little utility as a raw lithic material, as they are not appropriate for flaked stone tool industries, and are similarly difficult to use as groundstone due to their coarse grain and friable nature. The predominance of this parent material may largely explain the dearth of prehistoric archaeological sites on older alluvial fan segments within the northern portion of the project area. This same reasoning would further reduce the potential for buried archaeological resources with the fan piedmont (including the lower fan aprons, see below). In conjunction with the lack of identified paleosols and the consistently high-energy subsurface deposits, the sensitivity for buried archaeological deposits within the upper alluvial fan piedmont is considered very low.

- **Lower Alluvial Fan Apron** (Sensitivity: Low). The finer grain material that dominates the lower portions of the fan piedmont, the near absence of well-developed pavement surfaces, as well as the geomorphic structure– with countless small anastomatizing channels and distinct bar and swale surface morphology– are all typical of fan aprons. However, the topographical continuity between the upper and lower portions of the piedmont is atypical of alluvial fans and their associated younger aprons (Peterson 1981:22-24) and raises questions about the functional relationship and timing of deposition between the upper alluvial fan and the lower aprons. Is the surface morphology and grain size differentiation between the two portions of the fan piedmont a result of timing (i.e., the upper surfaces are older and had time to develop pavement surfaces), or a result of natural clast sorting (i.e., coarse grain material naturally settles-out up-slope, with progressively finer material as one moves down gradient)? The apparent young age of the lower apron surfaces is an initial indicator of their potential to harbor buried archaeological deposits. However, further investigations indicate that there is a low geoarchaeological potential due to the nature of their geomorphic evolution.

  Powell states that younger alluvial fan aprons often “bury or feather out onto older fans distally” (2002:16). Thus, this middle and lower portion of the northern fan piedmont has undergone deposition (and erosion?) since the earliest documented human occupation of this area. Therefore archaeological sites in this portion of the project area have been removed by erosion or may remain buried under these younger fan deposits. Along the eastern alluvial fan piedmont at Clark Mountain, in the northeastern Mojave, it was demonstrated that major progradation of the fan aprons occurred between 8,000 and 4,000 BP, followed by a switch to an erosional regime during the late Holocene. It was conjectured that this transition was due to a reduction in available sediment for deposition (CH2MHill 2008). After an initial erosion of the uplands, fluctuating precipitation and sediment-starved runoff eroded recently deposited material on the lower hill slopes. The middle and lower portion of the Calico Solar alluvial fan piedmont, dominated by fan aprons, is not a stabilized surface. Recent landforms such as bar and swale topography, countless small anastomatizing gullies, and larger channels extend across most of this area and indicate ongoing desiccation and active erosion.

  Buried pedogenic horizons were identified in numerous test pits and borings within the apron portion of the northern fan piedmont. The nature of these contacts are

indicative of the initial formation of the lower piedmont and suggests that deposition is typically preceded by significant erosion. The upper unit consists of a single fining upward sequence dominated by coarse sub-angular gravels and cobbles at its base, and sandy loam with few gravels near the surface. This suggests that this portion of the fan apron was formed as a single depositional package, likely during the middle or late Holocene. However, the coarse material at its base, and the very distinct lower erosional contact, indicate that initial deposition of the apron was relatively high-energy and preceded by significant erosion. The lower buried pedogenic unit has a Btk-Bkm-Bk-Ck-C profile, consistent with a Pleistocene age and a truncated upper profile.

The upper unit consists of an Av-Bwk-Ck-C profile that is better developed, with a maximum of Stage I+ to II carbonate development, and consistent with a middle Holocene (?) age. Note that the surface pavement is only slightly more distinct than the preceding example, despite the apparent pedogenic age difference. The surface is more accurately described as stony, with no varnish and only very minor rubification on the ventral surfaces of surface clasts. Again, this unit has coarse angular debris flow-type gravels at its base, and a distinct erosional contact with the underlying paleosol. However, rather than being a single depositional unit, the upper apron mantle appears to be composed of at least three lithologic units, each represented by a fining upward sequence. The continuous weathering profile across these lithologic contacts indicates that they were deposited in relatively rapid succession, with no periods of stability which would have formed individual pedogenic profiles. The lower buried pedogenic unit has a Km-Bkm-Bk-Ck-C profile, again, consistent with a Pleistocene age and an even more heavily truncated upper profile.

Although distinct very old paleosols, buried below recent alluvium, were consistently identified within the lower portions of the alluvial fan piedmont, they are marked by heavily erosional upper contacts. It appears that significant erosion occurred prior to deposition of the fan apron mantles. This erosion would have destroyed any archaeology deposited on these older (now buried) surfaces, and effectively nullifies the potential for buried archaeology within the middle and lower portions of the northern fan piedmont. The presence of more recent lithologic contacts indicates that the fan aprons were sometimes formed through multiple depositional events, but the lack of identifiable paleosols at these contacts suggests that they were laid down more-or-less contemporaneously and, therefore, have a low archaeological potential.

Southern Section. The southern portion of the study area is comprised of generally older and more variable landscape elements compared to the northern portion. While also considered a piedmont, the southern area appears to be generally much older, comprised of numerous relict landforms, with differing source material and component landforms.

An initial clue to the age of the landforms of the southern area is provided by the Pisgah Lava flow. This flow is generally considered to have erupted in a series of closely

related events ca. 20,000 BP.[6] The Pisgah lavas overlie numerous deposits just south of the study area, including the older alluvial sediments (Qoa), fanglomerate (Qof), and various clay units (Qc and QTc) mapped by Dibblee (2008) and observed during the field visit for this current study. As such, all of these mapped deposits are at least older than ca. 20,000 BP (i.e., were laid-down well before human occupation in the region). Additionally, the emplacement of the Pisgah lavas effectively blocked deposition of new alluvial material from the Rodman Mountains to the south. This explains both the lack of large late Pleistocene and Holocene alluvial fan deposits– that are present in the northern portion of the Calico Solar project area and throughout the Basin and Range– as well as the presence of so many relict landforms at the surface. Whereas the alluvial fan material in the northern section has its source in the mountain valleys of the Cady Mountains, any more recent depositional landforms within the southern section are comprised of material reworked from the older relict alluvial landforms.

- **Pisgah Lava** (Sensitivity: None to Very Low). As stated above, the Pisgah Lava flows have been dated to approximately 20,000 BP. As such, they have no potential for harboring buried archaeological deposits. The exception to this statement is the eolian sand deposits that have mantled certain limited areas along the base of the lavas. Relatively limited sand sheet has built up along the edge of a portion of the flow near the Pisgah Substation, in the eastern portion of the study area. Limited subsurface exploration indicated that the sheet was only approximately 30 cm thick and directly overlaid the lava flow. Lack of soil development within the sand sheet suggests that it is a very recent, unstabilized deposit. No subsurface archaeological materials were observed.

  Figure 11 shows a desert pavement that has developed on a portion of the Pisgah flow—elevated on a mantle of accretionary eolian sand and silt—and gives an indication of the degree of pavement development that can be expected on a 20,000 year old lavic surface.

  A portion of at least one large archaeological site identified during inventory efforts (KRM-135; URS 2009) is located in close association with the Pisgah Lava flows. The higher elevation western portion of this site is located on fine grain sediments, with a pebbly surface, which appear to be mantled into small embayments of the lava flow. The sediments within these areas appear to be a mixture of fine grain alluvium from a nearby drainage which have been deposited as an older terrace set and preserved within these embayments, along with more recent eolian sands and silts accreted onto the existing surface. As such, these limited portions of KRM-135 appear to have the potential for at least a minor subsurface component, and may represent the only limited potential for buried archaeological deposits associated with the Pisgah Lava flows.

- **Erosional Fan Remnant** (Sensitivity: Very Low). A large proportion of the southern section of the project area is dominated by very old alluvial landforms referred to here as “erosional fan remnants.” The erosional fan remnants are generally coincident with the areas of Quaternary fanglomerate (Qof) as mapped by Dibblee (2008). The fanglomerate is an early Pleistocene or older alluvial/fluvial deposit up to

[6] Sylvester et al. (2002) place the timing of the eruptions at 18,000 ±5,000 BP based on argon-argon dating, whereas Phillips (2003) obtained a date of 22,500 ±1,300 BP based on cosmogenic ^{36}Cl analysis. These dates are within the expected range, of a few thousand years, for the multiple flows issuing from the Pisgah crater.

300 feet thick, comprised of poorly sorted coarse gravels and cobbles of mixed Mesozoic porphyry complex, metavolcanics, and Tertiary volcanic rocks (as well as chalcedony/jasper). The clast-supported matrix appears to be comprised of loamy sand with a high $CaCO_3$ content. This very old Quaternary geologic unit has been uplifted along the multiple faults that run north–south through the southern portion of the project area. These faults may have a normal and rotational component, with the highest portions of the uplifted erosional fan remnants located along the fault scarp, which have eroded steeply toward the east (along the scarp) and more gradually to the west.

As the name implies, these uplifted relict landforms are largely erosional, particularly along the steeper side slopes of the fan remnants. The flatter summits of the fan remnants (or “ballenas” if the ridges have been completely separated from other portions of the original alluvial unit) are more stabilized and may exhibit more well-developed desert pavements than the side slopes. This pavement likely formed through a combination of accretionary processes (McFadden, Wells, and Jercinovich 1987) as well as erosional process, where the finer alluvial matrix is eroded away leaving a disproportionate amount of larger clasts at the surface (McAuliffe and McDonald 1995). Subsurface profiles along the side slopes exhibit Stage III to IV $CaCO_3$ morphology, consistent with a Pleistocene or older age.

An additional small area of erosional fan remnant, not mapped as Qof by Dibblee (2008), was identified near the Pisgah Substation, in the western portion of the project area. The subsurface profile, exposed in a channel that cuts through the deposit indicates that it is similar to the Qof—with similar lithology and $CaCO_3$ development—and may be functionally related. The uplifted exposed summit of the fan remnant is limited to a small area east of the Pisgah Substation, while an older depositional fan apron that appears to be related to the fan remnant extends out to the west.

In general, the areas mapped as erosional fan remnant (and Qof by Dibblee 2008) have a very low potential for harboring buried archaeological deposits. These landforms are far too old to bury archaeologically sensitive paleosols. The large number of prehistoric archaeological sites present on the surface of these landforms speaks to both their antiquity and the presence of valuable lithic materials (volcanics and silica rich precipitates) within the fanglomerate deposits.

An exception to this, as on other landforms discussed in this study, is the presence of small confined areas of fine-grain recent eolian deposition. Within the erosional fan remnants, these areas are generally limited to small coppice dunes (small piles of sand built up around and temporarily stabilized by vegetation). The coppice dunes observed in the project area are generally very small, averaging less than 0.5 meter tall by 1 meter wide. Due to their limited area, it is very unlikely that they would obscure an entire site, or bury artifacts significantly different than those observed on the site as a whole.

- **Inset Fans** (Sensitivity: Very Low to Low). Numerous distinct inset fans were mapped within the southern portion of the Calico Solar project area. These are very gross landform designations and, in reality, the areas mapped as inset fan may be comprised of numerous component landforms. However, the dominant landforms in

these areas consist of depositional alluvium (fans) inset between older relict landforms.

Perhaps the most geomorphically complicated and interesting of these inset fan units is IF1, located in the central-western area of the southern section of the Calico Solar project area. This area has a gravel and cobble surface lag deposit that forms a well-developed desert pavement, and appears somewhat similar to the clasts from the surrounding Qof fan remnants. The source material for these clasts is likely largely from the eroded fan remnants. However, an examination of the subsurface matrix indicates a much different geomorphic origin for this area. IF1 is underlain by a reddish brown lean clay, which exhibits a course angular blocky structure. Ped faces, when freshly excavated and exposed, exhibit a distinct glossy clay film that may be slickensides, related to periodic wetting and drying cycles. Geotechnical borings B006, B007, and B008 indicate that this clay is over 50 feet thick.

In lower lying areas (including the relict alluvial flat; see below), the clay is overlain by a shallow, well-developed soil profile with a well-developed desert pavement that represents a secondary inset fan. These soils exhibit Stage II to III $CaCO_3$ formation, with diffuse carbonate throughout the profile and distinct thick and indurated laminae within the Bk- and/or K-horizons. Where observed, subsurface profiles contain a well-developed Av-Bwk-Bk-Btk-BCk pedogenic sequence. These pedogenic features suggest that the soil within the IF1 area (and relict alluvial flat), as well as the clay they overlie, are very old, and are consistent with Pleistocene and early Holocene soils observed at other locales within the Mojave Desert (see e.g., McDonald, McFadden, and Wells 2003:Table 1). The contact between the surface soil unit and the clay appears to be an erosional unconformity.

In higher relief portions of IF1, it appears that these soils have either been stripped away or never formed, leaving distinct inset fan remnants and ballenas composed entirely of the clay with a coarse gravel and cobble deflated lag deposit at the surface. Indeed, the IF1 structure is old enough that it too has been dissected and contains both erosional and depositional landforms. An additional indication of the age of the clay unit is the presence of distinct, approximately 5cm thick veins and inclusions of gypsum precipitate within the clay. Given its age and physical characteristics, the underlying thick clay unit at IF1 may be functionally related to the late Miocene or early Pleistocene claystones (QTc) mapped by Dibblee (2008) south of the Calico Solar project area. These are described as light reddish-brown lacustrine deposits that are soft to moderately hard (Dibblee 2008) and which are likely the result of a large paleo-lake that once occupied the area.

Given the age of the soils, the lack of identified paleosols, the very old unconformable lower clay unit, and the largely erosional nature of the relict IF1 inset fan, the potential for buried archaeological deposits is considered extremely low.

The other inset fan units (IF2 and IF3), mapped to the east of IF1 are more typical of inset fans in desert piedmont contexts, in that they do not appear to be underlain by, or composed of, the very old resistant clay unit. These inset fans are, instead, largely composed of reworked and redeposited alluvium from the side slopes of the fan remnants into which they are inset. Subsurface pedogenic indicators observed

during the field reconnaissance and in geotechnical borings indicate that these other inset fans are relatively old (middle Holocene?). Subsurface profiles observed within inset fans IF2 and IF3 generally correspond to an Av-ABw-Btk-Bk Cox-C sequence with Stage I+ to II $CaCO_3$ morphology. While these soils are likely younger than those observed in other areas across the southern section of the study area, no paleosols were discovered.

In general, these inset fans are considered unlikely to contain buried archaeological sites because they were largely laid down unconformably on the erosional Pleistocene fanglomerate deposits. The preservation of archaeological material is wholly dependent on the erosional history prior to deposition of the inset pediment. Given the highly erosive nature of the fanglomerate piedmont in general, this type of localized subsurface preservation seems unlikely.

The final smaller inset fan (IF4) mapped at the western extent of the Calico Solar project area, inset between the relict alluvial flat and the Pisgah Lava appears much younger and more active than the other inset fans. The meandering channel that created the inset fan has been heavily affected by modern disturbance adjacent to it, and the construction of a culvert under Highway 40 which focuses numerous small upstream gullies into a single drainage. Profiles within a stabilized bank of the incising channel show that it has actively eroded the underlying paleosol (probably related to the relict alluvial flat) and redeposited it unconformably further downstream. The nature of the relatively high-energy unsorted gravelly alluvium upstream suggests that any artifacts on this surface may be the result of erosion and redeposition. As such, the IF4 inset fan is also considered to have very low potential for buried archaeological deposits (with no surface manifestation); though additional reworked artifacts, where they are evident on the surface, may be partially buried in a highly disturbed context within recent depositional units.

- **Relict Alluvial Flat** (Sensitivity: Very Low). The large area mapped as “relict alluvial flat,” in the western portion of the project area, appears to be functionally related to the IF1 inset fan. As such, this area could also be considered an apron of the IF1 inset fan. However, alluvial flat is preferred here because it describes the properties of the geomorphic surface—a nearly level alluvial surface between the piedmont and axial stream of a semi-bolson—without assuming genesis from a single parent landform, and without inherent morphological assumptions.[7] As with other landforms, the term “relict” implies that the surface has been stable for a considerable time and, as such, has also been highly dissected.

  This landform can be distinguished from other relict landforms in the southern area by a nearly flat, low lying surface that is cut by numerous braided and anastomatizing channels/gullies. These channels are dominantly oriented in the same direction as the major axial channel (i.e. east–west) that crosses the project area. Between these small channels/gullies tend to be bars of intact desert pavement. Although no borings or test pits were advanced within the western portion of the relict alluvial flat, the geoarchaeological reconnaissance and an earlier geologic reconnaissance of the project area (URS 2008) – which mapped a surface

[7] For example, a fan apron is generally assumed to consist of a thin mantle of relatively young alluvium that typically buries an older pedogenic soil (Peterson 1981:51).

clay unit at the western extent of the project area– suggest that the landform is underlain by the thick Pleistocene/Miocene clay. Soils in this area have well-developed subsurface horizons that are similar to those observed within the IF1 inset fan (see previous discussion).

The geomorphic evolution and interpretation of geoarchaeological sensitivity for the relict alluvial flat is considered similar to that of the IF1 inset fan. Given the well-formed pavement, upper pedogenic unit, and dissected nature of the relict flat, it appears that this area was dominated by a stable and subsequent erosional geomorphic regime for much of the Holocene. The potential for buried archaeological deposits within this area is considered very low.

- **Axial Channel** (Sensitivity: Very Low to Moderate). The “axial channel” represents the area occupied by the main drainage that bisects the Calico Solar semi-bolson, as well as component landforms related to the active channel. While the active channel is primarily an erosional structure, small depositional features such as alluvial flats, limited terraces, and fine overbank deposits are the result of deposition by the axial channel. In the absence of identified springs or fresh water sinks/lakes, the axial channel represents the largest and most reliable source of seasonal water within the Calico Solar project area. As such, this would have represented a very important resource to prehistoric populations in the project area. The only limited evidence for food processing (milling equipment) found during the cultural resources survey of Calico Solar is found in close proximity to this watercourse.

  Excavations were performed at TP050, near the interface of the lower fan piedmont apron and the axial channel zone. It is difficult to determine if the fine-grain alluvium at the surface of this location originates from the on-fan drainages or the axial channel, but appears that it may be related to an overbank deposit of the channel. The subsurface profile within TP050 is well-developed but unusual. The lack of pavement development at the surface is not consistent with the subsurface profile. An Av horizon has developed in the upper 3 to 5 cm, with a slightly consolidated loamy sand with gravel subsoil (ABw). This is followed by a zone of weak clay and carbonate accumulation (Btk) with observable rubification (ox). This overlies a second Btk-horizon with much stronger structure, distinct clay films on grains within peds, and carbonate accumulation completely surrounding larger gravels and cobbles (Stage II). This is underlain by an indurated carbonate layer (Bkm; Stage III+), as well as a Bk and Cox horizon not shown in Figure 18b.

  The existence of multiple B-horizons and gradual increase of carbonates to an indurated lamina is common in very old soils. However, the low carbonate accumulation and weak structure in the upper horizons (with such a well-developed lower profile) is unusual. A distinct lithologic contact is observable between the two Btk horizons with the upper dominated by fine-grain loamy sand and the lower dominated by coarse gravels and cobbles. While this may simply represent a facies shift during a single depositional event, the above observations suggest that the contact may also be pedogenic, with the lower Btk representing a truncated portion of a buried soil. In either case, the potential for intact buried archaeological deposits is low (i.e., either a buried surface is absent, or any archaeological deposits on that surface have likely been removed through subsequent erosion).

Test Pit 051 was placed in a similar geomorphic setting near the interface of the toe of a fan apron and the axial channel zone. The upper pedogenic unit is less well-developed than the preceding example, with an AB-Bw-Bwk-C profile, corresponding to a late Holocene age. This unit overlies a very old buried pedogenic unit with a Btk-Bkm-Km1-Km2-Bk-Ck-C profile. Again, a truncated erosional contact seems to be indicated.

No well preserved upper horizons of paleosols were observed in the subsurface explorations within the vicinity of the axial channel. However, multiple truncated paleosols were noted below relatively young fine-grain alluvial deposits. This suggests that there is the potential for low-energy burial of older land surfaces under significant amounts of recent alluvium (up to 2 meters) within the reach of the axial channel. The preservation of archeological deposits on these surfaces is entirely dependent on the erosional history prior to burial (in both of the test pits discussed here, it appears that significant erosion may have occurred prior to burial). Given these considerations, the geoarchaeological sensitivity of the axial channel is considered low within the current active channel/wash, but moderate on the small terraces and minor component landforms adjacent to the channel where, given the right geomorphic history, significant fine-grain low-energy alluvium *may* bury intact relict surfaces. The archaeological sensitivity of these limited areas is bolstered by the proximity to the only major seasonal watercourse identified within the study area.

Conclusions of the Geoarchaeological Investigation

The axial channel (and associated deposits), which cuts across the central portion of the study area and interfaces with fine-grain sediments from the toe of the alluvial fan piedmont, may represent the only geomorphic feature in the Calico Solar project area where buried archaeological deposits (with no surface manifestation) may reasonably be expected. While much smaller than the Mojave River drainage discussed by Sutton (1996), the same geomorphic processes that have buried sites along the Mojave River may be at play here, though on a much smaller scale. The fine-grain alluvial deposition along the margins of the axial channel—in the form of limited terrace deposits and alluvial flats—is functionally similar to that along the Mojave River, though large stratified alluvial terraces like those associated with the larger river, are clearly absent. As such, buried archaeological deposits, if present in this portion of the project area, will likely be aerially confined sites with a sparse deposit similar to surface sites in the Calico Solar study area, buried under up to two meters of very recent fine-grain alluvium. Given the likelihood that the course of the axial channel has meandered over its history, and scoured any existing land surfaces, the preservation of buried archaeological sites in this area will likely be greatly limited.

The vast majority of the northern alluvial fan piedmont is represented by a subsurface depositional environment that is too high-energy and coarse, with no observed paleosols, to preserve buried archaeological deposits. This lack of depositional sensitivity is coupled with an absence of economically viable lithic resources, which may largely explain the absence of surface sites on the fan piedmont. The high-energy erosional contacts between buried paleo-surfaces and overlying mantle deposits within the fan aprons, coupled with the lack of viable economic resources, largely precludes the presence of buried archaeological deposits within in this portion of the project area

as well. Both the very old age and largely erosional nature of the major landforms in the southern section of the project area indicate that buried archaeological sites (with no surface manifestation) are very unlikely. It appears that the greatest potential for site burial in the southern portion of the Calico Solar project area is in those places where unconsolidated and active eolian sands have obscured alluvial landforms. However, these eolian features appear to be so limited that they are unlikely to obscure any significant portion of an archaeological site.

A secondary conclusion of this geoarchaeological study is that prehistoric site location within the Calico Solar Project study area seems to be largely dictated by the availability of raw lithic materials. The series of coalescing fans that make up the alluvial fan piedmont north of the railroad tracks have their source in the Cady Mountains. An examination of Dibblee's (2008) geologic map of the Cady Mountains, indicates that the dominant material present above these fans is granite to quartz monzonite (gqm), with more limited (and presumably more resistant) outcrops of basalt and andesite (Tb and Ta). This is confirmed by subsurface geoarchaeological investigations of the alluvial fans, which show that the majority of material present is coarse-grained granitic sands, gravels, and cobbles, with little utility for prehistoric tool making. On the other hand, the fanglomerate remnant alluvial fans—and inset alluvial fans, which generally are comprised of reworked fanglomerates—that make up the majority of the landforms south of the railroad tracks, have a much more variable parent material—including volcanics, metavolcanics, and silicates (jasper, etc.)—more conducive to prehistoric tool production.

C.3.4.4 CULTURAL SETTING

Prehistoric Background

The chronological sequence of the cultural complexes for the Mojave Desert initially proposed by Warren (1980, 1984) and Warren and Crabtree (1986), divides the prehistoric era into five temporal periods: Lake Mojave, Pinto, Gypsum, Saratoga Springs, and Shoshonean. The four earlier periods encompass what is called the Archaic Period of the Great Basin and, in the Saratoga Springs period, formative influences from the Southwest (Lyneis 1982), while the Shoshonean period includes the ethnographic era. Claims have been made for archaeological assemblages dating to periods earlier than Lake Mojave, but as Warren and Crabtree (1986) note, all are controversial and, even if valid, have little or no relationship to later cultural developments in the region.

The Mojave Desert sequence has recently been expanded by Sutton *et al.,* (2007) to include elements more closely aligned to prehistoric cultural complexes in the Central Mojave Desert. Similar to Warren and Crabtree (1986), Sutton *et al.,* (2007) notes little evidence of a "Pre-Clovis" occupation of the Mojave Desert during the Pleistocene, but does not discount the possibility of such evidence existing in the region. In contrast to the earlier sequence, Pleistocene era occupation is identified and termed the hypothetical "Pre-Clovis" and "Paleo-Indian" Complexes. Other elements of the Sutton *et al.,* (2007) Mojave Desert chronology for the Holocene period include the Lake Mojave complex, Pinto complex, Dead Man Lake complex, Gypsum complex, Rose Spring complex, and Late Prehistoric complex, as described below. As used herein, "climactic periods (*e.g.,* Early Holocene) [refers] to specific spans of calendric time and

cultural complexes (*e.g.,* Lake Mojave Complex) to denote specific archaeological manifestations that existed during (and across) those periods" (Sutton *et al.,* 2007:233).

Additionally, Sutton *et al.,* (2007: Table 15.1 and 15.2) provide good summaries of major archaeological research conducted in the Mojave Desert since 1982. Due to the advent of cultural resource management projects, primarily on military bases and on federal land in the Mojave, more than 3 million acres have been surveyed with more than 20,000 sites identified in the last twenty-seven years. These include surveys at China Lake Naval Weapons Center, Edwards Air Force Base, Fort Irwin, Twenty-Nine Palms Marine Corps Center, and federal Bureau of Land Management Land (Basgall and Glambastiani 2000; Basgall 2004; Hall 1993; Warren 1991). In terms of excavation projects in the Mojave, work has been conducted on a wide range of site types, from Paleo-Indian sites to Late Prehistoric sites, several of which have provided radiocarbon dates that support the cultural chronology that has evolved with these more recent investigations (Sutton *et al.,* 2007: Table 15.3). The chronological sequence presented below is based on both the earlier and more recent archaeological survey and excavation projects in the Mojave.

Paleo-Indian Complex (10,000 to 8000 cal B.C.)

The Paleo-Indian Complex was an era of environmental transition between the late Pleistocene and early Holocene. The beginning of the Paleo-Indian Complex was characterized by increased rainfall and cooler temperatures, which formed deep lakes and marshes, even in the interior desert regions of California. As temperatures warmed at the start of the Holocene, glaciers slowly retreated, sea levels rose, and the interior lakes and marshes gradually evaporated over the millennia (Moratto 1984:78).

The earliest, clear evidence for human occupation of the Mojave Desert begins at about 12,000 years ago, while claims for earlier, pre-Holocene era occupations such as those made for the Calico Early Man site (Duvall and Venner 1979), Tule Springs (Harrington and Simpson 1961), Lake China (Davis 1978), and Lake Manix (Simpson 1958, 1960, 1961) remain unsubstantiated.

In 1926, a fluted point found in Folsom, New Mexico transformed the debate about the antiquity of the earliest inhabitants of the New World, pushing the date back to approximately 15,000 B.P. Since that time, many other sites containing this type of point have been identified throughout the United States. The Paleo-Indian Complex within the Mojave Desert is, thus far, represented exclusively by the Clovis Complex, though the relationship with the later Great Basin stemmed series points is also a consideration. The Paleo-Indian Complex experienced profound environmental changes, as cool, moist conditions of the terminal Wisconsin glacial age gave way to a warmer, drier climate of the Holocene (Spaulding 1990).

The China Lake site remains the only presumed occupation of the Paleo-Indian complex in the Mojave Desert for the late Pleistocene Period. China Lake is located near an ancient Pleistocene lake. Excavations at this site began in 1968 and lasted through the end of the 1970s (Moratto 1984:66-70). China Lake has a well-sealed stratigraphic context with prehistoric tools intermixed with the fossilized remains of extinct mammals. The tool sequence from the site suggests that China Lake was inhabited from as early as 9,200 cal. B.C. (Sutton *et al.,* 2007: 234). The earliest

calibrated dates for China Lake are from habitation debris at the Pleistocene lakeshore that continued through 10,000 B.C., where Proto-Clovis and Clovis cultures were identified. Nearly all of the tools identified at this site were produced from obsidian and fine-grained cryptocrystalline silicates (cherts and jaspers).

One common theme among nearly all Paleo-Indian sites in North America is the tool assemblage: projectile points, hafted to the end of a spear and launched using a throwing tool (atlatl), made from fine-grained lithic material and fluted. Fluted points, defined as a component of the Clovis culture in California, have been found nearly throughout the entire state from coastal estuary environments to ancient Pleistocene lakeshores, which are now in desert areas. At least five sites near Cajon Pass have been identified containing fluted projectile points, suggesting an early occupation of approximately 12,000 BP, which corresponds to the “hypothetical Pre-Clovis” complex (pre-10,000 cal B.P) for San Bernardino County (Sutton *et al.,* 2007:236). In addition to fluted points, the Paleo-Indian tool assemblage was composed mainly of scrapers, burins, awls, and choppers, all used for the processing of animal remains and foodstuffs.

The late Pleistocene to early Holocene geological period of transition, approximately 14,000 to 8,000 BP, was a period of global climatic change and in the California interior, pluvial lakes formed from glacial melt (Roberts 1989). Some early researchers pose the theory of two different traditions relating to interior and coastal adaptation during this transition. Based on work in the Panamint Valley, Davis (1969) posited the theory of “Paleo-Desert,” a geographic distinction from Paleo-Indian sites of the “Paleo-Coastal” tradition. In the Paleo-Desert geographic region, Paleo-Indian sites are generally located along the shorelines of these ancient pluvial lakes (Davis 1969). No sites dating to this period have been recorded to date in the project area of analysis.

Lake Mojave Complex (ca. 8000 – 6500 cal B.C.)

The temporal period 8000 to 6500 cal B.C. is referred to as the Altithermal Climatic Phase in which there was a dramatic shift towards a much warmer environment in the desert regions, and which appears to have witnessed a near hiatus in the occupation of the Mojave Desert. During this time it seems that people living in the desert regions migrated towards the coastal region. The change in the climate affected the distribution of floral and faunal communities and correspondingly people migrated toward the coast to exploit littoral resources. A small frequency of ground stone implements is present during this time, from which infers limited hard seed grinding activities (Sutton *et al.,* 2007:237). The high incidence of extra-local materials and marine shell is interpreted as wider spheres of interaction than witnessed previously. Sutton *et al.,* (2007: 237) interprets these and other data as indicators of “a forager-like strategy organized around relatively small social units.”

Cultural materials dating from this Complex encompass the Playa cultures (Rogers 1939), the San Dieguito Complex (Warren 1967), and the Lake Mojave Complex (Warren and Crabtree 1986). This phase is considered ancestral to the Early Archaic cultures of the Pinto Complex, representing a shift toward a more diversified and generalized economy (Sutton 1996:228). The Lake Mojave assemblages, first identified at Lake Mojave (Campbell *et al.,* 1937), include Lake Mojave series projectile points (leaf-shaped, long stemmed points with narrow shoulders) and Silver Lake points (short

bladed, stemmed point with distinct shoulders). Other diagnostic items include flaked stone crescents; abundant bifaces; and a variety of large, well-made scrapers, gravers, perforators, heavy core tools, and ground stone implements (Sutton *et al.,* 2007:234).

Millingstones generally occur in small numbers during this time. In the Mojave Desert and southern Great Basin, this assemblage is typically (but not exclusively) found around the margins of ancient lakes, although the role of the lakes in the overall adaptation remains unclear. According to Sutton (1996:229), Lake Mojave Complex sites occur more commonly in the eastern and central Mojave Desert, while rare occurrences have been noted within the western Mojave in the Lake China, Coso, and Owens Lake areas

The Lake Mojave cultural pattern seems to represent relatively small nomadic social units centered on foraging strategies with undefined hunting and lacustrine resource exploitation patterns. Studies conducted at Fort Irwin show a reliance on smaller taxa with less reliance on large game based on protein residue analysis; however, these data are contradictory to the cultural constituents recorded for this complex that suggest large game exploitation (Sutton *et al.,* 2007:237). There is an overlap in time between the Lake Mojave Complex and the Pinto Complex of approximately 1,000 years, in which continuity of technology occurs with a steady introduction of technologies referred to as the Pinto Complex. No sites dating to this period have been recorded to date in the project area of analysis.

The Pinto Complex (ca. 6500 – 4000 cal B.C.)

The Pinto Complex represents a broad continuity in the use of flaked stone technology, including less reliance on obsidian and cryptocrystalline silicates, as well as the prevalence of ground stone implements in the material culture (Sutton *et al.,* 2007:238), which distinguishes it from the Lake Mojave Complex. Climatic changes occur between the Early and Middle Holocene periods about 7500 B.P and 5000 B.P. appears to have been more arid across the Mojave region (S. Hall 1985; Spaulding 1991). It is during this time that woodland attained its approximate modern elevation range, and the modernization of desert scrub communities was completed with the migration of plant species such as creosote bush into the area (Byers and Broughton 2004). Warren (1984) sees this period as marking the beginning of cultural adaptation to the desert, as materials characteristic of the Pinto Complex gradually replace those of the preceding Lake Mojave Complex. Sites associated with this era are usually found in open settings, in relatively well-watered locales representing isolated oases of high productivity.

From the period 5000 B.C. to 3500 B.C., there was increased occupation of the desert regions during the Medithermal Climatic Period, a period of moister and cooler temperatures allowing for the intensive re-occupation of the desert region. In the desert region, the occupation is referred to as the Pinto Basin Complex. However, Sutton *et al.,* (2007:238) cite recent work conducted on Fort Irwin and Twenty-Nine Palms that produced radiocarbon dates as 6870 cal B.C., thus pushing the back the inception of the complex coincidental with the Lake Mojave Complex.

The Pinto Complex is marked by the appearance of Pinto series projectile points, characterized as thick, shouldered, expanding stem points with concave bases, as well as, bifacial and unifacial core tools, and an increase in millingstones. Pinto points were

typically produced by percussion reduction, with limited pressure retouch. Named for the Pinto Basin site (Campbell and Campbell 1935), the points were presumably used on atlatl darts. Large numbers of such artifacts were also recovered from the Stahl site near Little Lake (Harrington 1957; Schroth 1994).

Major technological shifts for this Complex include a significant increase in the use of millingstones (Warren and Crabtree 1986; Sutton *et al.,* 2007:238)). Warren (1990) attributes the latter development to the exploitation of hard seeds, part of a process of subsistence diversification brought on by increased aridity and reduced ecosystem carrying capacity. Big game hunting probably continued as an important focus during this time, but the economic return of this activity likely decreased as mountain sheep and deer (artiodactyls) populations declined in response to increased aridity (Warren and Crabtree 1986). During this transitional period there is faunal evidence that indicates exploitation of rabbit, rodent, reptile, and freshwater mussel resources.

The majority of Pinto Complex archaeological sites have been found near pluvial lakes, adjacent to fossil stream channels, near springs, and in upland regions. Many of these sites contain substantial midden deposition and cultural debris, which indicates larger groups and prolonged occupation for this time period (Sutton *et al.,* 2007:238).

A new complex has been proposed by Sutton *et al.,* (2007) that appears to be a variation of the Pinto Complex: the Dead Man Lake Complex (7000-3000 cal. B.C.), based on archaeological findings from the Twenty-Nine Palms area. The primary variation between Pinto and the Dead Man Complex is the presence of small to medium sized contracting stemmed or lozenge shaped points, battered cobbles, bifaces, simple flaked tools, milling implements, and shell beads (Sutton *et al.,* 2007:239).

Based on the current archaeological data there appears to have been a gap between the Middle and Late Holocene period, since few sites have been found that date between 3000 and 2000 cal B.C. It is believed that climatic changes during this period resulted in hotter and drier conditions, which may have led to the abandonment this region for approximately 1,000 years (Sutton *et al.,* 2007:241).

No sites dating to this period have been recorded to date in the project area of analysis.

Gypsum Complex (ca. 2000 cal B.C. – cal A.D. 200)

Gradual amelioration of the climate began by around 5000 B.P, culminating in the Neoglaciation at about 3600 B.P., with a period of increased moisture dating to the latter part of the Middle Holocene (Spaulding 1995). This increase in moisture would have presumably resulted in favorable conditions in the desert, and may have influenced changes in cultural adaptations, including increasing population, trade, and social complexity (Sutton 1996: 232; Sutton *et al.,* 2007:241).

Gypsum Complex sites are characterized by medium to large stemmed and corner notched projectile points, including Elko series, Humboldt Concave Base, and Gypsum. In addition, rectangular-based knives, flake scrapers, occasional large scraper planes, choppers and hammerstones; handstones and milling tools become relatively commonplace and the mortar and pestle appear for the first time. One site with an Elko

series projectile point was recorded in the project; no similar projectile points have been found in the project area of analysis.

This Complex is marked by population increases and broadening economic activities as technological adaptation to the desert environment evolved. Hunting continued to be an important subsistence focus, but the processing of plant foods took on greater importance as evidenced by an increase in the frequency and diversity of ground stone artifacts. Later, the bow and arrow were introduced, increasing hunting efficiency. Perhaps due to these new adaptive mechanisms, the increase in aridity during the late Gypsum Complex (after ca. 2500 B.P.) seems to have had relatively little consequence on the distribution and increase in human populations (Warren 1984; Warren and Crabtree 1986). In addition to open sites, the use of rock shelters appears to have increased at this time. Base camps with extensive midden development are a prominent site type in well-watered valleys and near concentrated subsistence resources (Warren and Crabtree 1986). Additionally, evidence of ritualistic behavior during this time exists through the presence of rock art, quartz crystals, and paint (Sutton *et al.,* 2007:241).

A shift in subsistence orientation and mobility near the end of the Gypsum Complex is suggested, with increased emphasis on the hunting of smaller mammals (Basgall *et al.,* 1986; Sutton 1996:234). Rock art suggests that the hunting of mountain sheep was important during the Gypsum Complex (Grant *et al.,* 1968); mountain sheep and deer, rabbits and hares, rodents, and reptiles remains are reported from Gypsum Complex sites in the central Mojave Desert (Hall and Basgall 1994). Evidence from the western Mojave Desert suggests that there was a major population increase ca. 3000 to 2300 B.P (Gilreath and Hildebrandt 1991; Sutton 1988).

Rose Spring Complex (ca. cal A.D. 200 – 1100)

The climate during the Rose Spring Complex remains relatively stable and consistent during the middle of the Late Holocene period. In the western Mojave Desert, some regions show an increase in lake stands, such as at Koehn Lake during this time (Sutton *et al.,* 2007:241). At the beginning of this period lakes were at high points; as the environment began to shift towards the end of this period, lakes began to desiccate and recede, which marked the end of the Rose Spring Complex around AD 1100.

The Rose Spring Complex is characterized by small projectile points, such as the Eastgate and Rose Spring series, stone knives, drills, pipes, bone awls, various milling implements, marine shell ornaments; the use of obsidian is prevalent during this time (Sutton *et. al.,* 2007:241). Smaller projectile points appear to mark the introduction of a bow and arrow technology and the decline of the atlatl and spear weaponry (Sutton 1996: 235). Sutton (1996: 235; 2007:241) notes that Rose Spring Complex sites are common in the Mojave Desert and are often found near springs, washes, and lakeshores.

Subsistence practices during the Rose Spring Complex appear to have shifted to the exploitation of medium and small game, including rabbits/hares and rodents, with a decreased emphasis on large game. At the Rose Spring archaeological site, numerous bedrock milling features, including mortar cups and slicks, are associated with rich midden deposits, indicating that milling of plant foods had become an important activity. In addition, evidence of permanent living structures are found during this time and

include wickiups, pit houses, and other types of structures (Sutton *et al.,* 2007:241). In the eastern Mojave Desert, agricultural people appear to have been present, as Anasazi populations from Arizona controlled or influenced a large portion of the northeastern Mojave Desert by cal A.D. 700 (Sutton *et al.,* 2007:242).

No sites dating to this period have been recorded to date in the project area of analysis.

Late Prehistoric Complexes (cal A.D. 1100–Contact)

Paleoenvironmental studies conducted within the western Mojave Desert point to increased effective moisture beginning just after 2000 B.P., as evidenced by a shoreline bench feature at Koehn Lake (Sutton 1996:238). The Koehn Lake site appears to have been abandoned by 1,000 years ago, as Koehn Lake desiccated during a major "medieval drought." This drought may have influenced the movement of people from this area north and east across the Great Basin (Sutton 1996:239). Population began to decrease, due in part to a drier climate, and later as a result of European contact.

Characteristic artifacts of this Complex include Desert series projectile points (Desert Side-notched and Cottonwood Triangular), Brownware ceramics, Lower Colorado Buff Ware, unshaped handstones and millingstones, incised stones, mortars, pestles, and shell beads (Warren and Crabtree 1986). The faunal assemblages typically contain deer, rabbits/hares, reptile, and rodents. The use of obsidian dropped off during this time with the increased use of cryptocrystalline silicates.

Between 1,000 and 750 years ago, ethnic and linguistic patterns within the Mojave Desert increased in complexity. One of the most important regional developments during the Late Prehistoric Period was the apparent expansion of Numic-speakers (Shoshonean groups) throughout most of the Great Basin. Many researchers accept the idea that sometime around A.D. 1,000, the Numa spread eastward from a homeland in the southwestern Great Basin, possibly from Death Valley (Lamb 1958) or Owens Valley (Bettinger and Baumhoff 1982). While there is little dispute that the Numic spread occurred, there is much disagreement over its mechanics and timing (see Madsen and Rhode 1995).

The Late Prehistoric Complexes mark the first recorded historical documentation of Native American inhabitants at European contact. The ethnohistoric record provides valuable data for understanding Late Prehistoric archaeology. The Late Prehistoric Complexes reveal a significantly different suite of material culture than that seen in earlier Complex assemblages. Manos and millingstones became more frequent, as did mortar and pestles. In addition, bow and arrow technology with the use of Desert Side-notched and Cottonwood points, both emerge during the Late Prehistoric Complexes. Large occupation sites, representing semi-permanent and permanent villages, emerge during this time as well.

During this time the first locally produced pottery is seen in the Mojave Desert Region, likely coming from the Anasazi in the southwest. Also, smaller projectile points, Cottonwood and later Desert Side- Notched points were introduced to use with bow and arrow technology. Plant food processing is indicated by the presence of manos and metates.

Ethnographic Background

Prehistorically, there was a large movement of people across the Mojave Desert and ethnographically several groups are associated with the Project area of analysis and surrounding Mojave Desert region. The Kawaiisu, Kitanemuk, Southern Piute, Serrano, Chemhuevi, Tabtulabal, and Panamint occupied the Mojave Desert region, north, south, west, and east of the Project. In this region there were four major linguistic groups originating from northern Uto-Aztecan groups; Tubatulabalic, Hopic, Numic, and Takic (Sutton *et al.,* 2007:243). The Mojave River appears to have been a major boundary between Takic and Numic speaking groups during prehistoric times. Groups occupying the Central Mojave Desert were of the Takic and Numic linguistic groups. Takic speaking groups originated in the southwestern Mojave Desert, expanding south and east sometime around 500 cal. B.P, and include the Serrano and Kitanemuk (Sutton *et al.,* 2007:243). At time of contact, groups south of the Mojave River and much of southern California were part of the Takic linguistic group. The groups north and east of the Project were of the Numic linguistic group, which included the Kawaiisu, Chemhuevi, and Southern Piute.

During the ethnographic period, the Serrano, Vanyume (Beñeme) and the Chemehuevi occupied the region in which the Project is located. The Vanyume were a small division of the Serrano, about whom little ethnographic information is known. The Chemehuevi entered the Mojave Desert much later in time. Other groups that could have entered the Project area were the Kawaiisu, the Kitanemuk, the Southern Piute, the Mohave, and the Ancestral Pueblo. Eerkens (1999:301) states that the area around Fort Irwin, northeast of the Project Site, was inhabited by the Kawaiisu, Chemehuevi, Las Vegas Paiute, and the Vanyume, although he acknowledges that all groups in the area maintained flexible settlement patterns based on availability of resources (1999:302). The Project area of analysis and surrounding valleys were not conducive for large scale inhabitation based on the fluctuating environmental conditions and overall arid nature of the region; therefore groups occupying/utilizing the area would have been small and nomadic (Zigmond 1986:398).

Serrano. The Project area of analysis is situated within the traditional boundaries associated with Mission San Gabriel during the Spanish Period (1769–1821) (Bean and Vane 1979). The natives in this area were known as the Yucaipaiem clan of the Serrano (Altschul, Rose and Lerch 1984; Kroeber 1925; Strong 1929; Bean and Smith 1978). They spoke a language that falls within the Takic family of the Uto-Aztecan language group. This language family is extremely large and includes the Shoshonean groups of the Great Basin. Due to the proximity of the Serrano and Gabrieliño bands in the area and their linguistic similarities, ethnographers have suggested that these two bands shared the same ethnic origins (Kroeber 1925; Bean and Smith 1978). For this reason, they will be referred to as the Serrano.

According to Kroeber (1976:611), the Serrano comprised five groups or bands: Kitanemuk, Alliklik, Vanyume, Kawaiisu and Serrano. They inhabited lands from the San Bernardino Mountains, part of the Transverse Mountains east of the Cajon Pass, across the Mojave Desert east as far as Twenty-Nine Palms, and from the Tehachapi Mountains to the northern Colorado Desert. They occupied most of modern day San Bernardino County (Bean and Smith 1978). Relatives of the Serrano included the

Gabrieliño and Luiseño to the west at the Pacific Coast, and the Cahuilla inhabiting the Colorado Desert. For much of the Late Prehistoric Complex, the Serrano band of the much larger Serrano tribe were the likely inhabitants of the western Mojave Desert, what is today the Cajon Pass and Barstow area. Most of what is known about the Serrano has been based upon the work done by Hicks (1958) and by later researchers working on a site known as CA-SBR-1000, located near Yucaipa, San Bernardino County, California. Studies indicate that the village had been occupied for thousands of years and that it was a major trading center both prehistorically and historically. Little is known about early Serrano social organization because the band was not studied until the 1920s (Kroeber 1925) and enculturation had seriously compromised their native lifeway. Kroeber (1925) indicates that the Serrano were a hierarchically ordered society with a chief who oversaw social and political interactions both within their own culture and with other groups. The Serrano had multiple villages ranging from seasonal satellite villages to larger, more permanent villages.

Resource exploitation was focused on village-centered territories and ranged from gathering and hunting with occasional fishing. The primary staple varied depending on locality. Acorns and piñon nuts were gathered by groups in the foothills; honey mesquite, piñon nuts, yucca roots, mesquite, and cacti fruits were gathered by groups in or near the desert (Bean and Smith 1978). Hunting activities consisted of deer, mountain sheep, antelope, rabbits, other small rodents, birds, with the most desired game bird quail (Bean and Smith 1978).

Serrano structures were situated near water sources and consisted of large, circular thatched and domed structures of willow and covered with tule thatching. These living structures were often sufficient to house a large family. In addition to the living structure, a ramada, an open air structure for outdoor cooking, was located adjacent to the home (Benedict 1924; Kroeber 1925; Drucker 1937; Bean and Smith 1978). A large ceremonial structure was often present and was used as the religious center where the lineage leader resided. Additional structures, such as granaries for food storage and sweathouses for ritual activities, were often located adjacent to pools or streams (Strong 1929; Bean 1962-1972; Bean and Smith 1978).

The Serrano, like the neighboring groups, were primarily semi-nomadic, hunter-gatherers. Because of their inland location, Serrano society was left relatively intact during the period of initial Spanish colonialization, unlike the Gabrielino, who inhabited the coastal area. In 1772, Spanish explorer Pedro Fagès traveled through the Cajon Pass to the Mojave Desert in an attempt to identify the native groups in this region. Fages' ultimate goal was to place the Serrano under supervision of a mission. By 1819, the Serrano were relocated to the Estancia of the Mission San Gabriel in Redlands (Bean and Smith 1978:573). At the time of relocation, there were likely on the order of 3,500 Serrano inhabiting the Mojave Basin. Between 1840 and 1860 a smallpox epidemic decimated the population. By 1885, there were only "390 Serranos [sic] remaining in all of southern California" (AccessGenealogy.com 2005) and the census of 1910 recorded only 100 Serrano (Kroeber 1976:616).

Vanyume (Beñeme). Limited information is available on the Vanyume during the historic period. What information exists describes the Vanyume as a small division of

the Serrano living in the Mojave Desert, north of Serrano territory. They were referred to as the “Serrano of the Mohave River” (Kroeber 1925:614). The name Vanyume is a Mohave word; the name Beñeme was given to the entire Serrano cultural group by Father Garcés. The Vanyume spoke a Takic language related to the Kitanemuk to the west and the Serrano to the South. Kroeber reported that the Vanyume were occasionally friendly with the Mohave and Chemehuevi, but hostile to the Serrano (Kroeber 1925:614). Kroeber also stated that the population of the Vanyume was very small at the time of historic contact. The “chief” of the Vanyume reportedly lived in one of the villages at the upper reaches of the Mojave River near Victorville. The Vanyume were hunters and gatherers, and shell beads and millingstones were known to have been used. The Vanyume are generally associated with similar life ways as the Serrano to the south (Yohe II and Sutton 1991).

Chemehuevi. The Chemehuevi were a band of the Southern Paiute that possibly entered the eastern Mojave Desert area from the north in fairly recent prehistoric times. The Chemehuevi, also called the Pah-Utes, were closely related to the Southern Paiute in Death Valley and the Southern Nevada region. At the time of ethnographic contact, the Chemehuevi claimed a large portion of the eastern and central Mojave Desert, perhaps as far west as Afton Canyon on the Mojave River (Kelly and Fowler 1986:368). Although the Chemehuevi territory boundaries are unclear, it is certain that they inhabited the Providence Mountains. Based on archaeological data, the Chemehuevi entered the Mojave Desert sometime in the 17th century (Yohe II and Sutton 1991).

The Chemehuevi were strongly influenced by the Mohave. It is possible that they displaced the Desert Mohave, a Yuman speaking group (Kelly and Fowler 1986:368). Many Chemehuevi words are related to Mohave vocabulary, along with agricultural practices, house construction, warfare, and other cultural elements such as religious practices. Like the Mohave, the Chemehuevi used square metates, paddle and anvil pottery techniques, and hair dye (Kelly and Fowler 1986:369). In addition to their close association with the Mohave, the Chemehuevi traded widely with the Shoshone, Kawaiisu, Serrano, Vanyume, Cahuilla, and Diegueno (Kelly and Fowler 1986:369).

Influence from the Pueblo area to the east is seen in the form of agricultural practices of many of the Southern Paiute groups. The Chemehuevi, in more well watered areas and flood plains, grew yellow maize, gourds, beans, and winter wheat, combining Mohave and Pueblo practices (Kelly and Fowler 1986:371). Kroeber reported that the Chemehuevi occasionally farmed small areas of corn, beans, melon and pumpkins and wheat. In more arid areas the Chemehuevi were hunter-gatherers. They hunted large game, such as deer and mountain sheep, along with rabbits, rodents, lizards, and other small game (Kroeber 1925:597). Plant foods were of great importance and included a variety of grass seeds, pinyon, and mescal (yucca).

The Chemehuevi had a large range associated with seasonal food practices and traveled through most of the Mojave Desert as far as the Tehachapi area and the San Bernardino Mountains. Occasionally they traveled to the Pacific coast to collect haliotis shells (Kelly and Fowler 1986:377). It was also reported that they would travel as far east as the Hopi’s territory, about a two month round trip (Kelly and Fowler 1986:377).

Little is known about the Chemehuevi material culture. However, in historic times they used basketry, primarily willow, to a great extent both for storage and for carrying possessions (Kroeber 1925:97). They also made basketry hats. The Chemehuevi used some pottery but relied more on basketry.

Spanish colonization had little effect on the Chemehuevi until the early 1800s. Although other Southern Paiute groups were enculturated earlier by the Spanish, the Chemehuevi's isolated territory protected from being assimilated into the mission system. With the opening of the Old Spanish Trail, the Chemehuevi became more affected by the Spanish, and were brought to the missions to work (Kelly and Fowler 1986:386).

In 1874, the United States government established the Colorado River Reservation in an effort to move the remaining Chemehuevi onto the reservation. However, the reservation was shared with the Mohave band, with whom the Chemehuevi had differences from 1865 to 1871, the Chemehuevi were at war with the Mohave. They were therefore, reluctant to move to the reservation (Kelly and Fowler 1986:388). Some of them were either forced to move to the reservation, while some of them would not move. Many stayed in their historic locations, finding work on farms and ranches and in mines. In 1901, the Chemehuevi received their own reservation in the Chemehuevi Valley.

Other Native American Groups Associated With the Region. In addition to those groups affiliated with the Project area, many other groups occupied and utilized the Mojave Desert in a variety of ways. For example, it appears that the Anasazi of southern Nevada greatly influenced the cultures within the region. By 1450 B.P., the Anasazi were exploiting turquoise deposits at Halloran Springs, approximately 25 miles northeast of the Calico Solar project area of analysis. The Anasazi Pueblo was 150 miles across the desert; therefore Anasazi miners must have spent a considerable amount of time in the area based on the amount of turquoise mined and the abundance of "Basketmaker III" pottery found near the springs (Fagan 2003: 310). Turquoise was mined up to twelve feet below the ground and for centuries Mojave turquoise was traded to the east of its source, throughout the Southwest; however, it does not appear that turquoise was traded to the west as evidence of it does not appear in the material cultural of California tribes.

About 1450 B.P., the use of bow and arrow technology spread throughout California's eastern deserts, eventually becoming the dominant hunting technology throughout California. The bow and arrow has many advantages over spears and atlatls and made hunting much more efficient. Bow and arrow technology could have been introduced to California by the Anasazi or by another Great Basin group, during this time. In addition, by 1200 B.P., buff, gray, and brownware pottery, made by Ancestral Pueblo groups and other surrounding tribes of the Lower Colorado River region, entered the Mojave Desert. The trade of technology along with items such as sea shells and steatite objects probably took place along the Mojave Trail (Fagan 2003:311) (Figure 2.8-1). Bow and arrow technology is appropriate, however, only if larger animals that can be hunted that way are available for the taking. Such game was usually unavailable in the valley of the project, but would have been more useful in the project area of analysis as there were

larger game in the Cady Mountains and around the pluvial lakes or short term water holes in the old lake beds.

Other tribes in the region include the Mohave. The Mohave lived along both the east and west banks of the Colorado River. During the winter, they inhabited semi-subterranean houses and depended upon maize agriculture for subsistence (Kroeber 1902; 1925). Throughout the rest of the year they were a hunting and gathering group, often traveling west far into the Mojave Desert. The Mohave traveled throughout southern California and northern Arizona utilizing a large network of trails (King and Casebier 1976:281). Two major geographical features influenced the Mohave's trade routes: the location of their villages along the Colorado River, and the waterless portions of the desert, also known as the Mojave Sink or Mojave Trough. Two major trade routes were used which started at villages along the Colorado River. The first route was the Pah-Ute Creek to Soda Springs route, which later became known as the Mojave Road wagon train. The other route ran south of the Mojave Road route through Poshay Pass and the Mojave River flood plain to the southeast corner of Soda Lake. The more northern route, the Mojave Road, was more heavily used, both prehistorically and in more recent historic times by Native Americans and European and American settlers alike (King and Casebier 1976:282).

Although the Mohave lived southeast of the project area, they potentially exercised a great amount of influence over the Mojave Desert region. They were skilled traders and traveled long distances to either fight or trade with other groups (Fagan 2003:297). Their movement across the southwest promoted the spread of new technologies, beliefs and ideas throughout the desert and southwestern regions. These Mojave transhumant patterns may have may have facilitated the knowledge, introduction, and sharing of arid lands water management techniques in the form of fields of rock piles to the project area of analysis and the broader desert region.

Regional Historic Context

Spanish Period (1540 to 1821)

The Spanish had explored much of the California coast and San Francisco and Monterrey bays by 1769, but paid little attention to the California interior. Several factors were detrimental to European exploration in the Project area: travel and communication were slow; there were few roads, trails and maps; and no supply stations existed in California's interior deserts (King and Casebier 1976).

Between 1775 and 1776, Father Francisco Garcés, a Franciscan missionary originally stationed near present-day Tucson, Arizona, explored the Mojave Desert as part of Spain's effort to forge an overland route to its settlements in Alta California. Garcés traveled with the 1775 Anza expedition until it crossed the Colorado River near present-day Yuma, Arizona (King and Casebier 1976:283). Garcés left the expedition at the Colorado River crossing and traveled north to the Mohave Villages near present-day Needles, California, while Anza continued west. Garces, in the company of Mohave guides, proceeded west to Mission San Gabriel in Los Angeles along the Mohave Trail, in the approximate location of the Mojave Road wagon route. The corridors of the Mojave Trail and the later Mojave Road are approximately 15 miles north of the Burlington Northern Santa Fe Railroad, north of the Cady Mountains near I-15. On his

return trip he visited several Mohave villages on the banks of the Colorado River. The journal Garcés kept during this expedition is the earliest written record of the eastern Mojave Desert (King and Casebier 1976; Robinson 2005). Spanish contact with the Mohave and Colorado Desert peoples likely came from both the east and west during this time (Vane and Bean 1994:1-8), as evidenced by the Anza/Garces expeditions, as well as known contacts made on the California coast.

The closest Spanish mission, Mission San Gabriel in Los Angeles, was too far away to have an every day effect on the Native Americans in the Mojave Desert. Native Americans who fled the missions often escaped into the Mojave Desert and exposed the Mohave tribe to Spanish influences, including the use of horses, which led to raids on the missions and horse thievery. In 1819, Lieutenant Gabriel Moraga led an expedition of fifty soldiers into the Mojave Desert in an attempt to retrieve stolen horses, to exact revenge against the Mohave for their raids on the coastal Spanish settlements, and for their ability to spread unrest against the Spanish and other Native American groups (King and Casebier 1976:284). Moraga's expedition was only the second Spanish-sponsored trip into the Mojave Desert. Lack of water in the arid Mojave Desert forced Moraga and his soldiers to turn back.

During the Spanish period, no permanent European settlements were established in the project vicinity, although there were reports that the Spanish had active mines in the Barstow area. It is unknown if the mines were being worked by the Spanish, Native Americans, or later Mexican or American prospectors because only mine shafts remained and no written records have been discovered (King and Casebier 1976:300).

Mexican Period (1821 to 1848)

In 1810, an independence movement began as many rancheros sought to split Mexico (and California) from Spain. In 1821, this desire came to fruition when New Spain (Mexico) became independent. Following Mexico's independence, the Alta and Baja California missions received less financial support from Spain and Mexico, and ultimately, independence from Spain was a catalyst for Mexico to secularize all California missions. Secularization would free vast amounts of land that had been under mission control and the land would become civilian pueblos or large land grants awarded to Mexican, American, or European settlers. In 1831, Governor Jose Maria Echeandia announced the secularization of a number of missions, and by 1834, all the missions were secularized, including Mission San Gabriel in Los Angeles, the nearest mission to the Project. Within ten years, the mission system had failed, the neophytes had left, and the buildings were in disrepair. Following secularization, San Gabriel mission became a parish for the City of San Gabriel and had little further effect on the Native Americans in the Project vicinity (Rolle 2003).

During Mexican control of Alta California, Americans started to enter California through the Mojave Desert, many of them using the Mojave Trail located north of the Project Area. Jedediah Smith, mountain man and fur trapper, was the first American to reach California using an overland route. Smith followed a route from the Great Salt Lake in Utah south to the Virgin and Colorado rivers and across the Mojave Desert to Spanish southern California. Smith arrived at the Mohave Villages in October 1826, then proceeded west on the Mojave Trail. After Smith's initial visit other American mountain

men and trappers ventured into the desert, including William Wolfskill, George C. Yount, Christopher “Kit” Carson, James Ohio Pattie, and Ewing Young (Brooks and others 1981; King and Casebier 1976:285; Robinson 2005).

Jedediah Smith’s ventures down the Virgin and Colorado rivers, combined with Garcés’ route across the Mojave Desert, linked the Spanish settlements in New Mexico and California, stimulating trade between these regions (Wright 1982). In 1829, New Mexico merchant Antonio Armijo reached the Las Vegas Valley via the Virgin River, pioneering a route that became known as the Old Spanish Trail. Armijo’s route followed the Mojave Trail in the project vicinity, but later routes of the Old Spanish Trail turned southwest out of Utah and headed toward the Mojave River through the San Bernardino Mountains. This route became known as the Northern Route of the Old Spanish Trail. The Mohave Indians had become increasingly hostile to travelers through their territories, and blazers of the northern route most likely took this path to avoid conflicts. The junction of the Northern Route of the Old Spanish Trail and the Mojave Trail was approximately 18 miles east of present-day Barstow, at a location historically called Fork of the Roads, northwest of the project area. Trade along the trail ended in 1848 with the Mexican-American War (Nystrom 2003; Robinson 2005; Rogge 2008).

No Mexican period artifacts have been found thus far in the project area of analysis.

American Period (1848 to Present)

Transportation

Mojave Road. The term “Manifest Destiny” was one of the likely causes for the Mexican-American War, which took place between 1846 and 1848. Jacksonian Democrats coined the phrase in the 1840s as a political philosophy whereby the United States would control all of the land between the Atlantic and Pacific oceans. The focus for expansion was on the northwest coast in Oregon territory and on the Texas territory. In 1845, during the Presidency of James K. Polk, the United States annexed Texas; the following year, the U.S. invaded Mexico. In 1848, the United States, victorious over the Mexican Army, signed the Treaty of Guadalupe Hidalgo, and acquired all Mexican territory north and west of the Rio Grande and Gila Rivers, which included Texas, New Mexico territory, and Alta California. American settlers began to migrate to the newly acquired territory, and the discovery of gold in 1848 and the ensuing Gold Rush in 1849 brought numerous settlers to California. Most of these travelers likely used the northern route of the Old Spanish Trail to enter California from New Mexico, Utah, and Nevada, although some likely followed the Mojave Trail as well (Robinson 2005).

Soon after California was granted statehood in 1850, the government wanted to recognize all of the trails running through California to promote immigration to the state, facilitate trade and communication, and develop routes of defense. A year after the Treaty of Guadalupe Hidalgo was signed, Lieutenant James H. Simpson of the Army Corps Topographical Engineers attempted to follow Father Graces’ direct route across the Mojave Desert (Mohave Trail), and in 1851, the U.S. Army Corps of Engineers sent another expedition to explore the area. During the 1840s and 1850s, the Union Pacific Railroad also contemplated using Gracés’ route in an attempt to find the most practical

course for a railroad line across the desert. Several explorers, hired by railroad companies, traveled throughout the Mojave Desert during the 1840s and 1850s. Eventually, a more northern route was selected for the transcontinental railroad line. In the late 1850s the General Land Office in California began the process of mapping the Mojave Desert area, and at that time several groups of surveyors mapped the desert (King and Casebier 1976:288-289).

Beale's Wagon Road was built in 1857 north of the Calico Solar Project area of analysis, along the 35th Parallel, and was in use between 1857 and 1861. Edward Fitzgerald Beale was a famous American Frontiersmen and was superintendent of the wagon road development. Beale, along with his party and 25 camels, crossed the Colorado River into California 15 miles north of present-day Needles, California, and followed the Mojave Trail west. In 1859, the U.S. Army established Fort Mojave near the location of Beale's river crossing in an effort to protect travelers from Mohave Indian attacks. As a result, the Mojave Trail developed into a wagon road, which allowed supplies to be brought to Fort Mojave overland from Los Angeles. The wagon road was called the Mojave Road or the Government Road and was actively used until the beginning of the Civil War in 1861.

During the Civil War, troops stationed at Fort Mojave were ordered to abandon the fort and report for duty in Los Angeles. The fort remained abandoned until the middle of 1863, when California Volunteers occupied it to protect travelers on the Mojave Road. Traffic had increased along the road as a result of gold discoveries about 100 miles south of Fort Mohave in the La Paz Mining District. Other travelers along the Mojave Road in the 1860s were members of the military on their way to Arizona to fight in the Apache Wars or merchants and ranchers hauling supplies and livestock to Prescott, the capital of the Arizona Territory. The Mojave Road also was used as a mail route between 1866 and 1868 (King and Casebier 1976; Nystrom 2003; Robinson 2005).

Although there was considerable traffic through the Mojave Desert into Southern California, most followed the Old Spanish Trail to the west of the Project area of analysis or the Mojave Road to the north, and any settlements associated with these routes would have been located adjacent to the trails. Except for miners, most other settlers did not stay in the desert until a railroad was constructed. Only a few early homestead claims were filed. These early homesteads consisted mainly of ranches raising sheep and cattle. The arid environment prohibited large scale agriculture except on the banks of the Mojave or Colorado Rivers (Walthall and Keeling 1986).

Atlantic & Pacific Railroad. Plans for a transcontinental railroad had been delayed due to the Civil War, but once the war ended, interest in the construction of transcontinental railroads resumed. In 1866, Congress contracted the Atlanta & Pacific Railroad (A&P) to construct a railway from the east to the California border. In 1879, the A&P partnered with the St. Louis & San Francisco Railroad and the Atchison, Topeka, & Santa Fe Railroad to facilitate construction of the transcontinental railroad. The A&P began construction of their track in Albuquerque, New Mexico in 1880 and reached Needles, California in May 1883. The A&P constructed a bridge over the Colorado River at Needles in August 1883 (Gustafson and Serpico 1992; Myrick 1992; Robinson 2005).

As the A&P tracks were being laid, the Southern Pacific Railroad was constructing a new railroad line between Mojave and Needles to intercept the A&P tracks at the Arizona border and protect its California interests. The Southern Pacific constructed the Mojave to Needles branch between 1882 and 1883, working east from their Mojave station (Gustafson and Serpico 1992; Myrick 1992). When surveyors initially explored the project vicinity for a viable railroad route, they assessed the Mojave Road corridor, and found that the terrain was too steep and unsuitable for railroad construction. In the arid Mojave, the trail through the mountain range was preferred to the flatter terrain because more sources of water could be found in the mountainous areas. In 1868, General William J. Palmer of the Union Pacific Railroad eastern division surveyed a railroad route to the south of the Cady Mountains, where the terrain was more favorable for railroad construction. Although the Union Pacific never constructed the railroad through the Mojave Desert, it was largely Palmer's route that the Southern Pacific used to construct the Mojave to Needles branch (Nystrom 2003; Robinson 2005).

For more than a year, the A&P and the Southern Pacific lines continued to operate independently. The Southern Pacific Railroad instituted tri-weekly service to Needles in 1883, but the trip through the Mojave Desert was long and desolate. The railroad had constructed only one station and turntable in the 124-mile stretch between Mojave and Ludlow. The Southern Pacific Railroad was reluctant to join rails with the A&P fearing that the completed line would compete with their newly constructed Sunset Route, which crossed into California further south on the Arizona border at Yuma. Passengers heading east on the Southern Pacific Railroad's line to Needles were inconveniently required to disembark from the train with their belongings and transfer to the A&P cars. Although each of the railroads developed local business, the volume of passenger travel was not large enough to support operations. The Southern Pacific Railroad's route through the Mojave Desert did facilitate mining operations in the area. Anticipating large future revenues from hauling bulk ore, the railroad provided water for miners at 2 cents per gallon anywhere on the route, putting an end to the water scarcity problem for mine development in the area (Myrick 1992).

By the end of 1883, the A&P began making plans to construct their own line parallel to the Southern Pacific's line across the Mojave Desert to San Francisco. The Southern Pacific Railroad realized that if the A&P constructed a parallel line across the desolate Mojave Desert, its line would essentially become useless. In October 1884, an agreement was signed in which the Southern Pacific Railroad would sell its Needles to Mojave section to the A&P for $30,000 per mile. Until the debt was paid, the A&P would lease the line. In addition, the A&P also received an option for trackage rights between Mojave and San Francisco. The A&P received full title to the Mojave to Needles branch in 1911 (Gustafson and Serpico 1992; Myrick 1992). The construction of the railroad changed the course of travel across the Mojave Desert in the project vicinity. The railroad provided travelers with water sources across the vast desert and travel was much easier along the flat railroad corridor than along the mountainous Mojave Road to the north. A wagon road was constructed adjacent to the railroad alignment and use of the Mojave Road decreased.

The California Southern Railroad joined with the A&P in 1885 to provide service from Kansas City to San Diego. The junction of the two lines was initially called Waterman Junction, but in 1886 it was renamed Barstow. Barstow is located approximately 40

miles west of the project area of analysis and is the closest city. The construction of the railroad brought numerous settlers to the area and although other railroad lines were eventually constructed throughout southern California, the route passing through Barstow remained a popular line for both freight and passenger service. In addition, the railroad acted as a lifeline connecting Barstow, alone in the desert, to the rest of Southern California. Barstow was a sizable railroad hub, and the railroad was the main employer in the city for many years.

In 1897, the A&P was redesignated as the Santa Fe Pacific Railroad and later became the Atchison, Topeka, & Santa Fe Railroad. When the A&P took over the Mojave to Needles branch in 1884, there were depots at Daggett, Fenner, and Needles (Figure 2.8-1). During the 1880s, 1890s, and the first decade of the twentieth century, Santa Fe Pacific constructed facilities at various locations along the line. All of the structures were wood frame, with the exception of brick and reinforced concrete structures in Needles. Santa Fe Pacific railroad sidings in the project vicinity include Troy, Hector, Pisgah, and Lavic. The Hector siding is the closest to the Calico Solar Project area of analysis. Neither the Pisgah or Troy sidings had any depot facilities. The building of the grade for the laying of the track through the Calico Solar Project area of analysis may, however, have contributed to the burying of any cultural resources that were beneath, or immediately north of the track in its present location. Hector had a 12-by-14-foot wood frame telegraph and train-order office that was constructed in 1906, which was closed in 1923 and moved to Earp in 1934. The Lavic siding was the largest of the four with a 24-by-34-foot frame combination passenger and freight depot that was constructed in 1901. The depot was closed in 1923 and removed (Gustafson and Serpico 1992; Myrick 1992).

The lack of water along the Mojave to Needles branch required the railroad to haul water in large tanks to the stations and construction camps. In 1897, a station was constructed at Newberry Springs, approximately 6 miles west of Troy, and this station became the railroad's primary source of water in the region. Although freight trains typically carried surplus water cars, engineers often had to go back to Newberry Springs for additional water supply (Gustafson and Serpico 1992; Myrick 1992).

The A&P Railroad/Santa Fe Pacific Railroad/Atchison, Topeka & Santa Fe Railroad is located between the Calico Solar Project Phase 1 and Phase 2 of the project area. The railroad is now operated as the Burlington Northern Santa Fe Railway.

National Old Trails Road and U.S. Route 66. Prior to the construction of the railroad between Needles and Barstow in 1883, travel across the Mojave Desert in the project vicinity was limited to the Mojave Road corridor, which evolved from a network of prehistoric trails, early trails developed by mountain men, early explorers, and gold seekers; and routes developed during the railroad surveys of the 1850s. After the railroad was completed, the travel corridor shifted south of the Cady Mountains, new roads were constructed between local mines and railroad sidings, and a wagon road was constructed adjacent to the railroad tracks from Barstow to the Arizona border (Hatheway 2001). In the first decade of the 1900s, this wagon road would be converted to an auto route, as the use and ownership of the automobile became more prevalent.

The automobile first made its appearance to the American public in the late 1890s, and by 1900 automobiles were still the toys of the wealthy, with only one for every one thousand Americans. Although Henry Ford introduced his Model T in 1907, widespread use of the automobile did not occur until after World War I. In 1914, Ford perfected full assembly line production and two years later more than half a million automobiles were sold. As the use of the automobile rose, the demand for good roads increased. Most rural roads in the 1900s had been constructed for wagon traffic and were not suited to automobile traffic (Fischer and Carroll 1988; Keane and Bruder 2004; Lyman 1999; Paxson 1946).

By 1910, national and local organizations promoted good roads in the United States, including the National Old Trails Road in the project area of analysis. A precursor to U.S. Route 66, in spirit but not always in location, the National Old Trails Road was part of the 2,448-mile ocean-to-ocean highway from Baltimore, Maryland to the California coast. The National Old Trails Road also was part of the National Auto Trail System, an informal network of automobile routes marked by local organizations in the early twentieth century. The National Old Trails Road, where it traverses the Project area of analysis, was located along and in the vicinity of the alignment of the old wagon road that was constructed adjacent to the Santa Fe Railroad tracks in the 1880s. The highway was designated by booster organizations in 1912, and by 1914 the Auto Club of Southern California had provided signage for much of the highway (Keane and Bruder 2004; Robinson 2005; Wikipedia contributors 2008).

In 1916, the Federal Highway Aid Act was passed to help fund rural roads, using a 50/50 funding match for states with a highway department. Route planning, however, remained a local matter, which usually did not include engineering surveys. In 1919, Congress liberalized the funding match requirements, and by late 1921, Congress passed the Federal Highway Act that further reduced the state match to about 26 percent (Lyman 1999) and required federal aid to be concentrated upon “such projects as will expedite the completion of an adequate and connected system of highways, interstate in character” (Paxson 1946:245). Up to seven percent of a state’s roads could be listed for reconstruction to create the national highway system. By 1923 a tentative plan had been developed linking every city with a population of 50,000 or more, with construction planned over a ten-year period (Paxson 1946).

During the early 1920s, automobile travel was an adventure for many Americans and was subsequently heavily promoted. By the late 1920s, much of the National Old Trails Road in the project vicinity had been widened and oiled or surfaced with gravelly sand. The segment of the highway across the Mojave Desert was notorious for its poor condition, and by 1925 the highway was full of ruts and chuck holes. The highway was narrow with no road shoulders or striping, tended to follow the natural topography of the area, and was vulnerable to the effects of erosion. The State of California had designated the highway as a public highway in 1919, but did not take any responsibility for the segment between Barstow and Needles until 1923, leaving the burden of maintenance to San Bernardino County. Despite the poor conditions, motorists were never more than four miles from the railroad, where they could find help in the form of stations and section crews, and water was available every 5 to 10 miles (Bischoff 2005; Hatheway 2001; Scott and Kelly 1988). Aggregate mining for sand and gravel became prevalent in the area (King and Casebier 1976) and the scraping scars for the

aggregate for the pavement of the Hector section of the National Old Trails Road can still be observed in the project area of analysis.

In 1926, the American Association of State Highway and Transportation Officials designated the National Old Trails Road in the Mojave Desert as U.S. Route 66. U.S. Route 66 was one of the main arteries of the National Highway System and was one of the first great highways in the United States, running from Chicago to the Pacific Ocean. Federal funding allowed for improvements, such as the construction of road shoulders. In the 1930s, the original alignment of the National Old Trails Road in the Project Area was abandoned in favor of a route to the south, which is the current alignment of historical U.S. Route 66 (Bischoff 2005; Scott and Kelly 1988; Wikipedia contributors 2008).

The new U.S. Route 66 alignment eliminated sharp turns, reduced steep grades, and straightened the roadway to accommodate higher speeds. The use of heavy machinery allowed for large road cuts that had not been possible in the early days of road building. The section of U.S. Route 66 from Needles to Los Angeles was the most heavily traveled section of the highway, and in 1934 this segment was paved. Much of the paving of U.S. Route 66 was completed by the Works Progress Administration during the Great Depression of the 1930s. By 1938 all of U.S. Route 66 was paved (Bischoff 2005; Scott and Kelly 1988).

U.S. Route 66 was an important transportation route during the Great Depression. In his book, *The Grapes of Wrath*, John Steinbeck wrote about migration of Midwestern farmers to the Pacific coast along this roadway. World War II caused further migration to the west coast along U.S. Route 66 as millions of Americans went to work in war related jobs in California. U.S. Route 66 became so famous that it was memorialized in Bobby Troup's popular song "Get Your Kicks on U.S. Route 66" (Scott and Kelly 1988) and was featured in many Hollywood movies.

While accommodations in the Calico Solar Project area of analysis were limited to road-side camping in the wilds, as a subsequent consequence of the heavy use of U.S. Route 66, thousands of businesses opened, mostly serving cross-country travelers. Businesses varied from grocery stores, service stations, restaurants, and motels to dance halls and tourist attractions. One of these tourist attractions in the project vicinity may have been the Pisgah Crater, a young volcanic cinder cone located south of the Project area of analysis. A road was constructed from U.S. Route 66 to the Pisgah Crater between the late 1930s and early 1950s from U.S. Route 66 either to provide access for travelers along the highway or for local aggregate miners (Scott and Kelly 1988).

Barstow was the last stop from Los Angeles before crossing the desert or the first stop after the desert, and was a popular rest area along the highway even during the Depression. During that time, business from U.S. Route 66 was an important part of the economies of many towns and small cities. By World War II, many businesses along U.S. Route 66 competed for travelers' money. Native American crafts sales became an important industry along the route. During the war, military use of the road increased in conjunction with development of military training bases in the Mojave Desert (Scott and Kelly 1988).

The Golden Age of U.S. Route 66 was the era after World War II and before the opening of other major east-west interstate highways, such as Interstate 40 (I-40). The increased traffic along U.S. Route 66 also led to its demise. Although the highway was an important east-west thoroughfare, it could no longer handle the volume of traffic and heavy military equipment using the road. After World War II, a new national interstate highway system was planned, and eventually replaced much of U.S. Route 66 (Scott and Kelly 1988).

There are no historic buildings associated with U.S. Route 66 along the segment of the road that is within 0.5 miles of the Project area of analysis. There are historical buildings associated with U.S. Route 66 in the town of Ludlow, located about 12 miles east of Pisgah and about 11 miles east of the Project, and in Newberry Springs, about 15 miles west of the Interstate 40 Hector exit and about 13 miles west of the Project.

Interstate Highways. Throughout the 1950s and 1960s, U.S. Route 66 remained the main road between the Midwest and the West Coast. Increased traffic and the narrowness of the roadway eventually led to the downfall of the road. On August 2, 1956, President Dwight D. Eisenhower signed the Federal Aid Highway Act which provided funding to upgrade America's roads. Eisenhower based his vision of a more connected America on Germany's Reichsautobahnen rural super highways. Eisenhower and his advisors originally envisioned creating a 40,000 mile interstate system costing approximately twenty-seven billion dollars. Construction began almost immediately throughout the United States (Weingroff 2008).

On December 13, 1958, Interstate 15 opened between Victorville and Barstow. This marked the beginning of the modern highway era in the Barstow area. The entire length of Interstate 15 from Los Angeles to Las Vegas was opened by July 1961. At that time, the stretch between Baker and Las Vegas was used by more than 500 vehicles an hour in one direction (Swisher 1997).

Interstate 40 begins at its junction with Interstate 15 in Barstow, then runs through the Mojave Desert to Needles and into Arizona. Interstate 40 is located along the southern edge of the Calico Solar Project area of analysis. Although the Interstate 40 is now a cross-country highway, its last sections were not built until 1980. In the southwest, much of present day Interstate 40 absorbed U.S. Route 66. Many of the western portions of Interstate 40 also follow the Beale Wagon Road. The segment of Interstate 40 in the project vicinity was not constructed until 1968.

Mining

Since the 1860s, mining has been the most important commercial industry near the Calico Solar Project area of analysis. Silver was discovered in 1863, although it is possible the Spanish had mined in the area almost a century before. Prospectors attempted to establish mines to sell to investors with sufficient capital. In the following decade, smaller operators attempted to compete with larger corporations, but without railroad transportation, very little money was made until the early 1880s with the coming of railroad through the eastern Mojave Desert (Brooks and others 1980; King and Casebier 1976:300-305).

The period between 1900 and 1919 was known as the “the Great Years” for mining in northeastern San Bernardino County (King and Casebier 1976:305) as it was more profitable than any other time. Copper, lead, zinc, and other base metals, as well as gold and silver, were mined throughout the Mojave Desert and San Bernardino County. Also, during World War I, chromium, manganese, tungsten, and vanadium were mined. Several large mining districts were developed, including Copper World, near Valley Wells; gold mines at Hart; lead, zinc, and copper in the Mohawk mines near Mountain Pass; copper mines near Von Trigger Spring; and gold mines at the north end of Old Dad Mountain (King and Casebier 1976).

During the Great Depression, a resurgence of gold mining took place, but World War II caused a return to the mining of base metals. The Vulcan Iron mine, in the Providence Mountains northeast of the Project, was excavated during that time. Since the end of World War II, mining in the area has considerably slowed. More recently, other nonmetals such as clay, talc, and cinder mining have gained popularity, especially around the Kingston Mountains in the vicinity of Interstate 15. Aggregate mining for sand and gravel has become prevalent in the area (King and Casebier 1976).

Manganese Mining in the Project Vicinity. Several manganese mines exist in this region, including the Logan Mine within the Calico Solar Project area of analysis, and the Black Butte Mine, located just over one half mile east of the Calico Solar Project area of analysis. Manganese was first mined in earnest during World War I, when the demand increased due to its use in the production of iron and steel. After World War I, manganese mining throughout the country decreased and continued to wane throughout the Depression but once again increased with the onset of World War II in the 1940s. In addition to iron and steel production, manganese also was used in the minting of the war-time nickel between 1942 and 1945. By 1943, deposits of manganese had been located in several desert locations throughout San Bernardino County, including the Lavic, Owl, and Whipple Mountains. Manganese, in combination with copper and silver, was used to produce these coins in an effort to conserve nickel for military uses (Tucker and Sampson 1943).

In 1942, the Metal Reserve Company of Washington D.C. published competitive price schedules for manganese ores. They offered $48 per ton for high grade ore (ore containing 48 percent manganese), $35.20 per ton for low grade A ore (44 percent manganese), and $26.00 per ton for low grade B ore (40 percent manganese). Ores containing 35 to 39 percent manganese were also accepted at a reduced price. Manganese producers in San Bernardino County brought their ore to stockpile points in Parker and Phoenix, Arizona. Lower grade ores containing 15 to 35 percent manganese often took their ore to the Kaiser Steel Corporation in Fontana, California. In the early 1940s, manganese ore was shipped from 5 deposits in San Bernardino County with ore containing 20 to 46 percent manganese. After the war, several manganese deposits continued to be worked in San Bernardino County (Tucker and Sampson 1943; Wright and others 1953).

Southern California Edison and the Hoover Dam

Two parallel Southern California Edison (SCE) steel-tower 220-kilovolt transmission lines are located in the Pisgah Substation Triangle area and the historic built-environment 0.5-mile buffer of the Project area of analysis. The SCE 220-Kilovolt North

Transmission Line was constructed between 1936 and 1939 and the SCE South 220-Kilvolt South Transmission Line between 1939 and 1941. The transmission lines originate at the SCE switchyard at the Hoover Dam and terminate in Chino, California. The transmission lines were constructed to deliver power from the Hoover Dam to SCE service areas in southern California.

Plans for development of a hydroelectric plant on the Colorado River were conceived as early as 1902 in response to fuel shortages that were limiting the mining activities in the vicinity of the river. SCE began to investigate development of such a plant and signed an option to utilize river water for power generation. Engineers surveyed the Colorado River and a preferred dam site was selected, but at the time the technology to transport the power to the SCE's service area (a distance of 300 to 400 miles) at high voltages did not exist. Because of technological limitations and the decline in mining activity along the Colorado River, SCE abandoned this option (Myers 1983).

Throughout the next twenty years, development of a power generating facility on the Colorado River was discussed and debated by public and private power companies and the concept of the use of a dam was investigated to control the highly variable flows of the river. In 1921, SCE and U.S. Geological Survey engineers once again surveyed the river and throughout the 1920s, SCE filed licensing applications with the Federal Power Commission in an effort to obtain the right to construct dams and power generating facilities, but none were approved. In 1928, Congress passed the Boulder Canyon Act, which stipulated that the federal government would construct a dam on the Colorado River if public and private utility companies would take responsibility for the distribution of electrical hydropower. In 1930, SCE signed a contract stating that they would buy and distribute power for themselves and all other investor-owned utility companies. The Los Angeles Bureau of Power and Light agreed to purchase and distribute power for state and municipal utilities, as well as the metropolitan water district (Myers 1983).

Construction of Hoover Dam began in 1931 and was completed in 1935. Power production for use began in 1936 when power was delivered to the cities of Los Angeles, Pasadena, Glendale, and Burbank through three parallel transmission lines constructed by the Los Angeles Bureau of Power and Light (currently Los Angeles Department of Water and Power). The second company to distribute Hoover Dam power was the Nevada-California Corporation. The power was conveyed by a 132-kilovolt transmission line that had been originally constructed in 1930 and 1931 to deliver power to the dam site during construction. This transmission line is known as the Edison Company Boulder Dam-San Bernardino Electrical Transmission Line (Hatheway 2006; Hughes 1993; Myers 1983).

The Metropolitan Water District of Southern California was the next to distribute electrical power in 1938. This transmission line, known as the Metropolitan Water District Line, used technology similar to that used previously by SCE for 220-kilovolt transmission lines in southern California. Utility companies in southern California, such as the Pacific Light and Power Company (which merged with SCE in 1917) and SCE, were innovators in the development of high voltage systems. In 1926, Stanford University established a high-voltage laboratory and worked with Pacific Gas and Electric and SCE in research and development. Through this collaboration insulators for

California's 220-kilovolt lines were developed (Hughes 1993; Myers 1983; Schweigert and Labrum 2001).

The SCE 220-Kilovolt North Transmission Line was constructed between 1936 and 1939, using the same design and technology SCE had been using for its high-voltage transmission lines in southern California (including its Vincent 220-kilovolt line), and the design used by the Metropolitan Water District for its Hoover Dam line. The transmission line was energized in 1939, after the completion of Hoover generating units A-6 and A-7 (Myers 1983; Schweigert and Labrum 2001).

When World War II began in Europe, SCE planners anticipated an increase in demand for power in southern California. SCE began construction on a second transmission line, the SCE South 220-Kilvolt South Transmission Line, in 1939. SCE North and SCE South take divergent courses from the SCE switchyard at the Hoover Dam, but meet near Hemenway Wash in Nevada, and run nearly parallel to each other from north of Boulder City, Nevada to Chino, California. SCE North and SCE South are parallel within the Calico Solar PROJECT AREA OF ANALYSIS. Both SCE North and SCE South delivered electricity that was essential to war-time industries in Southern California. These industries included the Douglas, Vultee, and Northrup aircraft plants, Consolidated Steel, the Long Beach Naval Shipyard, Kaiser Steel, Alcoa, Columbia Steel, as well as automobile factories, tire plants, oil refineries, ordnance works, and military bases and depots (Myers 1983; Schweigert and Labrum 2001).

Natural Gas Pipelines

Two natural gas pipelines run through the Calico Solar Project area of analysis —the Pacific Gas and Electric Pipeline and the Mojave Pipeline. Although it was known that natural gas could be used for fuel in the early years of the nineteenth century, it was not until 1859 when large amounts of natural gas were discovered in Titusville, Pennsylvania, that a commercial market for natural gas developed. Wide-spread use of natural gas began in the west when southwestern natural gas fields were discovered in the 1920s. Large natural gas fields found in the north Texas panhandle in 1918 and in Kansas in 1922, as well as the development of the technology needed to transport natural gas the long distances to urban areas, resulted in the development of the interstate gas pipeline industry (Castaneda 2001).

The Pacific Gas and Electric Pipeline on the Project Site is a 33-to-44-inch natural gas pipeline. The pipeline is an interstate pipeline that carries natural gas from the natural gas fields of Texas and New Mexico to Northern California. The 502-mile long pipeline was constructed in 1948, and at the time, was the largest pipeline in the country (PG&E Corporation 2004).

The Mojave Pipeline on the Project Site is a 24-inch natural gas pipeline, owned by El Paso Natural Gas Corporation, one of the largest natural gas companies in North America. The El Paso Natural Gas Corporation expanded their services into southern California in the 1940s in response to the post World War II population growth. The Mojave Pipeline is a 450-mile-long interstate pipeline that carries natural gas from Arizona to Kern County, California. It was constructed in the late 1940s (El Paso Corporation 2008; International Directory of Company Histories 1996).

While the modern practice of “monitoring” trenching for pipelines was not well-established at the time of the construction and installation of the PG&E and El Paso Natural Gas pipelines, subsequent surface surveys have not revealed negative impacts to cultural resources that are different from the range of site types and isolates identified during the survey for the Calico Solar project. A re-survey of the project is underway as this document is being prepared and this section will be updated in the future, if necessary.

Military Use

Several military bases are located in the Mojave Desert region and within the same region as the project, including Twenty-Nine Palms, south of the Calico Solar Project, and Fort Irwin, located approximately 37 miles northeast of Barstow. These, and other military installations in the area, led to an increase of traffic near the Project, and in the area population as civilians associated with the military took up residence.

During World War II, General George S. Patton established the Desert Training Center in California and Arizona, much of which was located on public land east of the Calico Solar Project area of analysis. Training exercises were designed to prepare U.S. troops for combat in the hostile desert terrain and climate. The army established camps and emergency airfields, remnants of which can still be found, including rock alignments designating tent camps and emergency airfields. The Desert Training Center closed in 1944 toward the end of World War II. During desert training, the army created the first detailed maps of the Mojave Desert to facilitate training activities. The maps were created using aerial photography and land-based methods. After the war, those maps were used by the U.S. Geological Survey to create 15-minute topographic quadrangles in the late 1940s and early 1950s (Nystrom 2003). These training areas were located on public land east of the Project area of analysis; there are no known desert training areas in the project vicinity.

Twenty years later, during the Cold War, the Mojave Desert in the vicinity of the Project again hosted a major training exercise. A training exercise, known as Desert Strike included troops from both the U.S. Army and Air Force and encompassed a 12 million-acre area in California and Arizona centered on the Colorado River. The two-week exercise was designed to test tactical deployment of nuclear weapons, and involved combat training between two hypothetical countries. Desert Strike occurred in May 1964 and resulted in the expenditure of approximately $60 million and 33 deaths (Garthoff 2001; Nystrom 2003; *Time Magazine* 1964).

Summary

Prior to arrival of Europeans in California, the central Mojave Desert was inhabited for thousands of years by indigenous populations, as evidenced by multiple archaeological complexes of different cultural affiliations. During ethnographic times, the Serrano, Vanyume and the Chemehuevi inhabited the area. The project area lies in a transitional zone near pluvial lakes, such as Troy Lake located to the west of the project, which experienced episodes of inundations and desiccations. As a result it is unlikely that this area would have been suitable to support a large population for prolonged periods of time. Indigenous people traveling in this area adapted to these arid desert environments

and managed successfully to exploit resources as is evident in the cultural materials they left behind.

During the Spanish and Mexican periods, San Bernardino County and the Project area remained relatively isolated. There were no Spanish and Mexican land grants in the region surrounding the project area, and the Spanish were mainly interested in using the area as an overland route to their coastal missions. The Spanish explored and used the Mojave Trail trade route blazed by the Mohave Indians north of the project area. This trail also was used by American explorers and mountain men who ventured into Mexican territory prior to the American period. The establishment of Fort Mohave on the banks of the Colorado River resulted in the use of the Mojave Trail as a wagon route, subsequently renamed the Mojave Road. This roadway was used as a travel and trade corridor until the railroad was constructed in the 1880s. After the railroad was built, travel through the Mojave Desert in the project vicinity shifted south into the project area of analysis. In the early 1900s, a wagon road that had been constructed adjacent to the railroad began to be used by automobiles and was designed the National Old Trails Road. The National Old Trails Road was designed as U.S. Route 66 in the 1920s, and by the 1930s, its original alignment was abandoned in favor of the alignment of U.S. Route 66 to the south. In the late 1960s, I-40 was constructed along the north side of U.S. Route 66 in the Calico Solar project area.

During the American period, the area was not ranched or farmed due to arid conditions, though some attempts at cattle grazing have noted. Because of the arid conditions, the Calico Solar Project area of analysis and its vicinity were used as a travel corridor rather than an area of settlement. Some mining activities occurred in the area, in particular manganese mining beginning in the 1940s. The area also was used as the setting for the Desert Strike military training exercises in 1964 and has been used as a corridor for electrical transmission lines and natural gas pipelines. Modern infrastructure in the project vicinity includes two steel tower transmission lines, wooden pole power lines, and underground pipelines along the south and east borders of Calico Solar Project. Radio facilities are also located south and east of the project.

C.3.5 CULTURAL RESOURCES INVENTORY

The analysis of the proposed action requires a detailed cultural resources inventory for the area where the action has the potential to disturb or destroy cultural resources. More specifically, the effort to develop the inventory involved a sequence of investigatory phases that included background literature research, consultation with Native Americans and the broader public, and primary field identification, description, and preliminary interpretation of the cultural resources present within the project area of analysis. This “Cultural Resources Inventory” subsection covers the methods and results of each phase of the background research and of the field investigations that have been conducted to complete a cultural resources inventory for the project area of analysis/APE. This subsection includes discussions of the archival research and the consultations that have taken place with Native American groups and the broader public about the project area of analysis/APE as a whole. This subsection also provides discussions of the field investigations conducted to date for the project. The investigations include the pedestrian archaeological survey work conducted to date of

the project area of analysis and the built-environment and ethnographic resource surveys. Separate subsections below explore the historical significance of the cultural resources identified during the inventory, assess the potential effects of the proposed action on significant cultural resources and on previously unidentified, buried archaeological resources, and propose mitigation measures for all significant effects.

C.3.5.1 PRE-FIELD BACKGROUND AND LITERATURE RESEARCH

The background research for the present analysis employs information that the applicant and the BLM gathered from literature and records searches and information that the BLM and Energy Commission staff gathered as a result of consultation with local Native American communities and with other potential public interest groups. The purpose of the background information is to help formulate the initial cultural resources inventory for the present analysis, to identify information gaps, and to contribute to the design and the interpretation of the field research that will serve to complete the inventory.

Literature and Records Searches

On July 28, 2008, Robin E. Laska and Dustin Kay performed a records search at the San Bernadino Archaoelogical Information Center (SBAIC), which is the California Historical Resource Information System (CHRIS) cultural resources database repository for San Bernardino County. Ms. Laska searched all relevant previously recorded cultural resources and previous investigations completed for the Project area and a one-mile search radius. Information included location maps for all previously recorded trinomial and primary prehistoric and historical archaeological sites and isolates, site record forms and updates for all cultural resources previously identified, previous investigation boundaries and National Archaeological Database (NADB) citations for associated reports, historic maps, historic addresses and resources listed on various state and federal inventories. These inventories included: the National Register of Historic Places, the California Register of Historical Resources, California Landmarks, California Places of Historic Interest, and others.

All previous cultural resource survey areas and all previously recorded cultural resource site locations were transferred to USGS 7.5' quadrangles and later digitized into geographic information system (GIS) using ArcGIS 9.2 software. The following USGS quadrangle maps were used to this purpose; Hector (1982 Provisional), Lavic Lake (1955 Photorevised 1973), Sleeping Beauty (1982 Provisional Minor Changes 1993), Sunshine Peak (1955 Photorevised 1992), and Troy Lake (1982 Provisional Minor Changes 1993) (S.B.B.M). These data were combined with additional layers including topography, aerial photography and others.

Results of Prefield Research

Previous Investigations

Based on the literature research conducted at the SBAIC, 22 cultural resource studies have been conducted within the Project footprint and one-mile record search radius (see Cultural Resource Table 3 below). Twelve of the previous studies occurred within the one-mile record search radius; nine occurred both within the Project footprint and one-mile search radius. One of these studies (Class II inventory–literature review) was

prepared for the BLM on behalf of the Applicant, and was submitted in August of 2006. This earlier report provided a preliminary assessment of the project area and includes a cultural resource record search results and background setting, but does not include a pedestrian survey of the Calico project area. The vast majority (95 percent) of the Calico project area had not been previously investigated. Nineteen of the previous survey reports within the record search radius were positive for cultural resources, 10 of those reports occur within the Calico project limits. With the exception of a few recent studies, the majority of these previous investigations were conducted more than 15 years ago.

CULTURAL RESOURCES TABLE 3:

Previously Conducted Cultural Resource Investigations in the Calico Project Area and One-mile Radius

Survey Report Number	Company	Author	Date	Report Title	Investigation Type	In footprint	In one-mile research radius
1060038		Simpson, Ruth D.	1958	The Manix Lake Archaeological Survey	Positive Archaeological Survey		X
1060047		Simpson, Ruth D.	1960	Archaeological Survey of the Eastern Calico Mountains	Negative Archaeological Survey		X
1060064		Simpson, Ruth D.	1965	An Archaeological Survey of Troy Lake, San Bernardino County	Positive Archaeological Survey		X
1060874	Archaeological Research Unit, UCR	Barker, James P., Rector, Carol H., and Wilke, Philip J.	1979	An Archaeological Sampling of the Proposed Allen-Warner Valley Energy System, Western Transmission Line Corridors, Mojave Desert, Los Angeles and San Bernardino Counties, California and Clark County Nevada	Positive Archaeological Survey	X	X
1060964	Regional Environmental Consultants	Norwood, Richard H	1980	Cultural Resource Survey for a Portion of the Earp to Johnson Valley, California, Enduro Racecourse Route	Positive Archaeological Survey		X

Survey Report Number	Company	Author	Date	Report Title	Investigation Type	In footprint	In one-mile research radius
1060965	Unknown	Musser, Ruth A.	1980	A Cultural Resource Inventory: Johnson Valley to Parker Motorcycle Race – The Public Comment Alternative	Negative Archaeological Findings		X
1061449	E.R. of Applied Conservation Technology, Inc.	Well, Edward B., Jill Weisbord, and Blakely	1964	Cultural Resources Literature Research, Records Check and Sample Field Survey for the California Portion of the Celeron/All American Pipeline Project.	Positive Archaeological Survey	X	X
1061940	California State University, Bakersfield – Cultural Resource Facility	Sutton, Mark Q. and Robert E. Parr	1989	A Cultural Resource Inventory for the Proposed Hidden Valley Hazardous Waste Disposal Facility, San Bernardino County, California	Positive Archaeological Survey		X
1061979	New Mexico University	Fagan Bryan *et al.*	1989	Cultural Resource Report for the All American Pipeline Project: Santa Barbara, California to McCarney Texas and Additional Areas to the East – Along the Central Pipeline Route Texas	Positive Archaeological Survey	X	X
1062220	Bureau of Land Management	BLM	1978	Archaeological Sites of the California Desert Area (Owlshead, Amargosa, Mojave Basin Planning Unit, Phase III): Archaeological Sample Unit Records.	Positive Archaeological Survey	X	X

Survey Report Number	Company	Author	Date	Report Title	Investigation Type	In footprint	In one-mile research radius
1062234	California State University, Bakersfield – Cultural Resource Facility	Yohe II, Robert M. and Sutton, Mark Q.	1992	An Archaeological Assessment of Eight Alternative Access Routes Into the Proposed Hidden Valley Hazardous Waste Disposal Facility, San Bernardino County	Positive Archaeological Survey	X	X
1062330		Simpson, Ruth D.	1964	The Archaeological Survey of Pleistocene Manix Lake (and Early Lithic Horizon)	Positive Archaeological Survey		X
1062388	Far Western Anthropological Research Group	McGuire, Kelly R.	1990	A Cultural Resources Inventory and Limited Evaluation of the Proposed Mojave Pipeline Corridor in California and Arizona	Positive Archaeological Survey	X	X
1062399	Far Western Anthropological Research Group	McGuire, Kelly R. and Glover, Leslie	1991	A Cultural Resource Inventory of a Proposed Natural Gas Pipeline Corridor From Adelanto to Ward Valley, San Bernardo County , California	Positive Archaeological Survey		X
1062406	California State University, Bakersfield – Cultural Resource Facility	Osborne, Richard H.	1991	Addendum to Archaeological Investigation of Hidden Valley Hazardous Waste Facility Access Route From Highway 40 to Hector Siding	Positive Archaeological Survey	X	X
1062701	California State University – Bakersfield	Sutton Mark Q. and Robert E. Parr	1989	An Archaeological Survey for Hidden Valley, Central Mojave Desert, California	Positive Archaeological Survey		X

Survey Report Number	Company	Author	Date	Report Title	Investigation Type	In footprint	In one-mile research radius
1062710	Dames and Moore	Apple McCorckle, Rebecca and Liliburn, Lori	1993	Cultural Resources for the Fort Cady Boric Acid Mining and Processing Facility Newberry Springs, California	Positive Archaeological Survey		X
1062808	Southern California Gas Company	Padon, Beth and Breece, Ladurel	1993	Archaeological Assessment, Kern Mojave Pipeline, San Bernardino County, Ca	Positive Archaeological Survey	X	X
1062862	Dames and Moore	Apple McCorckle, Rebecca	1993	Cultural Resources Testing and Evaluation Report for the Fort Cady Boric Acid Mining and Processing Facility, Newberry Springs - CA	Positive Archaeological Survey		X
1063630	Tetra-Tech	Budinger, Fred	2001	An Archaeological Assessment of the Proposed Verizon Wireless Newberry Springs Unnamed Cellular Telecommunications Site to be Located South of National Trails Highway (Old Rte 66) and West of Hector Off-Ramp From Hwy 40	Negative Archaeological Survey		X
1063631	ACS Limited	Clark, Caven	1998	Archaeological Survey at the Hector Meter Station	Positive Archaeological Survey	X	X
On File with BLM	Environmental Planning Group	Rowe, Robert, A.	2006	Results of Cultural Records Search in Support of the Proposed Solar One Power Generating Facility, Hector, San Bernardino County, California	Positive Records Search	X	X

Previously Recorded Cultural Resources

A total of 68 previously documented cultural resources were identified in the project area of analysis and the one-mile search radius (see Cultural Resources Table 4). Twenty-four of these resources are prehistoric isolates, 38 are prehistoric

archaeological sites, and six are historic-era resources (two of which are built-environment properties). Sixteen of these previously recorded cultural resources occur either partially or fully within the Calico project area of analysis, including one prehistoric isolate, twelve prehistoric archaeological sites, one historic archaeological site, and two historic built-environment resources. A discussion of the relocation of these resources within the project area of analysis and the corresponding site record updates is provided in the field inventory results section of this document. Of the previous investigations, most were completed before the advent/availability of global position system (GPS) data collection and standardized archaeological data-recording processes. Much of the previously recorded information is unevaluated, the site descriptions are poor, and locational information tends to be inaccurate or unavailable.

CULTURAL RESOURCES TABLE 4:
Previously Recorded Cultural Resources Within the Calico Project Area and One-mile Radius

Resource Designation	Cultural Resource Type	Cultural Resource Description	In Project Footprint	Within the one-mile research radius	Latest Update
36-061415	Prehistoric	Isolated jasper flake		X	1990
36-061416	Prehistoric	Two isolated chalcedony flakes		X	1990
36-061417	Prehistoric	Isolated chalcedony flake		X	1990
36-061420	Prehistoric	Isolated chalcedony flake and isolated rhyolite flake		X	Unknown
36-061421	Prehistoric	Isolated jasper flake		X	1991
36-061423	Prehistoric	Isolated cryptocrystalline flake		X	1990
36-061424	Prehistoric	Isolated white cryptocrystalline flake		X	1990
36-061425	Prehistoric	Isolated white cryptocrystalline flake		X	1990
36-061426	Prehistoric	Isolated red cryptocrystalline flakes		X	1990
36-061427	Prehistoric	One isolated red cryptocrystalline flake tool and one red cryptocrystalline flake		X	1990
36-061428	Prehistoric	Two isolated cryptocrystalline flakes		X	1990
36-061429	Prehistoric	Isolated cryptocrystalline silicate flake		X	1990
36-061430	Prehistoric	Isolated cryptocrystalline silicate flake		X	1990
36-061431	Prehistoric	Isolated cryptocrystalline silicate flake		X	1990
36-061432	Prehistoric	Isolated cryptocrystalline silicate flake		X	1990
36-061433	Prehistoric	Two isolated cryptocrystalline silicate flakes		X	1990
36-061434	Prehistoric	Isolated cryptocrystalline silicate flake		X	1990

Resource Designation	Cultural Resource Type	Cultural Resource Description	In Project Footprint	Within the one-mile research radius	Latest Update
36-061435	Prehistoric	Isolated cryptocrystalline silicate flake		X	1990
36-061436	Prehistoric	Isolated cryptocrystalline silicate flake		X	1990
36-064406	Prehistoric	Isolated chert flake and one piece of angular waste		X	2001
36-064407	Prehistoric	Two isolated chalcedony flakes	X		2001
36-064408	Prehistoric	Isolated red jasper flake fragment		X	2001
36-064409	Prehistoric	Isolated agate bifacial core		X	2001
36-064410	Prehistoric	One isolated red jasper flake and a second flake with dorsal scars		X	2001
CA-SBR-10649H	Prehistoric	Small lithic test and quarry area with flakes and one core	X		2001
CA-SBR-1585	Prehistoric	Also known as EM-266, this is a Petroglyph Site		X	1976
CA-SBR-1793	Prehistoric	Pottery sherds, awl, two bifaces		X	1963
CA-SBR-1889	Prehistoric	Lithic scatter containing metates, projectile points and debitage		X	1969
CA-SBR-1893	Prehistoric	Also known as SBCM 674, this site consists of two projectile points, scrapers flakes and bone which were collected at time of recordation	X		1963
CA-SBR-1905	Prehistoric	Jasper quarry with sparse scatters consists of flakes, bifaces and scrapers		X	1980
CA-SBR-1907	Prehistoric	Large quarry area containing debitage, cores and bifaces		X	1990
CA-SBR-1908	Prehistoric	Low density; sparse cobble testing/ quarry area consisting of cryptocrystalline silicate, basalt and rhyolite materials.	X	X	1979
CA-SBR-2910H	Historic	Also known as National Old Trails Road/Highway 66/ SM364. This is an early 20th century two lane paved road at Mile Post 183 where it becomes a graded dirt road.	X	X	2001
CA-SBR-3515	Historic/ Prehistoric	Two rock rings, it was not determined if they were historic or prehistoric		X	1978
CA-SBR-3516	Prehistoric/Historic	Lithic quarry site containing flakes and cores of chert material and historic trash scatter		X	1991
CA-SBR-3076	Prehistoric	Chalcedony lithic scatter	X		1985
CA-SBR-4307	Prehistoric	Several lithic scatters		X	1980
CA-SBR-4308	Prehistoric	Two lithic reduction stations that		X	1980

Resource Designation	Cultural Resource Type	Cultural Resource Description	In Project Footprint	Within the one-mile research radius	Latest Update
		contain flakes and cores			
CA-SBR-4309	Prehistoric	Lithic scatter with a lithic reduction station. Possible basalt and andesite tools present on site.		X	1980
CA-SBR-4405H	Historic	A booth and cargo loading platform located where the railroad splits.		X	1980
CA-SBR-4558H	Historic	Also known as SBCM 4918, This site is a 1930s and 1940s manganese mining area containing a galvanized steel structure, mill tailings, mine and historic trash scatters	X	X	1979
CA-SBR-4681	Prehistoric	Lithic scatter	X		1980
CA-SBR-5600	Prehistoric	Lithic reduction station	X		1980
CA-SBR-5598	Prehistoric	Large cobble test/quarry area		X	1991
CA-SBR-5599	Prehistoric	Lithic scatter and rock rings		X	1980
CA-SBR-5794	Prehistoric	Cobble quarrying and lithic reduction area		X	1989
CA-SBR-5795	Prehistoric	Lithic scatter originally containing 100s of flakes, several biface fragments and cores		X	2001
CA-SBR-5796	Prehistoric	Low density lithic scatter containing flakes and cores	X		2001
CA-SBR-6511	Prehistoric	Very large low density lithic scatter containing debitage and shatter	X		1989
CA-SBR-6512	Prehistoric	Also known as MP-26, this is a small low density lithic scatter that contains debitage		X	1989
CA-SBR-6513	Prehistoric	Also known as MP-27, this is a single segregated lithic reduction locus containing approximately 15 felsite flakes total		X	1989
CA-SBR-6517	Prehistoric	Small flake scatter with one core and eight flakes		X	1989
CA-SBR-6518	Prehistoric	Small cobble test and quarry area with two segregated reduction loci and debitage		X	1989
CA-SBR-6519	Prehistoric	A single Segregated Reduction Locus made up of approximately four flakes		X	1989
CA-SBR-6520	Prehistoric	Small cobble test and quarry area with one segregated reduction locus and debitage	X		1989
CA-SBR-6521	Prehistoric	Low density cobble test and quarry area with debitage, cores, bifaces and blanks	X		1989

Resource Designation	Cultural Resource Type	Cultural Resource Description	In Project Footprint	Within the one-mile research radius	Latest Update
CA-SBR-6522/H	Prehistoric and Historic	Low density cobble test and quarry area with debitage, cores, bifaces and blanks		X	1989
CA-SBR-6525	Prehistoric	Also known as MP-84, this is a low density lithic scatter that contains one lithic reduction locus flakes and debitage		X	1989
CA-SBR-6526	Prehistoric	Also known as MP-85, this site contains two adjacent lithic reduction loci and flakes		X	1989
CA-SBR-6527	Prehistoric	Also known as MP-86, this site is a small low density flaked stone scatter		X	1989
CA-SBR-6528	Prehistoric	Also known as MP-87, this is a small density lithic scatter	X		1989
CA-SBR-6693H NRHP E SBR 94028	Historic	Railroad Line built in 1883 for the Atlantic and Pacific Railroad Co., associated artifacts include track and train parts, railroad tableware, and insulator glass fragments	X	X	2001
CA-SBR-6786	Prehistoric	Cobble quarrying area comprised of approx. 200 flakes and four cores		X	1990
CA-SBR-6836	Prehistoric	Small lithic scatter containing approximately six jasper flakes		X	1991
CA-SBR-6895	Prehistoric	Single Segregated Reduction Locus containing flakes		X	1990
CA-SBR-10637	Prehistoric	Small lithic scatter containing at least nine chert flakes		X	
P1084-1	Historic	Two sets of foundations (one concrete and one concrete slab)		X	
P1793-1H	Historic	Hector train siding, 20 miles west of Ludlow, CA	X	X	

C.3.5.2 CONSULTATIONS

Native American Consultation

The Energy Commission has no specific regulatory obligation to consult with Native American tribes and/or individuals as a requirement under CEQA; however Energy Commission cultural resource staff routinely consult with local Native American representatives as a matter general policy, regardless of federal tribal recognition/status, to seek input and identify any concerns they may have regarding potential effects to cultural resources of importance to Native Americans. As the proposed Calico Solar project is located on land owned by the federal government and managed by the BLM, the BLM indicated its desire at the outset of this project to take the lead in all Native American Consultation, as is stipulated in the *Memorandum of*

Understanding between the U.S. Department of the Interior, Bureau of Land Management, California Desert District, and the California Energy Commission Staff Concerning Joint Environmental Review for Solar Thermal Power Plant Projects (http://www.energy.ca.gov/siting/solar/BLM_CEC_MOU.PDF).

On August 20, 2007, the BLM initiated contact with local Native American tribal organizations regarding a number of upcoming solar energy projects proposed on BLM land in the region, including the Calico Solar project. Among the tribal organizations contacted were the Chemehuevi Reservation; the San Manuel Band of Mission Indians; the Colorado River Indian Tribe; and the Twenty-nice Palms Band of Mission Indians; and the Fort Mojave Indian Tribe.

On July 22, 2008, the project applicant contacted the Native American Heritage Commission (NAHC) requesting a search of the NAHC's Sacred Lands File (SLF) in an attempt to determine the presence or absence of Native American sacred sites within the Calico project area. The response from the NAHC in July 2008 indicated that the SLF search identified no sacred sites in the project area of analysis. A list of local Native American representatives who could be contacted regarding potential concerns or knowledge of cultural resources that could be affected by the project was also provided in the response from the NAHC.

In a letter dated November 5, 2008, the BLM initiated formal consultation with the tribes regarding the Calico Solar Project, as a part of their obligation under Section 106 of the National Historic Preservation Act. Since that time, the BLM has maintained ongoing communications with the local tribal organizations through letters, phone calls, and meetings (Jim Shearer, personal communication.). During the course of this time, no Native American representatives have identified specific cultural resources of concern to them within the project limits; however, they have indicated an interest in the project and concerns for the resources that the applicant has identified in the project area.

On April 29, 2010, staff attended the BLM's Cultural Resources Programmatic Agreement kick-off meeting for the Calico Solar Project. Also present at that meeting were Ann Brierty and Anthony Madrigal, Sr. of the San Manuel Band of Mission Indians. During that meeting, Ms. Brierty and Mr. Madrigal expressed concerns for both cultural and biological resources that may be affected by the project.

On June 13, 2010, Energy Commission staff participated in an onsite field visit with the BLM and several members of the local Native American community including: Ann Brierty, Raymond Galvan, and Anthonly Madrigal, Sr. of the San Manuel Band of Mission Indians; Robert Chavez, Domingo "Chance" Esquerra, and Matthew Leivas of the Chemehuevi Tribe; Anthony Madrigal, Jr. of the Twentynine Palms Band of Mission Indians; and Linda Otero, of the Fort Mojave Indian Tribe and the AhaMaKav Cultural Society. During the field visit, the participants visited selected sites, including CA-SBR-1908/H, CA-SBR-13093, and CA-SBR-13443/H, which are being targeted for avoidance by the project applicant (as discussed below in Section C.3.6). During this field visit, tribal members expressed interest and concerns for the cultural resources that the applicant identified during the cultural resource inventory. Some indicated that they would consult with their Elders and would report back to the BLM, if there were any

issues. Consultations with interested Native Americans regarding the treatment of the cultural resources in the project area of analysis are ongoing.

On July 26, 2010, in an effort to follow up on the June 13th project site visit, staff contacted several tribal members, including Robert Chavez, Matthew Leivas, Linda Otero, Ann Brierty (phone messages only), and Anthony Madrigal, Jr. (email only). Staff also made attempts to contact other tribal members (i.e., Raymond Galvan and Anthony Madrigal, Sr.) for whom attempts to leave messages were unsuccessful (i.e., voicemail box full, or invalid phone number). Staff's discussions with tribal members indicated that they were not necessarily aware and/or fully informed of the other remaining archaeological sites in the project area beyond the three that were visited during the above-described field trip that took place on June 13, 2010. Staff's impression from the phone conversations was that many of the individuals have busy lives and, therefore, limited time to participate in the project; however all are very concerned and interested in the treatment of Native American cultural resources in the project area and do wish to be kept informed at the very least.

Other Consultations

The applicant contacted the San Bernardino County Land Use Services, City of Barstow Community Development department, and Mojave River Valley Museum on September 15, 2008 to identify cultural resources within a one-mile radius around the Project footprint that had been listed pursuant to ordinance or recognized by a local historical society or museum. To date, no responses have been received from the local agencies or the museum.

Energy Commission staff also consulted with the following organizations in July and August 2010 regarding built-environment resources: Kaisa Barthuli, Program Manager for the Route 66 Corridor Preservation Progam of the National Park Service; Michael Buhler, Executive Director of the San Francisco Architectural Heritage; and Brian Turner, Staff Attorney with the Western Regional Office of the National Trust for Historic Preservation.

C.3.5.3 NEW INVENTORY INVESTIGATIONS

The cultural resource inventory reported here encompasses the 8,230-acre project area of analysis. The applicant identified a total of 335 cultural resources within the project area of analysis/APE, including 206 archaeological isolates, 119 archaeological sites, and 10 historic built environment resources. This total includes twelve of the sixteen previously recorded cultural resources identified as a part of the prefield records search that were relocated during the field survey, including P-36-064407, CA-SBR-1908, CA-SBR-2910H, CA-SBR-3076, CA-SBR-4681, CA-SBR-5600, CA-SBR-5794, CA-SBR-5796, CA-SBR-6521, CA-SBR-6528, CA-SBR-6693H, and P1793-1H. Updated DPR site forms were prepared for the twelve relocated resources. The field surveyors were unable to relocate the remaining four previously recorded resources (CA-SBR-10649, CA-SBR- 1893, CA-SBR- 6511, and CA-SBR- 6520). The four sites that were not relocated appear to no longer exist due to surface artifact collection at the time of original recordation in 1963 (CA-SBR-1893) and/or mitigation or impact due to pipeline construction (CA-SBR-6511, CA-SBR-6520, and CA-SBR-10649H) within the project area. The details of the cultural resource inventory are described below, including all

previously recorded and newly identified archaeological sites and built environment resources.

C.3.5.4 CLASS III INTENSIVE ARCHAEOLOGICAL FIELD SURVEY

Archaeological Field Survey Methodology

The initial cultural resource field inventory of the Calico Solar project area of analysis/APE was conducted between August 4 and October 31, 2008. The applicant also conducted additional field surveys and more refined site recordation between October 2009 and March 2010. These additional surveys were intended to provide a better resolution of data for the site records, as specified in data requests by the BLM and Energy Commission staff (SES 2009dd). The pedestrian survey for the Class III Intensive Field Survey covered the original 8,230-acre Calico Solar (phases 1 and 2) project area of analysis/APE, as well as an additional 200 feet beyond that limit. The principal survey methods consisted of a systematic walk-over in parallel transect intervals no greater than 15 meters apart. Areas of steep terrain (greater than 45° angle), where access was not feasible due to unsafe/unstable surfaces, were not surveyed. These areas total less than 11 acres and occur within the northeastern project area along the south-southwest facing slope of the Cady Mountains. The areas of steep terrain not surveyed have an extremely low likelihood of containing cultural resources based on the angle and decomposition of volcanic rocks eroding downslope. Areas that were situated within or atop steep terrain with the potential for cultural resources were investigated (*e.g.,* caves and ridge tops). The survey transects extended across the entire horizontal extent of the project limits. Survey crews were guided by Trimble XH sub-meter global positioning system (GPS) units uploaded with records search, township, built-environment features, and project-specific boundary data. Individual crews were assigned portions of the project area for survey and recordation.

The applicant reported that the archaeological data recorded during the Class III intensive field survey represents a preliminary in-the-field assessment based solely on observations of artifacts and other cultural components visible on the surface (TS 2010an, p.6-15). The applicant has conducted no subsurface testing within the project area, and more formal laboratory analysis of artifacts was beyond the scope of the Class III intensive field survey (TS 2010an, p. 6-15). The BLM representatives did collect all temporally diagnostic artifacts identified on the surface by the applicant during the survey fieldwork. BLM archaeologist, James Shearer, took possession of those artifacts, which are now located at the BLM Barstow field office (TS 2010an, p. 4-2).

Site Recordation

The guidelines applied to field survey and recordation of cultural resources within the Project area of analysis were provided by BLM Barstow archaeologist Jim Shearer (TS 2010an, p. 4-3). The guidelines define archaeological sites as consisting of six (6) or more historic period artifacts or prehistoric period artifacts with a tool within 30 meters of each other. Groups of five or fewer prehistoric or historic artifacts within 30 meters of each other were recorded as isolated finds. Isolated groupings of five or fewer non-diagnostic historic cans were not recorded under the guidelines provided.

Individual Locus numbers were assigned to areas within sites where higher artifact concentrations occurred. A locus number was assigned to concentrations of more than six artifacts within a discrete location. Discrete locations were defined as single reduction loci, multiple single reduction loci, and/or lithic scatter concentrations. In the case of multi-component sites, historic and prehistoric components were assigned an individual locus when possible.

Once identified in the field, survey teams recorded archaeological sites and isolates by completing the appropriate Department of Parks and Recreation (DPR) 523 Series forms. Form information was collected using a combination of staff observations and data recording devices including sub-meter GPS and digital cameras. Each isolated find and site was given a designation that included the initials of the team leader and a sequential number (e.g., RAN-001, with isolated finds including the designator "ISO," e.g., RAN-ISO-002). Site and loci boundaries were delineated by team members transecting the area of the find with transects spaced no greater than 5 meters apart. Artifacts and/or artifact clusters were flagged, described, and photographed. Individual artifacts not part of a larger concentration were point-provenienced with the GPS, as were concentrations smaller than five meters across. Concentrations with a diameter of five meters or more were recorded as polygons representing the outer loci boundary. Digital photographs were taken of selected artifacts and concentrations. Each site was recorded with one or more photographs. All photographs were recorded onto the team's log with relevant data including temporary site/isolate designation, date, direction, recorder, and subject. Trails segments also mapped with the sub-meter GPS, following the trail until terminated or no longer feasible to follow, measured, described in notes, and photographed.

Data Processing

Data collected in the field were transferred to electronic field office data files on a daily basis. Data were quality checked to ensure conformance with the scope of work, agency satisfaction, and regulatory compliance. GPS data were downloaded using TerraSync software and transmitted to GIS staff for post-processing, e.g., applying differential data correction. Initial plots of data from each survey team were compiled and reviewed to determine the validity of resource boundaries with regard to established methods. Where appropriate, resource areas were combined into larger units based on distance between artifacts and/or concentrations (i.e., less than 30 meters).

Cultural Resource Site Taxonomy

Based on previous archaeological investigations completed within and/or near the Calico project area, the applicant developed categories of archaeological site types that one could expect to encounter during the Class III intensive field survey. The general prehistoric and historic site type categories listed below provided a framework for the definition and documentation of resources identified in the project area:

Isolated Find: Per the guidelines applied to intensive field survey and recordation of cultural resources within the Project area of analysis, provided by BLM archaeologist Jim Shearer, an isolated find is defined as a group of five or fewer prehistoric and/or historic artifacts more than 30 meters from any other prehistoric and/or historic artifacts.

Based on this definition, individual and groups of less than five historic period cans were not recorded during the survey.

Lithic Reduction Scatter: This site type includes all sites containing flaked and/or battered stone artifacts indicative of lithic reduction activities, including lithic debitage, cores (including early-stage bifacial cores), tested (or assayed) cobbles, and hammerstones; with no other artifact types present.

Complex Lithic Scatter: This site type may contain the same artifact types defined above for Lithic Reduction Scatters, but also contains formed flaked stone tools indicative of a wider range of activities beyond lithic reduction. Those tools may include projectile points or other late-stage bifacial tools, patterned or unpatterned flake tools, and edge-modified flakes.

Ground Stone Scatter: This site type includes milling-related artifacts, including “top” and “bottom” stones, such as manos and/or expedient hand stones and metates, respectively.

Ceramic Scatter: This site type contains objects made of clay that were fired and hardened to form utilitarian vessels or objects for use by prehistoric cultures. These objects are usually found as fragments at archaeological sites.

Fire-Affected Rocks and/or Hearths: These site types are typically loose scatters or discrete concentrations of rocks that have been affected by intense heat and display cracking or pot lid fractures, charring, and/or fire/smoke blackening.

Cleared Circles: These features are typically found on desert pavement surfaces. They consist of roughly circular areas ranging from approximately one to three meters in diameter where the larger rocks on the ground surface have been removed or relocated to the outer edge of the area, leaving only the smaller, surficial pebbles remaining within the circumference of the features. Similar features may result from natural or cultural processes.

Trails: These site types are 30-to-50-centimeter-wide footpaths that appear tamped or pushed (constructed) into the surrounding soils. These features are most apparent on desert pavement surfaces or other stable landforms. Often, particularly on desert pavement surfaces, the larger rocks have been cleared from the path of the trail. These site types may or may not be associated with other archeological remains.

Rock Cluster Features: These are features that may occur as isolated finds or can be associated with prehistoric or historical archaeological sites and are often referred to as cairns. These features consist of constructed rock concentrations that stand out from the surrounding ground surface. Such features can consist of a single course of rocks, or rocks stacked higher than one course. These features may represent prehistoric activity, or they may be associated with mining claims and homesteading land claims. Similar rock clusters are also commonly used by off-highway vehicle (OHV) users to demarcate OHV tracks, trails, and racecourses.

Historical Refuse: This site type consists of a deposit and/or sparse distribution of domestic, commercial, construction, or industrial debris (e.g., cans, bottles, ceramic tableware, milled lumber, machinery, and appliances) that pre-dates 1963.

Historical Structure: This site type consists of any structure constructed prior to 1963 including, but not limited to, residential buildings, commercial buildings, ancillary structures, and electrical sub-stations.

Historical Survey/Mapping Features: These site types are built/constructed features erected prior to 1963 (not including Rock Cluster Features) that may be isolated and/or associated with other site types listed. Examples of such features include United States General Land Office (GLO) benchmarks, aerial photograph markers, and concrete foundations.

Historical Linear Resources: Linear resources include the following subtypes constructed prior to 1963: roads, railroads, and transmission lines. These sites may or may not be associated with other historical resources.

Historical Mining Sites: These sites may include, but are not limited to, borrow pits; shafts; adits/prospects or other surface mining features; access roads; mining-related equipment and other mining-related artifacts; mining-related structural ruins; and raked and scraped surfaces resulting from gravel mining that pre-date 1963.

Results of Archaeological Field Inventory

Overall surface visibility was good to excellent throughout the project area of analysis. Visibility ranged from 90-100 percent over approximately 80 percent of the ground surface; areas with greater visibility were inspected for cultural materials to ensure adequate coverage for resource discovery. Evidence of disturbances observed within and surrounding the project area included various above- and below-ground utility developments (e.g., transmission lines and pipelines), numerous rodent burrows, flash flooding/erosional cuts, mining activities, livestock trampling, off-road vehicle use, unpaved access roads, and archaeological vandalism (i.e., unauthorized artifact collection/site looting), as evidenced by apparent collection piles.

Employing the survey methods and site taxonomy/classifications described above, the applicant's Class III pedestrian archaeological field survey resulted in the identification of 119 archaeological sites and 206 archaeological isolates within the project area of analysis/APE. The archaeological sites include 94 prehistoric sites, eight historic-era sites, 15 multi-component sites (containing both prehistoric and historic-era components), and two rock cluster feature sites of indeterminate age. The archaeological resources listed and described in Cultural Resources Table 5, below, include all newly identified and relocated/updated cultural resources in the project area of analysis/APE.

CULTURAL RESOURCES TABLE 5:
Cultural Resources Inventory for the Calico Solar Project Area

Site Designation	Cultural Context	Site Taxonomy	Project Phase	Geomorphic Landform	Potential for Buried Deposits Based on Geomorphic Landform	Applicant/BLM Eligibility Recommendations
CA-SBR-1908/H UPDATE	Multi-Component Archaeological Site	Lithic Reduction Scatter Rock Cluster Features Historical Refuse Fire Affected Rocks and/or Hearths	Phase 2	Erosional Fan Remnant/Inset Fan	Very Low to Low	Rock Feature Recommended Eligible by Applicant & BLM; Lithic Reducion Scatter and historical refuse are Non-Contributing
CA-SBR-3076 UPDATE (EJK-021)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Relict Alluvial Flat/ Inset fan/ Axial Channel	Very Low to Moderate	Recommended Not Eligible
CA-SBR-4558H UPDATE (Logan Mine)	Historic Archaeological Site	Historical Refuse Historical Mining Site Historical Structure	Phase 1	Upper Alluvial Fan Piedmont	Very Low	Recommended Not Eligible
CA-SBR-4681/H UPDATE (RAN-102/H)	Multi-Component Archaeological Site	Complex Lithic Scatter Historical Survey/Mapping Features	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-5600/H UPDATE (RAN-189/H)	Multi-Component Archaeological Site	Complex Lithic Scatter	Phase 2	Erosional Fan Remnant/ Inset Fan/ Pisgah Lava	None to Low	Recommended Not Eligible
CA-SBR-5796 UPDATE (DRK-180)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-6521 UPDATE (RAN-115)	Prehistoric Archaeological Site	Lithic Reduction Scatter Rock Features	Phase 2	Erosional Fan Remnant/Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-6528 UPDATE (RSS-020)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-12990 (DRK-001)	Prehistoric Archaeological Site	Lithic Reduction Scatter	200 Foot Buffer	Lower Alluvial Fan Apron	Low	Recommended Not Eligible
CA-SBR-12991 (DRK-012)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 1	Lower Alluvial Fan Apron	Low	Recommended Not Eligible
CA-SBR-12992H (DRK-021H)	Historic Archaeological Site	Historical Refuse	200 Foot Buffer	Lower Alluvial Fan Apron	Low	Recommended Not Eligible

CA-SBR-12993 (DRK-023)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Upper Alluvial Fan Piedmont	Low	Recommended Not Eligible
CA-SBR-12994 (DRK-026)	Prehistoric Archaeological Site	Lithic Reduction Scatter	200 Foot Buffer	Lower Alluvial Fan Apron	Low	Recommended Not Eligible
CA-SBR-13002/CA-SBR-13003/H (DRK-134/DRK-136/H)	Multi-Component Archaeological Site	Lithic Reduction Scatter Historical Refuse Fire Affected Rocks and/or Hearths	Phase 2	Lower Alluvial Fan Apron	Low	Recommended Not Eligible
CA-SBR-13004 (DRK-139)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13005 (DRK-140)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13006 (DRK-141)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13007 (DRK-142)	Prehistoric Archaeological Site	Complex Lithic and Groundstone Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13008 (DRK-145)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13009 (DRK-150)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13010 (DRK-152)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13011 (DRK-153)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13012H (DRK-155H)	Historic Archaeological Site	Historical Refuse Fire Affected Rocks and/or Hearths	Phase 2	Lower Alluvial Fan Apron	Low	Recommended Not Eligible
CA-SBR-13013 (DRK-160)	Prehistoric	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant/Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13014H (DRK-163H)	Historic Archaeological Site	Historical Refuse	Phase 2	Lower Alluvial Fan Apron	Low	Recommended Not Eligible
CA-SBR-13015 (DRK-166)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13016 (DRK-167)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Axial Channel	Very Low	Recommended Not Eligible
CA-SBR-13017H (DRK-168H)	Historic Archaeological Site	Historical Refuse	Phase 2	Lower Alluvial Fan Apron	Low	Recommended Not Eligible

CA-SBR-13020 (DRK-173)	Prehistoric Archaeological Site	Lithic Reduction and Groundstone Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13021 (DRK-174)	Prehistoric Archaeological Site	Lithic Reduction Scatter and Possible Hearth	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13022/CA-SBR-13024 (DRK-175/DRK-177)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13025 (DRK-178)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13026 (DRK-182)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant/Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13027 (DRK-184)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13028 (KRM-002)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Upper Alluvial Fan Piedmont	Very Low	Recommended Not Eligible
CA-SBR-13029 (KRM-003)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Upper Alluvial Fan Piedmont	Very Low	Recommended Not Eligible
CA-SBR-13030 (KRM-008)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Upper Alluvial Fan Piedmont/ Lower Alluvial Fan Apron	Very Low to Low	Recommended Not Eligible
CA-SBR-13031 (KRM-024)	Prehistoric Archaeological Site	Trail	Phase 2	Lower Alluvial Fan Apron	Low	Recommended Not Eligible
CA-SBR-13032 (KRM-028)	Prehistoric Archaeological Site	Trail	Phase 2	Upper Alluvial Fan Piedmont	Very Low	Recommended Not Eligible
CA-SBR-13038/CA-SBR-13040/H (KRM-160/KRM-167/H)	Multi-Component Archaeological Site	Lithic Reduction Scatter Rock Cluster Features	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13039 (KRM-164)	Prehistoric Archaeological Site	Lithic Reduction Scatter Rock Ring Feature	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13041 (KRM-170)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13042 (LTL-008)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13044 (LTL-011)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible

CA-SBR-13045 (LTL-012)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13046 (LTL-015)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13047 (LTL-016)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13048 (LTL-017)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13049 (LTL-018)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13050 (LTL-019)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13051 (LTL-022)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Pisgah Lava	None to Very Low	Recommended Not Eligible
CA-SBR-13052 (LTL-023)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan Pisgah Lava	None to Very Low	Recommended Not Eligible
CA-SBR-13053 (RAN-011)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Upper Alluvial Fan Piedmont	Very Low	Recommended Not Eligible
CA-SBR-13054 (RAN-025)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 1	Upper Alluvial Fan Piedmont	Very Low	Recommended Not Eligible
CA-SBR-13055 (RAN-101)	Prehistoric Archaeological Site	Lithic Reduction Scatter Rock Cluster Features	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13056 (RAN-108)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13059 (RAN-114)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13060 (RAN-116)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13061/CA-SBR-13076 (RAN-118/RAN-173)	Prehistoric Archaeological Site	Lithic Reduction Scatter Rock Cluster Features Historical Refuse	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13062 (RAN-120)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13063/H (RAN-123/H)	Multi-Component Archaeological Site	Lithic Reduction Scatter Rock Cluster Features Historical Refuse	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible

CA-SBR-13064 (RAN-128)	Prehistoric Archaeological Site	Lithic Reduction Scatter Rock Cluster Features	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13065 (RAN-131)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Axial Channel	Very Low to Moderate	Recommended Not Eligible
CA-SBR-13066 (RAN-138)	Prehistoric Archaeological Site	Lithic Reduction Scatter Historical Refuse	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13068 (RAN-146)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13069 (RAN-154)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13070/CA-SBR-13067/H (RAN-155/RAN-139/H)	Multi-Component Archaeological Site	Lithic Reduction Scatter Historical Refuse Fire Affected Rocks and/or Hearths	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13071 (RAN-163)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13072 (RAN-168)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Axial Channel	Very Low to Moderate	Recommended Not Eligible
CA-SBR-13073 (RAN-169)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Lower Alluvial Fan Apron	Low	Recommended Not Eligible
CA-SBR-13074 (RAN-170)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Lower Alluvial Fan Apron	Low	Recommended Not Eligible
CA-SBR-13075 (RAN-171)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Lower Alluvial Fan Apron Axial Channel	Very Low to Moderate	Recommended Not Eligible
CA-SBR-13078 (RAN-177)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13079 (RAN-179)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13080 (RAN-180)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Axial Channel	Very Low to Moderate	Recommended Not Eligible
CA-SBR-13081 (RAN-181)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Axial Channel	Very Low to Moderate	Recommended Not Eligible
CA-SBR-13082 (RAN-183)	Prehistoric Archaeological Site	Lithic Reduction Scatter Rock Cluster Features	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13083 (RAN-186)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible

CA-SBR-13084 (RAN-188)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Erosional Fan Remnant/Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13085 (RAN-190)	Prehistoric Archaeological Site	Lithic Reduction Scatter Rock Cluster Features	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13086 (RSS-005)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13089 (RSS-009)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Axial Channel/Relict Alluvial Flat	Very Low to Moderate	Recommended Not Eligible
CA-SBR-13091 (RSS-013)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Axial Channel	Very Low to Moderate	Recommended Not Eligible
CA-SBR-13092 (RSS-014)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13093/H (RSS-017/H)	Multi-Component Archaeological Site	Complex Lithic Scatter Rock Cluster Features	Phase 2	Erosional Fan Remnant/ Axial Channel/ Inset Fan	Very Low to Moderate	Rock Features and Cleared Areas are Recommended Eligible by Applicant & BLM; Complex Lithic Scatter are Non-Contributing
CA-SBR-13094 (RSS-018)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13096 (SGB-013)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 1	Lower Alluvial Fan Apron	Low	Recommended Not Eligible
CA-SBR-13097 (SGB-017)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 1	Lower Alluvial Fan Apron	Low	Recommended Not Eligible
CA-SBR-13104 (SGB-041)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Upper Alluvial Fan Piedmont	Very Low	Recommended Not Eligible
CA-SBR-13105 (SGB-097)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Rock Outcrop within the Upper Alluvial Fan Piedmont	None to Very Low	Recommended Not Eligible
CA-SBR-13106 (SGB-099)	Prehistoric Archaeological Site	Lithic Reduction Scatter Fire Affected Rocks and/or Hearths	Phase 2	Rock Outcrop within the Upper Alluvial Fan Piedmont	None to Very Low	Recommended Not Eligible
CA-SBR-13107 (SGB-104)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Rock Outcrop within the Upper Alluvial Fan Piedmont	None to Very Low	Recommended Not Eligible
CA-SBR-13111 (SGB-120)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13122 (KRM-165)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible

CA-SBR-13123 (EJK-002)	Prehistoric Archaeological Site	Lithic Reduction Scatter Historical Refuse	Phase 2	Relict Alluvial Flat/Axial Channel	Very Low to Moderate	Recommended Not Eligible
CA-SBR-13124/H (EJK-004/H)	Multi-Component Archaeological Site	Lithic Reduction Scatter Historical Refuse	Phase 2	Relict Alluvial Flat/Axial Channel	Very Low to Moderate	Recommended Not Eligible
CA-SBR-13125/H (EJK-005/H)	Multi-Component Archaeological Site	Lithic Reduction Scatter Historical Refuse	Phase 2	Relict Alluvial Flat	Very Low	Recommended Not Eligible
CA-SBR-13126/ CA-SBR-5794/H (EJK-009/H)	Multi-Component Archaeological Site	Complex Lithic Scatter Rock Cluster Features Historical Refuse	Phase 2	Axial Channel/Relict Alluvial Flat	Very Low to Moderate	Recommended Eligible by Applicant & BLM; Parts of the Site Within the project area of analysis are Non-Contributing
CA-SBR-13349/H (RSS-006/ SGB-112/ SGB-114/SGB-118/SGB-127/H)	Multi-Component Archaeological Site	Complex Lithic and Groundstone Scatter Historical Refuse	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13441 (RAN-107/RAN-110)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13442 (DRK-133/LTL-009)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Erosional Fan Remnant/Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13443/H (DRK-176/RAN-175/H)	Multi-Component Archaeological Site	Complex Lithic and Groundstone Scatter Historical Refuse	Phase 2	Axial Channel	Very Low to Moderate	Prehistoric Component Recommended Eligible by Applicant & BLM; Historic Component Recommended as Non-Contributing
CA-SBR-13444 (DRK-170/DRK-171)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13445 (RSS-008/RSS-011)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
DRK-S1-001H	Historic Archaeological Site	Trail	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible

DRK-S1-013	Indeterminate	Rock Cluster Feature	Phase 2		Very Low	Recommended Not Eligible
MN-S1-001	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
MN-S1-004	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
MN-S1-005	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
MN-S1-009	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
MN-S1-017H	Historic Archaeological Site	Historical Refuse	Phase 2	Axial Channel	Very Low to Moderate	Recommended Not Eligible
NOTR-PRM-S1-002/H	Multi-Component Archaeological Site	Lithic Reduction Scatter Historical Refuse	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
PRM-S1-009	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Upper Alluvial Fan Piedmont	Very Low	Recommended Not Eligible
PRM-S1-021H	Historic Archaeological Site	Rock Cluster Features Historic Survey/Mapping Features	Phase 2	Upper Alluvial Fan Piedmont	Very Low	Recommended Not Eligible
P36-014578 (RAN-035)	Indeterminate	Rock Cluster Features	Phase 2	Upper Alluvial Fan Piedmont	Very Low	Recommended Not Eligible
P1793-1H (RAN-050/H)	Multi-Component Archaeological Site	Historical Refuse	Phase I	Axial Channel	Low	Recommended Not Eligible
SM-S1-001	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
SM-S1-003	Prehistoric Archaeological Site	Lithic Reduction Scatter Fire Affected Rocks and/or Hearths	Phase 2	Inset Fan/Erosional Fan Remnant	Very Low to Low	Recommended Not Eligible
SM-S1-005	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible

Discussion of Results of Archaeological Surveys

As described in the Environmental Setting section of this document, a geoarchaeological investigation was conducted for the Calico Solar project in response to BLM/CEC Data Requests 92 to 96 (SES Nov. 2009dd DR 92-108). The results of geoarchaeological investigation concluded that the overall potential for buried archaeological resources to occur in the project area ranges from very low to moderate, depending on to the underlying landform, as well as the degree of desert pavement stablization present on the project site. The applicant defines desert pavement as a

desert surface covered with closely packed, interlocking angular or rounded rock fragments of pebble and cobble size (TS 2010an, p. 3-4).

Based on the geoarchaeological analysis, the applicant states that the degree of desert pavement stabilization is directly correlated with the likelihood of the matrix to contain buried archaeological deposits (*i.e.,* the less stable or poorly developed desert pavement surfaces exhibit more sediment visibility and are, therefore, more likely to contain buried archaeological deposits) (TS 2010an, p. 4-4). Although a well-formed desert pavement does not preclude the existence of a buried component to a site located on that pavement, it does significantly decrease the likelihood that a buried archaeological deposit *not already evident on the surface* is buried below it. In cases where archaeological remains are *evident on desert pavement surfaces*, artifacts that have been part of the desert pavement for longer periods of time will exhibit more patination and weathering from eolian (wind) abrasion. Thus, sites with a large number of heavily weathered surface artifacts may have a higher number of subsurface artifacts than a site with relatively "fresh" looking artifacts (TS 2010an, p. 4-4). The applicant reports a varying degree of artifact weathering in some of the site descriptions; however, there does not appear to be a comprehensive analysis of the degree of artifact weathering at the various sites.

The majority of archaeological sites identified during the survey were found to occur in the southern portion of the project area where the surface is covered by varying degrees of desert pavement. These areas of desert pavement also contain an abundance of naturally occurring cryptocrystalline silicate materials (chalcedony, jasper, others), which are suitable for the production of flaked stone tools. Thus, the locations of the prehistoric sites observed within the Calico Solar Project study area appear to be largely dictated by the availability of these lithic raw materials that are constituents of the pavements. Referred to as 'pavement quarries' (see Byrd, et al. 2009), these areas of desert pavement, which also contain naturally-occurring raw material exploited by prehistoric inhabitants for toolstone production, are commonly found on alluvial landforms in the Mojave Desert region. As such, the applicant has stated, "the correlation of these desert pavement surfaces with the archaeological materials contained therein may be informative" (TS 2010an, p. 3-4).

The geoarchaeological study also suggests that the Holocene alluvial deposits within and adjacent to the landform identified as the east-west Axial Channel (in the southern portion of the project area) are the most likely source for buried archaeological deposits. Archaeological sites identified along this drainage contain a variety of artifact types, including groundstone and other indications of, at the least, food processing localities. The loose sandy matrix and the seasonal rain and flood events are likely to have obscured portions of these deposits (TS 2010an, p. 2-4). At least sixteen (16) sites within the project area occur within the Axial Channel and associated minor landforms (see Cultural Resources Table 5).

Among the 119 archaeological sites documented in the project area of analysis, eighty-four (84) sites are categorized as *Lithic Reduction Scatters* consisting of locally occurring raw material obtained onsite. As discussed above in the methods section, sites classified as *Lithic Reduction Scatters* contain prehistoric flaked and/or battered stone artifacts including lithic debitage, cores, tested/assayed cobbles, and

hammerstones with no other artifact type present. Indicative of primary lithic reduction activities, such sites are common and even anticipated to be present in the context of a pavement quarry landscape where materials are being tested/assayed for suitability of toolstone manufacture.

Twenty-two (22) sites in the project area are categorized as *Complex Lithic Scatters*, which contain the same artifact types defined for *Lithic Reduction Scatters* above, but also contain formed flaked stone tools indicative of a wider range of activities beyond primary lithic reduction, such as projectile points or other late-stage bifacial tools, patterned or unpatterned flake tools, and edge-modified flakes. In addition, groundstone and fire affected rock and/or hearths were noted in at least five (5) sites in the project area, and groundstone was noted in at least four (4) sites. The presence of *Complex Lithic Scatter* sites, as well as the occurrence of hearths/fire affected rock and groundstone, in the project area suggests that a wider range of activities, beyond primary lithic reduction (intial testing/assaying), may have been occurring in the project area.

Over 560 *Rock Cluster Features* have been documented at 14 different archaeological sites in the project area. The applicant defines *Rock Cluster Features* as constructed rock concentrations, which consist of a single course of rocks or are stacked in multiple courses. These rock features have been recorded in association with seven (7) prehistoric sites, one (1) historic-era site, and four (4) multi-component sites (which contain both historic and prehistoric elements) in the project area of analysis. Two (2) of the rock features were recorded as isolated sites unassociated with any other archaeological remains. The function and cultural affiliation of the rock cluster features remains unknown at this time, as the applicant was unable to discern any patterns or associations that would enable a conclusive determination regarding whether these features are historic or prehistoric in origin. The primary artifact association of the rock features in the project is with prehistoric flakes and fragments, although not all features have them. Associations with historic artifacts are limited to the margins of the National Old Trails Road or other historic roads. The archaeological deposits of this feature type are found exclusively on the Inset Fans and Relict Alluvial Fan Piedmont landforms. It is uncertain from surface inspection, recordation, and review of the pertinent literature whether the rock features are all prehistoric, all historic, or both. The applicant points out that some of the stones that make up the rock clusters exhibit distinct rubification on their upper surfaces (TS 2010an, p. 5-335). Rubification is a red cast or film that accretes on desert stones through contact with iron in the soils. The presence of rubification on the upward-facing surfaces of these stones, rather than the surfaces that are in contact with the soil, indicates that they were upturned or transported to their current location. The corresponding lack of rubification on the lower surfaces, which are in contact with the soil, indicates that it is unlikely that these stones have been in their current configuration since prehistoric times, though the exact rate of rubification varies according to environmental conditions (TS 2010an, p. 5-335, p. 5-475, p. 5-566).

The applicant states that a total of twenty-two (22) sites recorded within the project area were reported to contain historic-era archaeological remains. Eight (8) of these sites were recorded solely as historic archaeological sites, while the remaining fourteen (14) were recorded as multi-component sites containing both historic and prehistoric remains. The overwhelming majority (17 out of 22) of the historic sites/components

identified within the project area are categorized as *Historic Refuse* scatters, which are defined as a sparse distribution of domestic, commercial, construction, or industrial debris (e.g., cans, bottles, ceramic tableware, milled lumber, machinery, appliances, etc.) that pre-date 1963. The remaining five (5) historic sites/components consist of *Historic Mining* remains (documented at two sites); *Historic Survey/Mapping Features* (documented at two sites), and a *Historic Linear Site* (one historic trail).

As indicated above, the majority of the resources identified within the project area are prehistoric lithic scatters that generally lack temporally diagnostic artifact types. Therefore, only broad timeframes could be applied to those sites ranging in age from the early prehistoric cultures (Paleoindian Period, circa 12,000 to 9,000 years before present) to the historical period. Only the sites that contain temporally diagnostic artifacts or features could be placed into chronological groups with any degree of precision or reliability. The applicant points out, however, that "diagnostic artifacts can provide valuable insights into the regional chronology, but information gathered exclusively through surface collection methods can be incomplete or unreliable" (TS 2010an, p. 6-2). "Additional information is, therefore, sometimes gathered using subsurface testing and analysis of artifacts by specialists to further refine site chronology" (TS 2010an, p. 6-2).

The applicant reports that the results of the survey, as well as previous research, in the Calico Solar project area revealed twenty-one (21) temporally diagnostic prehistoric artifacts (one of which was previously collected in 1990 for a different project), which indicate a broad time span of regional site use (TS 2010an, p. 6-23). Of the total temporally diagnostic artifacts in the project area, eighteen (18) occur at archaeological sites and three (3) are isolated finds. The projectile point types include the following: one (1) Elko Series projectile point (CA-SBR-13075); seven (7) Pinto Series projectile points (CA-SBR-6528, -5600, -13126, and isolate KRM-S1-ISO-001); one (1) Lake Mojave Series projectile point (CA-SBR-5600); four (4) Silver Lake Series projectile points (CA-SBR-13126/H, CA-SBR-1908); one (1) isolated Cottonwood Triangular point (P36-014748); and the base of one (1) isolated Desert-Side notched point (P36-014745). The groundstone consists of four (4) metates (CA-SBR-13007, -13443/H, -13349/H and -13061/13076), one (1) abrader (CA-SBR-13075) and two (2) manos (CA-SBR-13020, P36-014730). Two prehistoric pottery sherds were reported at site CA-SBR-1793. Some ceramics occur on private land outside the project area (i.e., NAP areas) and include one (1) Barstow buffware ceramic sherd (CA-SBR-13095) and four (4) Tizon brown sherds (P36-014829).

C.3.5.5 BUILT ENVIRONMENT SURVEY

Built Environment Field Survey Methodology

On August 19 and October 27 through 28, 2008, the applicant conducted a historic built environment survey for properties that appeared to meet the age criteria for consideration as potential historical resources (i.e., older than 45 years) within the built environment project area of analysis, which includes the project footprint and a CEC one-half-mile built-environment buffer. Following completion of the field survey, the applicant evaluated the properties for eligibility per NRHP and CRHR criteria. Properties younger than 45 years were noted, but not formally recorded or evaluated.

As part of the built environment survey the applicant contacted San Bernardino County Land Use Services, City of Barstow Community Development Department, and the Mojave River Valley Museum on September 15, 2008 to identify cultural resources within a one-mile radius around the project footprint that had been listed pursuant to ordinance or recognized by a local historical society or museum. To date, responses have not been received from the local agencies and historical society.

In addition to efforts to develop a historic context for the built environment, the applicant conducted site-specific and general primary and secondary research at the University of California at Riverside, Rivera and Science libraries; the SBAIC at the San Bernardino County Museum; San Bernardino County Recorder's office; San Bernardino County Assessor's office; and using numerous online resources. Thomas Taylor, Manager of Biological and Archaeological Services for Southern California Edison, provided site-specific information about the Pisgah Substation and the 12-kV and 220-kV transmission lines within the project area.

The applicant obtained historic maps from the University of California at Riverside science library and the Archaeological Information Center at the San Bernardino County Museum in Redlands. Maps obtained include 1955 15-minute U.S. Geological Survey quadrangles, five maps depicting the Old National Trails Highway, *Punnett Brothers Map of San Bernardino County* (1914), *Kremmerer's map of San Bernardino County* (1925), and *Thomas Brothers Settlers* and *Miner's Map of San Bernardino County* (1932). These maps were reviewed to identify possible unrecorded historical structures and archaeological sites within the project area and within a one-mile search radius.

The applicant conducted additional historic research in October 2009 in response to BLM/CEC Data Requests. As a result, the applicant updated information related to historic manganese mining in the general desert region, and provided more specific information for the Logan Mine.

Results of Built Environment Survey

Based on the historic built-environment field investigation, the applicant identified ten properties within the project area of analysis that meet the age criteria for consideration as potential historical resources (see Cultural Resources Table 6, below). Four of the properties are located within the area of direct impact, including Hector Road (CA-SBR-13118H), the Pacific Gas and Electric Pipeline (no trinomial), the Mohave Pipeline (no trinomial), and abandoned segments of the National Old Trails Road (CA-SBR-2910H). The remaining six resources are located within the one-half mile built-environment study area and would not be subject to direct impacts as a result of the project, but have been analyzed in terms of potential indirect effects. Two historic built linear resources occur within the project area of analysis: the National Old Trails Road/U.S. Route 66 (CA-SBR-2910H); and the Atlantic & Pacific Railroad/Atchison Topeka & Santa Fe Railroad (CA-SBR-6693H) (now the BNSF railroad). Segments of these linear resources had been previously recorded and evaluated outside the project limits. Some of the previously recorded segments (not within the project limits) were determined to be eligible for the NRHP and CRHR.

The Pacific Gas and Electric Pipeline and the Mojave Pipeline are natural gas pipelines that pass through the portions of the project area. Both of these pipelines were

constructed prior to 1955; however, there are no visible features of either pipeline within the project area. In addition, the Advisory Council on Historic Preservation has exempted federal agencies from taking into account the effects of their undertakings on historic natural gas pipelines (Advisory Council on Historic Preservation 2002). The two pipelines would not be affected by the proposed project, and they are recommended as not eligible for the NRHP or CRHR under any criteria. As a result, the applicant did not prepare DPR 523 forms for either of these pipelines. A wood pole power line is located adjacent to Hector Road in the project area south of BNSF railroad. This power line is not historic-age (45 years old or older) and was not evaluated. Two additional steel tower transmission lines are located adjacent to the SCE 12kV transmission line and a wood pole power line is located adjacent to U.S. Route 66 within the half-mile buffer of the Project area of analysis. These resources are also not historic-age and were not evaluated.

CULTURAL RESOURCES TABLE 6:
Built-Environment Resources within the Calico Solar Project Area

Trinomial	Resource Name	Year Constructed	Description of Resource	Recommended Eligible by Applicant	Location
CA-SBR-2910H	National Old Trails Road	1912	remnants of historic road	No	Phase 2 and one half-mile buffer
CA-SBR-2910H	U.S. Route 66	1930s	historic highway	No/Yes (conflicting recommendation)	One half-mile buffer
CA-SBR-6693H	Atlantic & Pacific Railroad/Atchison, Topeka, & Santa Fe Railroad	1882-1883	historic railroad and associated bridge structures	Yes	One half-mile buffer
CA-SBR-13114H	SCE 12-kilovolt power line	1961	pine T-post utility pole transmission line	No	One half-mile buffer
CA-SBR-13115H	SCE 220-kilovolt North Transmission Line	1936-1939	single-circuit, steel lattice tower transmission line	Yes	One half-mile buffer
CA-SBR-13116H	SCE 220-kilovolt South Transmission Line	1939-1941	single-circuit, steel lattice tower transmission line	Yes	One half-mile buffer
CA-SBR-13117H	Pisgah Substation	1940	SCE switching station including switch gear, bus bars, and 3 structures used for relay and station battery equipment and storage	Yes	One half-mile buffer
CA-SBR-13118H	Hector Road	late 1930s to early 1950s	one-lane, graded dirt road	No	Phase 1 and Phase 2
CA-SBR-13119H	Pisgah Crater Road	late 1930s to early 1950s	asphalt paved road	No	One half-mile buffer

Trinomial	Resource Name	Year Constructed	Description of Resource	Recommended Eligible by Applicant	Location
N/A	Pacific Gas and Electric Pipeline	prior to 1955	natural gas pipeline	Exempt under Sec. 106. Not evaluated – no effect.	Phase 2 and one half-mile buffer
N/A	Mojave Pipeline	prior to 1955	natural gas pipeline	Exempt under Sec. 106. Not evaluated – no effect.	Phase 2 and one half-mile buffer

Key:
SCE- Southern California Edison

* Both the National Old Trails Road and 1930s alignment of U.S. Route 66 have been recorded under site number CA-SBR-2910H. Because remnants of both the 1912 alignment of the National Old Trails Road and the 1930s alignment of U.S. Route 66 are located within the Project area of analysis, these resources are listed separately and separate update forms were completed.

C.3.6 HISTORICAL SIGNIFICANCE OF THE CULTURAL RESOURCES INVENTORY

State and Federal regulatory programs require the BLM and the Energy Commission to consider the potential effects of the proposed action on historically significant cultural resources. Under the subject programs (CEQA, NEPA, and Section 106), formal evaluations of historical significance conclude the process of identifying which cultural resources in the inventory for the proposed action must be given further consideration. Cultural resources that can be avoided by construction may remain unevaluated. Unevaluated cultural resources that cannot be avoided are either tested to determine eligibility status, or they are treated as eligible when determining effects. The early phases of the typical planning process often results in the development of a preliminary cultural resources inventory that includes more resources than a proposed action would ultimately affect, because the preliminary inventory cannot take into account the final design of the facility. Staff here assumes that the construction, operation, maintenance, and decommissioning of the proposed action may wholly or partially destroy all archeological sites on the surface of the project area.

Historical Significance of Archaeological Resources

Individual Prehistoric Archaeological Resources

Staff believes that the presently available prehistoric archaeological site data reported by the applicant are too course in resolution to enable an adequate evaluation of the significance of these resources. Staff asserts that there is evidence to suggest that the data potential of the prehistoric resources within the project area of analysis has not necessarily been exhausted through recordation, as suggested by the applicant, and that additional investigation is warranted in order to more definitively draw conclusions regarding archaeological site significance.

On May 22, 2010, seven (7) of the 119 archaeological sites in the project area of analysis were revisited for the purpose of site evaluation by BLM archaeologist, James Shearer and his consultant, LSA archaeologist, Dr. Fredrick Lange. The seven sites examined include CA-SBR-13126; CA-SBR-13443/H; CA-SBR-13093; CA-SBR-1908/H; CA-SBR-13075; CA-SBR-13007; and CA-SBR-6528. No formal report documenting the details of the BLM's investigation was prepared; however, upon request, staff did receive a summary of the work via email from BLM archaeologist, James Shearer on July 2, 2010. The rationale for the selection of these seven arcaheological sites for evaluation appears to be based on the following: (1) the types of surface artifacts observed during site recordation (all sites are classified as *Complex Lithic Scatters,* with the exception of one); (2) the location of the sites in proximity to the Axial Channel/Inset Fan (which is considered to have a moderate sensitivity for subsurface archaeological deposits per the geoarchaeological analysis); (3) the presence of rock cluster features or potential hearths (because the rock cluster features are indeterminate and have not been formally evaluated, the BLM is assuming them to be eligible for the NRHP); and (4) the low degree of desert pavement development reported during the applicant's site recordation. The BLM conducted subsurface testing at two (2) of the seven sites that were revisited (CA-SBR-13126/H, and CA-SBR-13443/H). No test excavation work was conducted at the remaining five sites. A brief summary of the BLM's evaluation efforts at these seven sites is provided below and is based on the email the BLM provided to staff on July 2, 2010.

CA-SBR-13126/H – The BLM excavated five (5) "post-holes" (11-inch diameter) to a depth of 70 centimeters at CA-SBR-13126/H. The BLM reported that no cultural artifacts or organic staining (midden) were observed from the post-hole excavation, but that subsurface remains may exist in the portion of the site that lies outside the project area of analysis to the west. No mapping depicting the locations of the post-holes relative to the site area was provided to staff; therefore, staff is unable to comment on the adequacy of the placement of the post-holes. The BLM determined that the portion of the site within the project area of analysis is not eligible for nomination to the NRHP.

CA-SBR-13443/H – One (1) "post-hole" (11-inch diameter) was excavated to a depth of 70 centimeters at CA-SBR-13443/H. The BLM reported that in-situ fire-affected rock was recovered from 50 to 70 centimeters below the surface. On this basis, the BLM concluded that subsurface cultural remains exist in at least one portion of the site that also has groundstone and flaked stone assemblages on the surface. No mapping depicting the locations of the post-holes relative to the site area was provided to staff;

therefore, staff is unable to comment on the adequacy of the placement of the post-holes. The BLM has determined that this site is eligible for nomination to the NRHP.

CA-SBR-13093/H – The BLM has determined that the portion of CA-SBR-13093/H, which contains thirty-seven (37) rock cluster features, is eligible for nomination to the NRHP. The BLM has also determined that the remaining portions of the site, which contain complex lithic scatter loci, are non-contributing elements to the rock features and are, therefore, not eligible for nomination to the NRHP. The BLM conducted no subsurface testing at CA-SBR-13093/H.

CA-SBR-1908/H – The BLM has determined that the portion of CA-SBR-1908/H that contains 498 rock cluster features is eligible for nomination to the NRHP. The BLM has also determined that the remaining portions of the site, which contain lithic reduction scatter loci, are non-contributing elements to the rock features and are, therefore, not eligible for nomination to the NRHP. The BLM conducted no subsurface testing at CA-SBR-1908/H.

CA-SBR-13075 – The DPR site form prepared by the applicant indicated that there was a near absence of well-developed desert pavement surface at CA-SBR-13075; however, when the BLM revisited the site, they concluded that the site is covered by "moderate desert pavement development." On this basis, the BLM concluded that there is no potential for subsurface cultural artifacts and, therefore, determined that the site is not eligible for nomination to the NRHP. The BLM conducted no subsurface testing at CA-SBR-13075.

CA-SBR-13007 – The DPR site form prepared by the applicant indicated that the soils throughout the site show no development of desert pavement; however, when the BLM revisited the site, they concluded that the site area is coverd by "moderate desert pavement development that has been disturbed throughout by braided slope erosion." On this basis, the BLM concluded that there is no potential for subsurface cultural artifacts to occur at this site and, therefore, determined that the site is not eligible for nomination to the NRHP. The BLM conducted no subsurface testing at CA-SBR-13007.

CA-SBR-6528 – The DPR site form prepared by the applicant indicated that ten of the 27 loci are on poorly developed desert pavement surfaces, one is on loose sands with no desert pavement, and the rest are on moderately to well developed desert pavement. When the BLM revisited the site, they concluded that "the site area is covered by low to moderate desert pavement development." On this basis, the BLM concluded that there is no potential for subsurface cultural artifacts to occur at CA-SBR-6528 and, therefore, determined that the site is not eligible for nomination to the NRHP. The BLM conducted no subsurface testing at CA-SBR-6528.

In summary, the BLM conducted subsurface investigations at two (2) of the 119 archaeological sites in the project area of analysis/APE; one "post-hole" was excavated at CA-SBR-13443/H, and five (5) "post-holes" were excavated at CA-SBR-13126/H. Based on surface observations and geoarchaeological data, the applicant has applied the NRHP and CRHR criteria to each of the remaining 116 archaeological sites and has recommended that all remaining 116 sites are ineligible for the NRHP and the CRHR, as follows: (1) the sites are not associated with events that have made a significant

contribution to the broad patterns of the history and cultural heritage of the United States or California (Criterion A/1); (2) the sites are not associated with the lives of persons significant to the nation's or California's past (Criterion B/2); (3) the sites do not embody distinctive characteristics of a type, period, region, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represents a significant and distinguishable entity whose components may lack individual distinction (Criterion C/3); and (4) based on the geology of the sites, there is low likelihood of buried archaeological remains. Thus, research potential of the 116 archaeological sites has been exhausted through recordation; therefore, the sites are not likely to yield information important to the prehistory or history of the nation or of California (Criterion D/4). Based on the post-hole sampling conducted at two (2) archaeological sites and surface observations at the remaining 117 sites, the BLM has determined that three (3) of the 119 archaeological sites in the project area of analysis/APE are eligible for the nomination to the NRHP. The remaining 116 archaeological sites in the project area of analysis have been recommended by the applicant, and determined by the BLM, to be ineligible for nomination to the NRHP.

On June 2, 2010, in response to concerns about impacts to both cultural and biological resources, the applicant submitted an alternative project layout, which reduced the original 8,230-acre project footprint to the current 6,215 acres (TS 2010ag). A substantial amount of the northern project boundary was removed along the base of the Cady Mountains to avoid biological resources. In addition, based on the BLM's NRHP eligibility determinations for cultural resources (described above), the applicant reconfigured the portions of the southern project area to avoid all or portions of the three archaeological sites determined eligible by the BLM (CA-SBR-13443/H, CA-SBR-13093/H, and CA-SBR-1908/H). As a result of the alternative site layout submitted by the applicant, CA-SBR-13443/H has been entirely excluded from the project area, and the majority of the two other sites (i.e., the portions containing the rock cluster features), CA-SBR-1908/H and CA-SBR-13093/H, have also been excluded from the project footprint. Only the "non-contributing" (lithic scatter) portions of these two sites remain within the project area of analysis. In addition, due to their proximity to the site areas targeted for avoidance and/or proximity to biological resources being avoided, ten (10) additional archaeological sites are now also excluded from the project footprint based on the applicant's June 2, 2010 alternative project layout. The ten additional archaeological sites now wholly excluded from the project footprint include: CA-SBR-4558H; CA-SBR-13013; CA-SBR-13028; CA-SBR-13029; CA-SBR-13030; CA-SBR-13054; CA-SBR-13105; CA-SBR-13107; P36-014578; SM-S1-005. A portion of site CA-SBR-13126/H is now also excluded from the project footprint.

As indicated above, subsurface archaeological site testing has been conducted at two (2) of the 119 archaeological sites identified within the initial project footprint. Due to the BLM's eligibility recommendations and the concomitant reconfiguration/reduction of the project footprint, ten (10) sites have been entirely excluded from the project footprint, and two (2) sites have been partially excluded. Of the ten (10) sites now excluded from the project, eight (8) are prehistoric, one (1) is historic, one (1) is multicomponent, and one (1) is indeterminate. Thus, 108 archaeological sites are currently entirely or partially within the most recent proposed project footprint and would be directly affected by the project. Among the 108 remaing archaeological sites, 100 are prehistoric sites (14 of which are multi-component sites with a minor historic component), seven (7) are historic

sites, and one (1) is indeterminate. The applicant has recommended, and the BLM has determined, based on surface observations, that the data potential has been exhausted through recordation for all 108 archaeological sites within the project current footprint and are, therefore, not eligible for nomination to the NRHP/CRHR.

As archaeological remains constitute non-renewable resources that, once destroyed, are lost forever, staff believes that determinations of resource eligibility must be made with due caution. Based on the information provided, staff is unable to confidently conclude that all potentially significant datasets have been identified and that representative samples of archaeological data potential have been exhausted through recordation for the 100 remaining prehistoric archaeological sites in the project area, as recommended by the applicant. The applicant's eligibility recommendations and the BLM's eligibility determinations for the 100 prehistoric archaeological sites that would be directly affected by the project are derived from preliminary, in-field assessments, based on observations of artifacts and other cultural components visible on the surface (TS 2010an, p.6-15), as well as on the geoarchaeological sensitivity analysis conducted for the project. Based on the information provided, staff believes that additional data potential may exist and subsurface testing of structured samples of the different archaeological sites would be warranted in order to draw more reliable conclusions regarding prehistoric archaeological site eligibility for at least the CRHR.

The applicant has conducted no subsurface testing at the 100 prehistoric archaeological sites in the project area, and "more formal laboratory analyses of artifacts was beyond the scope of the Class III intensive field survey" (TS 2010an, p. 6-15). The applicant has further stated that "obsidian hydration and/or radiocarbon studies were also beyond the scope of the current survey; therefore, the chronological placement of the prehistoric and historic sites for this project relied on the few temporally diagnostic surface artifacts or specific features that could be correlated with a general timeperiod" (TS 2010an, p. 6-1). The applicant has also stated that, "because a variety of temporally diagnostic artifacts occurs at different sites across the entire project footprint, these prehistoric sites, when viewed as a whole, appear to represent multiple complexes over time. In addition, because the number of temporally diagnostic artifacts is extremely low and the data are based on surface information alone, the applicant states that research questions pertaining to site chronology cannot be fully addressed *without gathering further data"* (emphasis added; TS 2010an, p. 6-25). "Though temporally diagnostic artifacts were used to assign a chronological timeframe to sites within the project area, a temporal relationship among the sites cannot be determined due to the limited data available at this time" (TS 2010an, p. 6-27). The reconstruction of these relationships among the sites (if data are available) would be critical to the derivation of interpretive contexts for the individual archaeological sites and to the consideration of whether and how the individual sites may represent a larger district or landscape-scale resources.

The applicant's and the BLM's conclusions regarding site eligibility also rely heavily on the geoarchaeological sensitivity analysis; however, as stated in the geoarchaeological technical report, the analysis is "focused on identifying those portions of the project area that have the potential for harboring archaeological deposits *with no surface manifestation*" (emphasis theirs; SES 2009dd, DR 92-93, p. 1). Since there are, in fact, ample surface manifestations of archaeological sites in the project area, and there are indications, based on the geoarchaeological report, that some portions of the project

area have at least some potential for subsurface deposits (e.g., the area of the axial channel landform and associated terraces), staff believes that some archaeological site sampling is warranted to confirm whether or not data potential has been exhausted at the archaeological sites that would be impacted by the project. Staff believes, based on the geoarchaeological report, that there is virtually no potential for deeply buried archaeological deposits with no surface manifestions; however, for those sites with surface manifestations that are distributed broadly across the project area, there does not appear to be sufficient evidence, based on the applicant's technical report, to dismiss these sites entirely without some degree of subsurface sampling.

The geoarchaeological report also states, "The lack of time-sensitive diagnostic artifacts across the Calico Solar project area makes it difficult to assess what sites are older, and thus more likely to contain buried artifacts, versus those that are younger and less likely to contain buried components. One corollary, which may prove useful, is the degree of weathering of surface artifacts. The longer the artifacts have been part of the desert pavement, the more patination and visible weathering from eolian abrasion on the surface of the artifact. As such, this theory would contend that sites with a large number of heavily weathered surface artifacts will have a higher number of subsurface artifacts than a site with relatively 'fresh' looking artifacts. Testing of this concept may prove beneficial during any Phase II (test) excavations at the Calico Solar project" (SES, 2009dd, DR-94, p. 23). Based on the information provided in the applicant's technical report, it appears that the applicant did periodically note the degree of artifact weathering; however, it does not appear that any structured analysis has occurred that would have tested the above concept.

What is compelling about the current project area in terms of substantiating staff's argument for some degree of site sampling is that: (1) a large number of formed artifacts were reported in the DPR forms for the sites in the project area; (2) being on public land, there is a high likelihood that unauthorized artifact collection (i.e., looting) has occurred in the project area (as reported in the Class III technical report), which may have skewed the surface visibility of lithic materials (particularly diagnostic artifacts) and correspondingly, any conclusions drawn about the sites based on surface observations alone; (3) the geology of the area is such that a sizable expanse of toolstone-quality material was available and actively exploited by prehistoric inhabitants over an apparently broad expanse of time, and the sites' constituents reflect the importance of lithic raw material procurement and initial treatment activities; and (4) while the project area of analysis was predominantly a lithic raw material procurement/assaying area, there is also evidence of other activities beyond primary lithic reduction (e.g., secondary/tertiary lithic reduction, late-stage bifacial tools, fire-affected rock, and groundstone artifacts). The sites in the project area do not uniformly reflect basic toolstone procurement only, and it appears that other activities were also occurring there. Thus, given the size and quantity of the pavement quarry area, staff believes an attempt to more accurately characterize the technology and reduction organization through structured sampling of the sites prior to their permanent destruction by the project's construction is warranted.

Staff acknowledges that sparse lithic scatters on desert pavement in the Mojave Desert have some degree of redundancy and may have a somewhat lower likelihood to contain substantial subsurface deposits; however, there is documented archaeological research

in the project vicinity indicating that such sites should not be readily disregarded, especially over such a broad expanse of land. For example, based on pavement quarry studies at the Wood Canyon Quackenbush Lake Training Area, Marine Corps Air Ground Combat Center, in Twentynine Palms (just south of the Calico Solar Project area), archaeological researchers suggest that, “excavation should remain an important component of quarry evaluations, even for sites on what appears to be compacted desert pavement. The surface expression of many SRL (segregated reduction loci) features proved quite different than what was discovered below ground, not only in terms of material volumes, but in the size and type of flaking debris encountered” (Giambastiani and Basgall 1999, p. 174).

In addition, staff would like to point out that it is common professional practice in cultural resource management to conduct at least some degree of subsurface sampling of archaeological sites that may be directly and permanently affected by a proposed project (even for sparse lithic scatters), particularly considering the broad expanse of land and degree of surface manifestations of archaeological remains reported by the applicant in the project area. The lack of site testing, as in this case, is an exception to this common practice. Furthermore, regardless of the presence of substantial subsurface deposits, professional research indicates that pavement quarries/toolstone procurement areas, such as that found in the Calico Solar project area, have been found to have research value in their own right (see Giambastiani and Basgall 1999; Giambastiani et al. 2009; Bird, et al. 2009). As stated in one study, “From a regional perspective, the study of quarry phenomena in the Mojave Desert is still in its infancy. Despite recent advances in our understanding of Great Basin obsidian and chert quarries, detailed investigations of Mojave Desert cryptocrystalline quarries have been limited in both number and scope” (Giambastiani and Basgall 1999, p. 173). In addition, Giambastiani further states, “Because these kinds of sites appear simple and redundant at first glance, there is a tendancy to assume they are all the same and that they offer little to our understanding of prehistoric desert adaptations. This is simply not true. Like any archaeological work in the Mojave Desert, it requires effort to glean hidden data from quarry sites” (Giambastiani 2009, p. 85). Based on the technical documentation provided by the applicant, a review of the archaeological literature on pavement quarries in the Mojave Desert, as well as consultations with archaeological professionals with expertise in the Mojave region, staff believes that further investigation of the sites in the Calico Solar project area is warranted in order obtain additional data that would contribute to the study of prehistory in the Mojave Desert and that the lack of subsurface sampling of the archaeological sites that would be affected by the project is not appropriate, particularly given the size and scope of the Calico Solar project and the number of sites that would be permanently destroyed as a result.

Prehistoric Archaeological Landscape

Beyond the consideration of the individual archaeological sites in the project area of analysis, Energy Commission staff believes, contrary to the recommendations of the applicant, that the implementation the proposed action would permanently destroy a large portion of a prehistoric archaeological landscape that may reasonably exist on the project site. The permanent loss of this landscape would be a significant impact requiring mitigation.

Description of Landscape

1. The potential landscape appears to represent the prehistoric use of desert pavement cobbles for toolstone acquisition along what appears to have been a key travelway between Troy Lake and Broadwell Lake, both of which are large, dry prehistoric lake beds. The archaeological sites in the project area that would contribute to the significance of the landscape include approximately 100 of the 109 known prehistoric sites in that area. Widespread archaeological remains that evidence the assay and initial reduction of desert pavement cobbles typify the contributors to this landscape. The chronological data presently available, the relatively sparse collection of projectile points, would appear to indicate that the most active use of the landscape was from roughly 6500 BC to 4000 BC. Although toolstone acquisition and early-stage lithic reduction appear to characterize the primary behavioral patterns of the landscape's use, evidence is also infrequently present that reveals other modes of landscape use. The presence of formed, chipped stone tools, ground stone tools, ceramic sherds, and fire-affected rock (FAR) concentrations reveal potential evidence of tool manufacture, organic resource processing and consumption, and temporary habitation. Temporary habitation in the project area is further indicated by the presence of two cleared circle features, which represent potential house pit depressions (site CA-SBR-13093).

2. The portion of the potential prehistoric archaeological landscape in the project area occurs across the entire southern portion of the project area south of the BNSF Railroad tracks.

3. The broader landscape of which the portion in the project area is a part includes intact desert pavements along the toe of the Cady Mountains bajada and across the older alluvial landforms that parallel the axial channel, the flowline of which slopes down to Troy Lake. The archaeological landscape, as a whole, appears to be bounded to the north by the Cady Mountains bajada, to the south by the basalt flows that emenate radially from Pisgah Crater to the southeast, to the west by Troy Lake, and to the east by Broadwell Lake. The broader landscape would appear to cover roughly nine square miles, and the portion of it in the project area covers roughly six square miles, or 66% percent of the apparent broader landscape.

Preliminary Interpretation and Evaluation of the Landscape

1. The potential prehistoric archaeological landscape is a subtle but potentially significant resource that may reflect underappreciated patterns of prehistoric land use that were important to the economy and to the maintenance of the regional social fabric during particular periods in prehistory. The landscape retains sufficient integrity to convey this significance. It has the further potential to provide information necessary to the reconstruction of those economic and social patterns, and may also provide information important to the reconstruction of toolstone acquisition and lithic production trajectories in prehistory. The individual contributors to the landscape, and the landscape as a whole, appear to retain the physical integrity necessary to the recovery of such data on lithic technology.

2. The high frequency of the archaeological sites across the desert pavements bearing toolstone quality raw materials is striking. In fact, a secondary conclusion of the geoarchaeological analysis is that prehistoric site location within the Calico Solar project area seems to be largely dictated by the availability of these lithic raw materials (SES 2009dd, p. 22).

3. Though the individual archaeological sites that contribute to the landscape typically contain sparse scatters of assayed cobbles, cortical flakes, and hammerstones, the extensive coverage of the desert pavements in the project area with this debris and the apparent relative restriction of the distribution of the debris to shallow surface grades along what are today intermittent stream courses potentially attest, over a number of millennium, to the recurrent and selective use of this portion of the desert landscape.

4. Energy Commission staff has come to the conclusion that this potential cultural landscape is a significant archaeological resource requiring mitigation as proposed in **CUL-4** and **CUL-5**.

The Perspective of the Applicant/BLM on the Landscape

1. The comment on the landscape concept in the SA/DEIS was prepared by the BLM and reflects the perspective of the BLM and the applicant.

2. The argument against the significance of the landscape made in the SA/DEIS is derived from the applicant's technical report (TS 2010an, pp. 590-591) and is summarized as follows:

    a. Using the guidelines of the National Park Service and the State of California, the applicant states that a grouping of cultural resources and their setting must be historically or functionally related and visually convey a historical theme or environment to be considered eligible for listing in the NRHP or CRHR as a landscape. The applicant states that the bolson in which the project area of analysis is situated can be characterized as an archaeological landscape; however, in terms of a definable geographic area that can be distinguished from surrounding properties by changes such as density, scale, type, age, or style of sites (per National Park Service Guidelines), the applicant suggests that rich sources of tool stone are not confined to the project area, nor are they unique. Thus, the applicant concludes that the tool stone source and landscape is not well bounded and that similar formations occur throughout the southern California deserts that were used prehistorically.

    b. The applicant further argues that the characteristic theme of the archaeological landscape cannot be dated; it is presumed, but unknowable that this toolstone source was used throughout prehistory. Since only a handful of temporally diagnostic artifacts were identified during the archaeological survey, the period of significance of the landscape cannot be met, as required by the California and National Registers. The archaeological landscape, therefore, does not have the distinctive or significant qualities required for eligibility under Criterion C/3.

c. The lack of datable material at the sites within the project area precludes their consideration for eligibility under Criteria A/1 and B/2, as both criteria require information that could link the landscape with particular events and trends, or with historically significant people. Absent information about who used these sites within the sites and when they were used, neither of these criteria can be met.

d. Finally, the lack of datable material also severely limits the utility of the assemblages to address important research issues. Data from the lithic reduction sites in the project area can address only two, insignificant questions: what materials were being exploited and what reduction residue was produced? These are insignificant because: (1) the source material is well-documented and obvious, and (2) debris from lithic reduction is of predictable forms that can inform on the methods and products of reduction, unless, as is the case in the Project area of analysis, assemblages from different reduction episodes may be mixed. Components must be well dated to provide information about trends in resource procurement, artifact/tool forms, and technological changes through time. In fact, for a number of reasons, these issues can be addressed much more productively using data from sites where the tool stone was taken and used. First, the source locality only bears the residues of reduction, while the use site will bear evidence of the forms in which the stone arrived, and the types of tools manufactured. Second, diachronic changes in technology are best addressed using data from destination sites where components are well-dated, not at mixed tool stone procurement sites. Third, the presence of certain source materials in destination/use sites provides an indication of the direction and distances the materials traveled, either through trade or direct procurement; source sites rarely bear evidence of who used the tool stone. Lastly, destination sites that are well-dated, typically bear other artifacts and ecofacts that can inform on reasons why patterns of lithic resource procurement may change through time (e.g., climate change, resource stress, technological change, circumscribed territories, etc.). In sum, the lithic reduction sites and landscape do not have sufficient data potential to qualify for listing under Criterion D/4.

Energy Commission Staff Response to the BLM Perspective

1. Energy Commission staff disagrees with the conclusions of the BLM on the potential prehistoric archaeological landscape. Staff does not believe that suffient data have been provided to substantiate the applicant's conclusions.

2. In order to refine the mitigation of the landscape, the additional data needed may include the following:

    a. An analysis of the geomorphic context of the boundary of the landscape would be necessary to enable comment on whether the apparent landscape boundary is a function of local geomorphic processes or cultural selection. For instance, are the archaeological sites coincident with all of the toolstone-bearing desert pavements that exist on the local natural landscape, other pavements having been eroded by more recent geomorphic processs, or does the archaeological site distribution

evidence cultural selection of some desert pavements on the natural landscape and the non-use of other nearby pavements?

b. The applicant states that the characteristic theme of the archaeological landscape cannot be dated due to limited presence of temporally-diagnostic artifacts and/or absence of datable materials. Among the fifteen diagnostic projectile points collected from the surface of the project area, the majority fall into the Pinto Complex, which dates from 6,500 – 4,000 BC. Since the applicant has conducted no subsurface testing, there may be additional chronological data that have not yet been collected to be able to address questions of chronology. For instance, there are ways of looking at levels of artifact weathering and at technological patterns that can provide some relative measure of site age. Such observations may also lead to other questions about how pavement quarries were used and about their place in the settlement systems that incorporated them (see Giambastiani 2009, p. 85).

c. The applicant's contention that the archaeological sites in the project area are common and found to occur on many, if not most, desert pavements is not supported by any evidence or peer-reviewed studies. It is also important to point out that not all pavement quarries are equal. The archaeological literature on the subject suggests that the more common quarries tend to contain the remains of primary reduction and assaying (Giambastiani and Basgall 1999; Giambastiani et al. 2009; Giambastiani 2009). The quarry landscape in the Calico project area appears to be atypical in the sense that it has evidence of later stage lithic tool reduction, large numbers of formed artifacts, fire affected rock, and some groundstone, all of which indicate more complexity.

d. Have the data that are now in-hand from the investigations done for the present siting case been sufficiently analyzed to be able to determine the degree to which the archaeological sites that may contribute to the subject landscape may be able to inform us on the local organization of toolstone acquisition and processing? Are there other potential datasets from these sites that recordation efforts to date have not adequately captured?

3. Energy Commission staff provides for the collection of these types of data in **CUL–4** to refine the mitigation of this prehistoric archaeological landscape.

Conclusions Regarding Prehistoric Archaeological Resources

Regarding the significance of the prehistoric archaeological resources within the Calico Solar project area, staff concludes, on the basis of the available information provided by the applicant, the BLM, and other sources that it does not appear that prehistoric archaeological resource data potential has been adequately assessed or exhausted through recordation, as believed by the applicant. Staff recommends that further sampling of the prehistoric archaeological sites within the project area is warranted in order to refine the mitigation of these and potentially broader resources.

Staff proposes Conditions of Certification **CUL-4** and **CUL-5**, requiring a post-certification refinement study to complete the applicant's effort to mitigate CRHR- and NRHP-eligible prehistoric archaeological deposits that could be impacted by the project, a preference called out in CEQA. The study would provide the applicant with information upon which to base project design changes to avoid impacts to prehistoric archaeological sites, and to verify the potential presence of such deposits and thereby provide more refined mitigation measures, particularly a more refined archaeological monitoring protocol.

The proposed conditions of certification would address questions pertaining to the eligibility of the prehistoric sites within the project area and would provide for mitigative measures for any significant impacts, should any of the sites be determined eligible for the NRHP/CRHR.

Historical Archaeological Resources

Following the applicant's submittal of the June 2, 2010 alternative project layout, which reduced the original 8,230-acre project footprint to the current 6,215 acres (TS 2010ag), the total number of historical archaeological sites within the project area of analysis was reduced to seven (7) historical archaeological sites and twelve (12) multi-component sites containing historical archaeological remains in conjunction with prehistoric remains. Among these nineteen (19) sites, sixteen (16) are comprised of historical refuse deposits consisting of a sparse distribution of domestic, commercial, construction, or inductrial debris (e.g., cans, bottles, ceramic tableware, milled lumber, machinery, and appliances) that predates 1963. The three (3) remaining sites consist of a survey/mapping feature, mining remains, and a trail, respectively.

The applicant has applied the NRHP and CRHR criteria to each of the historical archaeological sites and has recommended that all are not eligible for the NRHP and the CRHR, based on the following: (1) the sites are not associated with events that have made a significant contribution to the broad patterns of the history and cultural heritage of the United States or California (Criterion A/1); (2) the sites are not associated with the lives of persons significant to the nation's or California's past (Criterion B/2); (3) the sites do not embody distinctive characteristics of a type, period, region, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represents a significant and distinguishable entity whose components may lack individual distinction (Criterion C/3); and (4) based on the geology of the sites, there is low likelihood of buried archaeological remains. Thus, research potential of the nineteen (19) archaeological sites has been exhausted through recordation; therefore, the sites are not likely to yield information important to the prehistory or history of the nation or of California (Criterion D/4).

In most cases, the applicant indicated that, while the dates of manufacture could be determined for some of the artifacts present in the historical refuse scatters, the time between their manufacture, initial use/consumption of the artifacts, and their ultimate disposal could not be determined, so the specific date of activities at these sites could not reliably be determined based solely on the presence of these artifacts observed.

Having reviewed the site information provided for the nineteen (19) historical archaeological sites/components, staff concurs with the applicant's recommendations

that data potential at the historical archaeological sites has been exhausted through recordation and, therefore, all of the historical archaeological sites/components within the project area are not eligible for the NRHP/CRHR.

Historical Significance of Built-Environment Resources

To be eligible for the NRHP and/or CRHR, properties must be 50 years old (unless they have special significance) and have national, state, or local significance in American history, architecture, archaeology, engineering, or culture. They also must possess integrity of location, design, setting, materials, workmanship, feeling, and association, and meet at least one of four criteria:

Criterion A/1: be associated with significant historical events or trends.

Criterion B/2: be associated with historically significant people.

Criterion C/3: have distinctive characteristics of a style or type, or have artistic value, or represent a significant entity whose components may lack individual distinction.

Criterion D/4: have yielded or have potential to yield important information [Title 36, Code of Federal Regulations, Part 60; Title 14, California Code of Regulations, Chapter 11.5,Section 4852(b)(1)-(4)]).

The historic built environment survey identified 10 resources within the project area of analysis. Two of these resources are linear and previously recorded. Segments of these linear resources not within the project area have been previously determined eligible for listing in the NRHP and CRHP; these include the Atlantic & Pacific/Atchison, Topeka, & Santa Fe Railroad (CA-SBR-6693H), and National Old Trails Highway/U.S. Route 66 (CA-SBR-2910H).

The applicant recommends five of the historic built resources within the project area of analysis as eligible for listing on the NRHP and CRHR: US Route 66 (CA-SBR-2910H); (1) Atlantic & Pacific Railroad/Atchison, Topeka, & Santa Fe Railroad (CA-SBR-6693H); (2) the SCE 220-KV North Transmission Line (CA-SBR-13115H); (3) SCE 220-KV South Transmission Line (CA-SBR- 13116H); and (4) the Pisgah Substation (CA-SBR-13117H).

The following is a summary of the historic built-environment resources within the project area of analysis that have been recorded and evaluated or updated on the appropriate DPR 523 series forms. This summary has been drawn from the applicant's technical report (TS 2010an, p. 574-587).

National Old Trails Road (CA-SBR-2910H)

Within the project area of analysis, the National Old Trails Road consists of eight remnant segments of a batched mix oil road. The condition of the road segments is poor. Most of the road surface is crumbled, cracked, and has eroded away in places. Some segments are buried in sand, but may be partially intact.

According to the applicant, transportation resources may be evaluated in a conventional way, such as emphasizing their local, regional, or statewide significance or considering

them from the perspective of their original design, but they may also be evaluated by cognitive aspects such as their ability to illustrate the experience of the period of pre-chain-dominated roadside businesses and a sense of travel before the interstate. In order to be eligible as a transportation resource, this resource must be able to reflect its association with the theme of automobile transportation during the early 20th century era. A resource's integrity is important in evaluating these properties. A resource must be able to reflect its association with the significant period of automobile travel, when buildings were generally of simple design and materials, reflecting the styles of the local area, and when businesses were small, individually owned properties. Buildings should be linked in some way to the roadway (physically, visually, etc.) and must remain in context, illustrating their importance in roadway-related business. In addition, there are physical components of the roadway which are also important to the resource's eligibility, including the feel of the open road (vistas, panoramas, lack of encumbrances); ability to drive long distances; sense of adventure; proliferation of independently-owned roadside businesses); sense of travel before multi-lane interstates and pre-pavement roadways.

Based on the historic context and evaluative considerations, the portions of Old National Trails Road in the project area of analysis would not be considered a contributing element to the potential significance of the entire Old National Trails Road alignment or considered an individually significant segment of Old National Trails Road. Foremost, within the six-mile segment of the roadway within the project area, there are no standing structures or architectural properties associated with Old National Trails Road, such as businesses, roadside attractions, automobile court, etc. There are no properties within the project area associated with the theme of automobile transportation in the Old National Trails Road era. Further, the portion of the former roadway within the project area does not reflect any important trend or accomplishment associated with road engineering, highway design, or construction. There are no major or significant erosion-control features or landscape modifications within the segment – rather than, just mundane utilitarian erosion control efforts which really do not contribute to the significance or the understanding of the roadway. There are no distinctive engineering features with the roadway in this segment. The general feeling of the open roadway within the desert in this segment has been affected by the modern non-historic visual and atmospheric intrusions, such as the multi-lane Interstate 40, wooden and metal lattice tower power lines, transmission lines, and a fairly large electrical substation with associated infrastructure. These intrusions have diminished the property's visual narrative, context, and feeling. This portion of Old National Trails Road is not contiguous with rest of the Old National Trails Road/U.S Route 66 system, and is not associated with events which reflect the important land use activities, traditional cultural activities, and development that has characterized (and is important) to San Bernardino County, California, and the nation. There are no important people or events associated with this segment of the roadway. In addition, the property does not have the potential to yield important information. Therefore, the applicant recommends that the portion of Old National Trails Road within the project area of analysis does not appear to be a contributing element to the significance of the entire National Old Trails Road/U.S. Route 66 system, and the portion within the project area does not appear to be individually eligible for the NRHP, CRHR, or considered a historical resource for purposes of CEQA. The applicant, therefore, recommends that the portion of the road

within the project area of analysis does not appear to be considered historically significant.

The portion of Old National Trails Road within the project area does not appear to possess sufficient historic integrity of setting, feeling, materials, workmanship, and association to be considered eligible for listing to the NRHP, CRHR, or considered a historical resource for purposes of CEQA. The roadway's historic integrity aspects of setting and feeling were impacted by the addition of non-historic period elements (such as new built-up asphalt surfaces [highways and roads], wood and metal lattice transmission towers and a substation). Additionally, changes in the area's general character disrupt the original and historic-period physical features which characterize the roadway within the project area. While the portion of the roadway within the one-project area has retained some historic materials and fabric (e.g., oil batch surface is present in some areas), overall the replacement and addition of certain materials from outside of the historic period impacts the property's historic configuration and appearance. Accordingly, the loss of the property's original and historic-period setting and materials affects its ability to convey a specific historic feeling. In its current condition, the portion of the road within the project area does not exhibit signs of high workmanship, since the property does not express ways people fashioned their environment during the early twentieth century. The portion within the project area is representative of common utilitarian road construction and engineering from the early 20th century, and does not express a vernacular method of construction or highly sophisticated configurations. There is little physical evidence of the crafts of a particular culture or people from the period of significance. Lastly, the portion of the roadway within the project area does not have any association or direct link between important events or people and the property. The portion of the property in the project area was not the location or place for any important event or activity, and is not sufficiently intact or distinctive to convey any type of historic-period relationship.

In summary, the applicant recommends, and staff concurs, that the portion of the road within the project area does not appear to be individually eligible for listing to the NRHP, CRHR, or considered a historical resource for purposes of CEQA, and does not appear to be contributing element or significant related feature/component to the larger linear Old National Trails Road/U.S Route 66 system (if it is determined that such a resource exists). Further, the addition of a solar plant near the roadway would not create a new adverse effect or significant impact to the portion of the historic-period property within the project area.

U.S. Route 66 (CA-SBR-2910H)

U.S. Route 66 is located within the one-half mile built-environment area of analysis, but does not lie within the project footprint. It was originally constructed in the 1930s, south of the highway's original alignment, which was known as the National Old Trails Road. U.S. Route 66 in the vicinity of the project area is a contributing segment of the NRHP-eligible and CRHR-eligible U.S. Route 66. This segment of U.S. Route 66 has been previously evaluated as eligible for the NRHP under Criterion A as one of the first all-weather highways in the United States (TS 2010an, Route 66 DPR form, p. 2).

Within the one-half mile built environment area of analysis, U.S. Route 66 in consists of an approximately nine-mile segment of two-lane paved roadway that currently serves as

a frontage road for Interstate 40. The applicant describes this segment of U.S. Route 66 as a relatively pristine segment of the roadway, with modern intrusions that have compromised its historical setting, including Interstate 40, power lines, transmission lines, and an electrical substation. It is in fair condition and shows evidence of maintenance and repair. (TS 2010an, p. 5-577).

Additionally, four previously unrecorded bridge structures on U.S. Route 66 are within the one-half mile built-environment area of analysis. These bridge structures were recorded and documented on the DPR 523 update form (TS 2010an, Route 66 DPR form, p.7). All four of the bridge structures retain sufficient historical integrity to be considered contributing elements to the highway.

The applicant's consultant used the following evaluative considerations to recommend the eligibility of the segment of Route 66 in the project area of analysis: According to those existing management contexts used by the applicant's consultant, eligible Route 66 resources include properties such as motels, gas stations, restaurants and cafes, and roadside attractions, that may be individually eligible for listing on the NRHP. In order to be eligible as a Route 66 resource, a resource must be able to reflect its association with the theme of automobile transportation in the Route 66 era. A resource must be able to reflect its association with the significant period of automobile travel, when buildings were generally of simple design and materials, reflecting the styles of the local area, and when businesses were small, individually owned properties. Buildings should be linked in some way to the roadway (physically, visually, etc.) and must remain in context, illustrating their importance in highway-related business. In addition, there are physical components of the roadway which are also important to the resource's eligibility, including the feel of the open road (vistas, panoramas, lack of encumbrances); ability to drive long distances; sense of adventure; proliferation of independently-owned roadside businesses); sense of travel before multi-lane interstates and pre-pavement roadways (TS 2010an, Route 66 DPR form, p. 11).

The applicant concluded, based on the evaluative considerations described above, that the portion of Route 66 in the project area of analysis would not be considered a contributing element to the potential significance of the entire Route 66 alignment or considered an individually significant segment of Route 66. This conclusion was reached due to the absence of standing structures or built environment properties are associated with Route 66, such as businesses, roadside attractions, automobile court, etc.; the absence of properties within the area of analysis associated with the theme of automobile transportation in the Route 66 era; and that the portion of the roadway within the project area of analysis does not reflect any important trend or accomplishment associated with road engineering, highway design, or construction. Additionally, the applicant concluded that there are no distinctive engineering features with the roadway in this segment, and that the general feeling of the open roadway within the desert in this segment has been affected by atmospheric intrusions, such as the multi-lane Interstate 40, wooden and metal lattice tower power lines, transmission lines, and a fairly large electrical substation with associated infrastructure. The evaluation also states that changes in the roadway (resurfacing, re-striping, built-up asphalt application, widened shoulders) diminish the feeling of an open adventures trip on a small one- to two-lane long distance highway. The evaluation concludes that the portion of Route 66 within the built-environment area of analysis does not appear to be a contributing

element to the significance of the entire U.S. Route 66 system, and the segment within the one-half mile built-environment area of analysis does not appear to be individually eligible for the NRHP, the CRHR, and would not be considered a historical resource for purposes of CEQA (TS 2010an, Route 66 DPR form, p. 11–12).

However, the applicant was requested, in Data Request 106, to consider whether three historic districts should be defined within the area of analysis, including a "National Old Trials Road/U.S. Route 66 Historic District" (CEC 2009h, p.14). As part of this evaluation, the applicant concluded, incorporating the information above, that "the segment of U.S. Route 66 in the project area of analysis *retains historical integrity and is considered eligible*" (emphasis added, TS 2010an, p. 5-589). This contradicts the original conclusion reached by the applicant.

Staff was, therefore, prompted to further research the history, context and character-defining features of U.S. Route 66 due to the discrepancy in data described above, and disagrees with the context and criteria used to evaluate the segment of Route 66 within the project area of analysis. The context described above focuses solely on the architecture that resulted from the establishment of Route 66 as a major travel route, rather than the significance of Route 66 itself as a national highway. The Route 66 Corridor Preservation Program, established by National Park Service as a result of *Public Law 102-400, the Route 66 Study Act of 1990,* notes that the significance of Route 66 is as the nation's first all-weather highway linking Chicago and Los Angeles. It was the shortest, year-round route between the Midwest and the Pacific Coast at the time, reducing the distance by more than 200 miles. Route 66 is reflective of the origin and evolution of road transportation in the United States, and is representative of the transition from dirt track to superhighway. It linked the rural West to the more densely populated Midwest and Northeast, and came to symbolize the optimism that pervaded the nation's post World War II economic recovery. As noted on the Route 66 Corridor Preservation Program's website:

> "not only does Route 66 underscore the importance of the automobile as a technological achievement, but, perhaps equally important to the American psyche, it symbolized unprecedented freedom and mobility for every citizen who could afford to own and operate a car. Escalating numbers of motor vehicles and the rise of the trucking industry increased the need for improved highways. In response the federal government pledged to link small town U.S.A. with all of the metropolitan capitals" (http://www.nps.gov/history/rt66/HistSig/index.htm)

Additionally, the Route 66 Corridor Preservation Program commissioned the *Route 66 Corridor National Historic Context Study,* published in 2004. This context study details the national significance of Route 66, identifies the period of significance (1926-1970), and identifies the historic and architectural property types associated with it. The roadbed itself is identified as one of the associated property types. The context study notes that in the 50 years that Route 66 was a major highway, the roadbed changed extensively in construction and location. Its alignment was shifted to reduce curves and corners, widened, paved and repaired. The context study goes on to state,

> "In some instances the road continues to be used as a highway or service road that even runs along side the interstate that replaced it. By following the evolution

> of the road bed, thus, one gains a closer appreciation of not only the technology of highway construction and transportation engineering, but also the social implications of both
>
> Road segments that remain from the period of historic significance are valuable artifacts that serve to chart the changing social dynamics associated with Route 66. The materials, the designs, and the locations of these road segments reflect on the one hand new and changing technologies and the evolution of pavement design and traffic engineering, and on the other hand the social and economic circumstances that forced and shaped the roadway's course or alteration" (Cassity 2004, pp. 287–288).

The *Route 66 Corridor National Historic Context Study* also identifies those features that a road segment must retain in order to be considered eligible, including the original cross -section template (cut banks, fill slopes, roadbed, grade); original alignment or later realignment; and associated features such as bridges and culverts (even if they have been modified or replaced). The context study also states that those segments of road that have been widened after the end of the period of significance may still be included if they link other significant sections of the route, and, notably, that pavement is "an inherently fragile feature of highways and is routinely covered over and replaced" (Cassity 2004, pp. 289–290).

Based on the information from the *Route 66 Corridor National Historic Context Study* summarized above, staff has determined that the section of U.S. Route 66 in the project area of analysis would be a contributor to a larger U.S. Route 66 historic district, should such a resource be determined eligible, and that this section would therefore be considered a historic resource for the purposes of CEQA. This section of Route 66, as described in the original evaluation, is a pristine section of roadway. It is a realigned section of the road, which originally ran along the National Old Trails Road. It was realigned south to its existing location in the early 1930s to reduce sharp turns, steep grades and accommodate higher speeds. Also stated in the applicant's evaluation is that the section of Route 66 from Needles to Los Angeles, including this section, was the most travelled section of the highway and it was paved in 1934 (TS 2010an, Route 66 DPR form, p. 4). The road has been resurfaced and widened since its construction, and although the dates of these changes are not clear, staff is confident in the presumption that they took place within the identified Route 66 period of significance 1926-1970, as the road would have required those modifications to accommodate modern traffic.

This section of road also retains those character-defining features noted in the National Historic Context Study in order to be considered eligible: the original cross-section template, later (1934) realignment, and four associated single-span bridges that were constructed from 1939 to 1952 (Bridges located at postmiles 08-SBD-040-R31.37, 08-SBD-040-R32.26, 08-SBD-040-R33.11 and 08-SBD-040-R33.55).As stated in the original evaluation, these four bridges retain features that indicate they are likely an original features of Route 66, including the concrete decking, and are in good state of preservation (TS 2010an, Route 66 DPR form, page 8).

The original evaluation of the segment of Route 66 within the project area of analysis also notes that such the setting has been compromised by intrusions such as Interstate 40, wooden and metal lattice tower power lines, transmission lines, and a fairly large electrical substation with associated infrastructure. However, the Southern California Edison (SCE) 220-Kilovolt North and South Transmission Lines and the Pisgah Substation were all constructed between 1936 and 1941, beginning only two years after the construction of Route 66 in 1934. Interstate 40 was constructed in 1968, also within the national period of significance. The SCE 220 kV lines and the Pisgah Substation have been determined to be NRHP- and CRHR-eligible resources for their association with the Hoover Dam and their significance in the World War II effort (Criterion A/1). These resources would have been part of the Route 66 travel experience and landscape across this section of the Mojave Desert, and therefore would not compromise the integrity of Route 66.

Additionally, staff consulted with Kaisa Barthuli, Program Manager for the Route 66 Corridor Preservation Program, by phone on July 28, 2010. Ms. Barthuli stated that rural sections of Route 66, such as that found in the project area and in the eastern Mojave Desert in general, are particularly significant for the vast, open landscapes and viewsheds. Those landscapes and viewsheds are considered character-defining features of the travel experience of Route 66, which the program seeks to preserve. Moreover, the project area is included in the proposed Mojave Trails National Monument currently being heard by Congress, one purpose of which is the preservation of Route 66 (http://www.opencongress.org/bill/111-s2921/text).

In light of the above information, staff finds that the portion of Route 66 within the project area of analysis does contribute to the significance of Route 66, is potentially eligible for the NRHP and CRHR as a contributing resource to the larger Route 66 system under Criterion A/1 for its association as one of the first all-weather highways in the United States, and is therefore it is a historical resource for the purposes of CEQA. This section of Route 66 retains the character-defining features established in the national historic context statement and the Route 66 Corridor Preservation Program noted above. The open feeling of a desert highway has not been compromised by the construction of the SCE 220 kV lines and the Pisgah Substation, as they were constructed shortly after this section of Route 66 and would have been part of the landscape during the period of significance. It has been established at the national level that maintenance of the highway, including widening, repaving and restriping, also does not compromise the integrity of the resource. Considering the extant character-defining features and the integrity of the roadbed, staff finds that this section of Route 66 is a potential historical resource for the purposes of CEQA but mitigation for the impact on the viewshed of the resource is not feasible.

As detailed Section 5.13, Visual Resources, of the AFC, the project site is clearly visible to travelers on Route 66. Travelers “would have direct and immediate views to the site. Due to area topography, and the lack of vegetative screening adjacent to the interstate, with few exceptions, traveler views along I-40 are virtually unobstructed for over 20 miles in the vicinity of the site. Direct unobstructed traveler views from both the I-40 and U.S. Route 66 are available as the interstate approaches both the western and eastern boundaries of the site (SES 2008a, p. 5.13-6–7)

Subsequently, staff has determined that the installation of the proposed 34,000 solar dishes would result in a significant and unavoidable visual impact to a potential historical resource, U.S. Route 66. The installation of this large number of SunCatchers, consisting of an approximate 40-foot diameter solar concentrator dish that supports an array of curved glass mirror facets (TS 2010an, Route 66 DPR form, p. 1-3), will substantially alter the vast, open landscape that is a character-defining feature of this section of Route 66, as well as of the rest of Route 66 in the Mojave Desert. The travel experience of this section of Route 66—which is substantially unchanged since its construction—will be permanently impaired resulting in a unmitigable effect causing a substantial adverse change in the significance of a potential historical resources

On-site mitigation measures that would reduce the level of impact to less than significant are not available. The area is relatively flat and consists only of scrub vegetation. The historical significance of Route 66 in the Mojave is its view of the vast, unobstructed, flat expanse of desert landscape which would be impeded by any type of screening, either on the roadway itself or on the edge of the project site. Eliminating the first few rows of solar dishes would also not lessen the visual impact of the proposed project, as the views are unobstructed for approximately 20 miles.

Staff proposes condition of certification (**CUL-6)** requiring Historic American Landscape Survey (HALS) documentation, including photodocumentation, of the 9-mile segment of roadway and associated landscapes and viewsheds within the project area of analysis from the roadway. This level of documentation includes a historical description and large-format negatives that clearly depict the appearance of the property and areas of significance or the site, perspective-corrected and fully captioned. As noted above rural sections of Route 66, such as that found in the project area and in the eastern Mojave Desert in general, are particularly significant for the vast, open landscapes and viewsheds. Those landscapes and viewsheds are considered character-defining features of the travel experience through this section of Route 66.

Atlantic & Pacific/Atchison Topeka & Santa Fe Railroad [CA-SBR-6693H]

SBR-6693H is the railroad line that was originally built in 1883 for the Atlantic and Pacific Railroad Company. From 1890, the railroad was operated by the Atchinson, Topeka & Santa Fe Railroad until its merger in 1996 with the Burlington Northern Santa Fe Railway (BNSF). Between 1993 and 2002 portions of this site (none within the project area) have been given status codes 2S2 (individual property determined eligible for the NRHP by a consensus through Section 106 process; listed in the CR) and 6Y (determined ineligible for NR by consensus through Section 106 process, not evaluated for CR or Local Listing). SBR-6693H bisects the project area and is located within both phases of project construction.

The BNSF Railway (historically the Atlantic & Pacific/Atchison Topeka & Santa Fe Railroad) is located within the one-half mile built-environment area of analysis. In addition to the railroad track, associated historical artifacts include glass, metal, track and train parts, and railroad tableware. The Southern Pacific Railroad constructed a single track rail between Mojave and Needles to intercept the Atlantic & Pacific (A&P) Railroad tracks in Needles in an attempt to protect its California interests. The Southern Pacific constructed the Mojave to Needles branch between 1882 and 1883, working east from their station in Mojave. The railroad has been previously determined to be

eligible for the NRHP and the CRHR under Criterion A (Criterion 1) for its association with the history of transportation in California. Although much of the railroad has been upgraded for continued use and few historical materials remain in place, the applicant states that it retains integrity of location and the level of significance established by the previous recordings. There are thirteen previously unrecorded bridge structures on the railroad within the one-half mile built-environment area of potential effects. These bridge structures were recorded and documented on the DPR 523 update form. Five of the bridge structures retain sufficient integrity to be considered contributing elements to the railroad. The other eight are either modern replacement bridges or have been highly modified.

Staff disagrees that the BNSF Railway (historically the Atlantic & Pacific/Atchison Topeka & Santa Fe Railroad) and five bridge structures within the project buffer are eligible under NRHP Criterion A and CRHR Criterion 1 for its association with the history of transportation in California, due to the replacement of historic materials with modern materials and resulting loss of integrity. Staff therefore recommends that the BNSF Railway is not a historic resource pursuant to CEQA.

Southern California Edison 12-Kilovolt Transmission Line (CA-SBR-13114H)

The SCE 12-kilovolt transmission line was constructed in 1961 as a rural distribution line. The line within the project area of analysis consists of fifteen 40-foot-tall utility poles, which are each 0.75 foot in diameter. The poles have a single T-post on the top with 3 ceramic insulators and 3 transmission lines. The poles are creosote-treated pine and each pole features an identification tag and an embossed nail on the left for height (40) and an embossed date nail (61) on the right. There also is an associated 207-foot-long historic transmission road and sparse historic trash in the vicinity of the transmission line.

The technical report concluded that 12-kv transmission line is not associated with any distinctive or significant event, persons design or construction, and all data potential has been accounted for during the recordation process. The 12-kv transmission line is modest example of a pine T-post utility pole transmission line of typical construction, which has been well-documented in the California and the west. The evaluation recommended, and staff concurs, that based on site investigations and historic research the SCE 12-kilovolt transmission line is recommended not eligible for the NRHP or the CRHR under any of the criterion for eligibility, and there is not a historic resource pursuant to CEQA.

Southern California Edison 220-Kilovolt North and South Transmission Lines (CA-SBR-13115H and CA-SBR-13116H)

The SCE 220-kilovolt North and South Transmission Lines are single-circuit transmission lines with lattice steel, wedge A-frame and metal-waisted tower structures. The evenly-spaced tower structures are approximately 75-feet-tall and include 3 conductor wires, 2 static wires, and insulators. The transmission lines originate at the SCE switchyard at the Hoover Dam and terminate in Chino, California. Two approximately 4.7-mile-long segments of the transmission lines were recorded within the historic built-environment one-half mile project area of analysis. Within the project

area each tower structure has four legs, which are anchored in concrete footings. The transmission lines are located in a rural setting on property managed by the BLM.

The SCE 220-Kilovolt North Transmission Line was constructed between 1936 and 1939, using the same design and technology SCE had been using for its existing high-voltage transmission lines in southern California (including its Vincent 220-kilovolt line), and the design used by the Metropolitan Water District for its Hoover Dam line. The transmission line began receiving power from the Hoover Dam in 1939, after the completion of Hoover generating units A-6 and A-7 (Myers 1983; Schweigert and Labrum 2001). When World War II began in Europe, SCE planners anticipated an increase in demand for power in southern California. SCE began construction on a second transmission line, the SCE South 220-Kilvolt South Transmission Line (SCE South or Hoover-Chino No. 2), in 1939.

SCE North (CA-SBR-13115H) and SCE South (CA-SBR-13116H) take divergent courses from the SCE switchyard at the Hoover Dam but meet near Hemenway Wash in Nevada and run approximately parallel to each other from north of Boulder City, Nevada to Chino, California. SCE North and SCE South are parallel within the project area of analysis. Both SCE North and SCE South delivered electricity that was essential to war-time industries in Southern California. These industries included the Douglas, Vultee, and Northrup aircraft plants, Consolidated Steel, the Long Beach Naval Shipyard, Kaiser Steel, Alcoa, Columbia Steel, as well as automobile factories, tire plants, oil refineries, ordnance works, and military bases and depots (Myers 1983; Schweigert and Labrum 2001).

The SCE 220-Kilovolt North and South Lines are associated with the early operation of Hoover Dam and both played a significant role in providing electricity essential to World War II industries located in southern California. The Los Angeles Bureau of Power and Light transmission lines, the Edison Company Boulder Dam-San Bernardino Electrical Transmission Line, and the Metropolitan Water District Line, all of which provide Hoover Dam power to southern California, have all been determined eligible for the NRHP, and the Edison Company Boulder Dam-San Bernardino Electrical Transmission Line also is listed in the CRHR (Hatheway 2006; Myers 1983; Schweigert and Labrum 2001).

The SCE 220-Kilovolt North and South Lines were previously recorded in Nevada (site numbers 26CK6249 and 26CK6250) during the Boulder City/U.S. 93 Corridor Study, and were determined eligible for the NRHP by the Federal Highway Administration and Nevada State Historic Preservation Office (Federal Highway Administration 2005). Both the Southern California Edison 220-kilovolt North and South Lines are in-use and regularly maintained in the project area, but retain sufficient integrity to be considered for listing on the NRHP and CRHR. Because of the association of the transmission lines to the Hoover Dam and their significance in the World War II effort, the consultant recommended the SCE 220-Kilovolt North and South Lines as eligible for the NRHP under Criterion A and the CRHR under Criterion 1.

The transmission lines were constructed using the same design and technology SCE had been using for its existing high-voltage transmission lines in southern California. SCE and other southern California utilities companies were known as innovators in high-voltage systems (Hughes 1993). Further study would need to be conducted to

determine the significance of the design to southern California utilities and how many examples of this type remain extant to determine if the SCE North and South transmission lines are eligible under Criterion C/Criterion 3.

The applicant states that research did not reveal any associations with any important persons (Criterion B/Criterion 2) and the transmission line does not have the potential to yield important information (Criterion D/Criterion 4).

Staff concurs with the above evaluation of the SCE 220-Kilovolt North and South Lines and recommends them as eligible for the NRHP and CRHR under Criterion A/1.

Pisgah Substation (CA-SBR-13117H)

The Pisgah Substation is a Southern California Edison switching station that was constructed in 1940 during the construction of the SCE South 220-Kilvolt South Transmission Line and is considered a component of the transmission line (personal communication, Thomas Taylor, Manager, Biological and Archaeological Resources, Southern California Edison, 18 September 2008). It shares its name with the railroad siding of Pisgah and Pisgah Crater, which are located in the vicinity. A switching station is an intermediate station, which has incoming and outgoing power lines of the same voltage. Unlike other substations, a switching station does not transfer power from a higher voltage to a lower voltage, but instead works to control increases and decreases in voltage.

In addition to the equipment associated with the function of the substation, including switch gears and bus bars, the Pisgah Substation also has three buildings, which house the relay station and battery equipment. The largest of these buildings is a rectangular brick building that faces southeast. The building has steel-frame fixed and casement windows. The main entrance is a single entry door with 15 lights, which is accessed by concrete steps with a metal railing. The hipped roof is clad with asphalt shingles and clay tile along the ridge lines.

The other two buildings are smaller and appear to be used for storage. The building located at the north corner of the substation is a wood-framed box-shaped structure with a hipped roof that has exposed rafter ends and is clad with clay tile. There is a wood roll-up door on the southeast side of the building, suggesting that it is used to store vehicles or larger equipment. The other building is located adjacent to the wood-framed building and is a brick, box-shaped structure with a hipped roof that has exposed rafter ends and is clad with clay tile. The windows are steel frame casements and the building is accessed by a single entry wood door. All of the buildings are in good condition and appear to be in-use.

The Pisgah Substation is not associated with distinctive or significant person, and the substation is of a typical design for its era and is not a rare surviving example (personal communication, Thomas Taylor, Manager, Biological and Archaeological Resources, Southern California Edison, 18 September 2008). However, this switching station is associated with the Southern California Edison 220-Kilovolt North and South Lines, which are recommended eligible for the NRHP and CRHR under Criteria A/1 (see above). Because the Pisgah Substation is a component of the transmission line, the consultant concluded that it is also eligible for the NRHP and the CRHR under Criterion

A/1, and as a historic resource pursuant to CEQA Staff concurs with the above evaluation.

Hector Road (CA-SBR-13118H)

Four segments of Hector Road were recorded within Phase 1 and Phase 2 of the project area of analysis. The Hector Road interchange on Interstate 40 provides access to the project area of analysis. South of the interchange, Hector Road is a two-lane paved roadway that extends south for a short distance to U.S. Route 66. North of the Interstate 40 interchange, Hector Road is reduced to one-lane, graded, dirt roadway. This segment of the roadway has been realigned since its original construction, and much of the historic segment of the road between Interstate 40 and the BNSF is not within the project area of analysis. An improved railroad crossing has been constructed at Hector Road, which remains locked with a gate and padlock and is only used by local traffic with access permission. The improved crossing includes crossing arms and slightly sloped asphalt ramps that bring the road up to railroad grade and back down to road grade level.

From the BNSF Railroad, Hector Road continues northward about one mile to the northwest corner of Section 3, Township 8 North, Range 6 East, and then continues eastward along the section line for three miles. At the northeast corner of Section 1, Township 8 North, Range 6 East, Hector Road turns to the southeast and continues across sections 6 and 8 until its junction with the SCE 220-kV transmission line road. This segment of the road is a one-lane, graded dirt road that appears to be maintained and frequently used. The route of Hector Road from the railroad to the transmission line road has not been modified since its original construction in the late 1930s or early 1950s. Sometime after 1955, Hector Road was extended about one-half mile southeast to a road that leads to the Black Butte manganese mine. Hector Road likely was constructed to provide access to mines in the Project vicinity. The road also could have been used to transport construction materials to the SCE 220-kV transmission line and the Pisgah Substation from the railroad.

Hector Road is a modest example of a typical one-lane dirt graded rural road. It is not associated with any distinctive or significant events, persons, design/construction, or has the potential to yield important information about the past. The road is representative of typical construction, which has been well-documented in California and the West.The consultant concluded, and staff concurs, that based on site investigations and historic research, Hector Road is not eligible for listing in the NRHP and CRHR, and would not be considered a historic resource pursuant to CEQA.

Pisgah Crater Road (CA-SBR-13119H)

Pisgah Crater Road currently runs between the SCE 220-kilovolt transmission line road to the Pisgah Crater, a volcanic cinder cone located south of the project area of analysis. U.S.G.S. 15-minute topographic quadrangles indicate that this road was extended sometime after 1955 because the map only depicts the road between Pisgah Crater south of U.S. Route 66 and a small segment north of U.S. Route 66 that terminates at the BNSF Railway. The segment of Pisgah Crater Road that is historic-age (45 years old or older) is paved with asphalt and is approximately 24 feet wide. The Pisgah Crater currently is being mined for aggregate and is located on private land. The

road does not appear to be regularly maintained and likely is only sporadically used to access the mine.

The consultant recommended that Pisgah Crater Road is not associated with any distinctive or significant event, person, design, or construction, and the data potential has been accounted for during the recordation process. The majority of the road is located on private land and much of the crater has been destroyed by mining. No records were found to indicate that the Pisgah Crater was ever a well-known tourist destination for U.S. Route 66 travelers. The road is representative of typical construction and design, which has been well-documented in California and the west, and further study is unlikely to yield important information about the past. Therefore, staff concurs that Pisgah Crater Road is not eligible for listing in the NRHP or the CRHR and is not a historical resource pursuant to CEQA .

Pacific Gas and Electric and Mojave Pipelines

The Pacific Gas and Electric Pipeline and the Mojave Pipeline are natural gas pipelines that run through the Phase 2 portion of the project area. Both of these pipelines were constructed prior to 1955; however, there are no visible features of either pipeline in the project area. In addition, the Advisory Council on Historic Preservation has exempted federal agencies from taking into account the effects of their undertakings on historic natural gas pipelines (Advisory Council on Historic Preservation 2002). The two pipelines would not be affected by the proposed Project, and they are recommended as not eligible for the NRHP or CRHR under any criteria. DPR 523 forms were not completed for either pipeline.

Summary of historical significance of built environment

The applicant has recommended four of the historic built resources within the project area of analysis as eligible for listing in the NRHP and CRHR. These resources include the Atlantic & Pacific Railroad/Atchison, Topeka, & Santa Fe Railroad (CA-SBR-6693H), SCE 220-kilovolt (kV) North and South Transmission Lines (CA-SBR-13115H and 13116H), and the Pisgah Substation (CA-SBR-13117H). The applicant recommended that the remaining six built environment resources are not eligible for the NRHP or the CRHR.

The applicant has provided conflicting information regarding the eligibility recommendations for U.S. Route 66 (CA-SBR-2910H). The applicant has recommended that the portion of U.S. Route 66 within the project area of analysis (one-half-mile built environment buffer) does not appear individually eligible for listing to the NRHP or CRHR, is not considered a historical resource for purposes of CEQA, and does not appear to be contributing element or significant related feature/component to the larger linear U.S. Route 66 system. However, in response to Data Request 106, the applicant contradicts its conclusions regarding U.S. Route 66 by stating, “the segment of U.S. Route 66 in the Project area *retains historical integrity and is considered eligiblefor the NRHP/CRHR*” (emphasis added, TS 2010an, p. 5-589). Upon further research, staff finds that the portion of Route 66 within the project area of analysis does, in fact, contribute to the significance of Route 66, is potentially eligible for the NRHP and CRHR as a contributing resource to the larger Route 66 system under Criterion A/1 for

its association as one of the first all-weather highways in the United States, and is therefore it is a historical resource for the purposes of CEQA.

Staff disagrees with the applicant that the BNSF Railway (historically the Atlantic & Pacific/Atchison Topeka & Santa Fe Railroad) and five bridge structures within the project buffer are eligible under NRHP Criterion A and CRHR Criterion 1 for its association with the history of transportation in California, due to the replacement of historic materials with modern materials and resulting loss of integrity. Staff therefore recommends that the BNSF Railway is *not* a historic resource pursuant to CEQA.

In summary, staff recommends four of the historic built resources within the project area of analysis as eligible for listing in the NRHP and CRHR. These resources include U.S. Route 66 (CA-SBR-2910H), the SCE 220-kilovolt (kV) North and South Transmission Lines (CA-SBR-13115H and 13116H, respectively), and the Pisgah Substation (CA-SBR-13117H). The remaining six historic built resources are recommended not eligible under any criterion of NRHP or CRHR. These resources include; the Atlantic & Pacific Railroad/Atchison, Topeka, & Santa Fe Railroad (CA-SBR-6693H), the 12-kV power line (CA-SBR-13114H), Hector Road (CASBR-13118H), Pisgah Crater Road (CA-SBR-13119H), Pacific Gas and Electric Company pipeline, and the Mojave Pipeline. Staff has identified a direct visual effect to U.S. Route 66 and proposes condition of certification **CUL-6**, which requires Historic American Landscape Survey (HALS) documentation of the significant desert landscape of Route 66 in the eastern Mojave Desert.

Ethnographic Resources

There are no known ethnographic resources within the footprint or viewshed of the proposed project area.

Historic Districts and Landscape Considerations

Federal and State Guidelines for Historic Districts

The National Park Service defines a historic district as “a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development” (U.S. Department of the Interior, National Park Service 2002:5). For a grouping of cultural resources to be considered eligible for listing in the NRHP as a district, those resources must be historically or functionally related and visually convey a historical theme or environment. In addition, the district must possess sufficient historical significance and integrity. Resources included within the boundaries of a historic district do not all need to have the level of significance necessary to be individually eligible for listing in the NRHP as long as the grouping of resources as a whole conveys sufficient significance within the related historic context. However, all individual resources must possess sufficient historical integrity (U.S. Department of the Interior, National Park Service 2002).

The boundaries of a historic district “must be a definable geographic area that can be distinguished from surrounding properties by changes such as density, scale, type, age, style of sites, buildings, structures and objects, or by documented differences in patterns of historic development or associations” (U.S. Department of the Interior, National Park Service 2002:6). District boundaries rarely are defined by planning or

management boundaries, or by ownership parcels, but rather must be based on the spatial locations of the district's contributing properties (U.S. Department of the Interior, National Park Service 2002).

The California Code of Regulations defines historic districts as "unified geographic entities which contain a concentration of historic buildings, structures, objects, or sites united historically, culturally, or architecturally. Historic districts are defined by precise geographic boundaries. Therefore, districts with unusual boundaries require a description of what lies immediately outside the area, in order to define the edge of the district and to explain the exclusion of the adjoining areas" [Title 14, California Code of Regulations, Chapter 11.5, Section 4852(a)(5)].

The National Park Service defines a historic landscape is "a geographical area that historically has been used by people, or shaped or modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features" (U.S. Department of the Interior, National Park Service 1999:1-2).

Historic landscapes exhibit evidence of human use or activities and typically are one of the following types:

- agriculture (including various types of cropping and grazing),
- industry (including mining, lumbering, fish-culturing, and milling),
- maritime activities such as fishing,
- shell fishing, and shipbuilding recreation (including hunting or fishing camps),
- transportation systems,
- migration trails,
- conservation (including natural reserves), and
- sites adapted for ceremonial, religious, or other cultural activities, such as camp meeting grounds (U.S. Department of the Interior, National Park Service 1999:3).

Although the National Park Service recognizes the cultural landscape categories as descriptive terms, landscapes that are listed in or determined eligible for the NRHP are officially classified as districts or sites (Goetcheus 2002). The National Park Services classifies landscapes that are small with no buildings or structures as sites. Larger sites with numerous buildings, structures, and sites are classified as districts (U.S. Department of the Interior, National Park Service 1999). Because the National Park Service officially classifies landscapes as districts or sites, the potential landscapes within the Project area of analysis were evaluated pursuant to the federal and state guidelines described in Section 5.5.1.

In May 2002, BLM issued Information Bulletin 2002-101 to provide direction for incorporating consideration of cultural resources in their resource management plans (U.S. Department of the Interior, BLM 2002). In recognition of the influence that environmental factors have on the human occupation of any given region, the bulletin

recommended that cultural resources be considered at a “landscape scale,” focusing on “continuity of geographic and cultural similarities and influences” more than on current administrative boundaries. Cultural landscapes, as discussed in Information Bulletin 2002-101, are developed as part of records reviews, cultural resource overviews, and cultural settings that are used as planning tools for the BLM. Cultural landscapes, as defined by the BLM, are therefore more applicable when discussing larger historic themes in a planning area, rather than in designating geographical areas to be evaluated for listing in the NRHP or CRHR as a site or district.

Southern California Edison Historic District

Resources that could be included in the potential SCE Historic District are the SCE 220-kV North and South Transmission Lines (CA-SBR-13115H and CA-SBR-13116H), Pisgah Substation (CA-SBR-13117H), and archaeological site CA-SBR-12992H.

The SCE 220-kV North and South Transmission Lines are single-circuit transmission lines, which originate at the SCE switchyard at Hoover Dam and terminate in Chino, California. Both transmission lines played a significant role in providing electricity essential to World War II industries located in southern California. The transmission lines were previously recorded in Nevada (site numbers 26CK6249 and 26CK6250) during the Boulder City/U.S. 93 Corridor Study, and the Federal Highway Administration and Nevada State Historic Preservation Office made a consensus determination that they are eligible for the NRHP. Both transmission lines are in service and are regularly maintained in the Project area of analysis, but they retain historical integrity. Because of the association of the transmission lines to Hoover Dam and their significance in the World War II effort, the SCE 220-Kilovolt North and South Lines were evaluated as eligible for the NRHP under Criterion A and the CRHR under Criterion 1.

The Pisgah Substation is an SCE switching station that was constructed in 1940 (personal communication, Thomas Taylor, Manager, Biological and Archaeological Resources, Southern California Edison, 18 September 2008). In addition to the equipment associated with the function of the substation, including switch gears and bus bars, the Pisgah Substation also has three buildings, which house the relay station and battery equipment. Because the Pisgah Substation is a component of the SCE 220-kV North and South Transmission Lines, the substation also was evaluated as eligible for the NRHP under Criterion A and for the CRHR under Criterion 1.

Archaeological site CA-SBR-12992H is a small, low density scatter of historic trash with approximately 750 items, including glass fragments, animal bone fragments, tableware, ceramics, cans, wire, leather, and wood. The site has four concentrations of historic refuse. The site is near the SCE North and South Transmission Lines, and may be the remains of a work camp related to the construction of the transmission lines and the Pisgah Substation. The site was evaluated as not eligible for the NRHP and CRHR because of the low quantity of artifacts, lack of integrity, low probability of subsurface artifacts and features, and little potential for the site to yield important information.

The SCE 220-kV North and South Transmission Lines and Pisgah Substation are historically and functionally related and visually convey a historic theme in the Project vicinity. Both resources also possess historical significance and integrity and were

recommended as individually eligible for the NRHP and CRHR. No artifacts were found that directly associate archaeological site CA-SBR-12992H to the SCE facilities, but its proximity to the transmission lines suggests it is related. However, the archaeological site was evaluated as not eligible and would not be a contributor to the potential historic district.

Both the National Park Service and State of California definitions indicate that historic districts must have definable and precise boundaries and that these boundaries rarely are defined by planning or management boundaries, or by ownership parcels, but rather must be based upon the spatial locations of the district's contributing properties (Title 14, California Code of Regulations, Chapter 11.5, Section 4852(a)(5); U.S. Department of the Interior, National Park Service 2002). The SCE 220-kV North and South Transmission Lines are long, linear resources that extend more than 200 miles between Hoover Dam in Nevada to Chino, California. Only about 4.7 miles of the transmission lines were recorded as part of this Project within the historic built environment one-half mile buffer. Because the entire route of the transmission line was not studied as part of this Project, it is impossible to delineate a boundary that is not arbitrarily defined by the Project area of analysis. Therefore, according to the applicant, it appears inappropriate to define a district. Both transmission lines and the substation were recommended as individually eligible for listing in the NRHP and CRHR, and inclusion in a historic district would not upgrade their status for preservation purposes.

Atlantic & Pacific (Atchison Topeka & Santa Fe) Railroad Historic District

Resources that could be included in a potential Atlantic & Pacific (Atchison Topeka & Santa Fe) Railroad Historic District are the railroad (CA-SBR-6693H) and seven nearby refuse deposits. The Atlantic & Pacific Railroad was originally recorded as a historic resource in California in 1990. The Southern Pacific Railroad Company originally constructed the segment of the railroad in the Project vicinity as part of the Mojave to Needles branch in 1882 and 1883. In 1884, the Atlantic & Pacific Railroad, a subsidiary of the Santa Fe Pacific Railroad, leased the Mojave to Needles branch and purchased the single-track branch in 1911. In 1897, the branch was redesignated as the Santa Fe Pacific Railroad and later became known as the Atchison Topeka & Santa Fe Railway. In 1923, a second track was added. The railroad currently is used and maintained as the BNSF. In the Project area of analysis, the railroad has a double trackway on a raised, ballasted bed. The railroad has been previously evaluated as eligible for the NRHP and CRHR under Criterion A/1 for its association with the history of transportation in California. Although much of the railroad has been upgraded for continued use and few historical materials remain in place, the segment in the Project vicinity retains integrity of location. Thirteen previously unrecorded bridges were identified during the Class III intensive field survey along the railroad within the Project area of analysis and the one-half mile built environment buffer. Five of the bridges retain sufficient integrity to be considered contributing elements to the railroad. The other eight are either modern replacement bridges or have been highly modified.

As of 2006, about 1,800 railroad-related properties had been listed in the NRHP. Most of these properties included depots, railroad cars, and locomotives. The only listed railways are shorter spur lines (Railway Preservation Resources 2006). Historic railroad districts that have been established in other locations typically include buildings and

structures, such as homes, depots, warehouses, and commercial buildings, which were built as a result of the railroad and rarely include the railroad structure itself as a contributing property. Both the National Park Service and State of California definitions indicate that historic districts must have definable and precise boundaries and that these boundaries rarely are defined by planning or management boundaries (Title 14, California Code of Regulations, Chapter 11.5, Section 4852(a)(5); U.S. Department of the Interior, National Park Service 2002). The railroad is a long, linear resource that extends across seven states, and only about 10.5 miles of the railroad were recorded as part of this Project within the historic built environment one-half mile buffer. Because the entire route of the railroad was not studied as part of this Project, it is impossible to delineate a boundary for a segment of the railroad in the Project vicinity that would not be arbitrarily defined by the Project and buffer areas. Therefore, it seems inappropriate to define a district.

URS reviewed the site descriptions for the seven historic refuse sites located in the vicinity of the railroad, including CA-SBR-13002/H, -13012H, -13014H, -13017H, -13023/H, -13101, and -13108H. Because the sites have few temporally diagnostic artifacts, it is unclear whether these sites are contemporaneous. In addition, the types of artifacts do not indicate clear associations with the railroad. Three of these sites were evaluated as not eligible for the NRHP and CRHR because of the low quantity of artifacts, lack of integrity, low probability of subsurface artifacts and features, and little potential to yield important information. Four of these sites (CA-SBR-13002/H, -13012H, -13014H, -13017H) were recommended as eligible for the NRHP and CRHR for their potential to yield important information and testing was recommended to provide the lead agency with additional data necessary to determine eligibility. The recommended limited subsurface testing at four of the historic refuse sites should be conducted to determine if additional information can be obtained to support the hypothesis that these sites are related to railroad activities or some other activity.

In summary, defining a railroad district seems inappropriate because any boundary on a segment of the railroad would be arbitrary, and the associations of the trash scatters have not been confirmed. The railroad in the Project area of analysis and the four trash scatters that have potential to yield important information were recommended eligible for listing in the NRHP and CRHR. Inclusion of those properties in a historic district would not upgrade their status for preservation purposes.

National Old Trails Road/U.S. Route 66 Historic District

Resources that could be included in the potential National Old Trails Road /U.S. Route 66 Historic District are extant segments of National Old Trails Road, U.S. Route 66, and two rock concentrations. (The CEC and BLM identified a third rock concentration, P36-014578, in their data request, but it is located well to the north of the highways in the vicinity of the Logan Mine and almost certainly is unrelated to the highways).

U.S. Route 66 in the Project historic built environment one-half mile buffer area is a two-lane, paved roadway that currently serves as a frontage road for Interstate 40. This segment was originally constructed in the 1930s, south of the highway's original alignment, which was known as the National Old Trails Road. The National Old Trails Road in the Project area of analysis is represented by eight remnant segments of a batched mix oil road. The condition of the road segments is poor—most of the road

surface is crumbled and cracked, and in places has eroded. Some segments buried by sand may be partially intact.

The National Old Trails Road was designated by “booster” organizations in 1912, and by the late 1920s much of the highway was either oiled or surfaced with gravel. In 1926, the National Old Trails Road was designated as U.S. Route 66, but in the 1930s the segment in the Project area of analysis was abandoned in favor of a route to the south, which is the current alignment of historical U.S. Route 66. Both the National Old Trails Road and 1930s alignment of U.S. Route 66 have been recorded under site number CA-SBR-2910H, and previously evaluated as eligible for the NRHP under Criterion A as one of the first all-weather highways in the United States. The segment of U.S. Route 66 in the Project area of analysis retains historical integrity and is considered eligible. The National Old Trails Road in the Project area of analysis is isolated, segmented, in generally poor condition, and is recommended as a non-contributing element of the highway.

Two rock clusters also were recorded (P36-014519 and P36-014520) along the abandoned segment of the National Old Trails Road. These rock concentrations are almost exactly 400 feet apart and both are approximately 250 feet from the centerline of the former alignment of the Old National Trails Road. The placement of the cairns and absence of known mining deposits in the area suggests that these rock clusters may have been survey markers associated with the highway. San Bernardino County was responsible for route planning at the time the Old National Trails Road was designated, and the route may or may not have been professionally engineered. No historical as-built drawings of the highway have been located, and thus, a direct association between the rock clusters and the highway remains ambiguous. The rock clusters are recommended ineligible for the NRHP and not significant historical resources eligible for listing in the CRHR.

Segments of U.S. Route 66 and the National Old Trails Road have been listed in the NRHP in several states. U.S. Route 66 related districts have been listed but they include properties such as roadside businesses related to the development of the highway within the boundaries of a specific town or locality. There are no such properties in the Project vicinity. A statewide inventory of U.S. Route 66 has not been conducted for California. If a historic district or multiple property listing of the highway was defined in California, the segment of the 1930s U.S. Route 66 in the Project vicinity probably would be considered a contributing element. However, defining a U.S. Route 66 district at the Project limits would be arbitrary for a highway that ran through Illinois, Missouri, Kansas, Oklahoma, Texas, New Mexico, Arizona, and California. Because the other associated properties have little historic value, there seems to be little justification for defining a National Old Trails Road/U.S. Route 66 Historic District.

Potential Early Twentieth Century Gravel Mining Landscape

CEC and BLM staff also recommended the consideration of a historical archaeological landscape that represents an early twentieth century gravel mining operation in the south-central portion of the Project area of analysis. As mentioned in the discussion of the National Old Trails Road, gravel was applied to sections of the road during improvement activities in the mid 1920s, and some of this gravel may have been obtained from the well developed desert pavements adjacent to the road alignment.

During the intensive survey of the Project area of analysis, cleared areas within the desert pavement were observed adjacent to the National Old Trails Road. The scarification pattern within these cleared areas includes linear tracks that are interspersed with regularly occurring gravel mounds. This pattern indicates that rakes or scraping sleds may have been used to collect gravel from the desert pavement, which may have been applied to the surface of the National Old Trails Road.

Research and site revisits have found no conclusive data to determine the age of the surface disturbance (cleared area) along the National Old Trails Road that occurs within the Project area of analysis. There have been several other past Projects (historic and modern) that may be attributed to the surface disturbance found within the Project area of analysis other than the National Old Trails Road, such as the BNSF railroad and three pipelines within the same area as the disturbances. Modern surface prospects also occur in the Project area of analysis. These modern prospects are found on modern maps (1982 U.S.G.S. 7.5-minute topographic quadrangles), and are absent from historic maps (1955 U.S.G.S. 15-minute quadrangles). In addition, the majority of surface deposits lack diagnostic material (documentation and/or datable cans/refuse). San Bernardino County was responsible for route planning at the time the National Old Trails Road was designated, and the route may or may not have been professionally engineered. No historical as-built drawings of the highway have been located, and thus, a direct association between surface disturbances remains ambiguous.

The National Park Service states that the boundaries of a district or landscape “must be a definable geographic area that can be distinguished from surrounding properties by changes such as density, scale, type, age, style of sites, buildings, structures and objects, or by documented differences in patterns of historic development or associations” (U.S. Department of the Interior, National Park Service 2002:6). While the spatial relationship between historic road and surface gravel mining disturbance is distinctive, the utilization of the surface for stone resources within the Project area of analysis cannot be well bounded. Human-caused disturbance of desert pavement is not unique to the Project area of analysis nor are the reasons for such disturbances unique, therefore it is not possible to effectively separate the effects of gravel mining for road construction from those of gravel mining for various other reasons. The desert pavement is ubiquitous in desert environments and has provided a source of easily accessible construction material throughout history. Such areas also were frequently mined in search of valuable ores or other materials in search of profit. Furthermore, similar historic disturbances of the pavements occur throughout the Mohave Desert as well as other Southern California deserts. Like the sources in the Project area of analysis, these were utilized throughout historic and modern times.

In summary, defining an early twentieth century gravel mining landscape seems inappropriate because the activity lacks sufficient data to be directly attributed to gravel mining for the construction and maintenance of the National Old Trails Road. Additionally, the surface mining activity cannot be clearly linked with the early twentieth century period because a number of historic and modern ground disturbing related Projects have taken place in this area over time, the lack of directly associated temporally diagnostic artifacts, and the absence of historical documentation providing location and time period for this specific activity.

The lack of datable material also severely limits the utility of cleared areas to address important research issues. Data from the mechanical or manual scraping, clearing, raking, and size sorting of desert pavement materials can only address two fairly insignificant questions: (1) what surface materials were collected for possible use in construction of the National Old Trails Road or other historic roads in the area and (2) where do these locations occur within the Project area of analysis? These are insignificant because the desert pavement material is well-documented and obvious, and the location of these activities has been thoroughly documented through the Class III intensive field survey.

The proposed early twentieth century gravel mining landscape cannot be distinguished from similar landscapes that occur throughout this portion of the Mohave Desert. Thus, the proposed historic gravel mining landscape in the Project area of analysis is not sufficiently bounded nor distinguished from surrounding areas to meet NRHP standards. If the entire roadway in the Project area of analysis was graveled during the 1920s road improvements, the adjacent terraces probably would not have provided a sufficient amount of aggregate rock required to surface the roadway, and gravel would have needed to be hauled in. If road crews did mine gravel from these cleared areas, it is more likely that the gravel was used to for small maintenance projects. It also is possible that the cleared areas were construction staging areas. If the cleared areas were proven to be directly associated with the road either through historical documentation or diagnostic artifacts, the areas were considered features of the road and documented on the appropriate DPR 523 series forms.

Archival research and site visits have found no evidence of historic period rest stops associated with National Old Trails Road within the Project area of analysis. Historic research indicates that travelers were able to make the trip from Needles to Barstow in two days. Most travelers stopped for the night in Ludlow, which about half way between the two cities. Desert travel stops located in between were typically located at water sources. Because the National Old Trails Road roughly paralleled the Santa Fe Railroad, these stops would have been at railroad sidings. It is unknown whether the rock cluster features found within the Project area of analysis can be associated with prehistoric or historic activities. These features may have been associated with the National Old Trails Road, but without associated diagnostic artifacts and/or datable features, it is difficult to determine a direct connection.

C.3.7 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Construction Impacts

To identify construction-related impacts to cultural resources that would need to be mitigated, staff first identifies all potential CRHR-eligible cultural resources. In the next step in its analysis, staff must evaluate the potential project impacts to the identified CRHR-eligible cultural resources to determine if these impacts are substantial and adverse. Staff then must recommend mitigation for substantial and adverse impacts on CRHR-eligible resources that cannot be avoided. Staff also must assess whether the proposed project has the potential to impact as-yet-unknown buried archaeological resources and recommend mitigation for impacts to previously unknown but CRHR-eligible resources discovered during construction, if impacts to such resources cannot

be avoided.

Site Preparation and Construction Activities

Site preparation would be based on avoiding major washes and minimizing surface-disturbing activities. Also, areas of sensitive habitat and cultural resources would be avoided wherever possible. Brush trimming would be conducted between alternating rows of SunCatchers™. Brush trimming consists of cutting the top of the existing brush while leaving the existing native plant root system in place to minimize soil erosion. After brush has been trimmed, blading for roadways and foundations will be conducted between alternating rows of SunCatchers™ to provide access to individual SunCatchers™. Blading would consist of removing terrain undulations and would be limited to 3 feet in cut and 3 feet in fill. The blading operations would keep native soils within 100 feet of the pre-development location, with no hauling of soils across the site. Paved roadways would be constructed as close to the existing topography as possible, with limited cut-and-fill operations to maintain roadway design slope to within a maximum of 10%. Minor grading would also be required for building foundations and pads and parking areas in the Main Services Complex and substation areas. The clearing, blading, and grading operations would be undertaken using standard contractor heavy equipment. This equipment would consist of, but not be limited to, motorgraders, bulldozers, elevating scrapers, hydraulic excavators, tired loaders, compacting rollers, and dump trucks.

From the preliminary geotechnical investigations, it is expected that lightly loaded equipment and structures, including some of the equipment foundations in the substation yard, small equipment such as the fire water pump and standby generator, the support structures for the water treatment plant and hydrogen storage area, and the transmission line lattice steel towers would be supported on shallow footings. Shallow footings would be continuous strip and isolated spread footings.

The majority of each SunCatcher™ would be supported by a single metal pipe foundation that is hydraulically driven into the ground. These foundations are expected to be approximately 20 feet long and 24 inches in diameter. Shallow drilled pier concrete foundations of approximately 36 inches in diameter and an embedment depth with a minimum socketed depth into rock of 6 feet would be used for hard and rock-like ground conditions.The buildings and major structures such as yard tanks would be supported on shallow spread and continuous footings or mat-type foundations. Deep foundations would be required for heavy items, such as the power transformers at the electrical substation.

Materials and Equipment Staging Area. A100-acre lay down yard will be cleared on the southeast corner of the project site where SunCatchers will be assembled. Assembly buildings will be constructed adjacent to the Main Services Complex for the onsite assembly of the SunCatchers. The assembly buildings will be decommissioned and salvaged for re-use once all Calico Solar SunCatchers have been installed. SunCatchers will be installed in the area vacated by the removal of the construction laydown areas and assembly buildings when construction is completed.

Trenching for Buried Linear Facilities (Pipelines, Transmission Lines). SunCatcher systems will be tied together by an underground cable system.

Demolition of Structures on the Project Site or Along Linear Facilities. No demolition would occur on the project site or along linear facilities.

Alterations to Old Substations or Transmission Lines to Upgrade for More Capacity. Final design and construction of transmission facilities and reliability upgrades at the SCE Pisgah Substation and the Pisgah-Lugo 230 kV Transmission Line (should they be required) will be completed by Southern California Edison.

Addition of New and Incompatible Structures in an Old Neighborhood (even an Industrial One), or in the Rural Setting of an Old Agricultural Landscape, or in an Old Transmission Line Corridor, Affecting the Integrity of Setting and Feeling. With the presence of gas pipelines, historic roads, railroad line, transmission lines, and a substation, the project area is currently an open and relatively undeveloped landscape.

Operations Impacts

Liquid Wastes. SunCatcher mirror washing, operations dust control, potable water use, and water treatment under regular maintenance routines will require an average of 33.4 gallons of raw water per minute, with a daily maximum requirement of 56.6 gallons of raw water per minute during the summer peak months each year, when each SunCatcher receives a single mechanical wash. Road and SunCatcher area long-term maintenance would include:

- Temporary soil stabilization (SS) techniques, such as scheduling construction sequences to minimize land disturbance during the rainy and non-rainy seasons and employing BMPs appropriate for the season; preserving existing vegetation by marking areas of preservation with temporary orange propylene fencing; using geotextiles, mats, plastic covers, or erosion control blankets to stabilize disturbed areas and protect soils from erosion by wind or water; using earth dikes, drainage swales, or lined ditches to intercept, divert, and convey surface runoff to prevent erosion; using outlet protection devices and velocity dissipation devices at pipe outlets to prevent scour and erosion from storm water flows; and/or using slope drains to intercept and direct surface runoff or groundwater to a stabilized water course or retention area.
- Sediment Control (SC) techniques, such as using silt fences, straw bales, and/or fiber rolls to intercept and slow the flow of sediment-laden runoff such that sediment settles before runoff leaves the site.
- Wind Erosion (WE) control by applying water or dust palliatives, as required, to prevent or alleviate windblown dust.
- Tracking Control (TC) techniques to limit track-out, such as using stabilized points of entering and exiting the project site and stabilized construction roadways on the site.
- Other measures, as appropriate, to comply with the regulations.

Project Closure and Decommissioning

SES recognizes that development of a final termination and restoration strategy will be a collaborative process with the BLM and the CEC. Prior to authorization it is anticipated

that more clarity related to this effort will be directed by the BLM. Following is a brief discussion of concepts that may be more fully considered in the development of a termination and restoration strategy for the project.

- Although the project setting for this project does not appear, at this time, to present any special or unusual closure problems, it is impossible to foresee what the situation will be in 30 years or more when the project ceases operation.
- To ensure adequate review of a planned project closure, the project owner would submit a proposed facility closure plan to the CEC and BLM for review and approval at least 12 months (or other period of time agreed to by the FAO) prior to commencement of closure activities.
- In order to ensure that public health and safety and the environment are protected in the event of an unplanned temporary facility closure, it is essential to have an on-site contingency plan in place. The on-site contingency plan will help to ensure that all necessary steps to mitigate public health and safety impacts and environmental impacts are taken in a timely manner. The project owner would submit an on-site contingency plan for the FAO review and approval. The plan would be submitted no less than 60 days (or other time agreed to by the FAO) prior to commencement of commercial operation.
- In addition, consistent with requirements under unplanned permanent closure addressed below, the nature and extent of insurance coverage, and major equipment warranties must also be included in the on-site contingency plan. In addition, the status of the insurance coverage and major equipment warranties must be updated in the annual compliance reports.

SES continues to develop the design for the project, and will coordinate with all required agencies as part of the CEC/BLM permitting process. It is SES's understanding that a bond will be required for the SES Calico Solar Project.

Identification and Assessment of Direct Impacts on Archaeological Resources and Recommended Mitigation

On June 2, 2010, in response to concerns about impacts to both cultural and biological resources, the applicant submitted an alternative site layout, which reduced the original 8,230-acre project layout to 6,215 acres (see TS 2010ag). A substantial amount of the northern project boundary was removed along the base of the Cady Mountains to avoid biological issues. In addition, based on the BLM's NRHP eligibility determinations for cultural resources, the applicant reconfigured portions of the southern project area to avoid all or portions of the three sites determined eligible by the BLM (CA-SBR-13443/H, CA-SBR-13093/H, and CA-SBR-1908/H). As a result of the alternative site layout submitted by the applicant, CA-SBR-13443/H has been entirely excluded from the project area, and the majority of the two other sites, CA-SBR-1908/H and CA-SBR-13093/H (the portions containing the unevaluated/indeterminate rock cluster features), have been excluded from the project footprint. The portions (consisting of lithic remains) of these two sites that the BLM determined to be "non-contributing" would remain within the project area and would be subject to direct impacts. In addition, due to their proximity to the site areas being avoided and/or their proximity to biological resources

being avoided, ten (10) additional archaeological sites and a portion of one (1) site have also been excluded from the project area as a result the applicant's June 2, 2010 alternative project layout. The ten additional archaeological sites fully excluded from the project footprint include: CA-SBR-4558H; CA-SBR-13013; CA-SBR-13028; CA-SBR-13029; CA-SBR-13030; CA-SBR-13054; CA-SBR-13105; CA-SBR-13107; P36-014578; SM-S1-005. In addition, site CA-SBR-13126/H has been partially excluded from the project footprint.

In a consultation letter to the State Historic Preservation Officer (SHPO), dated July 22, 2010, the BLM determined that the identification efforts, reports, and the applicant's recommendations for the proposed Calico Solar project are adequate to identify historic properties that may be located within the project area and to support the BLM's decision process. The BLM has determined that three sites, CA-SBR-1908/H, CA-SBR-13093/H, and CA-SBR-13443/H, are eligible for inclusion to the NRHP under Criterion D. The applicant reconfigured the project layout to avoid all or portions of these sites, and consequently, the BLM has issued a finding of no adverse effect to historic properties and has sought concurrence from the SHPO accordingly.

On the contrary, CEC staff concludes that the construction of the proposed 6,215-acre solar thermal power facility may wholly or partially destroy the majority of surface archaeological resources identified by the applicant in the proposed project area. While efforts have been made to avoid three (3) sites determined eligible by the BLM, there are 100 surface prehistoric archaeological sites in the current project footprint that staff believes have not yet been adequately investigated or evaluated in terms of potential to yield data important to the study of prehistory. In addition, beyond the consideration of the individual archaeological sites in the project area of analysis, staff believes, contrary to the recommendations of the applicant, that the implementation the proposed action has the potential to destroy a large portion of a potential prehistoric archaeological landscape that may exist in the project area.

Although staff is presently unable to identify precisely which of the different archaeological resources are historically significant and is, therefore, also unable to to articulate the exact character of the effects that the construction of the proposed facility would have on such resources, staff does clearly foresee that the construction of the proposed facility could, under CEQA, have a significant effect on the environment. Although the specific programs and protocols do not presently exist, it is possible to describe the performance standards that would be used to ensure that the resolution of significant effects to historically significant archeological resources is adequate, as well as the types of measures that can be used to resolve such effects.

As noted in Section C.3.3 above, the analytical process for cultural resources involves five steps: 1) determination of the geographic extent of the project area of analysis; 2) creation of an inventory of the known cultural resources within that area; 3) assessing the historical significance of those known resources; 4) assessing the effects of the project on significant resources; and 5) resolving significant effects on significant cultural resources, and endeavoring to ensure that all significant effects are mitigated. The first and second steps of the analytical process for archaeological resources have been completed. The proposed conditions of certification would set forth provisions for completion of the remaining steps of the process by requiring the project owner to

collect the necessary surface and subsurface data on the resources sufficient to develop formal recommendations of historical significance, assess effects to significant resources, and implement mitigation measures that meet the standards for the resolution of significant effects to significant cultural resources. In addition, Energy Commission licensing decisions and BLM right-of-way grant decisions also typically identify the likelihood of encountering previously unknown resources and contain provisions that require specific procedures to ensure that any effects to these resources can be resolved.

Cultural resources that are found to be significant on the basis of their information value (principally archaeological deposits) would be subject to treatments which would variably be to actively avoid all or part of subject deposits, to record and preserve representative samples of the unique spatial or associative information that is intrinsic to the depositional history of each deposit, to collect and curate representative samples of material culture assemblages, to provide for the preparation and dissemination of professional technical publications and public interpretative materials, and to develop and implement plans to foster the long-term historic preservation of subject deposits. Archaeological resources in the project area of analysis that may be subject to unique treatment plans may include archaeological landscapes and/or districts, in addition to individual archaeological sites.

Mitigation measures for adverse effects to the information values of archaeological resources may include, but are not limited to, the following. The performance standard that any such mitigation measure must meet would be that the results of the mitigation effort would be able to evidence the recovery and curation of a representative sample of the information for which each adversely affected archaeological deposit was significant, and to demonstrate efforts to disseminate that information in the public interest.

- Physical avoidance of archaeological resources, wherever feasible, through, individually or in combination, project redesign, fencing or other methods of conspicuous demarcation, and monitoring;
- When physical avoidance is infeasible, the recovery of a representative sample of the information for which subject archaeological resources have been found to be significant;
- Professional and public dissemination of the results of data recovery investigations through, among other methods, the presentation of papers at professional conferences, the preparation of literature or film for public release, the development of education modules for public school use, and the development of museum exhibits and attendant catalogs;
- Preparation of applications and formal nomination of significant archaeological resources to the CRHR and the NRHP; and
- Recovery and repatriation of human remains in consultation with local Native American representatives.

Staff proposes conditions of certification **CUL-1** through **CUL-5** and **CUL-7** through **CUL-10** to resolve potential significant effects to archaeological sites within the Calico Solar project area.

Identification and Assessment of Direct Impacts on Ethnographic Resources and Recommended Mitigation

No ethnographic resources were identified in the Calico Solar project area of analysis.

Identification and Assessment of Direct Impacts on Built-environment Resources and Recommended Mitigation

The applicant has recommended four of the historic built resources within the project area of analysis as eligible for listing in the NRHP and CRHR. These resources include the Atlantic & Pacific Railroad/Atchison, Topeka, & Santa Fe Railroad (CA-SBR-6693H), SCE 220-kilovolt (kV) North and South Transmission Lines (CA-SBR-13115H and 13116H), and the Pisgah Substation (CA-SBR-13117H). The applicant recommends that the remaining six built environment resources are not eligible for the NRHP or the CRHR.

The applicant has provided conflicting information regarding the eligibility of U.S. Route 66 (CA-SBR-2910H). The applicant has recommended that the portion of U.S. Route 66 within the project area of analysis (one-half-mile built environment buffer) does not appear individually eligible for listing to the NRHP or CRHR, is not considered a historical resource for purposes of CEQA, and does not appear to be contributing element or significant related feature/component to the larger linear U.S. Route 66 system. However, in response to Data Request 106, the applicant contradicts its conclusions regarding U.S. Route 66 by stating, “the segment of U.S. Route 66 in the Project area *retains historical integrity and is considered eligiblefor the NRHP/CRHR*” (emphasis added, TS 2010an, p. 5-589). Upon further research, staff finds that the portion of Route 66 within the project area of analysis does, in fact, contribute to the significance of Route 66, is potentially eligible for the NRHP and CRHR as a contributing resource to the larger Route 66 system under Criterion A/1 for its association as one of the first all-weather highways in the United States, and is therefore it is a historical resource for the purposes of CEQA.

Staff disagrees with the applicant that the BNSF Railway (historically the Atlantic & Pacific/Atchison Topeka & Santa Fe Railroad) and five bridge structures within the project buffer are eligible under NRHP Criterion A and CRHR Criterion 1 for its association with the history of transportation in California, due to the replacement of historic materials with modern materials and resulting loss of integrity. Staff therefore recommends that the BNSF Railway is *not* a historic resource pursuant to CEQA.

In summary, staff recommends four of the historic built resources within the project area of analysis as eligible for listing in the NRHP and CRHR. These resources include U.S. Route 66 (CA-SBR-2910H), the SCE 220-kilovolt (kV) North and South Transmission Lines (CA-SBR-13115H and 13116H, respectively), and the Pisgah Substation (CA-SBR-13117H). The remaining six historic built resources are recommended not eligible under any criterion of NRHP or CRHR. These resources include; the Atlantic & Pacific Railroad/Atchison, Topeka, & Santa Fe Railroad (CA-SBR-6693H), the 12-kV power line

(CA-SBR-13114H), Hector Road (CASBR-13118H), Pisgah Crater Road (CA-SBR-13119H), Pacific Gas and Electric Company pipeline, and the Mojave Pipeline. Staff has identified a direct visual effect to U.S. Route 66 and proposes condition of certification **CUL-6**, which requires Historic American Landscape Survey (HALS) documentation of the significant desert landscape of Route 66 in the eastern Mojave Desert.

Staff has determined that the installation of the proposed 34,000 solar dishes would result in a significant and unavoidable visual impact to a historic resource, U.S. Route 66. The installation of this large number of SunCatchers, consisting of an approximate 40-foot diameter solar concentrator dish that supports an array of curved glass mirror facets (TS 2010an, Route 66 DPR form, p. 1-3), will substantially alter the vast, open landscape that is a character-defining feature of this section of Route 66, as well as of the rest of Route 66 in the Mojave Desert. The travel experience of this section of Route 66—which is substantially unchanged since its construction—will be permanently impaired. This impact is unmitigable, and should the project be approved, cannot be avoided.

There does not appear to be available mitigation on-site that would reduce the level of impact to less than significant. The area is relatively flat and consists only of scrub vegetation. The significance of Route 66 in the Mojave is the view of the vast, unobstructed, flat expanse of desert landscape which would be impeded by any type of screening, either on the roadway itself or on the edge of the project site. Eliminating the first few rows of solar dishes would also not lessen the visual impact of the proposed project, as the views are unobstructed for approximately 20 miles.

Consequently, staff proposes condition of certification (**CUL-6)** requiring Historic American Building Survey (HABS) Level III photodocumentation of the 9-mile segment of roadway and associated landscapes and viewsheds within the project area of analysis from the roadway. This level of photodocumentation includes large-format negatives that clearly depict the appearance of the property and areas of significance or the site, perspective-corrected and fully captioned. Undertaking the HALS recordation activities prior to certification would not affect the project's certification prospects in any way. The applicant undertaking such activities would do so, at their own risk, as a means of advantaging their schedule.

Identification and Assessment of Indirect Impacts and Recommended Mitigation

There is potential for indirect effects to sites in the exclusion areas especially due to increased traffic during construction. It is also possible that project area grading could increase the amount of sheet washing and water runoff during heavy rainfall and indirectly cause damage to sites outside the project area.

Operation Impacts

Many impacts described above as part of construction also apply to the operation phase. During operation of the proposed power plant, repair of a buried utility or other buried infrastructure could require the excavation of a large hole. Such repairs have the potential to impact previously unknown subsurface archaeological resources in areas unaffected by any original trench excavation. The measures proposed under **CUL-1**, **CUL-2**, and **CUL-8** through **CUL-10** would provide for mitigating impacts to previously

unknown archaeological resources during the construction of the plant and linear facilities would also serve to mitigate impacts from repairs occurring during operation of the plant.

Project Closure and Decommissioning

Re-excavation and removal of SunCatchers™ and ancillary facilities could impact cultural resources. Conditions of Certification **CUL-1**, **CUL-2**, and **CUL-8** through **CUL-10** would provide for mitigating impacts to cultural resources encountered during project decommissioning activities.

C.3.8 REDUCED ACREAGE ALTERNATIVE

The Reduced Acreage Alternative would be a 275 MW solar facility located within the boundaries of the proposed project as defined by SES. This alternative is analyzed because (1) it eliminates about 67 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources, and (2) it could transmit the power generated without requiring an upgrade to 65 miles of the existing 220 kV SCE Pisgah-Lugo transmission line.

The Reduced Acreage Alternative would consist of 11,000 SunCatchers with a net generating capacity of approximately 275 MW occupying approximately 2,600 acres of land. This alternative would retain 31 percent of the proposed SunCatchers and would affect 33 percent of the land of the proposed 850 MW project.

The boundaries of the Reduced Acreage Alternative are shown in **Alternatives Figure 1** (TS 2010 ag). This area was designed to avoid sensitive cultural resources and areas that were mapped as occupied tortoise habitat (live tortoise and/or active burrows and sign).

Similar to the proposed project, the Reduced Acreage Alternative would transmit power to the grid through the SCE Pisgah Substation and would require infrastructure including water storage tanks, transmission line, road access, main services complex, and substation (SES 2008a). However, as stated above, the Reduced Acreage alternative would not require the 65-mile upgrade to the SCE transmission line. SCE would complete system upgrades within existing substation boundaries to accommodate the 275 MW, and the 220 kV transmission line would be used. The main services complex, primary water well, and substation and onsite transmission line for the Reduced Acreage Alternative would remain at the location proposed for the proposed project.

As stated above, the Reduced Acreage Alternative is evaluated in this SA/DEIS because it would substantially reduce the impacts of the project. Additionally, the Reduced Acreage Alternative would allow the applicant to demonstrate the success of the Stirling engine technology and construction techniques, while minimizing impacts to the desert environment. Such a limited or phased alternative was suggested in numerous scoping comments.

C.3.8.1 SETTING AND EXISTING CONDITIONS

Please refer to subsection C.3.4 for a discussion of the proposed action. Whereas the setting and existing conditions of the Reduced Acreage alternative are the same as Phase 1 of the proposed project, the Reduced Acreage alternative would occupy only 31 percent of the proposed project area. The specific locations of SunCatchers for the Reduced Acreage alternative would avoid sensitive cultural and biological resources, as well as desert washes as part of the construction of a 275 MW solar facility within the proposed project area.

Regional Setting

The regional setting of the Reduced Acreage alternative is the same as Phase 1 of the proposed project. Please refer to subsection C.3.4 for the proposed action.

Environmental Setting

Please refer to "Environmental Setting" subsection C.3.4.3 for proposed action.

Cultural Setting

Please refer to "Cultural Setting" subsection C.3.4.4 for proposed action.

Cultural Resources Inventory

A records search and Class III inventory were performed by the applicant in the above Cultural Resources Inventory section for the proposed reduced acreage alternative. Twenty-four (24) cultural resources have been identified and recorded as a result of the cultural resources inventory in the project area of analysis for this alternative and are depicted in Cultural Resources Table 7 below.

CULTURAL RESOURCES TABLE 7:
Cultural Resources Site in Reduced Acreage Alternative

Site Designation	Cultural Context	Site Taxonomy	Location within Project area of analysis	Potential for Buried Deposits Based on Geomorphologic Landform
CA-SBR-12991 (DRK-012)	Prehistoric	Lithic Reduction Scatter	Phase 1	Low
CA-SBR-13002/CA-SBR-13003/H (DRK-134/DRK-136/H)	Multi-Component	Lithic Reduction Scatter, Historical Refuse, Fire Affected Rocks and/or Hearths	Phase 2	Low
CA-SBR-13012H (DRK-155H)	Historic	Historical Refuse, Fire Affected Rocks and/or Hearths	Phase 2	Low
CA-SBR-13014H (DRK-163H)	Historic	Historical Refuse	Phase 2	Low
CA-SBR-13016 (DRK-167)	Prehistoric	Lithic Reduction Scatter	Phase 2	Very Low

CULTURAL RESOURCES TABLE 7:
Cultural Resources Site in Reduced Acreage Alternative

Site Designation	Cultural Context	Site Taxonomy	Location within Project area of analysis	Potential for Buried Deposits Based on Geomorphologic Landform
CA-SBR-13017H (DRK-168H)	Historic	Historical Refuse	Phase 2	Low
CA-SBR-13022/CA-SBR-13024 (DRK-175/DRK-177)	Prehistoric	Complex Lithic Scatter	Phase 2	Very Low
CA-SBR-13048 (LTL-017)	Prehistoric	Complex Lithic Scatter	Phase 2	Very Low
CA-SBR-13072 (RAN-168)	Prehistoric	Lithic Reduction Scatter	Phase 2	Very Low to Moderate
CA-SBR-13073 (RAN-169)	Prehistoric	Complex Lithic Scatter	Phase 2	Low
CA-SBR-13074 (RAN-170)	Prehistoric	Complex Lithic Scatter	Phase 2	Low
CA-SBR-13078 (RAN-177)	Prehistoric	Lithic Reduction Scatter	Phase 2	Very Low
CA-SBR-13086 (RSS-005)	Prehistoric	Lithic Reduction Scatter	Phase 2	Very Low
CA-SBR-13096 (SGB-013)	Prehistoric	Lithic Reduction Scatter	Phase 1	Low
CA-SBR-13097 (SGB-017)	Prehistoric	Lithic Reduction Scatter	Phase 1	Low
CA-SBR-13349/H (RSS-006/ SGB-112/ SGB-114/SGB-118/SGB-127/H)	Multi-Component	Complex Lithic and Groundstone Scatter, Historical Refuse	Phase 2	Very Low
CA-SBR-13443/H (DRK-176/RAN-175/H)	Multi-Component	Complex Lithic and Groundstone Scatter, Historical Refuse	Phase 2	Very Low to Moderate
CA-SBR-2910H (National Old Trails Road/U.S. Route 66)	Historic- Built	remnants of historic road/historic highway	Phase 2 and One half-mile buffer	N/A
CA-SBR-6693H (Atlantic & Pacific Railroad/Atchison, Topeka, & Santa Fe Railroad)	Historic- Built	historic railroad and associated bridge structures	One half-mile buffer	N/A
CA-SBR-13114H (SCE 12-kilovolt power line)	Historic- Built	pine T-post utility pole transmission line	One half-mile buffer	N/A

CULTURAL RESOURCES TABLE 7:
Cultural Resources Site in Reduced Acreage Alternative

Site Designation	Cultural Context	Site Taxonomy	Location within Project area of analysis	Potential for Buried Deposits Based on Geomorphologic Landform
CA-SBR-13115H (SCE 220-kilovolt North Transmission Line)	Historic- Built	single-circuit, steel lattice tower transmission line	One half-mile buffer	N/A
CA-SBR-13116H (SCE 220-kilovolt South Transmission Line)	Historic- Built	single-circuit, steel lattice tower transmission line	One half-mile buffer	N/A
CA-SBR-13117H (Pisgah Substation)	Historic- Built	SCE switching station including switch gear, bus bars, and 3 structures used for relay and station battery equipment and storage	One half-mile buffer	N/A
CA-SBR-13118H (Hector Road)	Historic- Built	one-lane, graded dirt road	Phase 1 and Phase 2	N/A

C.3.8.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

A. Identification analysis is based on the three following observations:

1. Whereas testing has not been completed, a subset of sites may qualify for the NRHP and CRHR.
2. Given the low quantity and density of cultural resources present, it may be possible to avoid known cultural resources by project construction.
3. The potential exists for buried archaeological deposits.

B. The alternative is anticipated to have the following effects/impacts:

1. Significant effect per NEPA.
2. Significant impact per CEQA.
3. Adverse effect per Section 106 of the NHPA.

When resource evaluations have been completed, impacts will be assessed. The observation and identification of 119 archaeological sites suggests use of the project landform in the past. Severity and extent of impacts may be reduced given the presence of fewer cultural resources within this alternative, which is much reduced from the original size of the project. If impacts are deemed significant, conditions of certification **CUL-1** through **CUL-5** and **CUL-7** through **CUL-10** would reduce impacts to a less than

significant level; however, significant visual impacts to U.S. Route 66 would remain unmitigable.

C.3.8.3 CEQA LEVEL OF SIGNIFICANCE

The Reduced Acreage alternative would result in a reduction of impacts to cultural resources; however, this alternative would also result in significant impacts under CEQA. The implementation of Conditions of Certification, **CUL-1** through **CUL-10**, is anticipated to reduce the severity of impacts to some cultural resources to a level below significance under CEQA. However, it is still anticipated that this alternative would result in significant and unmitigable visual impacts to U.S. Route 66.

C.3.8.4 CUMULATIVE IMPACTS

This alternative would result in the conversion of 2,600 acres of undeveloped open space with an industrial utility use. When compared to the proposed action, this alternative would result in approximately 69 percent less land conversion to industrial uses. However, the cumulative effects of this amount of land conversion along with all other existing, planned, and proposed projects would result in adverse cumulative land conversion.

C.3.9 AVOIDANCE OF DONATED AND ACQUIRED LANDS ALTERNATIVE

Due to the reduction in project size and impacts associated with the northern portion of the originally proposed project layout, the Avoidance of Donated and Acquired Lands Alternative shown in **Alternatives Figure 2** will be addressed in the **Alternatives** section of this SSA.

C.3.10 NO ACTION ALTERNATIVE

There are three No Project/No Action Alternatives evaluated in this section, as follows:

C.3.10.1 NO PROJECT/NO ACTION ALTERNATIVE #1:

No Action on the Calico Solar Project Application and on CDCA Land Use Plan Amendment

In the No Project / No Action Alternative, the proposed action would not be undertaken. The BLM land on which the project is proposed would continue to be managed within BLM's framework of a program of multiple use and sustained yield, and the maintenance of environmental quality [43 U.S.C. 1781 (b)] in conformance with applicable statutes, regulations, policy and land use plan.

The results of the No Project / No Action Alternative would be the following:

- The impacts of the proposed project would not occur.

- The land on which the project is proposed may or may not become available to other uses (including another solar project), depending on BLM's actions with respect to the amendment of the California Desert Conservation Area Plan.
- The benefits of the proposed project in reducing greenhouse gas emissions from gas-fired generation would not occur. Both State and Federal law support the increased use of renewable power generation.

Under this alternative, the proposed Calico Solar Project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site and no new ground disturbance. As a result, no loss or degradations to cultural resources from construction or operation of the proposed project would occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

If this project is not approved, renewable projects would likely be developed on other sites in the California Desert or in adjacent states as developers strive to provide renewable power that complies with utility requirements and State/Federal mandates. For example, there are large solar and wind projects proposed on BLM land along the Interstate 40 corridor within a few miles of the Calico Solar Project site. In addition, there are currently over 70 applications for solar projects covering over 650,000 acres pending with BLM in California.

C.3.10.2 NO PROJECT/NO ACTION ALTERNATIVE #2:

No Action on Calico Solar Project and Amend the CDCA Land Use Plan to Make the Area Available for Future Solar Development

Under this alternative, the proposed Calico Solar Project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with a different solar technology. As a result, ground disturbance would result from the construction and operation of the facility providing different solar technology and would likely result in a loss or degradation to cultural resources. Different solar technologies require different amounts of grading and maintenance; however, it is expected that all solar technologies require some grading and ground disturbance. As

such, this No Project/No Action Alternative could result in impacts to cultural resources similar to the impacts under the proposed project.

C.3.10.3 NO PROJECT/NO ACTION ALTERNATIVE #3:

No Action on the Calico Solar Project Application and Amend the CDCA Land Use Plan to Make the Area Unavailable for Future Solar Development

Under this alternative, the proposed the Calico Solar Project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site and no corresponding land disturbance. As a result, the cultural resources of the site are not expected to change noticeably from existing conditions and, as such, this No Project/No Action Alternative would not result in impacts to cultural resources. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.3.11 PROJECT-RELATED FUTURE ACTIONS - CULTURAL RESOURCES AND NATIVE AMERICAN VALUES

This section examines the potential impacts of future transmission line construction, line removal, substation expansion, and other upgrades that may be required by Southern California Edison Company (SCE) as a result of the Calico Solar project. The SCE upgrades are a reasonably foreseeable event if the Calico Solar project is approved and constructed as proposed.

The SCE project will be fully evaluated in a future EIR/EIS prepared by the BLM and the California Public Utilities Commission. Because no application has yet been submitted and the SCE project is still in the planning stages, the level of impact analysis presented is based on available information. The purpose of this analysis is to inform the Energy Commission and BLM, interested parties, and the general public of the potential environmental and public health effects that may result from other actions related to the Calico Solar project, and to identify mitigation measures that could lessen such impacts that a level that is not significant.

The project components and construction activities associated with these future actions are described in detail in Section B.3 of this Staff Assessment/EIS. This analysis examines the construction and operational impacts of two upgrade scenarios

- The **275 MW Early Interconnection Option** would include upgrades to the existing SCE system that would result in 275 MW of additional latent system capacity. Under the 275 MW Early Interconnection option, Pisgah Substation would be expanded

adjacent to the existing substation, one to two new 220 kV structures would be constructed to support the gen-tie from the Calico Solar project into Pisgah Substation, and new telecommunication facilities would be installed within existing SCE ROWs.

- The **850 MW Full Build-Out Option** would include replacement of a 67-mile 220 kV SCE transmission line with a new 500 kV line, expansion of the Pisgah Substation at a new location and other telecommunication upgrades to allow for additional transmission system capacity to support the operation of the full Calico Solar project.

C.3.11.1 Environmental Setting

The environmental setting described herein incorporates both the 275 MW Early Interconnection and the 850 MW Full Build-Out options. The setting for the 275 MW Early Interconnection upgrades at the Pisgah Substation and along the telecomm corridors is included within the larger setting for the project area under the 850 MW Full Build-Out option.

Cultural Resources Overview. The Lugo-Pisgah project area is located in the western Mojave Desert where numerous large-scale inventory projects have been conducted. In part, these projects have defined a cultural chronology for the area that spans the last 12,000 years (SES 2008a). Ethnographically, the project area is centered on the traditional lands of the Serrano, a Numic speaking group related to the Shoshone. Between these earliest and latest Native American periods is a rich cultural history. The Mojave Desert is suggested to have been the area of principal point of origin for the migration of the Numic language group, which spread northeastward into the Great Basin and eventually the northern Colorado Plateau. Many of the distinctive projectile point types described for the Great Basin and Southwest culture areas may have originated in the broad geographic area of the Mojave Desert.

Native American history begins with the Clovis culture, the earliest substantively established cultural period in the Western Hemisphere and the only “classic” Paleoindian period represented in the project area. Dated from 10,000 to 8,000 B.C., the Clovis period is represented by distinctive spear points with a central flute or groove on either side of the point. These points are extremely well made and have been found in association with extinct Pleistocene megafauna. Because of the emphasis Clovis people placed on their hunting technology, researchers have tended to interpret Clovis as geared specifically towards big game hunting. In recent years this assumption has been challenged with increasing evidence towards a broader spectrum subsistence strategy (SES 2008a).

The transition from the Pleistocene to the Holocene is marked by significant environmental changes that resulted in equally significant changes in human settlement and subsistence strategies. The Lake Mojave Complex follows Clovis and subsumes several other named complexes, including the Western Pluvial Lakes Tradition and the San Dieguito Complex, among others. Again, the Mojave Complex is represented by a distinct projectile point that tapers to a rounded base. Dates of the complex are ca. 8000 to 6000 B.C. The period is associated with relatively wet conditions and periodic lake recharge in the region. Material culture for the period is dominated by a stone tool technology geared towards a forager-like subsistence strategy. Such a strategy reflects

the frequently changing environmental conditions and patchy resources that would be available necessitating frequent settlement shifts.

Changing environmental conditions to more arid, present-day conditions, marks the transition to the Middle Holocene and the Pinto Complex, which overlaps slightly with the preceding Lake Mojave Complex, and persists to about 3000 B.C. There is broad similarity with the Lake Mojave Complex, especially in toolstone selection and overall technology; however, the Pinto Complex begins the first extensive use of milling tools presumed to reflect the intensification of vegetal processing. An emphasis towards plant resources probably reflects a more predictable biotic environment. The range of settlements across the landscape also suggests more predictable subsistence resources and characterizes the complex overall as spatially extensive.

A new complex has been recently defined based on archaeological work within the Twentynine Palms area (SES 2008a). Although acknowledged as spatially confined for the time being, future work will undoubtedly extend the range of the Deadman Lake Complex. The associated assemblage is described with contracting stemmed or lozenge-shaped projectile points, battered cobbles and core tools, biface technology, and milling stones. Preliminary dating places the complex from 7500 to 5200 B.C. An occupation hiatus is suggested for the period between 3000 and 2000 B.C. Population density was very low (based on known archaeological sites) and large-scale abandonment is presumed for the Mojave Desert. After 2000 B.C. is the Gypsum Complex, represented by well-known projectile point styles, including the contracting stemmed Gypsum, Elko series, and Humboldt series projectile point types. Few excavated components are known from the project area despite the wide settlement pattern represented by these distinctive projectile point styles.

Following the Gypsum Complex, by A.D. 200 the Rose Springs Complex marks the introduction of the bow and arrow technology and significant population increase (SES 2008a). Rose Spring projectile points are smaller and were presumably hafted as arrow points. Environmental conditions were wetter and cooler during this period allowing Rose Spring settlement patterns to shift back to the Mojave Desert. Material culture is diverse and extensive and is often found as well developed middens. Architecture is first recognized during this period including wickiups and pit houses. Obsidian procurement was emphasized, as well. Settlement patterns appear to have been oriented initially towards permanent streams and lake margins and by the end of the period, or about A.D. 1000, settlements shifted to more ephemeral water sources as large-body lakes began to desiccate. The persistence of the Medieval Climatic Anomaly may have stressed an already expanding population resulting in the end of the complex by A.D. 1100.

The Late Prehistoric period extends from the close of the Rose Springs Complex ca. A.D. 1100 and ends with the ethnographically described groups occupying the area at contact in the 16th century. It is during this period that Ancestral Puebloan groups are known to have exploited turquoise mines and probably interacted with resident Numic speaking Paiute and Shoshone groups. Numic material culture includes Desert Side-notched and Cottonwood Triangular projectile points, buff and brown ware ceramics, ornaments, milling tools, and rock art. Although interaction spheres have been posited for the region, no clear cultural partitioning is evident so far in the archaeological record

despite the linguistic divergence. Obsidian procurement was greatly reduced in the southern and eastern portion of the Mojave Desert perhaps indicating increasing regionalization during this period. It is during this period that the postulated Numic expansion took place out of the Mojave Desert northeastward into the Great Basin. A return of warm and dry conditions, coupled with linguistic evidence, suggest this expansion began sometime before A.D. 1000 (SES 2008a).

Spanish settlement of southern California did not take place until the first mission was established in 1769. At the time, California had the highest Native American population in North America speaking over 300 dialects. The Serrano, a Shoshonean group, were the primary inhabitants of the project area. Serrano lived in large square communal houses and practiced an extensive trade network with the coast. Secularization of the Spanish missions in 1834 led to the development of large ranchos that extended into the interior from the coast. Ranchos often forced Native American groups into a form of indentured servitude. These closed, fortified communal settlements continued after non-Mexican immigrants entered the region. Upon statehood in 1850, industrialization began with the building of railroads, including the Atchison, Topeka & Santa Fe (AT&SF), mining, and the development of military installations (SES 2008a).

Potential Cultural Resources. To date, no formal file and literature review and no intensive cultural resources inventory has taken place in the area of potential effect along the Lugo-Pisgah ROW. SCE would conduct cultural surveys as part of its CPCN application and PEA that will be submitted to the CPUC for the 850 MW Full Build-Out. As such, the identification of affected cultural resources is limited to broad generalities until such time that an intensive cultural resources inventory can be completed.

Based on the cultural resources overview presented above, it can be expected that a number of prehistoric cultural resources would be identified during inventory for the proposed area of the 850 MW Full Build-Out upgrades. The 275 MW Early Interconnection upgrades would require substantially less ground disturbance and the chance of encountering cultural resources would be reduced. Likely locations for prehistoric archaeological sites include the edges of intermittent drainages, such as those that drain into Antelope Valley near the western end of the project area and ultimately the terraces above the Mojave River. East of the Mojave River it is expected that the number of prehistoric resources will decrease as the corridor extends across Apple and Fifteen-Mile Valleys. However, the many ephemeral drainages that bisect these areas are relict stream channels that could have archaeological sites in association. The margins of both Rabbit Lake and Lucerne Lake also have the potential to contain prehistoric resources. Sites along relict stream channels and desiccated lake margins could include prehistoric campsites and resource processing localities.

Potential historic resources include both the Pisgah and Panoche/Lugo substations, if more than 45-years old, and the 220 kV transmission line that is to be replaced by the new 500 kV line. If these resources meet the age criteria for consideration then a qualified architectural historian must document the resources on appropriate Department of Parks and Recreation (DPR) forms and assess the significance and potential impact to these resources. Other potential historic resources include the crossing of the AT&SF Railroad (two locations) and the California Aqueduct. Numerous other transmission lines would also be crossed.

C.3.11.2 Environmental Impacts

Impacts to cultural resources are unknown pending a formal file and literature review and intensive inventory. Since the proposed 500 kV transmission line corridor would follow an existing ROW for much of its proposed length, it is possible that impacts to cultural resources would be lower due to prior impacts. New construction would have the potential to adversely affect cultural resources from ROW/access road construction, blading, equipment storage, pole placement, substation expansion and line installation.

Ground disturbance, the presence of vehicles driving over the top of sites and the installation of new towers could damage archaeological resources. After the work area is defined and after archaeological and historic surveys are complete in any areas that have not been protocol-level surveyed previously by SCE, archaeological sites or historic resources within the built environment may be identified. Depending on when they were built, if the existing SCE 220 kV line or the Pisgah and Panoche/Lugo Substations are determined eligible for the National Register of Historic Places (NRHP), the upgrades and removal effort would result in an impact to historical resources. Other potential historic resources include the crossing of the AT&SF Railroad (two locations) and the California Aqueduct. Whether the impact is significant would need to be determined after the line, substations and/or other infrastructure are evaluated.

Some new lines would be installed in places where there were none previously, and some existing overhead lines would have structures retrofitted and replaced along existing lines. The trench for undergrounding for the Pisgah-Gale fiber optic cable (under the 275 MW Early Interconnection) would normally be excavated in an existing underground cable trench or in a new 600-foot-long trench near the SCE Pisgah Substation, and trenching would not come within 12 inches from any existing fence, wall, or outbuilding associated with an adjacent property. Therefore, there would be no potential to adversely impact the physical condition of existing above-ground cultural resources. The only potential to adversely impact existing above-ground cultural resources would arise from a change in the visual setting of the property due to the addition of taller poles or new poles, new overhead lines, and new substation equipment depending on the location in the project area.

Any potential for the project to impact cultural resources would be limited to undiscovered below-ground cultural deposits. It is possible that buried cultural deposits could be encountered during ground disturbing project activities including trenching for the installation of underground fiber optic cables, during ground disturbance associated with the removal or installation of transmission structures, or ground disturbance associated with the expansion at the Pisgah Substation. The 275 MW Early Interconnection upgrades would require substantially less ground disturbance than the 850 MW Full Build-Out, and the chance of impacting cultural resources would be reduced.

C.3.11.3 Mitigation

During the CEQA/NEPA environmental permitting process, cultural resources sites would likely be identified and then would be avoided by vehicles and construction activities. After the construction area has been identified and after work for Section 106 has been completed, archaeological sites should be evaluated for eligibility for listing in

the NRHP or California Register of Historic Resources (CRHR) if it appears that any would be affected by the project. Sites that have been evaluated as “not eligible” would warrant no further consideration and avoidance would not be required. Sites that have not been evaluated and sites that are considered “potentially eligible” should be treated as eligible resources pending formal evaluation. If found to meet age and significance criteria, the historic resources identified above, including the substations and the existing 220 kV transmission line, would require Level 1 Historic American Engineering Records (HAER) be completed in order to mitigate adverse effects. The crossing of the AT&SF railroad, other historic transmission lines, and the California Aqueduct would likely result in the determination of no adverse effect.

Data recovery should be conducted as a recommended mitigation measure for archaeological sites that are recommended as eligible to the CRHR or NRHP and would be impacted by the project. Monitoring of project-related excavation within an archaeological site is not appropriate mitigation and may destroy the site. SCE should comply with provisions of the National Historic Preservation Act and should consult with a California State Historic Preservation Officer regarding appropriate mitigation should any cultural materials be encountered during construction or other ground-disturbing activities.

In the event of a site discovery during project implementation, all work would stop in the immediate area in order to afford time for documentation, evaluation, and consultation between the lead federal agency, the California State Historic Preservation Officer (SHPO), and all consulting tribes if a discovery is aboriginal in origin. Consultation with the above entities would ensue regardless of whether the discovery is located on private or federal lands. If consultation determines that the discovery is eligible for the NRHP, a consideration of effects should be undertaken pursuant to 36 CFR 800.5 of the National Historic Preservation Act (NHPA, 1966, as amended). If consultation results in a determination of adverse effects to a historic property, mitigation measures would be proposed and implemented following consultation with the California SHPO, the lead federal agency, the Advisory Council on Historic Preservation (ACHP), and all consulting Tribes, if necessary. Avoidance would be the preferable mitigation measure in all instances.

C.3.11.4 Conclusion

While SCE would attempt to avoid effects to known cultural sites, it is possible that the corridors have sensitive cultural resources that may not be avoidable and could be affected. This Staff Assessment/EIS concludes that it would be possible to mitigate all impacts to cultural resources to less than a significant level and to implement recommended measures that apply to cultural resources. Known sensitive areas would be avoided, construction activities would be monitored and other appropriate mitigation similar to the Conditions of Certification identified in the **Cultural Resources and Native American Values** section of the Staff Assessment/EIS would be implemented.

C.3.12 CUMULATIVE IMPACTS

Section B.3, Cumulative Scenario, provides detailed information on the potential cumulative solar and other development projects in the project area. Together, these

projects comprise the cumulative scenario which forms the basis of the cumulative impact analysis for the proposed project. In summary, these projects are:

- Renewable energy projects on BLM, State, and private lands, as shown on **Cumulative Figures 1 and 2** and in **Cumulative Tables 1A and 1B.** Although not all of those projects are expected to complete the environmental review processes, or be funded and constructed, the list is indicative of the large number of renewable projects currently proposed in California.
- Future development projects in the immediate Newbury Springs/Ludlow area are shown on **Cumulative Impacts Figure 3,** Newbury Springs/Ludlow **Existing and Future/Foreseeable Projects, and Cumulative Tables 2 and 3**. Table 2 presents existing projects in this area and Table 3 presents future foreseeable projects in the Newbury Springs/Ludlow Area. Both tables provide the project names, types, locations and statuses

These projects are defined within a geographic area that has been identified by the Energy Commission and BLM as covering an area large enough to provide a reasonable basis for evaluating cumulative impacts for all resource elements or environmental parameters. Most of these projects have, are, or will be required to undergo their own independent environmental review under CEQA and/or NEPA. Even if the cumulative projects described in Section B.3 have not yet completed the required environmental processes, they were considered in the cumulative impacts analyses in this SA/Draft EIS.

Geographic Scope of Analysis

The geographic area considered for cumulative impacts on cultural resources is the Calico Solar Project area (Newbury Springs/Ludlow area).

Effects of Past and Present Projects

For this analysis, the following projects or developments are considered most relevant to effects on cultural resources (refer also to Section B.3, Table 2):

Project	Location
Twentynine Palms Marine Corps Air Ground Combat Center (MCAGCC)	Morongo Basin (to the south of project site)
SEGS I and II	Near Daggett (17 miles west of project site)
CACTUS (formerly Solar One and Solar Two)	Near Daggett (to the west of project site)
Mine	2 miles west of project site along I-40
Mine	14 miles west of project site along I-40

Cultural resources in the geographic area have been impacted by past and currently approved projects as follows:

1. Because cultural resources are non-renewable, the removal or destruction of any resource results in a net loss of resources

2. Existing development in the Newbury Springs/Ludlow area and the surrounding areas has resulted in the removal or destruction of cultural resources, which has resulted in a net loss of resources in these areas

Effects of Reasonably Foreseeable Future Projects

Cultural resources are also expected to be affected by the following reasonably foreseeable future projects as follows (refer also to Section B.3, Table 3):

SES Solar Three (CACA 47702)
SES Solar Six (CACA 49540)
SCE Pisgah Substation Expansion
Pisgah-Lugo transmission upgrade
Twentynine Palms Expansion
Broadwell BrightSource (CACA 48875)
Wind project (CACA 48629)
Wind Project (CACA 48667)
Wind project (CACA 48472)
Twin Mountain Rock Venture
Solar thermal (CACA 49429)
Proposed National Monument (former Catellus Lands)
BLM Renewable Energy Study Areas
SES Solar Three (CACA 47702)
SES Solar Six (CACA 49540)
SCE Pisgah Substation Expansion
Pisgah-Lugo transmission upgrade
Twentynine Palms Expansion
Broadwell BrightSource (CACA 48875)
Wind project (CACA 48629)
Wind Project (CACA 48667)
Wind project (CACA 48472)
Twin Mountain Rock Venture
Solar thermal (CACA 49429)
Proposed National Monument (former Catellus Lands)
BLM Renewable Energy Study Areas

Contribution of the Calico Solar Project to Cumulative Impacts

Construction. The construction of the Calico Solar Project would probably result in permanent adverse impacts related to the removal or partial destruction of archaeological resources on the project site during construction-related ground disturbance. The construction of the proposed project would also result in unmitigable adverse impacts to several built-environment resources, particularly a contributing segment of U.S. Route 66, due to the profound visual intrusion of the project on the

landscape. It is further expected that the construction of some or all of the foreseeable cumulative projects which are not yet built may also result in the permanent, potentially unmitigable, adverse impacts as a result of the removal or partial destruction of the archaeological resources on the sites for those projects and as a result of the visual intrusion of some of these projects on Mojave Desert vistas. As a result, the construction of the Calico Solar Project and other foreseeable cumulative projects will contribute to permanent long term, potentially unmitigable, adverse impacts as a result of of the physical degradation of and visual intrusion on significant cultural resources on those sites and an overall net reduction in cultural resources in the area.

Operation. During operation of the Calico Solar Project, cultural resources on and in the immediate vicinity of the project site may experience increased vandalism as a result of improved access to the project site, illegal collection of artifacts, and/or destruction of resources by vehicles traveling on the site. Similar impacts may also occur as a result of some or all of the cumulative projects, as more people come into this area associated with those new land uses. As a result, the Calico Solar Project and the other cumulative projects may contribute to a cumulative adverse impact on cultural resources as a result in increased access to the area and the potential for increased vandalism, illegal collection of artifacts, and/or destruction of resources during operation related activities.

Decommissioning. The decommissioning of the Calico Solar Project may result in adverse impacts to cultural resources as a result of ground disturbance, increased vandalism, illegal collection of artifacts, and/or destruction of resources by vehicles traveling on the site or during demolition and removal of the project facilities. Similar impacts are not anticipated as a result of most of the other cumulative projects as the removal of those land uses may not result in increased vandalism, illegal collection of artifacts, and/or destruction of resources by vehicles traveling on those sites or during demolition and removal of those land uses. As a result, decommissioning the Calico Solar Project is not anticipated to contribute to a cumulative adverse impact on cultural resources beyond the contribution of the project that would occur as a result of the construction and operation of the project.

C.3.13 COMPLIANCE WITH LORS

If the Conditions of Certification (**CUL-1** through **CUL-10**) are properly implemented, the proposed Calico Solar Project would result in a less than significant impact under CEQA and resolve effects under Section 106 of the NHPA on known and newly found cultural resources. The project would therefore be in compliance with the applicable state laws, ordinances, regulations, and standards listed in Cultural Resources Table 1.

The County of San Bernardino's General Plan has general language promoting the county-wide preservation of cultural resources. The Condition of Certification requires specific actions not just to promote but to effect historic preservation and mitigate impacts to all cultural resources in order to ensure CEQA compliance. Consequently, if Calico Solar, LLC implements these conditions, its actions would be consistent with the general historic preservation goals of the County of San Bernardino.

C.3.14 NOTEWORTHY PUBLIC BENEFITS

The Calico Solar project provides an opportunity to study cultural resources over a broad expanse of land that may not otherwise be investigated. Staff does believe that if the conditions of certification were implemented, the resulting acquisition of data would contribute to the knowledge of prehistory in the Mojave Desert. Thus, data recovery may provide some public benefits by advancing scientific understanding about the prehistory of the Mojave Desert.

C.3.15 RESPONSES TO COMMENTS

California Unions for Reliable Energy (CURE) submitted the following comments pertaining to the cultural resource analysis in a letter dated June 4, 2010.

CURE Comment 1: *The Staff Assessment (SA) must be revised and recirculated for public comment. The Revised SA will contain many new analyses and mitigation measures for significant unresolved issues. Indeed, that is the very purpose of the Revised SA. For example, the Revised SA will include wholly new mitigation measures for cultural resources never seen before by the public. The addition of this significant new information, which has not yet been analyzed and disclosed in a report by Staff, requires that the Revised SA be recirculated for public review and comment. The purpose of recirculation is to give the public and other agencies an opportunity to evaluate the new data and the validity of conclusions drawn from it. Consequently, the plan to include numerous additional analyses and mitigation measures in the Revised SA without renoticing and recirculating the revised document for public review and comment violates CEQA. The SA is being revised to inform the public and decision makers of the project's significant impacts and to avoid or reduce environmental damage when possible by requiring alternatives or mitigation measures. Thus, Staff, after receiving the necessary information from the Applicant, must draft and circulate a complete SA for public review and comment. The Committee must revise the schedule to incorporate this legally mandated procedure.*

> **Staff Response:** The applicant has worked with staff to provide additional follow-up data. These data, in combination with information provided earlier by the applicant, including the AFC and other documents cited in the SA/DEIS, and by staff's additional independent research, provide a suitable basis for CEQA analysis, as presented in this SSA. Staff also notes that the Energy Commission's certification process provides for additional future opportunities for public comment on the project as revised and the environmental analysis. Recirculation of the SA/DEIS is not required.

CURE Comment 2: *The applicant fails to set forth the environmental setting for the Lugo to Pisgah Transmission Line. The applicant has not yet informed the CEC where the new 500 kV transmission line that is required to enable the project's power to enter the grid or the new 100-acre substation will be located. Neither has the applicant provided biological or cultural surveys of the area that will be impacted by this transmission line and substation, as requested by Staff. Because the location and description of these transmission upgrades have not been provided by the applicant, the*

environmental impacts of these facilities and the necessary mitigation cannot be determined. Without this information about the project's proposed (and required) transmission upgrades, staff simply cannot provide and adequate basis for the Committee to make the findings required for certification of the project (e.g., compliance with all laws and regulations, and adequate mitigation of impacts); nor can staff issue a valid SA.

> **Staff Response:** Section C.3.11 of the SSA examines the potential impacts of the future SCE transmission line project, which would be related to the Calico Solar Project, under the separate jurisdiction of the California Public Utilities Commission. The SCE upgrades are a reasonably foreseeable event if the Calico Solar Project is approved and constructed as proposed, and are discussed in the SSA based on available information. As a separate project under another agency's jurisdiction, the SCE upgrades will also be the subject of a more detailed CEQA analysis in the future, based on a more specific project description than is now available.

CURE Comment 3: *The SA must disclose and analyze all potentially significant impacts to cultural resources. Because the applicant failed to provide necessary information, staff could not effectively evaluate the Project's impacts in the SA. Cure states that the Commission's environmental review must describe the mitigation measures to minimize significant effects. Formultaion of mitigation measures should not be deferred unitl some future time; however, measure may specify performance standards which would mitigate the significant effect of the project and which may be accomplished in more than one specified way.*

> **Staff Response:** Staff's analysis and recommended conditions of certification have been extensively revised based on updated and refined cultural resource data from the Draft Final Class III Cultural Resources Technical Report provided by the applicant in June 2010 (TS 2010an). Staff's analysis of the updated cultural resource data has disclosed all potentially significant impacts to cultural resources.

CURE Comment 4: *The SA only discusses impacts to archaeological and historical artifacts and completely omits any analysis of impacts to traditional cultural properties (i.e., properties of significance to tribes today that may or may not be tied to specific artifacts). After the SA was published, tribal members expressed a desire to bring Tribal elders out to the site to identify potential traditional cultural properties. Local tribes have not had an opportunity to participate in the review of the technical data from the survey efforts and so they have not had an opportunity to identify significant impacts to traditional cultural properties. Staff must give tribal members and knowledgeable individuals an opportunity to identify significant cultural resources on the project site, and in area near the site that would be impacted by the project development, as part of the project's potentially significant impacts under CEQA. It is improper for the SA to conclude that an adequate survey of cultural resources has been completed when a whole class of resources, traditional cultural properties, has not yet been studied. The SA must be revised to identify, analyze and mitigate potentially significant impact to all cultural resources on the project site, including traditional cultural properties.*

Staff Response: No traditional cultural properties have been identified in or near the Calico Solar project area of analysis. The BLM has been consulting with tribal representatives regarding concerns and/or knowledge of cultural resources within the Calico Solar project since August 2007. In July 2008, the applicant requested a search of the Sacred Lands File from the Native American Heritage Commission, and no Native American cultural sites were identified as a result of that search. Energy Commission staff has also consulted with tribal members regarding the project and found that, while tribal members are concerned about the treatment of cultural resources identified by the applicant within the project area, they have expressed no specific knowledge of traditional cultural properties within or near the project area of analysis. On June 13, 2010, the BLM hosted a project site field visit specifically for the tribal representatives. Tribal members reiterated concerns about the treatment of cultural resources; however, to date, no traditional cultural resources have been identified in or near the project area of analysis.

CURE Comment 5: *The SA indicates that all impacts to cultural resources will be mitigated through the preparation of a Programmatic Agreement (PA) pursuant to Section 106 of the National Historic Preservation Act (NHPA). The PA is an agreement that would be drafted prior to project approval that would defer the resolution of project impacts to after project approval. This is contrary to the statutory requirements of Section 106. If the PA is developed to mitigate significant impacts to cultural resources, the PA must fully consider the impact to cultural resources and propose mitigation for those impacts PRIOR to the issuance of any license for the project.*

Staff Response: In lieu of the PA, staff has prepared Conditions of Certification that include mitigation measures to address significant impacts to cultural resources under CEQA.

C.3.16 CONCLUSIONS AND RECOMMENDATIONS

This supplemental staff assessment has been prepared in response to the applicant's reduction to the original 8,230-acre project footprint to avoid cultural and biological impacts (TS 2010ag), as well as in response to comments received from the public about the proposed project. This supplement relies on the information provided in the "Draft Final Class III Cultural Resources Technical Report" completed by the applicant and submitted to the BLM in June 2010. A total of 119 archaeological sites and ten built-environment (architectural) resources were identified within the Calico Solar project's cultural resources area of analysis. The applicant has recommended, and the BLM has made the determination, that three (3) archaeological sites and five (5) built-environment properties within the project area are eligible for the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR). The BLM further appears to have found, under the National Environmental Policy Act (NEPA), that the proposed action would not have a significant impact on the environment, as that action relates to cultural resources, and that, under Section 106 of the National Historic Preservation Act (NHPA), the proposed action, or undertaking, would not adversely affect significant cultural resources, or historic properties.

Energy Commission staff, by contrast, believes that the data on which the applicant's and the BLM's conclusions are based are not adequate to definitively draw conclusions regarding resource eligibility. Energy Commission staff, therefore, believes that an as yet unquantified number of individual archaeological sites are potentially eligible for listing in the California Register of Historical Resources (CRHR), that three archaeological districts and landscapes have the potential to be eligible, that the effects of the proposed action on any of these resources that are conclusively recommended to be eligible would be significant, and that the Commission's adoption of proposed conditions of certification **CUL–1** through **CUL–5** and **CUL–7** through **CUL–10** would reduce these effects to a less than significant level. Energy Commission staff more definitively recommends that four built-environment resources are eligible for listing in the CRHR; however, notwithstanding the Commission's adoption of condition of certification **CUL–6** to reduce significant visual effects to one of those built-environment resources (a segment of historic U.S. Route 66), the effects are unmitigable and would not be reduced to a less than significant level.

C.3.17 PROPOSED CONDITIONS OF CERTIFICATION

CUL-1 Prior to the start of ground disturbance (includes "preconstruction site mobilization," "ground disturbance," and "construction grading, boring, and trenching," as defined in the General Conditions for this project), the project owner shall obtain the services of a Cultural Resources Specialist (CRS) and one or more alternate CRSs (at the project owner's option).

The CRS shall manage all cultural resources monitoring, mitigation, curation, and reporting activities in accordance with the Conditions of Certification (Conditions). The CRS may elect to obtain the services of Cultural Resources Monitors (CRMs) and other technical specialists, if needed, to assist in monitoring, mitigation, and curation activities. The project owner shall ensure that the CRS makes recommendations regarding the eligibility for listing in the California Register of Historical Resources (CRHR) of any cultural resources that are newly discovered or that may be affected in an unanticipated manner. No ground disturbance shall occur prior to Compliance Project Manager (CPM) approval of the CRS and alternates, unless such activities are specifically approved by the CPM.

Approval of a CRS may be denied or revoked for reasons including but not limited to non-compliance on this or other Energy Commission projects. After all ground disturbance is completed and the CRS has fulfilled all responsibilities specified in these cultural resources conditions, the project owner may discharge the CRS, if the CPM approves. With the discharge of the CRS, these cultural resources conditions no longer apply to the activities of this power plant.

CULTURAL RESOURCES SPECIALIST

The resumes for the CRS and alternate(s) shall include information demonstrating to the satisfaction of the CPM that their training and backgrounds conform to the U.S. Secretary of Interior's Professional Qualifications Standards, as published in Title 36, Code of Federal

Regulations, part 61 (36 C.F.R., part 61). In addition, the CRS shall have the following qualifications:

1. The CRS's qualifications shall be appropriate to the needs of the project and shall include a background in anthropology, archaeology, history, architectural history, or a related field;

2. At least three years of archaeological or historical, as appropriate (per nature of predominant cultural resources on the project site), resource mitigation and field experience in California; and

3. At least one year of experience in a decision-making capacity on cultural resources projects in California and the appropriate training and experience to knowledgably make recommendations regarding the significance of cultural resources.

The resumes of the CRS and alternate CRS shall include the names and telephone numbers of contacts familiar with the work of the CRS/alternate CRS on referenced projects and demonstrate to the satisfaction of the CPM that the CRS/alternate CRS has the appropriate training and experience to implement effectively the Conditions.

CULTURAL RESOURCES MONITORS

CRMs shall have the following qualifications:

1. a B.S. or B.A. degree in anthropology, archaeology, historical archaeology, or a related field, and one year experience monitoring in California; or

2. an A.S. or A.A. degree in anthropology, archaeology, historical archaeology, or a related field, and four years experience monitoring in California; or

3. enrollment in upper division classes pursuing a degree in the fields of anthropology, archaeology, historical archaeology, or a related field, and two years of monitoring experience in California.

CULTURAL RESOURCES TECHNICAL SPECIALISTS

The resume(s) of any additional technical specialist(s), e.g., historical archaeologist, historian, architectural historian, and/or physical anthropologist, shall be submitted to the CPM for approval.

Verification:

1. At least 45 days prior to the start of ground disturbance, the project owner shall submit the resume for the CRS, and alternate(s) if desired, to the CPM for review and approval.

2. At least 10 days prior to a termination or release of the CRS, or within 10 days after the resignation of a CRS, the project owner shall submit the resume of the proposed

new CRS to the CPM for review and approval. At the same time, the project owner shall also provide to the proposed new CRS the AFC and all cultural resources documents, field notes, photographs, and other cultural resources materials generated by the project. If no alternate CRS is available to assume the duties of the CRS, a monitor may serve in place of a CRS so that ground disturbance may continue up to a maximum of 3 days without a CRS. If cultural resources are discovered then ground disturbance will remain halted until there is a CRS or alternate CRS to make a recommendation regarding significance.

3. At least 20 days prior to ground disturbance, the CRS shall provide a letter naming anticipated CRMs for the project and stating that the identified CRMs meet the minimum qualifications for cultural resources monitoring required by this Condition.

4. At least 5 days prior to additional CRMs beginning on-site duties during the project, the CRS shall provide letters to the CPM identifying the new CRMs and attesting to their qualifications.

5. At least 10 days prior to any technical specialists, other than CRMS, beginning tasks, the resume(s) of the specialists shall be provided to the CPM for review and approval.

6. At least 10 days prior to the start of ground disturbance, the project owner shall confirm in writing to the CPM that the approved CRS will be available for onsite work and is prepared to implement the cultural resources conditions.

CUL-2 Prior to the start of ground disturbance, if the CRS has not previously worked on the project, the project owner shall provide the CRS with copies of the AFC, data responses, confidential cultural resources reports, and the Final Staff Assessment (FSA) for the project. The project owner shall also provide the CRS and the CPM with maps and drawings showing the footprints of the power plant, all linear facility routes, all access roads, and all laydown areas. Maps shall include the appropriate USGS quadrangles and a map at an appropriate scale (e.g., 1:2400 or 1” = 200’) for plotting cultural features or materials. If the CRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the CRS and CPM. The CPM shall review map submittals and, in consultation with the CRS, approve those that are appropriate for use in cultural resources planning activities. No ground disturbance shall occur prior to CPM approval of maps and drawings, unless such activities are specifically approved by the CPM.

If construction of the project would proceed in phases, maps and drawings not previously provided shall be provided to the CRS and CPM prior to the start of each phase. Written notice identifying the proposed schedule of each project phase shall be provided to the CRS and CPM.

Weekly, until ground disturbance is completed, the project construction manager shall provide to the CRS and CPM a schedule of project activities for the following week, including the identification of area(s) where ground disturbance will occur during that week.

The project owner shall notify the CRS and CPM of any changes to the scheduling of the construction phases.

Verification:

1. At least 40 days prior to the start of ground disturbance, the project owner shall provide the AFC, data responses, confidential cultural resources documents, and the FSA to the CRS, if needed, and the subject maps and drawings to the CRS and CPM. The CPM will review submittals in consultation with the CRS and approve maps and drawings suitable for cultural resources planning activities.

2. At least 15 days prior to the start of ground disturbance, if there are changes to any project-related footprint, the project owner shall provide revised maps and drawings for the changes to the CRS and CPM.

3. At least 15 days prior to the start of each phase of a phased project, the project owner shall submit the appropriate maps and drawings, if not previously provided, to the CRS and CPM.

4. Weekly, during ground disturbance, a current schedule of anticipated project activity shall be provided to the CRS and CPM by letter, e-mail, or fax.

5. Within 5 days of changing the scheduling of phases of a phased project, the project owner shall provide written notice of the changes to the CRS and CPM.

CUL-3 Changes to the proposed project or to the character of its construction, operation, and maintenance that may become necessary subsequent to the approval of the project, were such approval to occur, may in turn require the re-consideration of the extent of the original project area. Where such changes indicate the need to alter the original project area to include additional lands that were not elements of analysis during the certification process, the effects of any proposed changes on historical resources that may be on such lands would need to be taken into account. Changes in the character of the construction, operation, and maintenance of the proposed project may include such actions as decisions to use non-commercial borrow or disposal sites.

Upon the recognition that proposed changes to the project would require the use of lands that were not a part of the original project area of analysis, the project owner shall ensure that the CRS surveys any such lands for cultural resources and record each newly found resource on DPR 523 Series forms. Exceptions would be made to this protocol in cases where cultural resources surveys no greater than five years in age are documented for the entirety of the subject lands and approved by the CPM. Where new cultural resources surveys are warranted, the project owner shall convey the results of such surveys, along with the CRS's recommendations for further action, to the CPM, who will determine whether further action is necessary. If the CPM determines that historical resources may be present and that any such resource may be subject to a substantial adverse change in its significance, the project owner shall ensure that the CRS provides the CPM with

substantiated recommendations on whether each such resource is eligible for listing in the CRHR and recommendations for the resolution of any such significant effects. The CRS, the project owner, and the CPM shall then confer on said recommendations, and, upon the concurrence of the CPM with those recommendations, the project owner shall ensure that the CRS proceeds to implement them, and reports on the methods and the results of any such work in the final Cultural Resources Report (CRR) (**CUL-8**).

Verification:

1. Upon the recognition that proposed changes to the project or to the character of the construction, operation, and maintenance of the project would require the use of lands that were not a part of the original project area, the project owner shall notify the CRS and CPM. The project owner shall then provide, for CPM review and approval, documentation of any cultural resources surveys five years or less in age that exist for the additional lands.

2. At least 105 days prior to the use of the new additional project area lands, in the absence of any such cultural resources surveys or when the extant cultural resources surveys do not cover the entirety of the lands to be added to the project area, the project owner shall ensure that the CRS surveys the additional lands for cultural resources, notifies the project owner and the CPM of the results of the new cultural resources survey, and recommends further action.

3. No more than 15 days subsequent to the receipt of the information in verification 2, **CUL-3**, above, the CPM shall determine whether historical resources may be present and whether any such resources may be subject to substantial adverse changes in significance.

4. At least 60 days prior to the use of the new additional project area lands, if the CPM determines that historical resources may be subject to substantial adverse changes in significance, the project owner shall ensure that the CRS provides the CPM with substantiated evaluations, based on archival and field research, on whether each such resource is eligible for listing in the CRHR and recommendations for the resolution of any potential significant effects.

5. For no longer than 15 days, the project owner, the CRS, and the CPM shall confer about the above evaluations and recommendations, and, upon the concurrence of the CPM with those evaluations and recommendations, the project owner shall ensure that the CRS proceeds to resolve any significant effects pursuant to the above recommendations prior to the use of the new additional project area lands.
6. The project owner shall ensure that the CRS reports on the methods and the results of all such work in the CRR (**CUL-7**).

CUL-4 Prior to the preparation of the Cultural Resources Monitoring and Mitigation Plan (CRMMP), pursuant to **CUL-5**, the project owner shall develop, prepare, and implement a series of protocols the purposes of which will be to gather and analyze information to refine the assessments of the historical significance of the archaeological resources in the project area of analysis. The project owner shall first prepare and submit, for the review and approval

of the CPM, a final draft of an archaeological resource taxonomy that splits out the individual archaeological resources in the project area of analysis into objectively similar archaeological site types or site type groups, and that delimits, as appropriate, groups of individual resources, such as districts or landscapes, that relate unifying prehistoric and historic themes. The initial basis for the taxonomy of individual archaeological resources should be the taxonomy in the "Cultural Resource Site Taxonomy" subsection of the published SSA for this project. Subsequent to CPM approval of the final draft of the archaeological resource taxonomy, the project owner shall prepare and submit, for the review and approval of the CPM and consistent with the guidance found in the February 1990 "Archaeological Resource Management Reports (ARMR): Recommended Contents and Format" and the February 1991 "Guidelines for Archaeological Research Designs," separate protocols for the CRHR evaluation of each archaeological site type or site type group in the CPM-approved, final archaeological resource taxonomy and for each archaeological district, landscape, or other large-scale archaeological resource in the subject taxonomy. Among the large-scale resources that the project owner shall explicitly consider in the final draft of the archaeological resource taxonomy are a prehistoric archaeological landscape that encompasses the numerous and diverse individual prehistoric archaeological sites across the desert pavements in the southern portion of the project area, a potential historical archaeological gravel mining district over roughly the western to west-central portion of the project area, and the archaeological remnants of the segment of the National Trails Road in the project area that may be a contributing element to a National Trails Road historic district.

Each CRHR evaluation protocol shall include, at a minimum, the following elements:

1. A background research section which develops interpretive contexts germane to each protocol and which presents information on previous research in the vicinity of the project area, generally, and on previous research on the specific resource types under consideration in the respective protocols.

2. An evaluation phase research design which, in the case of protocols prepared for individual archaeological resource types or type groups, should include a rationalized sample of the resources in a type or type group, rather than a protocol structured to sample 100 percent of the population of a type or type group, and which explicitly takes into account extant information on the subject resources.

3. A detailed and explicit field methodology tailored to acquire the data necessary to address specific research questions.

4. Provisions for visual and specialized laboratory analyses of recovered cultural materials.

5. Provisions for visual and specialized laboratory analyses of chronometric samples, and organic remains and residues.

Where defensible relative to archaeological theory, the project owner may submit documents that, within a single document, tier several separate evaluation protocols from common background research. In such documents, the project owner would develop and present germane prehistoric or historic contexts and present a general review of previous archaeological research in the project area vicinity before laying out the specific evaluation protocols for particular archaeological resources by reviewing previous archaeological research specific to a resource type, type group, or large-scale resource, and then developing and presenting custom research designs for those particular resources.

Subsequent to the completion of the implementation of each protocol, the project owner shall prepare and submit, for the review and approval of the CPM, separate reports on the results of the implementation of each protocol, on the analysis and interpretation of that data, and on the CRHR evaluation of the resource type, type group, or large-scale resource that a subject protocol addresses.

Each CRHR evaluation report shall include, at a minimum, the following elements:

1. Synopses of the background research section, evaluation phase research design, field methodology, and material culture, chronometric, and organic analyses as set out in the relevant original evaluation protocol.

2. A detailed, explicit, illustrated presentation of the results of the field and laboratory work done under the relevant protocol.

3. An analysis and behavioral interpretation of data from previous research, and of field and laboratory data acquired as the result of the implementation of the relevant protocol.

4. Formal evaluation of the specific resource types relative to the CRHR program.

The project owner may lump the evaluation reports into report documents that reflect any prior approved protocol documents that contain more than one protocol.

Verification:

1. At least 150 days prior to the start of ground disturbance, the project owner shall submit a final draft of the archaeological resource taxonomy for the project area of analysis to the CPM for review and approval.

2. At least 120 days prior to the start of ground disturbance, the project owner shall have submitted all CRHR evaluation protocols to the CPM for review and approval.

3. At least 60 days prior to the start of ground disturbance, the project owner shall have submitted all CRHR evaluation reports to the CPM for review and approval.

CUL-5 Prior to the start of ground disturbance, the project owner shall submit the CRMMP, as prepared by or under the direction of the CRS, to the CPM for review and approval. The CRMMP shall follow the content and organization of the draft model CRMMP, provided by the CPM, and the authors' name(s) shall appear on the title page of the CRMMP. The CRMMP shall identify general and specific measures to minimize potential impacts to sensitive cultural resources. Implementation of the CRMMP shall be the responsibility of the CRS and the project owner. Copies of the CRMMP shall reside with the CRS, alternate CRS, each CRM, and the project owner's on-site construction manager. No ground disturbance shall occur prior to CPM approval of the CRMMP, unless such activities are specifically approved by the CPM.

The CRMMP shall include, but not be limited to, the following elements and measures:

1. The following statement included in the Introduction: "Any discussion, summary, or paraphrasing of the Conditions of Certification in this CRMMP is intended as general guidance and as an aid to the user in understanding the Conditions and their implementation. The conditions, as written in the Commission Decision, shall supersede any summarization, description, or interpretation of the conditions in the CRMMP. The Cultural Resources Conditions of Certification from the Commission Decision are contained in Appendix A."

2. A proposed general research design that includes a discussion of archaeological research questions and testable hypotheses specifically applicable to the project area, and a discussion of artifact collection, retention/disposal, and curation policies as related to the research questions formulated in the research design. The research design will specify that the preferred treatment strategy for any buried archaeological deposits is avoidance. Specific mitigation plans shall be prepared and submitted, for the review and approval of the CPM, for any unavoidable significant effects to archaeological resource types, type groups, or large-scale archaeological resources determined by the process in **CUL-4** to be eligible for listing in the CRHR. Specific mitigation plans shall also be prepared and submitted, pursuant to **CUL-6**, for the review and approval of the CPM, for the unmitigable significant effects that the project will have on U.S. Route 66, and for any other significant effects that the project may have on other significant built-environment resources. Prescriptive treatment plans for construction-related discoveries may also be included in the CRMMP for limited archaeological resource types.

3. Specification of the implementation sequence and the estimated time frames needed to accomplish all project-related tasks during the ground-disturbance and post-ground–disturbance analysis phases of the project.

4. Identification of the person(s) expected to perform each of the tasks, their responsibilities, and the reporting relationships between project construction management and the mitigation and monitoring team.

5. A description of the manner in which Native American observers or monitors will be included, the procedures to be used to select them, and their role and responsibilities.

6. A description of all impact-avoidance measures (such as flagging or fencing) to prohibit or otherwise restrict access to sensitive resource areas that are to be avoided during ground disturbance, construction, and/or operation, and identification of areas where these measures are to be implemented. The description shall address how these measures would be implemented prior to the start of ground disturbance and how long they would be needed to protect the resources from project-related effects.

7. A statement that all encountered cultural resources over 50 years old shall be recorded on Department of Parks and Recreation (DPR) 523 forms and mapped and photographed. In addition, all archaeological materials retained as a result of the archaeological investigations (survey, testing, data recovery) shall be curated in accordance with the California State Historical Resources Commission's *Guidelines for the Curation of Archaeological Collections*, into a retrievable storage collection in a public repository or museum.

8. A statement that the project owner will pay all curation fees for artifacts recovered and for related documentation produced during cultural resources investigations conducted for the project. The project owner shall identify three possible curation facilities that could accept cultural resources materials resulting from project activities.

9. A statement that the CRS has access to equipment and supplies necessary for site mapping, photography, and recovery of any cultural resource materials that are encountered during ground disturbance and cannot be treated prescriptively.

10. A description of the contents, format, and review and approval process of the final Cultural Resource Report (CRR), which shall be prepared according to ARMR guidelines.

Verification:

1. Upon approval of the CRS proposed by the project owner, the CPM will provide to the project owner an electronic copy of the draft model CRMMP for the CRS.
2. At least 30 days prior to the start of ground disturbance, the project owner shall submit the CRMMP to the CPM for review and approval.

3. At least 30 days prior to the start of ground disturbance, in a letter to the CPM, the project owner shall agree to pay curation fees for any materials generated or collected as a result of the archaeological investigations (survey, testing, data recovery).

4. Within 90 days after completion of ground disturbance (including landscaping), if cultural materials requiring curation were generated or collected, the project owner

shall provide to the CPM a copy of an agreement with, or other written commitment from, a curation facility that meets the standards stated in the California State Historical Resources Commission's *Guidelines for the Curation of Archaeological Collections*, to accept the cultural materials from this project. Any agreements concerning curation will be retained and available for audit for the life of the project.

CUL-6 Prior to the start of ground disturbance the project owner shall complete Historic American Landscape Survey (HALS) documentation of the 9-mile long segment of U.S. Route 66 and associated landscapes and viewsheds within the project area from the roadway. The project owner shall ensure that photodocumentation is submitted to the California Historical Resources Information System (CHRIS) and to the Historic American Landscape Survey (HALS) Program. The project owner shall be responsible for any associated curation fees.

Documentation shall adhere to the established HALS recordation guidelines and be undertaken and completed by a historian meeting the U.S. Secretary of Interior's Professional Qualifications Standards, as published in Title 36, Code of Federal Regulations, part 61 (36 C.F.R., part 61) and a qualified architectural photographer. The resumes of the historian and architectural photographer shall include the names and telephone numbers of contacts familiar with their work on referenced projects and demonstrate to the satisfaction of the CPM that the historian and architectural photographer have the appropriate training and experience to effectively implement this condition. The applicant may undertake the HALS recordation activities prior to certification. The applicant undertaking such activities would do so, at their own risk, as a means of advantaging their schedule.

The project owner shall submit the final HALS documentation to the CPM for review and approval. The final HALS report and documentation shall be provided in the format specified by the HALS guidelines. The applicant may undertake the HALS recordation activities prior to certification. The applicant undertaking such activities would do so, at their own risk, as a means of advantaging their schedule.

The HALS documentation shall be used to develop an interpretive display adjacent to the project in an area easily accessible by the public. The interpretative display shall display photographs of the project site and include a written history of Route 66 and its significance in the eastern Mojave, to be reviewed and approved by the CPM prior to installation. The project owner shall maintain the interpretive display for the life of the project.

Verification:

1. At least 60 days prior to the start of ground disturbance, the project owner shall submit the resume for the historian and architectural photographer to the CPM for review and approval.

2. At least 45 days prior to the start of ground disturbance, the project owner shall submit the research design for the HALS report and documentation to the CPM for review and approval.

3. At least 15 days prior to the start of ground disturbance, the project owner shall submit the draft HALS report to the CPM for review and approval. If any reports have previously been sent to the CHRIS and/or the HALS, then receipt letters from the CHRIS and/or HALS or other verification of receipt shall be included in an appendix.

4. Within 10 days after CPM approval of the HALS report, the project owner shall provide documentation to the CPM confirming that copies of the final report have been provided to the SHPO, the CHRIS, and the HALS.

5. At least 60 days prior to the completion of Phase 1 construction, the project owner shall submit the interpretive display design and text to the CPM for review and approval.

CUL-7 The project owner shall submit the final Cultural Resources Report (CRR) to the CPM for approval. The final CRR shall be written by or under the direction of the CRS and shall be provided in the ARMR format. The final CRR shall report on all field activities including dates, times and locations, results, samplings, and analyses. All survey reports, Department of Parks and Recreation (DPR) 523 Series forms, data recovery reports, and any additional research reports not previously submitted to the California Historical Resource Information System (CHRIS) and the State Historic Preservation Officer (SHPO) shall be included as appendices to the final CRR.

If the project owner requests a suspension of ground disturbance and/or construction activities, then a draft CRR that covers all cultural resources activities associated with the project shall be prepared by the CRS and submitted to the CPM for review and approval on the same day as the suspension/extension request. The draft CRR shall be retained at the project site in a secure facility until ground disturbance and/or construction resumes or the project is withdrawn. If the project is withdrawn, then a final CRR shall be submitted to the CPM for review and approval at the same time as the withdrawal request.

Verification:

1. Within 30 days after requesting a suspension of construction activities, the project owner shall submit a draft CRR to the CPM for review and approval.

2. Within 90 days after completion of ground disturbance (including landscaping), the project owner shall submit the final CRR to the CPM for review and approval. If any reports have previously been sent to the CHRIS, then receipt letters from the CHRIS or other verification of receipt shall be included in an appendix.

3. Within 10 days after CPM approval of the CRR, the project owner shall provide documentation to the CPM confirming that copies of the final CRR have been provided to the SHPO, the CHRIS, the curating institution, if archaeological materials

were collected, and to the Tribal Chairpersons of any Native American groups requesting copies of project-related reports.

CUL-8 Prior to and for the duration of ground disturbance, the project owner shall provide Worker Environmental Awareness Program (WEAP) training to all new workers within their first week of employment at the project site, along the linear facilities routes, and at laydown areas, roads, and other ancillary areas. The training shall be prepared by the CRS, may be conducted by any member of the archaeological team, and may be presented in the form of a video. The CRS shall be available (by telephone or in person) to answer questions posed by employees. The training may be discontinued when ground disturbance is completed or suspended, but must be resumed when ground disturbance, such as landscaping, resumes.

The training shall include:

1. A discussion of applicable laws and penalties under the law;
2. Samples or visuals of artifacts that might be found in the project vicinity;
3. A discussion of what such artifacts may look like when partially buried, or wholly buried and then freshly exposed;
4. A discussion of what prehistoric and historical archaeological deposits look like at the surface and when exposed during construction, and the range of variation in the appearance of such deposits;
5. Instruction that the CRS, alternate CRS, and CRMs have the authority to halt ground disturbance in the area of a discovery to an extent sufficient to ensure that the resource is protected from further impacts, as determined by the CRS;
6. Instruction that employees are to halt work on their own in the vicinity of a potential cultural resources discovery and shall contact their supervisor and the CRS or CRM, and that redirection of work would be determined by the construction supervisor and the CRS;
7. An informational brochure that identifies reporting procedures in the event of a discovery;
8. An acknowledgement form signed by each worker indicating that they have received the training; and
9. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

No ground disturbance shall occur prior to implementation of the WEAP program, unless such activities are specifically approved by the CPM.

Verification:

1. At least 30 days prior to the beginning of ground disturbance, the CRS shall provide the training program draft text and graphics and the informational brochure to the CPM for review and approval.

2. At least 15 days prior to the beginning of ground disturbance, the CPM will provide to the project owner a WEAP Training Acknowledgement form for each WEAP-trained worker to sign.

3. Monthly, until ground disturbance is completed, the project owner shall provide in the Monthly Compliance Report (MCR) the WEAP Training Acknowledgement forms of workers who have completed the training in the prior month and a running total of all persons who have completed training to date.

CUL-9 The project owner shall ensure that the CRS, alternate CRS, or CRMs monitor full time all ground disturbance at the project site, along the linear facilities routes, and at laydown areas, roads, and other ancillary areas, to ensure there are no impacts to undiscovered resources and to ensure that known resources are not impacted in an unanticipated manner.

Full-time archaeological monitoring for this project shall be the archaeological monitoring of earth-removing activities for as long as the activities are ongoing. Where excavation equipment is actively removing dirt and hauling the excavated material farther than fifty feet from the location of active excavation, full-time archaeological monitoring shall require at least two monitors per excavation area. In this circumstance, one monitor shall observe the location of active excavation and a second monitor shall inspect the dumped material. For excavation areas where the excavated material is dumped no farther than fifty feet from the location of active excavation, one monitor shall both observe the location of active excavation and inspect the dumped material.

A Native American monitor shall be obtained to monitor ground disturbance in areas where Native American artifacts may be discovered. Contact lists of interested Native Americans and guidelines for monitoring shall be obtained from the Native American Heritage Commission. Preference in selecting a monitor shall be given to Native Americans with traditional ties to the area that shall be monitored. If efforts to obtain the services of a qualified Native American monitor are unsuccessful, the project owner shall immediately inform the CPM. The CPM will either identify potential monitors or will allow ground disturbance to proceed without a Native American monitor.

The research design in the CRMMP shall govern the collection, treatment, retention/disposal, and curation of any archaeological materials encountered.

On forms provided by the CPM, CRMs shall keep a daily log of any monitoring and other cultural resources activities and any instances of non-compliance with the Conditions and/or applicable LORS. Copies of the daily monitoring logs shall be provided by the CRS to the CPM, if requested by the CPM. From these logs, the CRS shall compile a monthly monitoring summary

report to be included in the MCR. If there are no monitoring activities, the summary report shall specify why monitoring has been suspended.

The CRS or alternate CRS shall report daily to the CPM on the status of the project's cultural resources-related activities, unless reducing or ending daily reporting is requested by the CRS and approved by the CPM.

In the event that the CRS believes that the current level of monitoring is not appropriate in certain locations, a letter or e-mail detailing the justification for changing the level of monitoring shall be provided to the CPM for review and approval prior to any change in the level of monitoring.

The CRS, at his or her discretion, or at the request of the CPM, may informally discuss cultural resources monitoring and mitigation activities with Energy Commission technical staff.

Cultural resources monitoring activities are the responsibility of the CRS. Any interference with monitoring activities, removal of a monitor from duties assigned by the CRS, or direction to a monitor to relocate monitoring activities by anyone other than the CRS shall be considered non-compliance with these Conditions.

Upon becoming aware of any incidents of non-compliance with the Conditions and/or applicable LORS, the CRS and/or the project owner shall notify the CPM by telephone or e-mail within 24 hours. The CRS shall also recommend corrective action to resolve the problem or achieve compliance with the Conditions. When the issue is resolved, the CRS shall write a report describing the issue, the resolution of the issue, and the effectiveness of the resolution measures. This report shall be provided in the next MCR for the review of the CPM.

Verification:

1. At least 30 days prior to the start of ground disturbance, the CPM will provide to the CRS an electronic copy of a form to be used as a daily monitoring log.

2. Monthly, while monitoring is on-going, the project owner shall include in each MCR a copy of the monthly summary report of cultural resources-related monitoring prepared by the CRS and shall attach any new DPR 523A forms completed for finds treated prescriptively, as specified in the CRMMP.

3. At least 24 hours prior to implementing a proposed change in monitoring level, the project owner shall submit to the CPM, for review and approval, a letter or e-mail (or some other form of communication acceptable to the CPM) detailing the CRS's justification for changing the monitoring level.

4. Daily, as long as no cultural resources are found, the CRS shall provide a statement that "no cultural resources over 50 years of age were discovered" to the CPM as an e-mail or in some other form of communication acceptable to the CPM.

5. At least 24 hours prior to reducing or ending daily reporting, the project owner shall submit to the CPM, for review and approval, a letter or e-mail (or some other form of communication acceptable to the CPM) detailing the CRS's justification for reducing or ending daily reporting.

6. No later than 30 days following the discovery of any Native American cultural materials, the project owner shall submit to the CPM copies of the information transmittal letters sent to the Chairpersons of the Native American tribes or groups who requested the information. Additionally, the project owner shall submit to the CPM copies of letters of transmittal for all subsequent responses to Native American requests for notification, consultation, and reports and records.

7. Within 15 days of receiving them, the project owner shall submit to the CPM copies of any comments or information provided by Native Americans in response to the project owner's transmittals of information.

CUL-10 The project owner shall grant authority to halt ground disturbance to the CRS, alternate CRS, and the CRMs in the event of a discovery. Redirection of ground disturbance shall be accomplished under the direction of the construction supervisor in consultation with the CRS.

In the event that a cultural resource over 50 years of age is found (or if younger, determined exceptionally significant by the CPM), or impacts to such a resource can be anticipated, ground disturbance shall be halted or redirected in the immediate vicinity of the discovery sufficient to ensure that the resource is protected from further impacts. Monitoring and daily reporting, as provided in other conditions, shall continue during the project's ground-disturbing activities elsewhere. The halting or redirection of ground disturbance shall remain in effect until the CRS has visited the discovery, and all of the following have occurred:

1. The CRS has notified the project owner, and the CPM has been notified within 24 hours of the discovery, or by Monday morning if the cultural resources discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning, including a description of the discovery (or changes in character or attributes), the action taken (i.e., work stoppage or redirection), a recommendation of CRHR eligibility, and recommendations for data recovery from any cultural resources discoveries, whether or not a determination of CRHR eligibility has been made.

2. If the discovery would be of interest to Native Americans, the CRS has notified all Native American groups that expressed a desire to be notified in the event of such a discovery.

3. The CRS has completed field notes, measurements, and photography for a DPR 523 "Primary" form. Unless the find can be treated prescriptively, as specified in the CRMMP, the "Description" entry of the DPR 523 "Primary" form shall include a recommendation on the CRHR eligibility of

the discovery. The project owner shall submit completed forms to the CPM.

4. The CRS, the project owner, and the CPM have conferred, and the CPM has concurred with the recommended eligibility of the discovery and approved the CRS's proposed data recovery, if any, including the curation of the artifacts, or other appropriate mitigation; and any necessary data recovery and mitigation have been completed.

Verification:

1. At least 30 days prior to the start of ground disturbance, the project owner shall provide the CPM and CRS with a letter confirming that the CRS, alternate CRS, and CRMs have the authority to halt ground disturbance in the vicinity of a cultural resources discovery, and that the project owner shall ensure that the CRS notifies the CPM within 24 hours of a discovery, or by Monday morning if the cultural resources discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning.

2. Within 48 hours of the discovery of a resource of interest to Native Americans, the project owner shall ensure that the CRS notifies all Native American groups that expressed a desire to be notified in the event of such a discovery.

Unless the discovery can be treated prescriptively, as specified in the CRMMP, completed DPR 523 forms for resources newly discovered during ground disturbance shall be submitted to the CPM for review and approval no later than 24 hours following the notification of the CPM, or 48 hours following the completion of data recordation/recovery, whichever the CRS decides is more appropriate for the subject cultural resource.

C.3.14 REFERENCES

The "(tn: 00000)" in a reference below indicates the transaction number under which the item is catalogued in the Energy Commission's Docket Unit. The transaction number allows for quicker location and retrieval of individual items docketed for a case or is used for ease of reference and retrieval of exhibits cited in briefs and used at Evidentiary Hearings.

The "(tn: 00000)" in a reference below indicates the transaction number under which the item is catalogued in the Energy Commission's Docket Unit. The transaction number allows for quicker location and retrieval of individual items docketed for a case or is used for ease of reference and retrieval of exhibits cited in briefs and used at Evidentiary Hearings.

References Cited (Data Responses 104 and 105):

Altschul, et al., 1984 – Altschul, J.H., M.R. Rose, and M.K. Lerch. *Man and Settlement in the Upper Santa Ana River Drainage: A Cultural Resource Overview*. Prepared for the U.S. Army Corps of Engineers, Los Angeles District, California. Statistical Research Technical Series, No. 29, Part 1, Tuscon, AZ.

Basgall 2004 – Basgall, M.E. *Further Archaeological Assessments at Deadman Lake Basin, Marine Corps Air Ground Combat Center, Twentynine Palms, California.* Prepared for U.S. Marine Corps, Air Ground Combat Center, May 2004.

Basgall and Giambastiani 2000 – Basgall, M.E., and M.A. Giambastiani. *An Archaeological Evaluation of 13 Locations in the Deadman Lake Basin, Marine Corps Air Ground Combat Center, Twentynine Palms, California*. Prepared for U.S. Marine Corps, Air Ground Combat Center, April 2000.

Bean 1962-1972 – Bean, L.J. *1962 – 1972 Serrano Field Notes*. Manuscript on file, California State University, Bakersfield, California.

Bean and Smith 1978 - Bean, L.J., and Smith, C.R. "Serrano," in *Handbook of North American Indians*, Vol. 8, R.F. Heizer, ed., pp. 570-587. Washington D.C.: Smithsonian Institution, 1978.

Bean and Vane 1979 – Bean, L.J., and S.B. Vane. *ANTAP – California Indian Political and Economic Organization*. Ramona, California: Balena Press.

Benedict 1924 – Benedict, R. A Brief Sketch of Serrano Culture. *American Anthropologist*, 26(3):366-392.

Bettinger and Baumhoff 1982 – Bettinger, R.L., and M.A. Baumhoff. "The Numic Spread: Great Basin Cultures in Competition." *American Antiquity* 47(3):485-503.

Bischoff 2005 – Bischoff, M.C. *Life in the Past Lane, The Route 66 Experience, Historic and Management Contexts for the Route 66 Corridor in California: Volume I, Route 66 in the California Desert*. Technical Series 86. Tuscon: Statistical Research.

Brooks et al. 1981 – Brooks, R.H., R. Wilson, and S. Brooks. *An Archaeological Inventory Report of the Wolshead/Amargosa-Mojave Basin Planning Units of the Southern California Desert Area*. Archaeological Research Center, Museum of Natural History, University of Nevada, Las Vegas.

Bull 1991 - Bull, W.B. Geomorphic Responses to Climate Change. New York: Oxford University Press, 1991.

Byers and Broughton 2004 – Beyers, D.A., and J.M. "Broughton. Holocene Environmental Change, Artiodactyl Abundances, and Human Hunting Strategies in the Great Basin," *American Antiquity*, pp. 235-255.

Byrd, et al., 2009 – Byrd, B.F., D.C. Young, and K.R. McGuire. "Pavement Quarries, Gypsum Period Residential Stability, and Trans-Holocene Settlement Systems of the Mojave Desert: A Case Study at Fort Irwin," in *Journal of California and Great Basin Anthropology*, Vol. 29, No. 2, pp. 121-142.

Campbell and Campbell 1935 – Campbell, E.W.C., and W.H. Campbell. "The Pinto Basin Site," *Southwest Museum Papers 9*. Los Angeles.

Campbell et al. 1937 – Campbell, E.W.C., W.H. Campbell, E. Antevs, C.A. Amsden, J.A. Barbieri, and F.D. Bode. The Archaeology of the Pleistocene Lake Mojave. *Southwest Museum Papers* 11. Los Angeles.

Castaneda 2001 – Castaneda, C. "Manufactured and Natural Gas Industry," *EH.Net Encyclopedia*. R. Whaples, ed. Electronic document, http://eh.net/encyclopedia/article/Castaneda.gas.industry.us, accessed November 6, 2008.

CH2MHill 2008 – CH2MHill. Ivanpah Solar Electric Generating System (ISEGS)(07-AFC-5), Data Response, Set 1B. Submitted to the California Energy Commission. Available online at: http://www.energy.ca.gov/sitingcases/ivanpah/documents/applicant/

Davis 1969 – Davis, E.L. "Archaeology of the North Basin of Panamint Valley, Inyo County, California. Part 3," in *Five Papers on the Archaeology of the Desert West*, D.R. Tuohy, D.L. Rendall, and P.A. Crowell, eds., pp. 83-141. Nevada State Museum Anthropological Papers No. 15.

Davis 1978 – Davis, E.L. "The Ancient Californians: Rancholabrean Hunters of the Mojave Lakes Country." *Natural History Museum of Los Angeles County Science Series 29*. Los Angeles.

Dibblee 2008 - Dibblee, T.W. Jr. *Geologic Map of the Newberry and Cady Mountains 15-minute Quadrangles, San Bernardino County, California*. Santa Barbara: Santa Barbara Museum of Natural History.

Dibblee and Bassett 1966 - Dibblee, T.W., and A.M. Bassett. *Geologic Map of the Cady Mountains Quadrangle, San Bernardino County, California*. Santa Barbara: Santa Barbara Museum of Natural History.

Dohrenwend, et al. 1991 – Dohrenwend, J.C., W.B. Bull, L.D. McFadden, G.I. Smith, R.S.U. Smith, and S.G. Wells. "Quaternary Geology of the Basin and Range Province in California," in *The Geology of North America*, Vol. K-2, R.B. Morrison, ed. Quaternary Nonglacial Geology: Conterminous U.S. Boulder: The Geological Society of America.

Drucker 1937 – Drucker, P. *Culture Element Distributions*. Southern California University of California Anthropological Recores 1(1):1.

Duvall and Venner 1979 – Duvall, J., and W.T. Venner. *A Statistical Analysis of the Lithics from the Calico Site (SBCM 1500A), California*. Journal of Field Archaeology, Vol. 6, No. 4: 455-462.

Eerkens 1999 – Eerkens, J. "Common Pool Resources, Buffer Zones, and Jointly Owned Territories: Hunter-Gatherer Land and Resource Tenure in Fort Irwin, Southeastern California." *Human Ecology* 27 (2): 297-318.

El Paso Corporation 2008 – El Paso Corporation. *El Paso Natural Gas Company and the Navajo Nation*. Electronic document, http://www.elpaso.com/about/navajo/history.shtm, accessed November 13, 2008.

Enzel, et al. 2003 - Enzel, Y., S.G. Wells, and N. Landcaster. *Paleoenvironments and Paleohydrology of the Mojave and southern Great Basin Deserts*. Boulder, CO: Geological Society of America.

Eppes, et al. 2003 - Eppes, M.C., E.V. McDonald, and L.D. McFadden. "Soil Geomorphological Studies in the Mojave Desert: Impacts of Quaternary Techtonics, Climate, and Rock Type on Soils, Landscapes, and Plant-Community Ecology," in I*NQUA 2003 Field Guide Volume: Quaternary Geology of the United States*, D. Easterbrook, ed., pp. 105-122. Reno: Desert Research Institute (DRI).

Fagan 2003 – Fagan, B. *Before California: An Archaeologist Looks at Our Earliest Inhabitants*. Walnut Creek: Alta Mira Press.

Fischer and Carroll 1988 – Fischer, C.S., and G.R. Carroll. "Telephone and Automobile Diffusion in the United States, 1902-1937," *American Journal of Sociology* 93:1153-1178.

Garthoff 2001 – Garthoff, R.L. *A journey Through the Cold War: A Memoir of Containment and Coexistence*. Washington, D.C.: Brookings Institution Press.

Giambastiani and Basgall 1999 – Giambastiani, M.A., and M.E. Basgall. *An Evaluation of Eighteen Archaeological Sites at Wood Canyon, Quackenbush Lake Training Area, Marine Corps Air Ground Combat Center, Twentynine Palms, California*. Prepared for U.S. Marine Corps, Marine Corps Air Ground Combat Center, Twentynine Palms, CA, August 1999.

Giambastiani, et al. 2009 – Giambastiani, M.A., M.J. Hale, and A. Catacora. *Archaeological Evaluations at 43 Prehistoric Toolstone Quarry Sites and Review of Evaluations at 26 Additional Quarry Sites in the Quackenbush Training Area, Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center, Twentynine Palms, California.* Prepared for, U.S. Marine Corps, Marine Air Ground Task Force Training Command Air Ground Combat Center, Twentynine Palms, California.

Gilreath and Hildebrandt 1991 – Gilreath, A.J., and W.R. Hildebrandt. *National Register of Historic Places Registration Form: Sugarloaf Archaeological District*. United States Department of the Interior, National Park Service, Washington, D.C.

Goetcheus 2002 – Goetcheus, C. "Cultural Landscapes and the National Register," *Cultural Resource Management* 25:1, pp.24-25. Electronic document, http://crm.cr.nps.gov/archive/25-01-11.pdf, accessed April 9, 2010.

Grant et al. 1968 – Grant, C., J.W. Baird, and J.K. Pringle. *Rock Drawings of the Coso Range, Inyo County, California*. Maturango Museum Publication 4. China Lake, California.

Gustafson and Serpico 1992 – Gustafson, L., and P. Serpico. *Santa Fe Coast Line Depots: Los Angeles Division*. Palmdale, California: Omni Publications.

Hall 1985 - Hall, S.A.. "Quaternary Pollen Analysis and Vegetational History of the Southwest," in, *Pollen Records of Late Quaternary North American Sediments*, V.M. Bryant, Jr., and R.G. Holloway, p.95.

Hall 1993 – Hall, S.A. *Archaeology of Seven Prehistoric Sites in Tiefort Basin, Fort Irwin, San Bernardino County, California*. Prepared for U.S. Army Corps of Engineers, Los Angeles District.

Hall and Basgall 1994 – Hall, M.C., and M.E. Basgall. "Lessons to Learn from Newberry/Gypsum Period Archaeology of the Mojave Desert." In *Kelso Conference Papers 1987 – 1992: A Collection of Papers and Abstracts from the First Five Kelso Conferences on the Prehistory of the Mojave Desert*, G.D. Everson and J.S. Schneider, eds., pp. 84-94. Museum of Anthropology Occasional Papers in Anthropology No. 4, California State University, Bakersfield.

Harrington 1957 – Harrington, M.R. "Pinto Site at Little Lake," *Southwest Museum Papers 17*. Los Angeles.

Harrington and Simpson 1961 – Harrington, M., and R.D. Simpson. “Tule Springs, Nevada, With Other Evidences of Pleistocene Man in North America.” *Southwest Museum Papers 18*. Los Angeles.

Hatheway 2001 – Hatheway, R. *The Late “Prehistory” of Route 66 in the California Mojave Desert*. On file, Archaeological Research Center, San Bernardino County Museum, Redlands.

Hatheway 2006 – Hatheway, R. *“Due Diligence” Summary of Findings Report: An Historical and Archaeological Survey of Krumsick Subject Property #2(B), county of San Bernardino, California*. Crestline, CA: Hatheway and Associates.

Hicks 1958 – Hicks, F. *Archaeological Investigations in the Yucaipa Valley*. San Bernardino County Museum Association. Volume 6, No. 1, November 1958.

Hughes 1993 – Hughes, T.P. N*etworks of Power: Electrification in Western Society, 1880*. Baltimore: The Johns Hopkins University Press.

International Directory of Company Histories 1996 – International Directory of Company Histories, Vol. 12. *El Paso Natural Gas Company*. Farmington Hills, MI: St. James Press.

Keane and Bruder 2004 – Keane, M., and J.S. Bruder. *Good Roads Everywhere: A History of Road Building in Arizona*. Cultural Resource Report 2003-28(AZ). Phoenix: URS Corporation.

Kelly and Fowler 1986 – Kelly, I.T., and C.S. Fowler. “Southern Paiute,” in *Handbook of North American Indians*, Vol. 11, W.L. d’Azevedo, ed., pp. 368-399. Washington D.C.: Smithsonian Institution.

King and Casebier 1976 – King, C., and D.G. Casebier. *Background to Historic and Prehistoric Resources of the East Mojave Desert Region*. Prepared for the U.S. Department of Interior, Bureau of Land Management, California Desert Planning Program. Archaeological Research Unit, University of California, Riverside.

Kroeber 1902 – Kroeber, A.L. Preliminary Sketch of the Mohave Indians. *American Anthropologist*, Vol. 4, pp. 276-285.

Kroeber 1925 – Kroeber, A.L. *Handbook of the Indians of California*. New York: Dover Publications, Inc.

Kroeber 1976 – Kroeber, A.L. *Handbook of the Indians of California*, New York: Dover Publications, Inc.

Lamb 1958 – Lamb, S.M. Linguistic Prehistory of the Great Basin. *International Journal of American Linguistics* 24:95.

Lyman 1999 – Lyman, E.L. “The Arrowhead Trails Highway: the Beginnings of Utah’s Other Route to the Pacific Coast,” *Utah Historical Quarterly* 67(3):242-264.

Lyneis 1982 – Lyneis, M. M. “Prehistory of the Southern Great Basin,” in *Man and Environment in the Great Basin*, D. Madsen and J.F. O’Connell, eds., pp. 172-186.

Madsen and Rhode 1995 – Madsen, D., and D. Rhode (eds.). Late Wisconsin Vegetation in the Northern Bonneville Basin. *Quaternary Research 44*, pp. 246-256.

McAuliffe and McDonald 1995 – McAuliffe, J., and E. McDonald. “A Piedmont Landscape in the Eastern Mojave Desert: Examples of Linkages between Biotic and Physical Components,” in *San Bernadino County Museum Association Quarterly* 43(3), pp. 35-42.

McDonald, McFadden, and Wells 2003 – McDonald, E.V., L.D. McFadden, and S.G. Wells. “Regional Response of Alluvial Fans to the Pleistocene-Holocene Climatic Transition, Mojave Desert, California,” in *Paleoenvironmental and Paleohydrology of the Mojave and Southern Great Basin Deserts*, Y. Enzel, S.G. Wells, and N. Lancaster, eds., pp. 189-205.

McFadden, et al., 1987 - McFadden, L.D., S.G. Wells, M.J. Jercinovich. “Influence of Eolian and Pedogenic Processes on the Origin and Evolution of Desert Pavements,” *Geology* 15, pp. 504-508.

Miles and Goudey 1997 - Miles, S.R., and C.B. Goudey. *Ecological Subregions of California: Section and Subsection Descriptions*. R5-EM-TP, 005. San Francisco: USDA Forest Service, Pacific Southwest Region.

Moratto 1984 - Moratto, M.J. *California Archaeology*. Orlando: Academic Press, 1984.

Myers 1983 – Myers, W.A. *Iron Men and Copper Wires: A Centennial History of the Southern California Edison Company*. Glendale, CA: Tran-Anglo Books.

Myrick 1992 – Myrick, D.F. *Railroads of Nevada and Eastern California: Volume II, The Southern Roads*. Reno and Las Vegas: University of Nevada Press.

National Park Service 2002 – U.S. Department of the Interior, National Park Service. *Bulletin 15: How to Apply the National Register Criteria for Evaluation*. National Register of Historic Places, Washington, D.C.

Norris and Webb 1976 - R.M. Norris and R.W. Webb. *The Geology of California*. New York: John Wiley and Sons, 1976.

Nystrom 2003 – Nystrom, E.C. From Neglected Space to Protected Place: An Administrative History of Mojave National Preserve. Electronic document, http://www.nps.gov/archive/moja/adminhist/adhi.htm, accessed November 8, 2008.

Paxson 1946 – Paxson, F.L. “The Highway Movement 1916-1935,” *American Historical Review* 51(2):236-253.

Peterson 1981 - Peterson, F.F. *Landforms of the Basin and Range Province: Defined for Soil Survey*. Technical Bulletin 28. Nevada Agricultural Station, University of Nevada, Reno.

PG&E Corporation 2004 – Pacific Gas and Electric Corporation. *History*. Electronic document, http://www.pgecorp.com/about us/history/, accessed November 13, 2008.

Powel 2002 - Powell, R. *Geological Map and Digital Database of the Pinto Mountain 7.5-minute Quadrangle, Riverside County, California*. U.S. Geological Survey, Open File Report 02-491.

Railway Preservation Resources 2006 – *Railway Preservation Resources. A Survey of Railway Cars and Locomotives on the National Register of Historic Places*. Electronic document: http://www.railwaypreservation.com/NationalRegister.htm, accessed November 6, 2009.

Reheis, et al. 2007 - Reheis, M.C., D.M. Miller, and J.L. Redwine. *Quaternary Stratigraphy, Drainage-Basin Developments and Geomorphology of the Lake Manix Basin*. Reston, VA: U.S. Geological Survey.

Rogge 2008 – Rogge, A.E. *Cultural Resource Studies for the City of Mesquite Proposed Replacement General Aviation Airport, Clark County, Nevada*. Cultural Resource Report 2008 – 33 (AZ). Phoenix: URS Corporation.

Rolle 2003 – Rolle, A.F. *California: A History*. Wheeling, IL: Harlan Davidson, Inc.

Robinson 2005 – Robinson, J.W. *Gateways to Southern California*. The Big Santa Anita Historical Society, Arcadia, California.

Rogers 1939 – Rogers, M.J. *Early Lithic Industries of the Lower Basin of the Colorado River and Adjacent Desert Areas*. San Diego Museum Papers No. 3.

SES 2008a – Stirling Energy Systems/R. Liden (tn 49181). Application for Certification, dated December 1, 2008. Submitted to CEC/Docket Unit on December 1, 2008.

SES 2008b - URS/B. Magdych (tn 49277). Application for Confidential Designation of Cultural Resources Technical Report, dated December 1, 2008. Submitted to CEC/Docket Unit on December 1, 2008.

SES 2009c - URS/R. Nixon (tn 50885). Repeated Application for Confidential Designation of Revised Cultural Resource Technical Report, dated April 6, 2009. Submitted to CEC/Docket Unit April 6, 2009.

SES 2009dd - Stirling Energy Systems/F. Bellows (tn 54229). Applicants' Responses to Energy Commission & Bureau of Land Management's Data Request Set 1, Part 2 Cultural Resources Data Responses & 25% Submittal, dated November 19, 2009. Submitted to CEC/Docket Unit on November 20, 2009.

Schroth 1994 – Schroth, A.B. *The Pinto Point Controversy in the Western United States*. Unpublished Ph.D. dissertation, Department of Anthropology, University of California, Riverside.

Schweigert and Labrum 2001 – Schweigert, K.P., and T. Labrum. *Boulder City/U.S. 93 Corridor Study, Historic Structures Survey, Volume I: Technical Report*. Littleton: Associated Cultural Resource Experts.

Roberts 1989 – Roberts, N. *The Holocene: An Environmental History*. Malden, MA: Blackwell Publishers, 1989.

Scott and Kelly 1988 – Scott, Q., and S.C. Kelly. *Route 66: The Highway and Its People*. Norman: University of Oklahoma Press.

Simpson 1958 – Simpson, R.D. "The Manix Lake Archaeological Survey." *Masterkey* 32(1): 4-10.

Simpson 1960 - Simpson, R.D. "Archaeological Survey of the Eastern Calico Mountains." *Masterkey* 34(1):25-35.

Simpson 1961 - Simpson, R.D. *Coyote Gulch: Archaeological Excavations of an Early Lithic Locality in the Mohave Desert of San Bernardino County*. Archaeological Survey Association of Southern California Paper 5. Los Angeles.

Spaulding 1990 – Spaulding, W. G. "Vegetational and Climatic Development of the Mojave Desert: The Last Glacial Maximum to the Present," in *Packrat Middens: The Last 40,000 Years of Biotic Change*, J. L. Betancourt, P.S. Martin, and R.R. Van Devender, eds., pp. 166-199. Tuscon: University of Arizona Press.

Spaulding 1991 – Spaulding W.G. "A Middle Holocene Vegetation Record from the Central Mojave Desert and its Paleoclimatic Significance," *Quaternary Research* 35:427-437.

Strong 1929 – Strong, W.D. *Aboriginal Society in Southern California*. University of California Publications in American Archaeology and Ethnology 26, Berkeley.

Sutton 1988 – Sutton, M.Q. *An Introduction to the Archaeology of the Western Mojave, California*. Archives of California Prehistory 14. Coyote Press, Salinas, California.

Sutton 1996 – Sutton, M. "The Current Status of Archaeological Research in the Mojave Desert," in *Journal of California and Great Basin Anthropology*, 18, pp. 221-257.

Sutton, et al., 2007 - Sutton, M.Q., M.E. Basgall, J.K. Gardner, and M.W. Allen. "Advances in Understanding the Mojave Desert Prehistory," in *California Prehistory, Colonization, Culture, and Complexity*, T.L. Jones and K.A. Klar, eds., pp. 229-245. Lanham, MD: Altamira Press.

Swisher 1997 – Swisher, J.M. *Mojave Rendezvous: True Old Desert Tales*. Barstow, California: Self Published.

TS 2010ag - Tessera Solar/ F. Bellows (tn 57018). Applicant's Submittal of Alternative Site Layout #2 - Engineering Figure with SunCatcher Layout, and Revised Project Boundary with 4000' Desert Tortoise Corridor Figure, dated June 2, 2010. Submitted to CEC/Docket Unit on June 2, 2010.

Tucker and Sampson 1943 – Tucker, W.B., and R.J. Sampson. Mineral Resources in San Bernardino County, California. *Division of Mines and Geology*, Volume 39, No. 4, October 1943. On file, Archaeological Research Center, San Bernardino County Museum, Redlands.

United States Department of the Interior, BLM 2002 – *Bulletin 30: Guidelines for Evaluating and Documenting Rural Historic Landscapes*. U.S. Department of the Interior, National Park Service, National Register of Historic Places, Washington, D.C.

URS 2008 – URS Corporation. *Preliminary Geotechnical and Geologic Hazards Evaluation, Solar One Project, San Bernardino County, California*. Prepared for Sterling Energy Systems, Inc. Phoenix, Arizona.

URS 2009 – URS Corporation. Volume 1, Class III Confidential Cultural Resources Technical Report – Revised Draft, Application for Certification (08-AFC-5), SES Solar Two, LLC. Report submitted to the Bureau of Land Management, El Centro Field Office.

Vane and Bean 1994 – Vane, S.B., and L.J. Bean. *Bitterness Road. The Mohave: 1604 to 1860, by Lorraine M. Sherer, with comments by Frances Stillman, A Mojave Elder*. Anthropological Papers No. 41, Menlo Park: Ballena Press.

Walthall and Keeling 1986 – Walthall, M., and P.J. Keeling. *Century Notes: Highlighted Events of Barstow Area History, 1885 to 1986*. Mojave River Valley Museum Association, Barstow, California.

Warren 1967 – Warren, C.N. The Dieguito Complex: A Review and Hypothesis. *American Antiquity* 32(4):168-185.

Warren 1980a – Warren, C.N. “Pinot Points and Problems in Mojave Desert Archaeology,” in *Anthropological Papers in Memory of Earl H. Swanson, Jr.,* L.B. Harton, C.N. Warren, and D.R. Tuohy, eds., pp. 67-76. Pocatello: Idaho Museum of Natural History.

Warren 1980b – Warren, C.N. “The Archaeology and Archaeological REsoruces of the Amargosa-Mojave Basin Planning Units,” in *A Cultural Resource Overview for the Amargosa-Mojave Basin Planning Units*, C.N. Warren, M. Knack, and E. von Till Warren, eds., pp. 1-134. Cultural Resource Publications, Anthropology-History. USDI Bureau of Land Management, Riverside, CA.

Warren 1984 - Warren, C.N. “The Desert Region,” in *California Archaeology*, M.J. Moratto, ed. New York: Academic Press.

Warren 1990 – Warren, C.N. "Archaeological Investigations at Nelson Wash, Fort Irwin, California," in, *Fort Irwin Archaeological Project Research Report No. 23, Volumes I and II*. Interagency Archaeological Services, National Park Service, Western Region, San Francisco.

Warren 1991 – Warren, C.N. "Archaeological Investigations at Nelson Wash, Fort Irwin, California." *Fort Irwin Archaeological Project Research Report No. 23, Volume 1*. Submitted to Interagency Archaeological Services Branch, National Park Services, Western Region, March 1990.

Warren and Crabtree 1986 – Warren, C.N., and R.H. Crabtree. "Prehistory of the Southwestern Area," in *Handbook of North American Indians*, Vol. 11, W.L. d'Azedvedo, ed., pp. 183-193. Washington D.C.: Smithsonian Institution.

Weingroff 2008 – Weingroff, R.F. *The Greatest Decade 1956-1966, Part 1, Essential to the National Interest*. U.S. Department of Transportation, Federal Highway Administration Electronic Document, http://www.fhwa.dot.gov/infrastructure/50interstate.cfm, accessed August 2008.

Wright 1982 – Wright, F. *Clark County: The Changing Face of Southern Nevada*. Nevada Historical Society, Las Vegas.

Wright, et al. 1953 – Wright, L.A., R.M. Stewart, T.E Gay, Jr., and G.G. Hazenbush. Mines and Mineral Deposits of San Berardino County, California. *California Division of Mines and Geology*, Volume 49, Nos. 1 and 2, January through April 1953. On file, Archaeological Research Center, San Berardino County Museum, Redlands.

Yohe and Sutton 1991 – Yohe II, R.M., and M.Q. Sutton. *An Archaeological Assessment of Eight Alternative Access Routes into the Proposed Hidden Valley Hazardous Waste Disposal Facility, San Bernardino County, California*. On file at the Archaeological Information Center, San Bernardino County Museum, Report No. 1062234.

Zigmond 1986 – Zigmond, M. Kawaiisu. In, *Handbook of North American Indians*, Vol. 11, W.L. d'Azevedo, ed., pp. 398-411. Washington, D.C.: Smithsonian Institution.

C.3.15 CULTURAL RESOURCES GLOSSARY

AFC	Application for Certification
ARMR	Archaeological Resource Management Report
CCS	Cryptocrystalline silicate (Cryptocrystalline silicates are rocks such as flint, chert, chalcedony, or jasper that contain a high percentage of silica (SiO^2), the primary compound that composes quartz.)
CEQA	California Environmental Quality Act
CHRIS	California Historical Resources Information System
Conditions	Conditions of Certification
CPM	Compliance Project Manager
CRHR	California Register of Historical Resources
CRM	Cultural Resources Monitor
CRR	Cultural Resource Report
CRS	Cultural Resources Specialist
DPR 523	Department of Parks and Recreation cultural resources inventory form
FAR	Fire-affected rock
FSA	Final Staff Assessment
Historical resource	A cultural resource, for the purpose of CEQA, listed in, or determined to be eligible for listing in, the California Register of Historical Resources (PRC § 21084.1). Subsumed in present analysis under “important historic and cultural aspects of our national heritage.”
Historic property	A cultural resource, for the purpose of Section 106, included in, or eligible for inclusion in the National Register of Historic Places (36 CFR § 800.16(l)(1). Subsumed in present analysis under “important historic and cultural aspects of our national heritage.”
HRMP	Historical Resources Management Plan
Important historic and cultural aspects of our national heritage	A broadly inclusive term for historically significant cultural resources that encompasses the concepts of “historical resource” and “historic property.”
LORS	Laws, ordinances, regulations, and standards
MCR	Monthly Compliance Report

MLD	Most Likely Descendent
NAHC	Native American Heritage Commission
NRHP	National Register of Historic Places
OHP	California Office of Historic Preservation
Programmatic agreement	An agreement document negotiated and drafted under Section 106 of the National Historic Preservation Act of 1969
Project area	The project site, the rights-of-way of all linear and other ancillary power facility features, construction laydown areas, and non-commercial borrow sites
Project area of analysis	The project area and all further areas in which the proposed project has the potential to directly or indirectly affect cultural resources
Project site	The principal proposed plant site parcel or main plant site of which the power block area and the solar thermal field would occupy the majority of that area
Proposed action	Equivalent in present analysis to “proposed project” and “undertaking.” The “proposed action” and other “alternative actions” are developed under NEPA to meet a specified purpose and need.
Proposed project	Equivalent in present analysis to “proposed action” and “undertaking.” A “project,” pursuant to 14 CCR § 15378, “means the whole of an action, which has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment.”
PSA	Preliminary Staff Assessment
SHPO	State Historic Preservation Officer
Staff	Energy Commission cultural resources technical staff
Undertaking	Equivalent in present analysis to “proposed action” and “proposed project.” An undertaking, pursuant to 36 CFR § 800.16(y), “means a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license or approval.”
WEAP	Worker Environmental Awareness Program

C.11 – TRAFFIC AND TRANSPORTATION

Testimony of Marie McLean; James Jewell; and Alan Lindsley, AIA

C.11.1 SUMMARY OF CONCLUSIONS

- SunCatcher Mirrors have the potential to significantly affect train crews and motorists on 1-10; Route 66; and Hector Road. Consequently, staff has proposed conditions of certification designed to reduce those impacts to less than significant.
- Crossing BNSF Railway's tracks has the potential to significantly affect access to and exit from the project for emergency vehicles, workers, visitors, and delivery persons. Staff has proposed conditions of certification designed to reduce those impacts to less than significant.
- With implementation of proposed conditions of certification, the Calico Solar Project as proposed would cause no significant direct or cumulative traffic and transportation impacts and would comply with all applicable LORS related to traffic and transportation.

C.11.2 INTRODUCTION

In the Traffic and Transportation analysis, staff focuses on:

1. Whether construction and operation of the Calico Solar Project would result in traffic and transportation impacts under the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA)

2. If the project would be in compliance with applicable laws, ordinances, regulations, and standards (LORS).

In its analysis, staff identifies potential impacts related to the construction and operation of the Calico Solar Project on the surrounding transportation systems and roadways and, when applicable, proposes mitigation measures.

C.11.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

Significance criteria are based on the California Environmental Quality Act (CEQA) Guidelines, the CEQA Environmental Checklist Form, and on performance standards determined by federal, state, and local agencies. Those performance standards, incorporated in CEQA Guidelines for transportation/traffic, are included in this section as part of **Traffic and Transportation Table 2,** Laws, Ordinances, Regulations, and Standards (LORS).

TRAFFIC AND TRANSPORTATION Table 1
CEQA Environmental Checklist Form—Transportation/Traffic

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
TRANSPORTATION/TRAFFIC — Would the project:				
A. Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths and mass transit?		X		
B. Conflict with an applicable congestion management program, including, but not limited to level-of-service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?		X		
C. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?				X
D. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?		X		
E. Result in inadequate		X		

emergency access?				
F. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?				X

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Staff uses LORS as significance criteria to determine if the proposed Calico Solar Project would have a significant adverse impact on the environment. Those LORS are used to assess a CEQA impact, when necessary, because CEQA guidelines and checklist specifically refer to the performance standards and thresholds established by federal, state, and local agencies. See **Traffic and Transportation Table 1** for the CEQA checklist pertaining to this project.

The federal, state, and local performance standards and thresholds applicable to the proposed project are listed in **Traffic and Transportation Table 2,** which follows. If this project were not to conform to those LORS, the project could result in a significant CEQA impact.

TRAFFIC AND TRANSPORTATION Table 2
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
Code of Federal Regulations (CFR), Title 14, Aeronautics and Space; Part 77, Objects Affecting Navigable Airspace (14 CFR 77)	Includes standards for determining physical obstructions to navigable airspace; information about requirements for notices, hearings, and requirements for aeronautical studies to determine the effect of physical obstructions to the safe and efficient use of airspace.
*Code of Federal Regulations (*CFR*)*, Title 49, Subtitle B, Sections 171-177; Sections 350-399; Appendices A-G Other Regulations Relating to Transportation	Includes procedures and regulations pertaining to interstate and intrastate transport (including hazardous materials program procedures) and as well as safety measures for motor carriers and motor vehicles operating on public highways.
Code of Federal Regulations (CFR); Title 49, Part 209 to Part 244*; Federal Railroad Safety Act of 1970 (FRSA)*	Act granted the Federal Railroad Administration rulemaking authority over all areas of railroad safety. Violations of federal safety laws are regulations are reported by FRA inspectors or by states in which violation was noted.
State	
California Vehicle Code (CVC), Division 2, Chapter 2.5, Div. 6; Chap. 7, Div. 13; Chap. 5, Div. 14.1; Chap. 1 and 2, Div. 14.8, Div. 15	Pertains to licensing, size, weight, and load of vehicles operated on highways; safe operation of vehicles; and transporting hazardous materials.
California Streets and Highways Code, Division 1, Chapter 3; Division 2, Chapter 5.5	Pertains to regulations for care and protection of state and county highways.

California Health and Safety Code; Section 25160 et seq.	Pertains to operators of vehicles transporting hazardous materials.
California Fire Code, Section 902.2.1 et.seq.	*Pertains to requirements for constructing an access road for fire department and other emergency vehicle access.*
California Streets and Highway Code, Section 117; Section 660-695; Section 700-711; Section 1450; 1460 et seq.; and 1480 et. Seq.	Pertains to regulating rights-of-way encroachments and granting permits for encroachment on state highways and freeways and on county roads.
California Public Utilities Code, Section 1201-1220	Pertains to constructing and operating rail road crossings.
Local	
San Bernardino County Comprehensive Transportation Plan	Identifies transportation improvements and strategies to enhance system performance and achieve emission reductions to meet air quality requirements and serves as a basis for action programs to be implemented through the Congestion Management Program.
San Bernardino County Congestion Management Program, 2007	Requires all counties to develop a Congestion Management Plan designed to develop and implement comprehensive strategies needed to develop appropriate responses to transportation needs. Mandated by *Government Code Section* 65088, the CMP defines a network of state highways and arterials, level of service (LOS) standards and related procedures, and provides technical justification for the approach.
San Bernardino General Plan, Circulation and Infrastructure Element, Desert Region	Pertains to public policies and strategies for the transportation system in San Bernardino County, including those pertaining to transportation routes, terminals, and facilities; construction of extensions of existing streets; and levels of services (LOS).
San Bernardino Traffic Code, Section 52.0125	Pertains to requirements for oversize and overweight vehicles.

C.11.4 PROPOSED PROJECT

C.11.4.1 SETTING AND EXISTING CONDITIONS

The project site is located in San Bernardino County and was originally proposed on approximately 8,230 acres of land owned by the United States government and managed by the US Department of Interior, Bureau of Land Management. To avoid damaging environmental resources, approximately 1,000 acres on the northern part of the project site was eliminated.

Access to the site is off Hector Road, north of Interstate 40, 17 miles east of Newberry Springs and 115 miles east of Los Angeles in the Mojave Desert. The project consists of 29 contiguous parcels; and the Burlington Northern Santa Fe (BSNF) railroad bisects the site from west to east.

In the project area, I-40 is a primary east/west regional arterial beginning at the Interstate-15 interchange in the city of Barstow and heading east towards Arizona and eventually ending at the concurrence of U.S. Route 117 and North Carolina Highway 132 in Wilmington, North Carolina.

In the project area, I-40 is classified as a freeway with two lanes in each direction. Access to the site from I-40 is the Hector Road interchange. See **Traffic and Transportation Figure 1**, Local Transportation Network.

The proposed project would utilize SunCatchers— a 40-foot tall, 25-kilowatt-electrical (kWe) solar dish developed by Stirling Energy Systems. The SunCatcher system consists of a unique radial solar concentrator dish structure that supports an array of curved glass mirror facets.

Those mirrors are designed to automatically track the sun, collect and focus or concentrate its solar energy onto a patented power conversion unit (PCU). The PCU is coupled with and powered by a Stirling engine that generates power grid-quality electricity.

Originally, the applicant planned to construct its project in two phases: a 500-MW facility (Phase 1) and an additional 350 megawatt facility (Phase II). However, the applicant subsequently revised the project to align the output of Phase I with the capacity of the Southern California Edison (SCE) transmission system prior to the completion of a 500 kV upgrade to the Lugo-Pisgah Transmission line. Consequently, today Phase I would be limited to 275 MW, with the remaining 575 MW to be constructed as part of Phase II.

The project would consist of two laydown areas for each phase of the project—a 26-acre laydown site located on the southeast corner of phase-one site. The second laydown area, which consists 14 acres, will be located next to the main services complex. Other features and facilities associated with the proposed project—the majority of which are located on the proposed project site or construction laydown area)—include:

- Approximately 34,000 SunCatchers and associated equipment and infrastructure within a fenced boundary
- An onsite, 14.4-acre main services complex located in the north eastern portion of the Phase I section of the project site for administration and maintenance activities. The complex would include buildings, parking and access roads (SES 2008f page 3-62 and Figure 3-4)
- An onsite, 2.8-acre 850-MW Calico Solar Project substation located in the southern portion of the Phase I section of the site (SES 2008f page 3-62 and Figure3-4)

Local Highways and Roads

The following roads are located in the vicinity of the project, Interstate 40, Route 66, and Hector Road. Information about each road follows. See **Traffic and Transportation Figure 2**.

Interstate 40 (I-40)

Interstate 40, an east-west interstate freeway, is located south of the Calico Solar Project site. I-40 begins at the I-15 interchange in the city of Barstow, San Bernardino County, and heads east towards Arizona. Interstate 40 ends at the concurrence of U.S. Route 117 and North Carolina Highway 132 in Wilmington, North Carolina.

Interstate 40 is the major access road to and from the Calico Solar Project. A four-lane highway, two lanes in each direction, I-40 has six feet of shoulder on both sides and a wide center median. It is posted at 70 miles per hour (mph) in the vicinity of the site. The existing average daily traffic (ADT) near the vicinity of the Calico Solar Project site is 15,600 vehicles per day; 43% is truck traffic.

Temporary and permanent access to the project site will be through the Hector Road exit off I-40. The roadway segment north of the interchange is currently unpaved. The northbound and southbound approach at the double-track BNSF at-grade railroad crossing is newly improved with asphalt surface aprons.

Hector Road is currently gated on both the northbound and southbound approaches. Access is controlled and determined by BNSF.

See information about Hector Road in this section for additional information on access to the project site.

National Trails Highway (Route 66)

Route 66 is located south of the Calico Solar Project site and runs parallel to I-40. Route 66, a 2,448-mile roadway once known as the Main Street of America, runs west to east from Santa Monica, California, to Chicago, Illinois, wending its way through Arizona, New Mexico, Texas, Oklahoma, Kansas, and Missouri before ending in Chicago. This east-west, two-lane highway is located approximately 300 feet south of the project site.

Hector Road

Hector Road within the I-40 interchange is paved and controlled by Caltrans. North of the Caltrans right-of-way (ROW) the pavement extends for about 750 feet as a 24-foot roadway controlled by San Bernardino County. From the end of this San Bernardino County-controlled segment to the gated BNSF crossing is an unpaved, unnamed route that extends for about 24 feet.

The Hector Road interchange will be used for both temporary and permanent access to the project site. The existing average daily traffic (ADT) on Hector Road near the vicinity of the project site is 31 vehicles per day. Information about temporary and permanent access to the site is included in the next section.

Access Roads

According to the applicant, a temporary construction access road will be constructed from Hector Road, an existing road off Interstate 40 (I-40). The road will extend for approximately one mile from the Hector Road interchange and continue to the existing gated railroad crossing owned by BNSF Railway. Workers, visitors, and delivery

persons will need to cross the BNSF's tracks to get to the project site. See **Traffic and Transportation Figure 1.**

The temporary access road used for construction will be located within the north side of the BNSF right-of-way from the existing crossing and extend one to two miles. Access to the project site will be over BNSF Railway's tracks.

According to the applicant, a permanent access road will also be constructed within BNSF's right-of-way. The permanent road will be used beginning October 2011, the date of expected completion of the bridge across the BNSF tracks. Staff has analyzed the construction of the permanent access road in the Construction Impacts and Mitigation Section of this document.

Until October 2011, the temporary access road will be used by workers and visitors as well as for delivery of hazardous materials and other supplies. In addition, it will be used for access by fire trucks and ambulances. After October 2011, the applicant expects the new access road and bridge across the BNSF's tracks to be constructed and operating and used by workers, visitors, and delivery persons to gain access to the site.

According to the applicant, both the temporary and permanent access roads will have two 12-foot travel lanes with 3-foot shoulders and exceed the minimum design requirements of the American Association of State Highway and Transportation Officials (AASHTO).

Bureau of Land Management Routes

Presently, open BLM routes traverse the Avoidance of Donated and Acquired Lands Alternative area. Those routes would be closed if the proposed project is approved, limiting transportation through the area.

Public Transportation

Public transportation consists of rail services, bicycle and pedestrian facilities, and airports. Information about those forms of public transportation follows.

Rail Service

The Burlington Northern Santa Fe Railway (BNSF) provides long-haul freight service throughout the United States over a 32,000-mile route. Near the project site, BNSF operates a double-track railroad line through the project site from east to west. See **Traffic and Transportation Figure 1** for the BNSF route intersecting the project site. AMTRAK's Southwest Chief route from Los Angeles to Chicago travels on the BNSF rail line through the project site.

Bicycle and Pedestrian Facilities

Neither bicycle nor pedestrian facilities are located in the project vicinity. Instead, bicycle and pedestrian circulation is limited to shoulders of rural highway and county roads and is not allowed on freeways such as I-40.

Airports

Three airport facilities are located in the general vicinity of the Calico Solar Project:

1. Barstow-Dagget Municipal Airport, located approximately 19 miles west of the project site

2. Twentynine Palms Airport, owned and operated by San Bernardino County, located approximately 32 miles southeast of the project site.

3. Bicycle Lake Army Airfield, a private-use facility, located approximately 34 miles northwest of the project site

Federal Aviation Administration (FAA) Regulation Part 77 contains specific requirements pertaining to objects affecting navigable airspace. However, that FAA regulation does not apply to the Calico Solar Project because the project is not located within 20,000 feet or less of a public use or military airport and will not contain an object 200 feet above ground level.

C.11.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The direct and indirect impacts of the proposed CSP on the transportation system are examined in this section. The assessment of transportation-related impacts is based on evaluations and technical analyses designed to compare the pre-CSP conditions to the post-CSP conditions. The assessment is based on CEQA Guidelines and the Environmental Checklist Form as well as applicable LORS. See Section C.11.3 “Methodology and Thresholds for Determining Environmental Consequences.”

Studied Intersections and Road Segments

The following locations on the surrounding roadway network were reviewed to determine level of service (LOS) criteria.

1. Interstate 40, West of Hector Road

2. Interstate 40 West-Bound Ramp at Hector Road Intersection

3. Interstate 40, East of Hector Road

4. Interstate 40 East-Bound Ramp, at Hector Road Intersection

5. Hector Road, North of I-40, Westbound ramps, east of project site

6. Hector Road, South of I-40 10, Eastbound ramps, Mesa Drive

7. National Trails Highway, West of Hector Road

8. National Trails Highway, East of Hector Road

9. Hector Road and National Trails Highway Intersection

San Bernardino County and the State of California use the LOS criteria to assess the performance of its street and highway system and the capacity of roadway segments. The county's as well as the state's threshold standards policy requires that LOS C or better be maintained on roadway segments under their jurisdiction.

The level-of-service standards for the Calico Solar Project as required by San Bernardino County and the State of California are as follows:

> LOS C or better on roads and conventional highways located in San Bernardino County's Desert Region, the location of the Calico Solar Project.
>
> LOS C or better on Interstate 40, the primary access road to the project site.

A significant impact would exist if the Calico Solar Project were to cause intersection operations to exceed the accepted LOS standards on a state, county, or federal roadway.

Direct/Indirect Impacts and Mitigation

Determinations of the direct and indirect impacts of the CSP are based significance criteria included in the CEQA guidelines and checklist as well as the applicable laws, ordinances, regulations, and standards, which are incorporated by reference into the CEQA standards. See "Methodology and Thresholds for Determining Significance" in this document.

To address direct and indirect impacts and mitigation, two project scenarios have been evaluated:

1. Construction phase impacts and mitigation
2. Operations phase impacts and mitigation

Construction Phase Impacts and Mitigation

Potential traffic impacts associated with the construction of the CSP were evaluated for both construction workforce traffic and construction truck traffic. Most traffic would occur during the construction phases.

Access to Site

Access to the site will change during the construction period. Initially, as reported by the applicant, access will be provided through a temporary access road designed to cross BNSF Railway's train tracks. Access to this temporary road will be from the Hector Road exits off I-40. BNSF's rail lines are heavily used by its freight trains. The trains, some of which are approximately 10,000 feet long, cross the tracks approximately every fifteen minutes from both directions.

Beginning in October 2011, the applicant has indicated that access to the site will change because of the construction of a new, permanent access road, designed to use the same exit off Hector Road as the temporary access road. However, this permanent access road, located west of the temporary road, would be designed to cross a newly-constructed bridge over BNSF's tracks and continue on to the Main Services Complex.

See **Traffic and Transportation Figure 1**. Information about the temporary and access road and the permanent access road follows.

Temporary Access Road

The temporary access route will provide the only access to the site during at least the first ten months of construction. The applicant must secure permission from BNSF Railway to construct a temporary access road across its right-of-way.

Staff is recommending Condition of Certification **TRANS-1,** which requires the applicant to obtain an easement from BNSF Railway to construct the road on its right-of-way before construction begins. Condition of Certification **TRANS-1** also requires that this road be constructed as an all-weather road so emergency vehicles may have access to the site.

In addition, because this access route intersects with BNSF Railway's tracks and has no crossing arms, this intersection could pose a danger to workers, delivery persons, and flaggers. In addition, the frequency of the trains could result in traffic backing up or stacking on Interstate 40 as workers wait in vehicles for the train to pass and to cross the tracks. The same scenario could occur as workers leave the site.

For example, during the peak construction period, approximately 731 workers are projected to be working on the site. Assuming the worst possible scenario, with each worker driving in his or her own vehicle and crossing the track at five miles per hour, it could take approximately 12 hours for all workers to cross the tracks. That is, approximately 15 workers could cross the track before another train would go by. And workers would need to wait approximately another fifteen minutes or so for the train to pass.

Those calculation are based on BNSF Railway's every 15-minute train schedule and length of the two-mile train; the fact that flaggers are directing traffic; and the occasional stops and starts that will occur as workers as well as delivery personnel ask questions of or otherwise speak to the flaggers. However, even if the time to cross is cut in half or three-quarters, the time needed to get workers to the site could result in a significant impact due to stacking as well as to the safety of workers.

Consequently, staff has recommended Condition of Certification **TRANS-2,** which includes provisions designed to reduce traffic on I-40 during critical commute times and ensure safe crossing of the BNSF Railway tracks.

Staff also notes that the temporary access road proposed by the applicant will also be used for access to the site by emergency vehicles. However, because of the nearly two-mile length of each BNSF Railway train and the frequency with which the trains run—every fifteen minutes—the time an emergency vehicle may to wait to cross the tracks could result in a significant impact to a worker, visitor, or delivery person who needs emergency treatment.

Emergency response times are generally within the six-minute to ten-minute range. If an emergency vehicle is attempting to gain access to the project site while workers are also trying to enter or while a BNSF Railway train is traveling on the tracks, the

response time could be increased by as much as fifteen minutes or more. See the section on **Worker Safety/Fire Protection** for information about mitigation measures for emergency response times.

Permanent Access Road

According to the applicant, a permanent access road will be constructed within BNSF's right-of-way. Workers, visitors, and delivery persons will use the same Hector Road access to the permanent access road as they will use for the permanent road. According to the applicant, this permanent road will be used beginning October 2011, the date of expected completion of the bridge across the BNSF tracks.

Staff is recommending Condition of Certification **TRANS-1** to require the applicant to obtain an easement from BNSF Railway to construct a permanent all-weather road and bridge across BNSF Railway's tracks and to ensure bridge is constructed according to the California Public Utilities Commission's standards.

Because of the mitigated significant impacts resulting from the use of the temporary access road, staff recommends that the applicant consider building the permanent access road as soon as possible.

Parking

According to the applicant, parking for workers will be provided in the14-acre construction laydown area adjacent to 14.4-acre main services complex as well as the 26-acre laydown and staging areas immediately south of the Main Services Complex. In addition, employees may be moved to and from the site from surrounding areas and/or the laydown parking areas, in shuttles or other mass conveyance vehicles or both.

In the previous section, "Access to the Site," staff notes the difficulties that may be encountered by the necessity to cross BNSF Railway's tracks to gain access to the parking lot during the first phase of construction.

Consequently, staff is proposing Condition of Certification **TRANS-2**, which requires, among other things, the applicant to develop a parking and staging plan for workforce and construction vehicles that takes into account any impediments that may occur because of the need to cross BNSF Railway's tracks.

Construction Workforce

Construction of the CSP would be completed over an approximately 48-month period beginning in 2010 and ending in 2014. The construction work force will peak during month 16 at approximately 731 workers per day in month seven (2011) and average approximately 400 workers over the course of construction.

Construction of the transmission line is expected to require a limited crew with fewer than 25 workers during peak periods. However, the transmission line construction schedule will not coincide with the peak of plant site construction employment.

During the four-year construction period, the project is expected to employ an average of 400 workers per month. However, during the peak construction month, 731 workers will be on-site daily. To evaluate the worst-case scenario, the traffic analysis is based on

the assumption that no workers would carpool and all workers would arrive during the morning peak period (7 AM to 9 AM) and depart during the evening peak period (4 PM to 6 PM).

Consequently, staff has proposed Condition of Certification **TRANS-2**, a traffic control plan to ensure stacking does not occur on the highways and safety provisions are put in place to ensure safe crossing by

1. Work schedules and end-of-shift departure plans to ensure stacking does not occur on roads or intersections.

2. Flaggers to ensure safe crossing of BNSF Railway's tracks by workers, visitors, and delivery persons accessing the site.

3. Parking and staging plan for workforce and construction vehicles. The plan is to be designed to take into account any impediments that may occur because of the need to cross BNSF Railway tracks. In developing this plan the applicant is required to consider off-site parking and staging in designated areas and the use of buses to transport workers to and from the construction site.

4. Once the bridge is constructed, a parking and staging plan to require all project-related parking to occur on-site or in designated off-site parking areas and that staging occurs on-site in a specifically-defined area.

Peak Construction for Workers

During peak construction, the daily round trips for workers would total 1,462 trips, 731 inbound in morning and 731 outbound in evening.

The construction workforce, to be drawn from the surrounding local and regional area, including San Bernardino County and Riverside County, is expected to commute to the site. Approximately 20% of the workers are expected to travel east on I-40; approximately 80%, west on I-40.

The following roads and intersections will be used to travel to and from the project site. **See Traffic and Transportation Figure 1**.

1. Interstate 40, West of Hector Road

2. Interstate 40, East of Hector Road

3. Hector Road, North of I-40

4. Hector Road, South of I-40

5. National Trails Highway (Route 66), West of Hector Road

6. National Trails Highway (Route 66), East of Hector Road

The temporary intersection at Hector Road off I-40, which is controlled by a stop sign, has the potential to result in congestion on I-40 as workers travel to and from the construction site. Consequently, staff is recommending Condition of Certification

TRANS-2, a traffic control plan, which includes provisions for eliminate congestion at intersections and off-ramps. Without this traffic control plan, stacking could occur on intersections and off-ramps needed to enter or exit the project site and levels of service on I-40 east and west and National Trails Highway, east and west, could fall to unacceptable levels.

This traffic control plan is designed to allow the project owner to devise a work schedule and end-of-shift departure plan to ensure that (1) stacking does not occur on intersections needed to enter and exit the project site and (2) levels of service for both I-40 and National Trails Highway are maintained at acceptable levels.

In addition the traffic control plan provides for the project owner to stagger work shifts; implement off-peak work schedules; and restrict travel to and departure from the project site to ten or fewer vehicles every three minutes during peak travel hours on I-40. The project owner also has the opportunity to provide incentive programs to encourage workers to carpool or use a van or bus service or both.

With implementation of this condition, all roads and intersections during peak-hour construction are projected to operate at least LOS C or better during peak-hour construction.

See **Traffic and Transportation Table 3**, 2011 Peak Hour Roadway Traffic Volumes, Design Capacities, and Levels of Service Without Project; **Traffic, and Transportation Table 4,** 2011 Peak Roadway Traffic Volumes With Project; **Traffic and Transportation Table 5**, 2011 Peak Hour Intersection Volumes With Project; and **Traffic and Transportation Table 6**, 2011 Peak Hour Intersection Volumes Without Project, which follow.

Traffic and Transportation Table 3
2011 Peak Hour Roadway Traffic Volumes
Design Capacities, and Levels of Service Without Project

2011 Existing Conditions without Calico			Morning Peak Hour		Evening Peak Hour	
Roadway Segment	**Traffic Volumes**	**LOS**	**Average Delay (sec/veh)**	**LOS**	**Average Delay (sec/veh)**	**LOS**
I-40 – West of Hector Road	15,660[1]	B[4]	8.8	A	8.8	A
I-40 – East of Hector Road	16,850[1]	B[4]	8.8	A	8.8	A
Hector Road – North of I-40	10/10[2]	A/A[5]	---	---	8.5	---
Hector Road – South of I-40	10/15[5]	A/A[5]	---		---	---
National Trails Highway – West of Hector Road	10/10[2]	A/A[5]	8.5	A	8.5	A
National Trails Highway – East of Hector Road	10/15[2]	A/A[5]	8.5	A	8.5	A
BLM Access Road – North of I-40	N/A	N/A	---	---	---	---

Notes and Sources: 2007 Traffic Volumes (Caltrans, 2008a); [2]AM/PM Volumes (Higher Volumes between Northbound and Southbound Direction), Source: National Data Services, 2008a; 2007 Truck Volumes (Caltrans, 2008b); 4 ADT LOS; 5 Peak Hour LOS; 6 Peak Hour LOS is based on Table 5.11-3, San Bernardino CMP, 2003 Update. Information not listed was not available; ADT = Average Daily Traffic; LOS = Level of Service. Source: URS Corporation.

Traffic and Transportation Table 4
2011 Peak Hour Roadway Traffic Volumes
Design Capacities, and Levels of Service With Project

2011 Existing Conditions with Calico			Morning Peak Hour		Evening Peak Hour	
Roadway Segment	**Traffic Volumes**	**LOS**	**Average Delay (sec/veh)**	**LOS**	**Average Delay (sec/veh**	**LOS**
I-40 – West of Hector Road	17,000[1]	B[4]	15.5	C	13.1	B
I-40 – East of Hector Road	17,250[1]	B[4]	16.5	C	11.0	B
Hector Road – North of I-40	705/775[2]	B/C[5]	---	---	---	---
Hector Road – South of I-40	10/15[2]	A/A[5]	---	---	---	---
National Trails Highway – West of Hector Road	10/10[2]	A/A[5]	8.5	A	8.5	A
National Trails Highway – East of Hector Road	10/15[2]	A/A[5]	8.5	A	8.5	A
BLM Access Road – North of I-40	81/12[2]	A/A[5]	---	---	---	---

Notes and Sources: 2007 Traffic Volumes (Caltrans, 2008a); [2]AM/PM Volumes (Higher Volumes between Northbound and Southbound Direction), Source: National Data Services, 2008a; 2007 Truck Volumes (Caltrans, 2008b); 4 ADT LOS; 5 Peak Hour LOS; 6 Peak Hour LOS is based on Table 5.11-3, San Bernardino CMP, 2003 Update. Information not listed was not available; ADT = Average Daily Traffic; LOS = Level of Service. Source: URS Corporation 2008.

Traffic and Transportation Table 5
2011 Peak Hour Intersection
Levels of Service Without Project

Intersection	AM Average Delay (sec/veh)	LOS	PM Average Delay (sec/veh)	LOS
I-40 – Westbound Ramp/Hector Road	8.8	A	8.8	A
I-40 – Eastbound Ramp Hector Road	8.8	A	8.8	A
Hector Road/National Trails Highway	---	---	8.5	---

Source: URS Corporation.

Traffic and Transportation Table 6
2011 Peak Hour Intersection
Levels of Service During Construction

Intersection	AM Average Delay (sec/veh)	LOS	PM Average Delay (sec/veh)	LOS
I-40 – Westbound Ramp/Hector Road	15.5	C	13.1	B
I-40 – Eastbound Ramp Hector Road	16.5	C	11.0	B
Hector Road/National Trails Highway	8.5	A	8.5	A

Source: URS Corporation.

Construction Truck Deliveries

During construction the passenger car equivalent (PCE) of approximately 41 trucks are expected to arrive at and leave from the construction site each morning and evening, resulting in a total of 274 trips during the 48-month construction period. Most deliveries will occur between 7 AM and 5 PM on weekdays.

Because these trucks will use the temporary intersection off I-40 to Hector Road, which is controlled by a stop sign, staff is recommending for inclusion in Condition of Certification **TRANS-2,** a traffic control plan**,** which includes a requirement for ensuring that the arrival and departure time of these trucks does not occur in peak traffic periods, thereby contributing to a decrease in the LOS on I-40 to unacceptable levels.

To transport this equipment, the applicant must obtain special permits from Caltrans to move oversized or overweight materials. In addition, the applicant must ensure proper routes are followed; proper time is scheduled for the delivery; and proper escorts,

including advanced warning and trailing vehicles as well as law enforcement control are available, if necessary.

Consequently, staff is recommending Condition of Certification **TRANS-3** to ensure the project owner will comply with vehicle size and weight limitations imposed by Caltrans and other relevant jurisdictions; Condition of Certification **TRANS-4** to ensure the applicant complies with Caltrans' and other relevant jurisdictions' limitations on encroachments into public rights of way; and **TRANS-5** to ensure that the project owner will restore to their original condition or to near-original condition all public roads, easements, and rights-of-way that have been damaged due to project-related construction activities.

Emergency Services Vehicle Access

The applicant is proposing to build a temporary and permanent access road to the project site. Those access roads must be an all-weather road, constructed of appropriate materials and be able to be accessed from I-40. Therefore, staff is recommending Condition of Certification **TRANS-1** to ensure the construction of an all-weather access roads, designed for fire-truck access, constructed of appropriate materials, including culverts and paving, and safe for use in crossing washes at the site.

Staff notes that the temporary access road to the project site requires workers to travel over BNSF Railway tracks to get to the project site. Because of the schedule of BNSF Railway's trains and the number of workers and delivery trucks needing to access the site, staff also notes that access for emergency vehicles could be delayed.

Acceptable emergency response times are generally within the six-minute to ten-minute range. If an emergency vehicle is attempting to gain access to the project site while workers are also trying to enter or while a BNSF Railway train is traveling on the tracks, the response time could be increased by as much as fifteen minutes or more.

Staff is recommending in Condition of Certification **TRANS-2** methods to help ensure emergency response times are adequate and result in a less than significant impact. To ensure that emergency services vehicle access is available to workers and visitors as quickly as possible after start of construction, staff recommends that the applicant begin construction on the bridge to cross BNSF Railway's tracks as soon as possible.

Transportation and Storage of Hazardous Materials

Approximately ten types of hazardous materials, including hydrogen gas, will be used and stored at the site during construction. See **Hazardous Materials Handling** in this document. Those materials will be delivered to the site and disposed of by trucks via I-40 at regularly scheduled intervals.

During the construction phase of this project, hazardous materials delivered to the site will have to cross the BNSF Railway's tracks to gain access to the site. Staff is including in Condition of Certification **TRANS-2** requirements designed to ensure that the delivery and disposal of hazardous materials to and from the site will not result in a significant impact. In addition, to ensure that the transporting of hazardous materials will comply with all applicable federal and state regulations pertaining to the transportation of these

materials, staff is recommending Condition of Certification **TRANS-6**. See **Traffic and Transportation Table 7** for information about these regulations.

To ensure that the transportation of hazardous materials is accomplished in the safest manner possible, staff recommends that the applicant begin construction on the bridge to cross BNSF Railway's tracks as soon as possible.

Operation Impacts and Mitigation

Operation of the CSP will result in a small amount of vehicular traffic. Operational workforce is estimated to be 164 workers. The arrival and departure time of those 164 workers will be staggered in three, eight-hour shifts. Those three, eight-hour shifts ensure workers are present on a 24-hour, seven-day-a-week basis.

Assuming the worst-case scenario with worker traffic, peak weekday traffic will consist of 53 vehicles per day, assuming each worker drove alone in his or her own vehicle. Those 53 vehicle trips will not contribute to a significant increase in the LOS on the surrounding roads. Hence, no mitigation is required.

Assuming the worse-case scenario with truck traffic, an average of 12 round-trip truck trips daily would arrive throughout the day to the project site. This increase in traffic, based on worst-case scenarios, would be minor and not contribute to increases in LOS on surrounding roads. Staff notes that during operation of the CSP, a bridge will have been constructed over BNSF Railway's tracks. Hence, no mitigation is required.

The surrounding roadways and intersections are projected to operate well below LOS capacity when CSP is operational in 2016. Projections have taken into account continued local and regional growth.

Truck travel as well as other non-employee site visits will be very small and will typically occur during non-peak periods. Consequently, cumulative operational impacts will not be significant and not require mitigation.

Emergency Services Vehicle Access

The applicant is proposing to build a permanent access road to the project site. To meet state fire marshall regulations, that road must be an all-weather road constructed of appropriate materials and be able to be accessed from I-40. Therefore, staff is recommending in Condition of Certifications **TRANS-1** that the access road be an all-weather road designed to allow for fire-truck access and be constructed of appropriate materials, including culverts and paving, so that it will be safe for use in crossing washes at the site.

Staff also notes that the permanent access road will be constructed to provide access to the site by a bridge to be constructed over BNSF Railway's tracks. Staff is recommending Condition of Certification **TRANS-1** to ensure that the bridge is constructed according to applicable code requirements and that the applicant has been granted access to BNSF Railway's right-of-way.

Parking

According to the applicant, on-site parking for workers would be provided on the grounds of a 10-acre satellite services complex located in the eastern portion of the Phase II section of the project site. When operational, the project would employ up to 164 workers, who would work in three 8-hour shifts.

To ensure adequate parking for workers, staff is proposing Condition of Certification **TRANS-2**, a traffic control plan that requires the project owner to ensure adequate parking for workers either in designated areas off the project site or on the project site itself.

Water and Rail Obstructions

The proposed CSP is not located adjacent to a navigable body of water; therefore, the CSP is not expected to alter water-related transportation. However, BNSF operates a double-track railroad line through the project site. See the **Worker Safety and Fire Prevention** section of this document for information on safety pertaining to the operation of the railroad line through the project.

Transportation of Hazardous Materials

Approximately ten types of hazardous materials will be used at the site during operations. See **Hazardous Materials Handling** in this document. Those materials will be delivered to the site and disposed of by trucks via Interstate 40 at regularly scheduled intervals.

Consequently, staff is recommending Condition of Certification **TRANS-6** to ensure that the transporting of hazardous materials will comply with all applicable federal and state regulations pertaining to the transportation of these materials. See **Traffic and Transportation Table 3** for information about these regulations.

Hazardous materials include gases, chemicals, and other toxic materials. Federal and state regulations specify precautions to be taken when using the highways to transport hazardous materials.

Those regulations are designed to help ensure that hazardous materials—including those that are flammable, combustible, explosive, toxic, noxious, corrosive, oxidizers, or radioactive—are not released into the environment when being transported and delivered. If spilled or released on the highway, hazardous materials can cause short-term or long-term evacuations of an area depending on the nature of the spill and weather conditions.

Impact of Glint and Glare

The proposed Calico Solar Project would utilize SunCatchers— a 40-foot tall, 25-kilowatt-electrical (kWe) solar dish developed by Stirling Energy Systems. The SunCatcher system consists of a unique radial solar concentrator dish structure that supports an array of curved glass mirror facets. Those mirrors are designed to automatically track the sun and collect and focus or concentrate its solar energy onto a patented power conversion unit (PCU).

The SunCatcher mirrors have the potential to move off-axis during cloud cover, and staff is concerned that the energy of the reappearing sun redirected from the mirrors nearest the rail line may pose a hazard in the form temporary flash blindness to motorists on Hector Road, I-40, and National Trails Highway (Route 66); and crews on trains traversing the project site on BNSF tracks

Consequently, staff has determined that the impacts of the SunCatchers could present, if not mitigated, a significant hazard to motorists and train crews. As a result, staff has proposed Condition of Certification **TRANS-7**, which is designed to reduce to less than significant the operational impacts of the SunCatchers to motorists and passengers on Hector Road, Interstate 40, and National Trails Highway (Route 66) as well as to BNSF Railway and AMTRAK train crews and passengers.

This condition of certification requires the project owner to modify the normal and offset tracking position to specific specifications and ensure specific morning-stow and night-stow procedures are followed. The applicant is also required to ensure that the minimum distance from any SunCatcher reflector assembly to the BNSF ROW or any public roadway be at least a minimum of 233 feet to reduce the possibility of temporary flash blindness.

In addition Condition of Certification **TRANS-7** requires the applicant to develop an emergency glare response program that requires, among other things, a monitoring plan; plan for reporting malfunctions and complaints; immediate repositioning of malfunctioning units; and a process of evaluating intrusive light conditions through video surveillance.

Finally, BNSF Railway has communicated to staff its concern about the effect of glint and glare on the railroad engineers' ability to clearly and accurately see signal lights. Staff has previously included in Condition of Certification **TRANS-7** measures designed to reduce to less than significant the operational impact of the SunCatchers' on BNSF Railway and AMTRAK crews and passengers.

However, because of the significance of the signal lights to the operational safety of the crews and trains, staff has analyzed BNSF's concerns. Staff has determined that any escaping or itinerant glint and glare that may affect the railroad engineer's ability to clearly and accurately see signals lights is mitigable through shielding, LED lights, or other means designed to increase the contrast and intensity of the signal light.

Consequently, staff is proposing for inclusion in Condition of Certification **TRANS-7** a requirement for the applicant to work with BNSF Railway to determine the appropriate size and design of shields to be affixed to signal lights as well as measures to increase the contrast of the signal light, including orienting the appropriately sized shield around the signal light; ensuring the darkest background possible on the signal light; or increase the brightness of the signal light emitter over historic light levels using current LED signal technology.

C.11.5 REDUCED ACREAGE ALTERNATIVE

The Reduced Acreage alternative would essentially be a 275 MW solar facility located within the central portion of the proposed 850 MW project. It was developed because it could be constructed without the necessity of a new 500 kV transmission line, and would avoid several other environmental impacts. This alternative's boundaries and the revised locations of the transmission line, substation, laydown, and control facilities are shown in **Alternatives Figure 1**.

C.11.5.1 SETTING AND EXISTING CONDITIONS

The general setting and existing conditions would remain as described in C.11.4.1 although the land requirements would be proportionately reduced to reflect the smaller project size. Locations of laydown areas may also vary.

C.11.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The implementation of this alternative would reduce the number of workers needed for the construction and operation of this project. However, that reduction would not have a significant impact for the following reasons: It does not change the project's setting and the change in the number of workers is not significant. That is, traffic would still need to be mitigated because of the intersection at which workers would need to exit to the project. That intersection is signed and without mitigation, LOS would decrease to unacceptable levels.

C.11.5.3 CEQA LEVEL OF SIGNIFICANCE

Similar to the proposed project, staff considers project compliance with LORS and staff's conditions of certification to be sufficient to ensure that no significant impacts would occur as a result of waste management associated with the Reduced Acreage Alternative.

The implementation of this alternative would not significantly affect the number of workers needed for the construction and operation of this project because it does not change the setting of the project or the necessity of the workers to travel on I-40. Workers required for this project is relatively small and even each worker traveling alone in one vehicle would not exceed acceptable levels of service on I-40. However, staff has proposed mitigation to encourage car-pooling or other methods of reducing traffic impacts.

C.11.6 AVOIDANCE OF DONATED AND ACQUIRED LANDS ALTERNATIVE

Due to the reduction in project size and impacts associated with the northern portion of the originally proposed project layout, the Avoidance of Donated and Acquired Lands Alternative shown in **Alternatives Figure 2** will be addressed in the **Alternatives** section of this SSA.

C.11.7 NO PROJECT/NO ACTION ALTERNATIVE

There are three No Project / No Action Alternatives evaluated as follows:

C.11.7.1 NO PROJECT / NO ACTION ALTERNATIVE #1

No Action on the Calico Solar Project application and on CDCA land use plan amendment

Under this alternative, the proposed Calico Solar Project would not be approved by the CEC and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

If the proposed project is not approved, renewable projects would likely be developed on other sites in San Bernardino County, the Mojave Desert, or in adjacent states as developers strive to provide renewable power that complies with utility requirements and State/Federal mandates. For example, there are dozens of other wind and solar projects that have applications pending with BLM in the California Desert District.

The impacts of traffic and transportation of developing renewable projects being developed on other sites in San Bernardino County, the Mojave Desert, or adjacent states would be not significant because of the various mitigation measures available for transporting workers to those sites. These mitigation measures include:

1. Busing workers to the sites from central locations
2. Staying in local hotels and motels near the site and being bused to the site
3. Staggering work hours over a 24-hour period
4. Providing park-and-ride locations

C.11.7.2 NO PROJECT / NO ACTION ALTERNATIVE #2

No Action on the Calico Solar Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed Calico Solar Project would not be approved by the CEC and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. As a result, impacts on traffic and transportation would essentially be the same and the same mitigation would be proposed to ensure a significant impact on the roadways would not occur.

That mitigation would include park-and-ride locations; staying in motels and being bused to work; and staggering work hours.

C.11.7.3 NO PROJECT / NO ACTION ALTERNATIVE #3

No Action on the Calico Solar Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed Calico Solar Project would not be approved by the CEC and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result the negative impacts on the local transportation system would be nonexistent due to the construction and operation of a solar project. Roads would continue to operate at a relatively high level of service.

C.11.8 PROJECT-RELATED FUTURE ACTIONS - TRANSPORTATION AND TRAFFIC

This section examines the potential impacts of future transmission line construction, line removal, substation expansion, and other upgrades that may be required by Southern California Edison Company (SCE) as a result of the Calico Solar Project. The SCE upgrades are a reasonably foreseeable event if the Calico Solar Project is approved and constructed as proposed.

The SCE project will be fully evaluated in a future EIR/EIS prepared by the BLM and the California Public Utilities Commission. Because no application has yet been submitted and the SCE project is still in the planning stages, the level of impact analysis presented is based on available information. The purpose of this analysis is to inform the Energy Commission and BLM, interested parties, and the general public of the potential environmental and public health effects that may result from other actions related to the Calico Solar Project.

The project components and construction activities associated with these future actions are described in detail in Section B.3 of this Staff Assessment/EIS. This analysis examines the construction and operational impacts of two upgrade scenarios

- The 275 MW Early Interconnection Option would include upgrades to the existing SCE system that would result in 275 MW of additional latent system capacity. Under the 275 MW Early Interconnection option, Pisgah Substation would be expanded adjacent to the existing substation, one to two new 220 kV structures would be constructed to support the gen-tie from the Calico Solar Project into Pisgah Substation, and new telecommunication facilities would be installed within existing SCE ROWs.
- The 850 MW Full Build-Out Option would include replacement of a 67-mile 220 kV SCE transmission line with a new 500 kV line, expansion of the Pisgah Substation

at a new location and other telecommunication upgrades to allow for additional transmission system capacity to support the operation of the full Calico Solar Project.

C.11.8.1 ENVIRONMENTAL SETTING

The environmental setting described herein incorporates both the 275 MW Early Interconnection and the 850 MW Full Build-Out options. The setting for the 275 MW Early Interconnection upgrades at the Pisgah Substation and along the telecomm corridors is included within the larger setting for the project area under the 850 MW Full Build-Out option, which also includes the Lugo-Pisgah transmission corridor.

The proposed transmission line route would generally follow a southwest line from north of the Town of Newberry Springs, crossing I-40 east of Daggett, crossing State Highway 247 and terminating south of Hesperia at the SCE Lugo Substation. The major access routes for project workers would likely be I-40, I-15, and State Highway 247, as well as secondary routes such State Route 18 (SR 18).

The section of I-40 within the project area would be from Barstow southeast to Needles. This segment of I-40 is a fully improved freeway through Barstow at the junction with I-15. I-15 extends northeasterly from the Victorville area through Barstow and Las Vegas. It is fully improved to freeway status in the Victorville area with grade-separated interchanges at Bear Valley Road, Palmdale Road, Hook Boulevard, Mojave Drive, "D" Street, and Stockton Wells Road. State Highway 274 is classified as a minor arterial and is a two-lane highway connecting Barstow and Lucerne Valley near SR 18. SR 18 is a two-way, two-lane roadway.

The roadway operating characteristics for these routes have been defined in several recent transportation planning documents, including the Victor Valley Area Transportation Study (SANBAG 2008). LOS defines roadway operating conditions as follows:

- **LOS A**: Free flow, with no restrictions on maneuvering or operating speeds. Minimal or no delay.
- **LOS B**: Stable flow, with some restrictions on maneuvering or operating speeds. Nominal delays
- **LOS C**: Stable flow, with more restrictions on speed and maneuverability. Some delays.
- **LOS D**: Approaching unstable flow. Restricted speed and maneuverability. Delays encountered at intersections.
- **LOS E**: Unstable flow, with some stoppages. Constitutes maximum capacity by definition. Extensive delays at some locations.
- **LOS F**: Forced flow, with many stoppages. Low operating speeds, extensive queuing and very extensive delays.

C.11.8.2 ENVIRONMENTAL IMPACTS

The construction activity requiring the largest workforce would likely be the installation of the conductors and optical ground wire (OPGW). In addition, at some stages of the project, especially during the full build-out construction, multiple locations would be under construction simultaneously.

Consequently, several independent construction teams may be working throughout the project area. As a result, the overall peak number of workers may be greater. The area's roadways would also be used for transportation of equipment and access to the temporary staging areas and the transmission and telecommunication corridors. Finally, the movement of heavy machinery or the possible need to use rail lines, such as the BNSF railroad tracks that bisect the project area, to deliver equipment or materials to the project site could also affect the surrounding transportation system.

In addition, large vehicles delivering materials and oversized vehicles used in the construction process may affect traffic flow on one or more of the roadways, resulting in a safety hazard. These potential impacts can be avoided through mitigation, which is discussed below. In addition, there is potential for unexpected damage to roads by vehicles and equipment (overhead line trucks, crew trucks, concrete trucks, etc.) that would be entering and leaving roads within the project area.

Permits and Impact Fees. Some of the potential permits and impact fees that may be applicable to the project construction and transport of equipment or materials include:

- Apply at least 2 working days prior to oversize load on city roadways Caltrans Oversize Load Permit

C.11.8.3 MITIGATION

Mitigation for preventing or mitigating or both damage to the highways include developing and implementing a traffic control plan to include provisions for (1) on-site parking for workers; (2) deliveries of heavy equipment and building materials; (3) emergency access; (4) signing, lighting, and traffic control device placement; temporary travel lane closures and potential need for flaggers. The plan also requires coordination with San Bernardino County to mitigate any potential adverse traffic impacts from other proposed construction projects that may occur during the construction phase of this project.

In addition mitigation includes limitations on vehicle size and weight; prevention of encroachment into public rights of way; and restoration of all public roads, easements, and rights-of-way. See Condition of Certification **TRANS-3** through **TRANS-4**.

C.11.8.4 CONCLUSION

The intersection of a new access road with an existing public road would be constructed in accordance with the requirements of the agency having authority over the existing public road. Any activity that would need to occur outside of the existing transmission line ROW would require landowner notification and permission for access. Movement of heavy machinery on local roads would occur intermittently, but infrequently over the construction period. Since the majority of the upgrade activities for both options would

take place in undeveloped areas on BLM land, impacts to traffic level of service for most roadways in the project vicinity would be less than significant.

Based on the temporary nature of the construction activities and the minor staffing and equipment expected to be required compared to the traffic volumes on I-40, and I-15 and coupled with implementation of mitigation measures similar to Conditions of Certification concerning peak hour traffic would likely ensure that any potential impacts to traffic and transportation would be less than significant.

C.11.9 CUMULATIVE IMPACT ANALYSIS

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (California Code Regulation, Title 14, section 15130). NEPA states that cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR §1508.7).

There is the potential for substantial future development in the San Bernardino Valley area and throughout the southern California desert region. Analysis of cumulative impacts is based on data provided in the following maps and tables (see **CUMULATIVE SCENARIO**):

- Cumulative Impacts Figure 1, Regional Renewable Applications;
- Cumulative Impacts Figure 2, Renewable Applications in the Barstow & Needles District Areas;
- Cumulative Impacts Figure 3, Newberry Springs/Ludow Area - Existing and Future/Foreseeable Projects;
- Cumulative Impacts Table 1, Renewable Energy Projects in the California Desert District
- Cumulative Impacts Table 2, Existing Projects in the Newberry Springs/Ludow Area; and
- Cumulative Impacts Table 3, Future Foreseeable Projects in the Newberry Springs/Ludlow Area.

The analysis in this section first defines the geographic area over which cumulative impacts related to traffic and transportation could occur. The cumulative impact analysis itself describes the potential for cumulative impacts to occur as a result of implementation of the Calico Solar Project along with the listed local and regional projects.

Geographic Extent

Cumulative impacts can occur within San Bernardino County if implementation of the Calico Solar Project could combine with those of other local or regional projects. Cumulative impacts could also occur as a result of development of some of the many

proposed solar and wind development projects that have been or are expected to be under consideration by the BLM and the Energy Commission in the near future. Many of these projects are located within the California Desert Conservation Area, as well as on BLM land in Nevada and Arizona.

The geographic extent for the analysis of the cumulative impacts associated with the Calico Solar Project includes San Bernardino County. This geographic scope is appropriate because the roads to be most affected by the project are roads that are located in San Bernardino County, particularly I-40.

Potential Environmental Impacts

Local Impacts

Eleven projects either exist or are projected to be constructed during the same period as the Calico Solar Project. See Cumulative Impacts Figure 3 and the Cumulative Impacts section of this document.

These projects include the following:

1. Abengoa Solar Project, 250 MW solar thermal, Proposed. Application for Certification being reviewed by California Energy Commission.
2. SES Solar Three, 914 MW solar thermal, Proposed.
3. SES Solar Six, 1,631 MW solar thermal, Proposed.
4. Southern California Edison Pisgah Substation Expansion and Pisgah-Lugo Upgrade, Proposed.
5. CACTUS, originally a solar plant, now converted into an observatory, Existing.
6. Two small mines within 14 miles of project, Existing.

According to *California Environmental Quality Act (CEQA) Guidelines*, a project may result in significant adverse cumulative impacts when its effects are “cumulatively considerable.”

Cumulatively considerable means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, or the effects of probable future projects (Title 14, California Code of Regulations, section 15130).

Cumulative traffic and transportation impacts could occur when more than one project has an overlapping construction schedule resulting in a demand on highways that, if met, would result in an unacceptable level of service (LOS). An unacceptable level of service would result in traffic delays, significantly reduced traffic flows, and backup of traffic at signed intersections.

Operational cumulative traffic and transportation impacts could occur when the operation of multiple projects significantly impacts the highways, resulting in unacceptable levels of service (LOS) on highways.

Cumulative impacts of the Calico Solar Project were analyzed in the context of other known projects in the area. The analysis was based on the construction schedule indicated in the Executive Summary of the *Application for Certification* prepared by the applicant and submitted to the California Energy Commission on December 2, 2008. In that Executive Summary the applicant indicated that construction would begin in Fall 2010; be completed in Fall 2012; and the plant would be in full-scale operation in Winter 2012. The year 2012 traffic estimate is based on a 2% per year general growth rate.

In the general vicinity of the Calico Solar Project, the following projects were proposed, approved, or already exist:

1. Abengoa Solar Project, 250 MW solar thermal, Proposed. Application for Certification being reviewed by California Energy Commission.
2. SES Solar Three, 914 MW solar thermal, Proposed.
3. SES Solar Six, 1,631 MW solar thermal, Proposed.
4. Southern California Edison Pisgah Substation Expansion and Pisgah-Lugo Upgrade, Proposed.
5. CACTUS, originally a solar plant, now converted into an observatory, Existing.
6. Two small mines within 14 miles of project, Existing.

Staff analyzed the traffic-related impacts of those existing or proposed projects when combined with the traffic-related activities of the Calico Solar Project.[1] See **Cumulative Impacts Figure 3.**

Staff concluded that the existing or proposed projects, although relatively close to the Calico Solar Project on I-40, will not significantly impact traffic due to number of workers; construction schedules; in-place park-and-ride programs; and existing capacity

During regular operations facilities listed in this section generate a negligible amount of traffic. Consequently, the cumulative impacts of these projects are less than significant.

Regional Impacts

If all were to be built, projects located along I-40 and included in **Cumulative Impacts Figure 1**, **2**, and **3** and **Cumulative Tables 1B, 2,** and **3**, may have the potential to result in increased congestion on that highway. These projects include solar and wind projects in the California Desert District and Renewable energy projects. However, not all projects will be built. In addition, because of varying construction schedules; park and ride programs in place; and the locations of the various projects, the cumulative impact to the highway system will not be significant. In addition, not all projects will be built.

[1]Other projects were proposed but not considered, including Broadwell BrightSource, three wind projects, and the Twentynine Palms Expansion because of existing concerns with the projects; location; or length of EIS review period.

Cumulative Impacts Conclusion

In this analysis, staff considered the cumulative impacts of all future/foreseeable and existing projects as indicated in **Cumulative Impacts Figure 3** and determined that they would not contribute to a significant cumulative impact for the following reasons:

1. The number of workers needed for existing projects is minimal.
2. The mitigation measures the Calico Solar Project will result in acceptable levels of level of service (LOS) on roads and highways.
3. Even all existing and proposed projects used the same roadways, which is not the case, the locations of the various projects; different roadways, start times, and direction of travel used by workers; and conditions of certification imposed on the projects, including Calico Solar Project, to keep traffic at acceptable LOS level, will help to ensure that affected roadways operated at acceptable LOS.

C.11.10 COMPLIANCE WITH LORS

The proposed Calico Solar Project is intending to comply with all federal, state, and local LORS. Development and operation of the Calico Solar Project, as planned, would not conflict with the LORS as described in this section. **Traffic and Transportation Table 6** summarizes Calico Solar Project's conformance with all applicable LORS.

Traffic and Transportation Table 7
Calico Solar Compliance with Adopted Traffic and Transportation LORS

Applicable Law	Description
Federal	
Code of Federal Regulations (CFR), Title 14, Aeronautics and Space; Part 77, Objects Affecting Navigable Airspace (14 CFR 77)	This regulation includes standards for determining physical obstructions to navigable airspace; information about requirements for notices, hearings, and requirements for aeronautical studies to determine the effect of physical obstructions to the safe and efficient use of airspace. *Not applicable.*
*Code of Federal Regulations (*CFR*)*, Title 49, Subtitle B, Sections 171-177; Sections 350-399; Appendices A-G Other Regulations Relating to Transportation	49 CFR Subtitle B includes procedures and regulations pertaining to interstate and intrastate transport (including hazardous materials program procedures) and as well as safety measures for motor carriers and motor vehicles operating on public highways. *Consistent:* With implementation of Condition of Certification **TRANS-2**, **TRANS-3**; **TRANS-4**; **TRANS-5**; and **TRANS-6**, project will comply. Enforcement is conducted by state and local law enforcement agencies and through state agency licensing and ministerial permits (for example, California Department of Motor Vehicles licensing; California Department of Transportation permits; and local agencies such as San Bernardino County Department of Transportation or Public Works.

Code of Federal Regulations (CFR); Title 49, Part 209 to Part 244*; Federal Railroad Safety Act of 1970 (FRSA)*	Act granted the Federal Railroad Administration rulemaking authority over all areas of railroad safety. Violations of federal safety laws are regulations are reported by FRA inspectors or by states in which violation was noted. Consistent: With implementation of **TRANS-2**, project will conform.
State	
California Vehicle Code (CVC), Division 2, Chapter 2.5, Div. 6; Chap. 7, Div. 13; Chap. 5, Div. 14.1; Chap. 1 and 2, Div. 14.8, Div. 15	These code sections pertain to licensing, size, weight, and load of vehicles operated on highways; safe operation of vehicles; and transporting hazardous materials. *Consistent:* With implementation of Condition of Certification **TRANS-3**, project will comply. Enforcement is conducted by state and local law enforcement agencies and through state agency licensing and ministerial permits (for example, California Department of Motor Vehicles licensing; California Department of Transportation permits; and local agencies such as San Bernardino County Department of Transportation or Public Works.
California Streets and Highway Code, Section 117; Section 660-695; Section 700-711; Section 1450; 1460 et seq.; and 1480 et. Seq.	Pertain to regulating rights-of-way encroachments and granting permits for encroachment on state highways and freeways and on county roads. *Consistent:* With implementation of **TRANS-4** and **TRANS-5**, project with comply. Enforcement is conducted by state and local law enforcement agencies and through state agency licensing and ministerial permits (for example, California Department of Motor Vehicles licensing; California Department of Transportation permits; and local agencies such as San Bernardino County Department of Transportation or Public Works.
California Health and Safety Code; Section 25160 et seq.	Pertain to operators of vehicles transporting hazardous materials. *Consistent:* With implementation of Condition of Certification **TRANS-6,** project will comply. Enforcement is conducted by state and local law enforcement agencies and through state agency licensing and ministerial permits (for example, California Department of Motor Vehicles licensing; California Department of Transportation permits; and local agencies such as San Bernardino County Department of Transportation or Public Works.
California Fire Code, Section 902.2.1 et.seq.	Pertains to requirements for constructing an access road for fire department and other emergency vehicle access. *Consistent:* With implementation of Condition of Certification **TRANS-1 and TRANS-2,** project will comply with this section of the California Fire Code. Enforcement is provided by local and state law enforcement and fire protection agencies.

California Public Utilities Code, Section 1201-1220	Pertains to constructing and operating rail road crossings. *Consistent:* With implementation of Condition of Certification **TRANS-2**, project will comply. Enforcement is provided by California Public Utilities Commission.
Local	
San Bernardino County Comprehensive Transportation Plan	Identifies transportation improvements and strategies to enhance system performance and achieve emission reductions to meet air quality requirements and serves as a basis for action programs to be implemented through the Congestion Management Program. *Consistent:* With implementation of Condition of Certification **TRANS-2** through Condition of Certification **TRANS-6**, project will comply. Enforcement provided through state and local agencies.
San Bernardino County Congestion Management Program, 2007	Requires all counties to develop a Congestion Management Plan designed to develop and implement comprehensive strategies needed to develop appropriate responses to transportation needs. Mandated by *Government Code Section* 65088, the CMP defines a network of state highways and arterials, level of service standards, and related procedures, and provides technical justification for the approach. *Consistent:* With implementation of Condition of Certification **TRANS-2**, project will comply. Enforcement provided through state and local agencies.
San Bernardino General Plan, Circulation and Infrastructure Element, Desert Region	Pertains to public policies and strategies for the transportation system in San Bernardino County, including those pertaining to transportation routes, terminals, and facilities; construction of extensions of existing streets; and levels of services (LOS). *Consistent:* With implementation of Condition of Certification **TRANS-2** project will comply.
San Bernardino Traffic Code, Section 52.0125	Pertains to requirements for oversize and overweight vehicles. *Consistent:* With implementation of Condition of Certification **TRANS-3**, project will comply. Enforcement provided by state and local agencies.

C.11.11 NOTEWORTHY PUBLIC BENEFITS

While the development of the proposed project is intended to address the requirements of federal and state mandates to develop renewable energy, it would not yield any noteworthy public benefits related to traffic and transportation.

C.11.12 FACILITY CLOSURE

Staff has considered facility closure and decommissioning impacts to Traffic and Transportation under individual headings in Assessment of Impacts and Discussion of Mitigation above. Impacts would be mitigated by implementing the required conditions of certification.

C.11.13 RESPONSE TO PUBLIC AND AGENCY COMMENTS

C.11.13.1 APPLICANT'S COMMENTS

Comment: The Applicant agrees with Staff's intention of providing alternative transportation; however, there is no demonstrated nexus between the cumulative traffic impacts of the Calico Solar Project and the Abengoa Mojave Project. The employee travel patterns would not overlap as the Calico Solar workforce is expected to originate almost entirely in Barstow and Calico Solar is located in the opposite direction as the Abengoa Mojave Project when traveling from Barstow.

The Applicant requests that condition of certification **TRANS-11** be deleted.

Response: Staff considered the applicant's comment; reviewed the documents filed with the Energy Commission since the first staff assessment was prepared; and modified its Condition of Certification **TRANS-2** to incorporate the applicant's concerns. The applicant is provided flexibility in determining its options for controlling traffic to account for cumulative impacts, if necessary, in **TRANS-2**.

C.11.13.2 PUBLIC COMMENTS

Comment: On July 29, 2010, staff received a copy of a letter from BNSF Railway to Christopher Meyer, California Energy Commission project manager for the Calico Solar Project, and Jim Stobaugh, Bureau of Land Management project manager for the project. The subject of the letter is "BNSF Comments Regarding Prehearing Conference and for Consideration at Evidentiary Hearing."

Response: Staff notes that Section 6 of the letter pertains to the glint and glare portion of the traffic and transportation section of the staff assessment. In particular, BNSF requested a specific condition of certification requiring a site-specific glint and glare study be conducted prior to the first SunCatcher disc being mounted on a pedestal.

Staff has been working with representatives from BNSF Railway since July 16, 2010, to resolve BNSF Railway's concerns with glint and glare. As is its usual procedure, staff commissioned a glint and glare study, which is attached to this document. The study included mitigation measures to ensure that significant impacts to BSNF Railway operations did not occur. Staff has incorporated those mitigation measures in this analysis.

In addition, staff reviewed the glint and glare study and mitigation measures with BNSF Railway representatives. The review included telephone conversations with Energy Commission glint and glare consultants to ensure BNSF Railway's concerns were addressed.

BNSF Railway's representatives also expressed a concern about glint and glare and its effects on the railroad engineer's ability to correctly perceive the color of the signal. Through several telephone conversations, staff and the commission's glint and glare consultants discussed with BNSF Railway representatives their specific concerns about the signal lights. Staff determined that measures exist, if needed, to ensure that BNSF Railway engineers will be able to correctly perceive the color of the signal. Those procedures involve hooding and increasing the intensity of the lights.

We have incorporated into this document a condition of certification that requires the applicant to work with BNSF Railway to fund and conduct a study to determine the specific measures needed, if any, to ensure that the correct signal color is visible to BNSF Railway engineers. This study and modifications to the signal, if required, are to be completed before operation of the Calico Solar Project.

C.11.14 PROPOSED CONDITIONS OF CERTIFICATION

TRANS-1 –Construction of All-Weather Roads and Bridge. If an easement is granted and the applicant begins construction, the applicant shall construct an all-weather road according to (1) California State Fire Marshall specifications as outlined in *California Fire Code* Section 902.2.1 et seq. These roads shall be constructed with appropriate materials, including culverts and paving, so that they will be safe for use in crossing washes at the site.

In addition, the applicant shall coordinate its activities with the BNSF Railway. Those activities include working with the Public Utilities Commission to ensure compliance with provisions of the *California Public Utilities Code* Sections 1201-1220.

During construction of both the temporary and permanent road, temporary crossing of BNSF tracks, and permanent crossing of BNSF tracks, the applicant shall prepare and coordinate with BNSF Railway; California Public Utilities Commission; and Federal Railroad Administration a safety plan for ensuring that all state and federal safety requirements for railroad crossings are followed.

That plan shall be reviewed and coordinated with BNSF Railway, appropriate regulatory agencies, and the CPM to ensure compliance with all state and federal requirements and approved by those agencies s well as the CPM.

Verification: At least 30-days prior to the start of mobilization, right-of-way easements shall be obtained and presented to the CPM. In addition to the BSNF easement, the project owner shall provide the CPM a copy of all documents pertaining to approvals from the Federal Railroad Administration (FRA); and the California Public Utilities Commission (CPUC). A courtesy copy shall be provided to the California Department of Transportation (Caltrans), District 8 Office. Within 30 days after the completion of each road and railroad crossing improvements, the project owner shall provide the CPM with a copy of written approvals from BNSF, FRA, and CPUC as to the adequacy and safety of the roads and bridge.

TRANS-2 – Traffic Control Plan. Prior to the start of construction for the Calico Solar Project, the project owner shall prepare and implement a traffic control plan (TPC) for the project's construction and operation traffic. The plan shall address the movement of workers, vehicles, and materials, including arrival and departure schedules and designated workforce and delivery routes.

For the project's construction period, the plan is to be designed to take into account any impediments that may or could occur because of the need to cross BNSF Railway tracks. In developing this plan the applicant is required to consider off-site parking and staging in designated areas and the use of buses to transport workers to and from the construction site.

Once the bridge is constructed, the applicant shall prepare a parking and staging plan to require all project-related parking to occur on-site or in designated off-site parking areas and that staging occurs on-site in a specifically-defined area.

The project owner shall consult with the BNSF Railway; County of San Bernardino; and the California Department of Transportation (Caltrans) District 8 office in the preparation and implementation of the plan and shall submit the proposed traffic control plan to the BNSF Railway; County of San Bernardino; and Department of Transportation (Caltrans) District 8 office in sufficient time for review and comment. The plan, along with any written comments from the BNSF Railway, County of San Bernardino; and Department of Transportation (Caltrans) District 8 office, shall then be submitted to the Energy Commission Compliance Program Manager (CPM) for review and approval prior to the proposed start of construction and implementation of the plan.

The traffic control plan shall include:

- A work schedule and end-of-shift departure plan designed to ensure that stacking does not occur on intersections necessary to enter and exit the project site. The project owner shall consider using one or more of the following measures designed to prevent stacking: (1) staggered work shifts; (2) off-peak work schedules; and (3) restricting travel to and departures from the project site to ten or fewer vehicles every three minutes during peak travel hours on Interstate 40.
- Provisions for at least two flaggers stationed at the BNSF Railway crossing during each day of construction until the proposed bridge is constructed and operating. Flaggers shall be present at the BNSF Railway crossing to ensure the safe crossing of workers, visitors, and delivery persons arriving and leaving the project site.
- Provisions for an incentive program such as an employer-sponsored Commuter Check Program to encourage construction workers to carpool or use van or bus service or both.
- Provisions for delivering and staging of heavy equipment and building material deliveries as well as for the movement of hazardous materials to the site

- Limitation on truck deliveries to the project sites to only off-peak hours to ensure adequate exit and entry at appropriate intersections and railroad tracks.
- On I-40, provisions for direction and redirection of construction traffic with flag persons as necessary to ensure traffic safety and minimize interruptions to nonconstruction-related traffic flow.
- Placement of signage, lighting, and traffic control devices at the project construction site and laydown areas
- Signage along eastbound and westbound appropriate roads and at the entrance of the Hector Road I-40 northbound and southbound off-ramps to notifying drivers of construction traffic throughout the duration of the construction period.
- A heavy-haul plan designed to address the transport and delivery of heavy and oversized loads requiring permits from Department of Transportation (Caltrans) or other state and federal agencies.
- Parking for workforce and construction vehicles, including consideration of off-site parking prior to opening of bridge across BNSF Railway tracks, to prevent stacking on I-40 roads and intersections and facilitate timely and safer crossing across tracks for workers, visitors, and delivery persons as well as for emergency access.

Verification: At least 30-days prior to the start of construction, including any grading or site remediation on the power plant site or its associated easements, the project owner shall submit the proposed traffic control plan to BNSF Railway; San Bernardino County; and the Department of Transportation (Caltrans) District 8 office for review and comment and to the CPM for review and approval. The project owner shall also provide the CPM with a copy of the transmittal letter to BNSF Railway; San Bernardino County; and the Department of Transportation (Caltrans) District 8 office requesting review and comment.

At least 60 calendar days prior to the start of construction, the project owner shall provide copies of any comment letters received from BNSF Railway; San Bernardino County; and the Department of Transportation (Caltrans) District 8 office along with any changes to the proposed traffic control plan for CPM review and approval.

TRANS-3 – Limitations on Vehicle Size and Weight. Due to the dynamic nature of the construction environment, at least 30 days prior to the start of construction, the project owner shall consult with the BNSF Railway; San Bernardino County; and the Caltrans District 8 office to coordinate procedures for obtaining required and necessary easement and permits on an as-needed basis.

After consultation with BNSF Railway, San Bernarndino County, and the Caltrans District I office, the project owner shall prepare a coordination plan designed to comply with limitations imposed by California Department of

Transportation (Caltrans) District 8 office and other relevant jurisdictions including San Bernardino County, on vehicle sizes and weights. In addition, the project owner or its contractor shall obtain necessary transportation permits from Caltrans and all relevant jurisdictions for use of roadways.

Verification: At least 30-days prior to construction, a copy of the coordination plan shall be provided to the CPM for review and comment. In addition, the applicant shall provide copies of easements and permits obtained from BNSF Railway; San Bernardino County; and the Caltrans District 8 office to the CPM.

In the monthly compliance reports (MCRs), the project owner shall submit copies of any easements or permits or both received during that reporting period. In addition, the project owner shall retain copies of these permits and supporting documentation in its compliance file for at least six months after the start of commercial operation. The project owner shall retain copies of BNSF Railway easements for the life of the project.

TRANS-4 – Encroachment into Public Rights of Way. The project owner and its contractors shall comply with Caltrans and other relevant jurisdictions limitations for encroachment into public rights-of-way and shall obtain necessary encroachment permits from Caltrans and all relevant jurisdictions.

Verification: In the monthly compliance reports (MCRs), the project owner shall submit copies of permits received during the reporting period. In addition, the project owner shall retain copies of these permits and supporting documentation in its compliance file for at least six months after the start of commercial operation.

TRANS-5 – Restoration of All Public Roads, Easements, and Rights-of-Way. The project owner shall restore all public roads, easements, and rights-of-way that have been damaged due to project-related construction activities to original or near-original condition in a timely manner, as directed by the CPM. Repairs and restoration of access roads may be required at any time during the construction phase of the project to ensure safe ingress and egress.

Verification: At least 30-days prior to the start of mobilization, the project owner shall photograph or videotape all affected public roads, easements, and right-of-way segments and/or intersections and shall provide the CPM, the affected local jurisdictions, and Caltrans (if applicable) with a copy of these images. The project owner shall rebuild, repair and maintain all public roads, easements, rights-of-way in a usable condition throughout the construction phase of the project.

In addition, the project owner shall consult with San Bernardino County and California Department of Transportation (Caltrans) District 8 and notify them of the proposed schedule for project construction. The purpose of this notification is to request that San Bernardino County and Caltrans consider postponement of public right-of-way repair or improvement activities in areas affected by project construction until construction is completed and to

coordinate with the project owner regarding any concurrent construction-related activities that are planned or in progress and cannot be postponed. The purpose of this requirement is to help ensure cooperation from San Bernardino County and Caltrans so that the applicant's construction work is accommodated and the project can be completed in a timely and safe manner.

TRANS-6– Permits/Licenses to Transport Hazardous Materials. The project owner shall ensure that permits and/or licenses are secured from the California Highway Patrol and Caltrans for the transport of hazardous materials.

Verification: The project owner shall include in its monthly compliance reports (MCRs), copies of all permits and licenses acquired by the project owner or contractors or both concerning the transport of hazardous substances.

TRANS-7 – Prevention of Glare from SunCatchers to BNSF Train Crews and Motorists on Hector Road; Route 66; and Interstate 40

This condition of certification is divided into two sections. Section One concerns the testing of signals to ensure that they are easily visible to train engineers. Section Two concerns general location, operating, and reporting procedures pertaining to the SunCatcher mirrors.

I. Signal Light Modifications

Immediately after the installation of the first SunCatcher mirrors near the BNSF Railway right-of-way but before operation of the mirrors, the applicant will work with BNSF Railway to ensure that the operation of the SunCatcher mirrors will not interfere with the railroad engineers' ability to accurately see and respond to appropriate signal lights.

The applicant will work with BNSF Railway to determine the appropriate size and design of shields to be affixed to signal lights as well as measures to increase the contrast of the signal light, including orienting the appropriately sized shield around the signal light and increasing the brightness of the signal light emitter over historic light levels using current LED signal technology.

In addition, the applicant will work with BNSF Railway to determine emergency reporting procedures to immediately identify, report, and repair any malfunctioning or missing shield.

Verification: Signal Light Modifications. At least 120 days before the first SunCatchers are operated, the applicant shall consult with BNSF to prepare a plan to design, develop, and manufacture the appropriate shields to ensure that railroad engineers can accurately identify and respond properly to signal lights. As part of the development process, the applicant shall coordinate the development of the plan as well as the manufacture and installation of these shields with BNSF Railway, California Public Utilities Commission, and the

CPM. The completed plan shall be submitted to the CPM for review and approval at least 30 days prior to the start of operations.

At least 60 days before the first SunCatchers are operated, the applicant shall consult with BNSF Railway to test the shielded signal lights to ensure that the railroad engineers can accurately identify and respond to the appropriate signal. The CPM shall also be notified when testing shall occur.

Once BNSF Railway, California Public Utilities Commission has accepted the modified shield and verified that it allows the railroad engineers to accurately identify and respond to the proper signal, the applicant, along with BNSF Railway, shall coordinate methods and reporting procedures to ensure their safe and effective use.

The applicant shall develop, with BNSF Railway's input and approval, a monitoring plan that shall provide for the immediate reporting of any defective shield as well as its immediate replacement. This plan shall include methods for coordinating and implementing these reporting procedures with all necessary federal, state, and local agencies as well as BNSF Railway. This monitoring plan shall be submitted to the CPM for review and approval.

In addition, the project owner shall provide the CPM a monthly report that includes the date, time, location, response, and response time of any malfunction, public complaint, or video detection covered by the emergency glare response program; any determinations made by the project owner as to cause of the problem; and methods taken to resolve the problem. A copy of these reports shall be kept by the project owner for at least five years.

II. General Location, Operating, and Reporting Procedures

The project owner shall accomplish the following:

1. Modify the offset tracking procedure to use a 25-degree offset instead of the proposed 10-degree offset.
2. Ensure the morning stow position-to-offset position transitions occur at least 30 minutes before sunrise and end in the 25 % offset tracking position
3. Ensure that the "Night Stow" should occur 30 minutes after sunset to avoid any intrusive light effects
4. Ensure that the minimum distance from any SunCatcher reflector assembly to the BNSF right-of-way (ROW) or any public roadway shall be a minimum of 223 feet to reduce the possibility of temporary flash blindness. In addition, during the normal tracking and offset tracking positions, the project operator shall adhere to the following procedures and specifications:
5. Develop and implement an emergency glare response program that includes all of the following:

a. Monitoring plan that requires (1) the use of video surveillance trucks to identify and document intrusive light conditions, covering all hours of operation on a weekly basis for five years; and (2) monitoring of the status of individual SunCatchers during all hours of operation to immediately identify any malfunctioning units with the potential to create glare within the BNSF Railway right-of-way; or on I-40, Route 66, or Hector Road

b. Procedures that allow motorists and train operators, including AMTRAK and BNSF, to report to the project owner, as well as to Caltrans, California Highway Patrol (CHP), and the County of San Bernardino. in the case of complaints from motorists, any problems with glint or glare resulting from the operation or malfunction of SunCatchers. The procedures developed by the applicant for public reporting of glare problems shall be developed in consultation with BNSF Railway, California Department of Transportation (Caltrans) District 8 office, California Highway Patrol (CHP), and San Bernardino County. These procedures shall include a toll-free number for reporting problems as well as a process for written notification to the project owner and to California Department of Transportation (Caltrans, District 8) and San Bernardino County, in the case of complaints from motorists; or to AMTRAK or BNSF Railway, or both, in the case of complaints from train operators or passengers.

c. Procedures for the immediate (1) repositioning of any malfunctioning units to avoid potential glare within the BNSF Railway right-of-way or on I-40, Route 66, or Hector Road; investigation and resolution of complaints received from train operators or motorists or both.

d. Process for evaluating intrusive light conditions identified by the video surveillance and determining, in consultation with the CPM, what operational or other changes may be warranted to reduce or eliminate the identified intrusion;

e. Procedures for documenting instances when malfunctioning units with the potential to create glare are identified, or when train operators or motorists complain of glare, and the actions taken in response to those instances or complaints

f. Period reports to the Project CPM detailing instances of SunCatcher malfunction, public complaints about glare, or video-detected problems that are covered by the emergency glare response program.

Verification: General Location, Operating, and Reporting. At least 90 days before the first SunCatchers are tested or operated, the project owner shall submit documentation to the CPM necessary to verify that the operational measures and setback requirements included in this condition of

certification will be implemented and achieved.
At least 60 days before the SunCatchers are tested or operated, the project owner shall .submit to the CPM, for the CPM's review and approval, a copy of the project owner's draft emergency glare response program, including methods for coordinating and implementing the program with all state, county, and local agencies as well as BNFS Railway and AMTRAK.

Beginning no more than 30 days after the first SunCatchers are tested or operated and continuing for the duration of project operations, the project owner shall develop a procedure for any motorist, passenger, worker, train personnel, or visitor to report a malfunctioning unit and make those procedures known and available to those groups. The project owner shall provide the CPM a monthly report that includes the date, time, location, response, and response time of any malfunction, public complaint, or video detection covered by the emergency glare response program; any determinations made by the project owner as to cause of the problem; and methods taken to resolve the problem. A copy of these reports shall be kept by the project owner for at least five years.

C.11.15 CONCLUSIONS

1. SunCatcher Mirrors have the potential to significantly affect train crews as well as motorists on 1-10; Route 66; and Hector Road. Consequently, staff has proposed conditions of certification designed to reduce those impacts to less than significant.
2. Crossing BNSF Railway's tracks has the potential to significantly affect access for emergency vehicles, workers, visitors, and delivery persons. Staff has proposed conditions of certification designed to reduce those impacts to less than significant.
3. With implementation of proposed conditions of certification, the Calico Solar Project as proposed would cause no significant direct or cumulative traffic and transportation impacts, and therefore, no environmental justice issues, and would comply with all applicable LORS related to traffic and transportation.
4. Presently open BLM routes that traverse the project area would be closed if any of the action alternatives of amendments to the CDCA Plan as required are approved, limiting transportation through the area.
5. Staff is proposing Condition of Certification **TRANS-1**, which requires the applicant to obtain from BNSF Railway the easements necessary to construct all-weather roads to access the project site and a bridge designed to transverse BNSF tracks.
6. Staff is proposing Condition of Certification **TRANS-2**, which requires that the applicant to develop a traffic control plan to be developed and implemented prior to earth-moving activities. This plan is to be coordinated with BNSF Railway, San Bernardino County; and California Department of Transportation, District 8 Office.
7. Staff is proposing Condition of Certification **TRANS-3** to ensure the applicant complies with all size and weight limitations proposed by San Bernardino County.
8. Staff is proposing Condition of Certification **TRANS-4** to ensure applicant complies with Caltrans requirements for encroachment on rights-of-way.

9. Staff is proposing Condition of Certification **TRANS-5** to ensure that the applicant restores to its original or better condition all public roads that may be damaged during the construction of the project.
10. Staff is proposing Condition of Certification **TRANS-6** to ensure applicant complies with all relevant state, county, and local regulations on the transportation, handling, and disposal of hazardous materials.
11. Staff is proposing Condition of Certification **TRANS-7** to ensure that glare from SunCatcher mirrors located near Hector Road, Interstate 40; Route 66; and BNSF Railway right-of-way is reduced to less than significant levels and that the SunCatcher mirrors do not interfere with the railroad engineers' ability to correctly see and respond to signal lights.

C.11.16 REFERENCES

Burch, Cynthia, Partner, Katten Muchin Rosenman, LLP, "Calico Solar Project Comments," July 16, 2010, e-mail.

Bureau of Land Management California. Renewable Energy. <http://www.blm.gov/ca/st/en/prog/energy/solar.html> Accessed November 2009.

California Energy Commission Power Plant Siting Website < http://www.energy.ca.gov/sitingcases/alphabetical.html> Accessed November 2009.

CSA 2010a – County of San Bernardino Department of Public Works/J. Babico (tn 55052). County of San Bernardino's Comments Regarding Traffic and Transportation for the Proposed Project, dated January 11, 2010. Submitted to CEC/Docket Unit on January 27, 2010.

DOT 2010A – California Department of Transportation/D. Kopulsky (tn 55376). Department of Transportation's Comments on Proposed Project, dated February 9, 2010. Submitted to CEC/Docket Unit on February 12, 2010.

Jackson 2008a – Intervener/P. Jackson (tn 49436). Comments from Patrick Jackson Regarding Access to Public and Private Lands dated December 13, 2008. Submitted to CEC/Docket Unit on December 17, 2008.

Jackson 2009a – Intervener/P. Jackson (tn 52181). Petition to Intervene by Patrick Jackson, dated June 27, 2009. Submitted to CEC/Docket Unit on June 29, 2009.

Jackson 2009b – Intervener/P. Jackson (tn 52929). Letter from Patrick Jackson Regarding Hector Road, dated August 23, 2009. Submitted to CEC/Docket Unit on August 24, 2009.

Jackson 2009c – Intervener/P. Jackson (tn 53144). Letter to J. Stobaugh and R. Rotte of the Bureau of Land Management Regarding Hector Road, dated September 5, 2009. Submitted to CEC/Docket Unit on September 8, 2009.

Jackson 2009d – Intervener/P. Jackson (tn 53851). Letter to J. Stobaugh and R. Botte of the Bureau of Land Management Regarding Hector Road, dated October 25, 2009. Submitted to CEC/Docket Unit on October 26, 2009.

Jackson 2009e – Intervener/P. Jackson (tn 53849). Patrick Jackson's Status Report #1, dated October 25, 2009. Submitted to CEC/Docket Unit on October 26, 2009.

Jackson 2009f – Intervener/P. Jackson (tn 54518) Patrick Jackson's Status Report #2, dated December 19, 2009. Submitted to CEC/Docket Unit on December 21, 2009.

Jackson 2010a – Intervener/P. Jackson (tn 54906). Patrick Jackson's Status Report #3, dated January 14, 2020. Submitted to CEC/Docket Unit on January 15, 2010.

Jackson 2010b – Intervener/P. Jackson (tn 55399). Patrick Jackson's Status Report #4, dated February 13, 2010. Submitted to CEC/Docket Unit on February 16, 2010.

Jackson 2010c – Intervenor/P. Jackson (tn 55876). Patrick Jackson Status Report #5, dated March 13, 2010. Submitted to CEC/Docket Unit on March 15, 2010.

Schnell, Joseph, Manager, Special Projects, BNSF Railway, letter dated July 29, 2010, "BNSF Comments Regarding Prehearing Conference and for Consideration at Evidentiary Hearing."

West-wide Energy Corridor Programmatic EIS Information Center. <http://corridoreis.anl.gov/> Accessed November 2009.

APPENDIX A

DAYTIME INTRUSIVE BRIGHTNESS ANALYSIS FOR STIRLING ENGINE SOLAR ENERGY SYSTEMS

James Jewell, LC, IES; Alan Lindsley, AIA, IESNA, LEED GA; & Clifford Ho, Sandia National Laboratories[1]

INTRODUCTION

California is being asked to approve and accept a significant number of solar energy electricity generating plants. The capture and redirection of insolation has the potential for important impacts on transportation systems and facility workers. These impacts may be actinic or visual. The different styles of facilities can be broken into four types: linear troughs, Stirling engine, photovoltaic flat panels and focused power tower systems. The Calico Solar Project utilizes approximately 34,000 SunCatcher units (Stirling engine technology) to generate thermal-rotary power.

PROJECT DESCRIPTION

The Calico Solar Project is located in an undeveloped area of San Bernardino County, California approximately 37 miles east of Barstow, California and north of Interstate 40 (I-40) between approximately 1,925 to 3,050 feet above mean sea level. The project is located primarily on Bureau of Land Management (BLM). The area where the Project would be constructed is primarily open, undeveloped land within the Mojave Desert. The Cady Mountain Wilderness Study Area (WSA) is located north of the Calico site. The Pisgah Crater, within the BLM-designated Pisgah area of Critical Environmental Concern (ACEC), is located south and east of the Project (south of I-40 by several miles). Several underground and above ground utilities traverse the area, primarily along the east side of the project area.

Adjacent land uses include the Pisgah Substation located along the southeastern border of the project site, as well as a small number of rural residences. The nearest residence is located approximately 2 miles to the east of the project site. Five to seven miles to the west of the site there are some scattered residences with obstructed and partial views of the project site. Although few people live in the local area, the majority of viewers are anticipated to be travelers commuting to and from larger urban centers or to local industrial facilities.

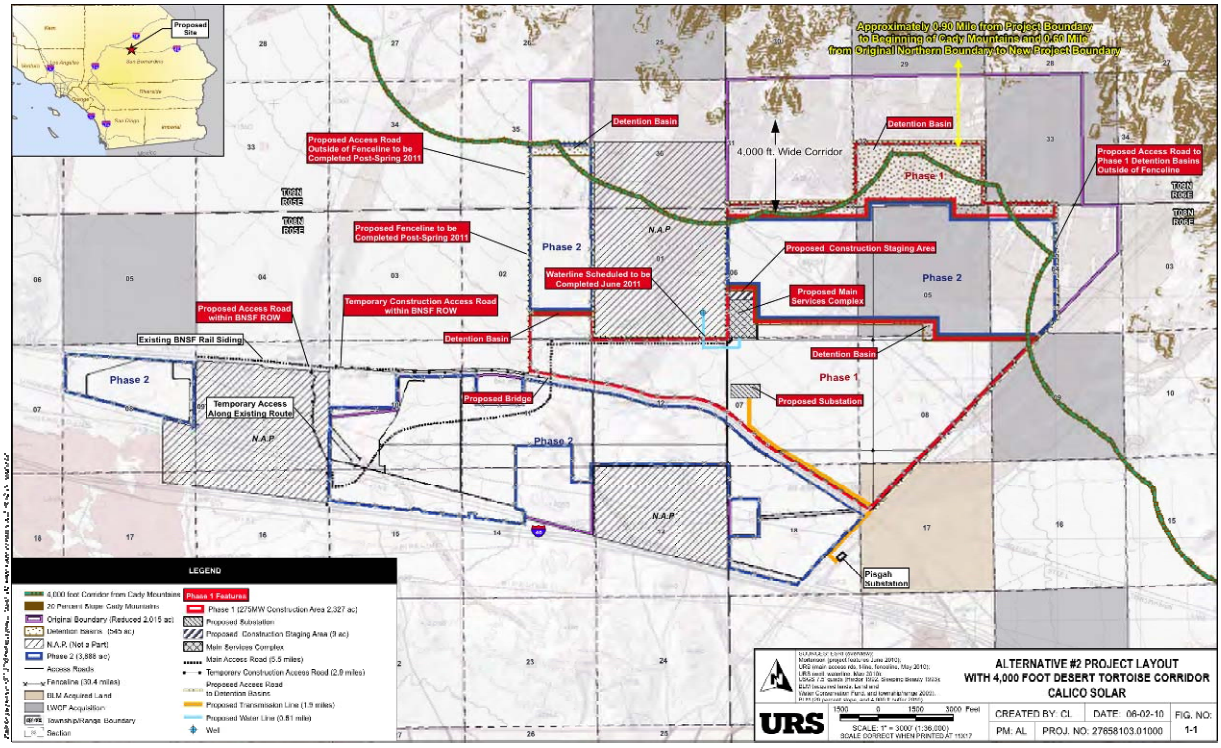
A Burlington Northern Santa Fe Railway (BNSF) runs between Phase I (to the north) and Phase II (to the south) of the proposed installation (see Exhibit 1). The railroad right-of-way (ROW) is adjacent to the southern boundary (fence line) of Phase I for approximately 2.8 miles. For Phase 2, the railroad ROW is adjacent to the northern

[1] Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

boundary (fence line) of the Project area for approximately 3.5 miles.

I-40 runs to the south of Phase II from east to west. For approximately 2.1 miles, the southern boundary (fence line) of Phase II ranges between approximately 120 to 260 feet north of Interstate 40.

Exhibit 1 – Project Location



STIRLING ENGINE CHARACTERISTICS

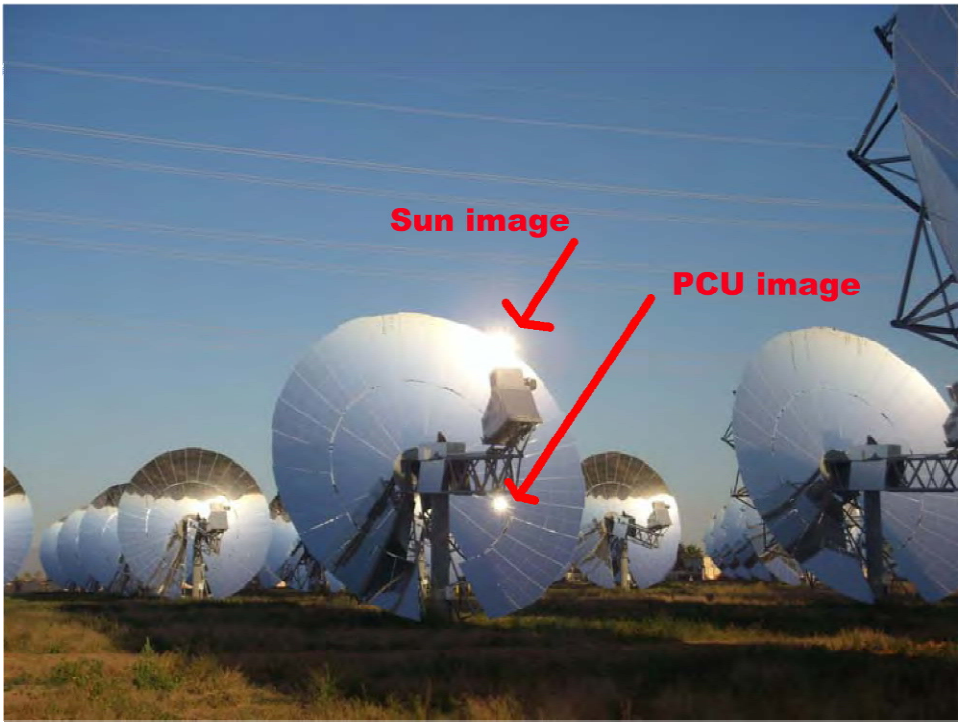
Each SunCatcher device consists of a power conversion unit (PCU) and a mirrored-surface dish assembly operating as a solar concentrator that automatically tracks the sun. The dish assembly (±40 feet high) collects and focuses solar energy onto the PCU to generate electricity. Each PCU consists of a solar receiver heat exchanger and a closed-cycle, high-efficiency Solar Stirling Engine specifically designed to convert solar power to rotary power via a thermal conversion process. The collection system will combine the output from multiple groups of SunCatchers and connect each 1.5 MW group to a generator step-up unit (GSU) transformer. Power is then transferred to the independent grid.

The SunCatcher is a parabolic dish that tilts in elevation and rotates in azimuth to track the sun. The SunCatcher mirrors focus the reflected sunlight on a single point 22 feet from the dish surface. The PCU is located at that focal point and absorbs the reflected

solar energy to power the Stirling engine. As a result of the intensity of this solar energy, the face of the PCU can be observed from some viewpoints as a very bright object (see Exhibit 2).

Photograph #5
Date: 04/06/10

Comments:
Maricopa Solar Site



Photograph #6
Date: 04/06/10

Comments:
Maricopa Solar Site

Exhibit 2 – Solar Reflection Examples

There are two basic operating conditions for the SunCatcher system: tracking and off-axis positions:

Tracking Position – This is the normal operating position of a SunCatcher, which occurs approximately 30 minutes after sunrise and continues throughout the day until sunset. In this position, the center of the parabolic mirror is directly in line with the PCU and the

sun (see Exhibit 2, Photograph #5). An observable halo of light is visible around the PCU. Up to 5% of the visible light reflected by the SunCatcher may spill outside of the receiver aperture (95% of the reflected sunlight enters the aperture). However, much of this spillage would be intercepted by the rest of the PCU, which extends several feet around the aperture opening. Only a small percentage (of the 5% spillage) gets past the PCU. Of that amount, only a small fraction is actually pointed in the direction of the observer. The rest is spilled in many directions that cannot be seen by the observer. As a result, the halo of light around the PCU is not expected to have a significant impact on any observers beyond 223 ft.

Off-axis Positions – Off-axis includes all positions where the back of the mirror is not aligned with the PCU and the sun (see Exhibit 2, Photograph #6). In off-axis positions, the focal point of energy is shifted away from the PCU. The following is a description of these conditions.

1. Night-Stow to Operation Transition – A SunCatcher moves from night stow position to a tracking position at sun-up and back into night-stow position after sundown. In the morning, the SunCatcher rotates approximately 270 degrees counter-clockwise from a north-facing azimuth to a 10 degree offset track position. The rotation may take up to 5 minutes. It stays in this offset tracking position until the light level is sufficient to generate power (up to 30 minutes). From offset tracking position to tracking position takes approximately 10 seconds.
2. Wind Stow – During high winds a SunCatcher will cease operations and move into a position with the PCU pointed skyward. It takes up to five minutes for SunCatchers to transition into the wind stow position, depending on initial position.
3. Offset Tracking (Cloud Cover) – When the sun is blocked by a cloud, the SunCatcher will move into a 10 degree offset tracking position (PCU pointed above the sun). The 10 degree offset track is required to protect equipment and bring the PCU back on-line gradually after the cloud has passed. The SunCatcher may stay in an offset track position for up to 30 minutes waiting for the PCU to come on-line. Once the PCU is on-line, it takes approximately 10 seconds to transition from offset tracking to tracking position.
4. Malfunction – A malfunction or fault is a rare occurrence. In most cases, the SunCatcher detects the fault, immediately moves into a wind stow position, and remains offline until maintenance is performed. In very rare cases, a SunCatcher may malfunction and hold a static position. A SunCatcher unable to move into wind stow position is either manually moved or repaired within one hour.

ANALYSIS & CONCLUSIONS

CRITERIA FOR EVALUATION

Total solar energy is the complete spectrum of sunlight including ultra violet energy

(UV), the visible spectrum, and infrared energy (IR). It is this total solar irradiation that has the potential to create a human safety impact by causing erythemal or ocular damage. Total solar energy is evaluated in units of power such as kilowatts per square meter (kW/m²).

Glare is defined as difficulty seeing in the presence of bright light such as reflected sunlight. Glare is caused by a substantial ratio of luminance (brightness) between a field of view and an intrusive light source. Glint is defined as a momentary flash of intrusive light or brightness. Please refer to Appendix I of this report for a glossary of lighting terms.

There are currently no regulations specific to light reflected from solar plants. However, potential safety effects of solar radiation have been analyzed within the context of principles and procedures developed for beam safety in the Solar 1 experimental plant at Daggett, California, as conducted by the Sandia National Laboratories (Sandia Report SAND83-8035 by T. D. Brumleve). The Sandia Report identified maximum permissible exposure (MPE) limits for reflected sunlight to minimize the potential for permanent eye damage (i.e., retinal burn).

Temporary flash blindness is caused by excessive light exposure that saturates the retinal pigments, causing a visual image of the glint or glare to remain temporarily after the intrusive light exposure. Impacting variables may include, but not be limited to: individual filtering ability of the preretinal ocular media, background illuminance adaptation, age, eye disease and corrective corneal surgery (radial keratotomy or RK). Veiling reflections are caused by a reflection that, when perceived by the human eye, deceases visual acuity to either side of the reflection and progressively gets better as one moves the eye away from the intrusive light source.

Sandia National Laboratories has developed models of glare from concentrating solar collectors. They examine the impact of retinal irradiance vs. the subtended angle based upon the distance of the observer from the source. Ho et al. (2010) state, “If the retinal irradiance is sufficiently large for a given subtended source angle, permanent eye damage from retinal burn may occur. Note that as the subtended source angle increases, the safe retinal irradiance threshold decreases because of the increased size of the retinal image area, and, hence, increased energy applied to the retina.” See Exhibit 3 as an example of the potential impacts of retinal irradiance as a function of subtended source angle for 0.15 second exposure (typical blink reflex). Additional metrics are also provided that describe the potential for temporary after-image, which can occur at retinal irradiances (or subtended angles) that are much lower than that which causes retinal burn.

In this assessment, the potential ocular impacts of glint and glare can be categorized as follows:

- **Permanent Eye Damage or Retinal Burn**: For the SunCatchers evaluated in this study, there is minimal risk of permanent eye damage to individuals unless they are within several meters of the focal length (between ~4 - 10 m) of the SunCatchers.

- **Temporary Flash Blindness (After-Image)**: Within 223 feet of the SunCatchers, there is a strong potential for temporary after-image effects (see following calculation).

- **Veiling Reflections and/or Distracting Glare**: Beyond the distance that may cause temporary flash blindness, intrusive light may cause nuisance distractions or veil other objects (e.g., signal indicators for train operators) in the visual field.

Exhibit 3 – Example of Retinal Irradiance Calculation (Ho et al. (2010))

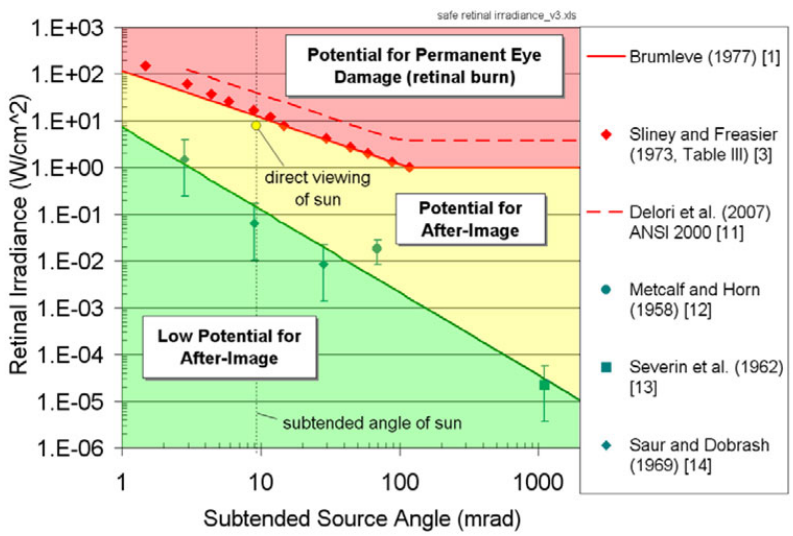


Figure 1. Potential impacts of retinal irradiance as a function of subtended source angle for 0.15 s exposure (typical blink response time). Data for irreversible eye damage is from [1], [10], and [11]. Data for temporary flash blindness (after-image) is from [12], [13], and [14].

The equations provided in Ho et al. (2010) can be used to determine the maximum distance from the SunCatcher at which temporary flash blindness is likely to occur. The equations use the diameter (11.5 m) and focal length (6.7 m) of the parabolic dish collector, which are taken from Figure 7 of the Calico Solar Project Staff Assessment and Draft Environmental Impact Statement Visual Resources section (CEC 2010). In addition, the mirror facets are assumed to have a reflectivity of 0.94 with an RMS slope error of 1 mrad. The sun shape is assumed to be 9.4 mrad. The retinal irradiance is first determined using the equations in Ho et al. (2010) assuming a direct normal insolation of 1000 W/m^2 and ocular parameters recommended in the paper (pupil diameter = 2 mm, transmission coefficient = 0.5, eye focal length = 17 mm).

Based on the calculated retinal irradiance value, which does not change with distance since the retinal image size decreases at the same rate as the corneal irradiance with increasing distance (assuming no atmospheric attenuation), the maximum distance between the collector and an observer that has a strong potential for causing temporary flash blindness can be determined. For the parameters listed above, this distance is

found to be 68 m (223 feet). Beyond this distance, temporary flash blindness is less likely to occur.

GLARE SAFETY CONCERNS/SIGNIFICANCE THRESHOLDS

Once operating, the proposed project will require special consideration to any worker, interstate highways, secondary roads, or railroad ROW adjacent to the Project where the mirrors may present exposure to intrusive brightness. A number of SunCatcher operating conditions can occur:

- Tracking Position (normal)
- Off-axis Positions
    - Night Stow
    - Wind Stow
    - Offset Tracking (cloud cover)
    - Malfunction

Of these conditions, the offset tracking (cloud cover) position have the greatest potential to generate glare impacts to adjacent receptors. During proposed Project operation, when switching from offset tracking to on-axis tracking positions, the SunCatchers have the greatest potential for glare. Based on the Criteria for Evaluation and Technical Reports Completed/Evaluated (as discussed above), for purposes of this analysis it is determined that significant glare impacts (temporary flash blindness) would occur to any receptor within 223 feet of any SunCatcher unit. This threshold is utilized during both Phase I and full buildout (Phase II) operations.

TRAIN OPERATIONS

An existing double-track railroad line currently operates through the Project site. The railroad is owned by BNSF Railway. During both Phase I and Phase II operations of the Calico Solar project, the potential for significant glare impacts to the BNSF Railway operators would occur as SunCatcher units may be located within 223 feet of the BNSF ROW. To reduce the potential for temporary flash blindness impacts, recommended measure #1 (as described below) is suggested to ensure that no SunCatcher unit be located within 223 feet of the existing BNSF ROW.

During normal and offset tracking positions, as observers move past the SunCatchers a “flashing” will occur as the reflective image transfers from one unit to the next. This exposure will continue for approximately three miles along the ROW on both the north (2.8 miles) and south (3.5 miles) sides of the ROW. The introduction of these types of solar facilities will add visual distractions and daytime intrusive light to the visual terrain where none have existed previously.

The rapid movement of trains passing through the solar field and the human instinct to avoid such brightnesses in the field of vision should reduce these impacts. First surface reflection from train windows as well as the index of refraction of the windows will diminish the impact of high brightnesses and contrasts.

To reduce the extent of these extending veiling reflections and/or distracting glare impacts, recommended measure #2 (as described below) is suggested and includes a

number of technical specifications and operating procedures to reduce the veiling reflections and/or distracting glare associated with Project operation.

ROADWAYS

The potential impact of the redirected sunlight on observers such as motorists on adjacent roadways is a matter of great concern. The following describes general characteristics of roadways adjacent to the proposed Project with the potential to be impacted by glare.

- **Hector Road**. This local roadway is a north-south local road that currently serves as the primary access to the Project site. It starts at Historic Route 66 just south of the I-40 interchange and continues north entering the Project site. The existing ADT near the vicinity of the Project site is 31 vehicles per day.
- **Interstate 40 (I-40)**. This freeway runs east-west and is located approximately 120 to 260 feet south of the Project site. The segment of I-40 near the Project site has four through lanes (two through lanes in each direction) with 6 feet of shoulder on both sides and a wide center median. The speed limit along this segment is posted at 70 miles per hour (mph), with existing average daily traffic (ADT) of 15,600 vehicles per day.
- **National Trails Highway (Historic Route 66)**. This roadway is an east-west two-lane highway located approximately 300 feet south of the Project site and running parallel to I-40. The existing ADT near the vicinity of the project site is 28 vehicles per day.

As indicated above, both Phase I and Phase II of the proposed project would have the potential to result in temporary flash blindness to motorists traveling on Hector Road because the applicant has proposed locating SunCatcher units along the roadway. To reduce the potential for temporary flash blindness impacts on Hector Road, recommended measure #1 (as described below) is suggested to ensure that no SunCatcher unit be located within 223 feet of an existing public roadway ROW.

Phase Two of the installation will result in extending veiling reflections and/or distracting glare to the I-40 highway corridor and Historic Route 66 in a manner similar to those impacts expected to occur along the BNSF ROW. The exposure to motorists will be approximately 2.1 miles long and visible to the north. As the observer moves past the SunCatchers, a “flashing” will occur as the reflective image transfers from one unit to the next. To reduce the extent of these extending veiling reflections and/or distracting glare impacts, recommended measure #2 (as described below) is suggested and includes a number of technical specifications and operating procedures to reduce the veiling reflections and/or distracting glare associated with Project operation to help ensure that passengers and drivers along those roadways in the vicinity of the project will be less likely to experience temporary flash blindness.

CONSTRUCTION AND OPERATION WORKERS

At any distance less than 223 feet from the SunCatcher units, construction and operational workers will experience hazardous levels of irradiance. This means the potential for ocular hazards are more likely to occur. In addition, at distances closer to the SunCatcher (within ~10 – 15 m), hazardous impacts to the skin may occur. Both construction and operational workers risk the exposure of active SunCatcher units within these distances during both Phase I and Phase II operations. To reduce the extent of skin and ocular impacts, recommended measure #3 (as described below) is suggested and includes requiring all workers who enter the field of SunCatchers wear proper protective eyewear and clothing.

PEDESTRIAN SAFETY

Public pedestrian circulation networks are mainly associated with existing roads that have sidewalks. In the absence of curbs, gutters, or sidewalks, pedestrian circulation and local foot traffic generally use the ROW easements along the edges of paved streets. The traffic and circulation review found no pedestrian activity within the immediate vicinity of the Project site. Additionally, perimeter security fencing and access gates will be provided for the Project site further deterring pedestrian activity near the Project and eliminate pedestrian activity within the field of SunCatchers.

AVIATION SAFETY

The following lists airports identified near the Project site, and includes their approximate distances in relation to it:

- Barstow-Dagget Municipal Airport (DAG) – approximately 19 miles west of the Project Site,
- Twentynine Palms EAF Airport (NXP) – approximately 32 miles southeast of the Project Site, and
- Bicycle Lake Army Airfield (BYS) – approximately 34 miles northwest of the Project Site.

Based on the distances of these airports, it is assumed that aircraft approaching or departing from these facilities would be at an elevation exceeding potential glare associated with proposed Project operation.

RECOMMENDED MEASURES

Best practices for reducing the potential impacts of intrusive light is to prevent the intrusive light from occurring (#1), then apply physical set backs to protect the populance when intrusive light does occur (#2 & #3)

#1. During the normal tracking and offset tracking positions, the project operator shall adhere to the following procedures and specifications:

a. Modify the offset tracking procedure to use a 25-degree offset instead of the proposed 10-degree offset.
b. Ensure the morning stow position-to-offset position transitions occur at least 30 minutes before sunrise and end in the 25 percent offset tracking position
c. The “Night Stow” should occur 30 minutes after sunset to avoid any intrusive light effects; and
d. Develop and implement an emergency glare response program that includes all of the following:

- a monitoring plan that 1) makes use of video surveillance trucks to identify and document intrusive light conditions, covering all hours of operation on a weekly basis for five years; and 2) also monitors the status of individual SunCatchers during all hours of operation to immediately identify any malfunctioning units with the potential to create glare within the BNSF Railway right-of-way or on I-40, Route 66 or Hector Road;
- procedures that allow motorists and train operators to report to the project owner, as well as to Caltrans, CHP and the County of San Bernardino in the case of complaints from motorists, any problems with glint or glare resulting from the operation or malfunction of SunCatchers. The procedures developed by the applicant for public reporting of glare problems shall be developed in consultation with BNSF Railway, California Department of Transportation (Caltrans) District 8 office, California Highway Patrol (CHP), and the County of San Bernardino. These procedures shall include a toll-free number for reporting problems as well as a process for written notification to the project owner and to Caltrans, CHP, and the County of San Bernardino, in the case of complaints from motorists, or to BNSF Railway, in the case of complaints from train operators;
- procedures for the immediate repositioning of any malfunctioning units to avoid potential glare within the BNSF Railway right-of-way or on I-40, Route 66 or Hector Road, and to immediately investigate and resolve complaints received from train operators or motorists;
- a process for evaluating intrusive light conditions identified by the video surveillance and determining, in consultation with the CPM, what operational or other changes may be warranted to reduce or eliminate the identified intrusion;
- a procedure for documenting instances when malfunctioning units with the potential to create glare are identified, or when train operators or motorists complain of glare, and the actions taken in response to those instances or complaints; and
- periodic reports to the Project CPM detailing instances of SunCatcher malfunction, public complaints about glare, or video-detected problems that are covered by the emergency glare response program.

#2. The project owner shall ensure that the minimum distance from any SunCatcher reflector assembly to the BNSF ROW or any public roadway ROW shall be a minimum of 223 feet to reduce the possibility of temporary flash blindness.

#3. The SunCatchers shall be rotated away from the sun to cool before any maintenance work is performed. Additionally, if the potential for severe intrusive light is a possibility, workers who enter the field of SunCatchers shall be protected against the reflected solar energy.

RECOMMENDED VERIFICATION

At least 60 days before the first SunCatchers are tested or operated, the project owner shall give the CPM, for the CPM's review and approval, a copy of the project owner's draft emergency glare response program.

Beginning no more than 30 days after the first SunCatchers are tested or operated and continuing for the duration of project operations, the project owner shall provide the CPM a monthly report that includes the date, time, location, response, and response time of any malfunction, public complaint, or video detection covered by the emergency glare response program, and any determinations made by the project owner as to cause of the problem. A copy of these reports shall be kept by the project owner for at least five years.

REFERENCES

Mark S. Rea, Ph.D., FIES, Editor-in-Chief; *The IESNA Lighting Handbook, Ninth Edition*. New York, NY: Illuminating Engineering Society of North America, 2000.

The Standard Practice Subcommittee of the IESNA Roadway Lighting Committee. "ANSI/ IESNA RP-8-00." American National Standard Practice for Roadway Lighting. ANSI Approval Date 6/27/00.

CEC (2010). California Energy Commission Calico Solar Project Staff Assessment and Draft Environmental Impact Statement and Draft California Desert Conservation Area Plan Amendment. Published March 30.

Clifford K. Ho, Cheryl M. Ghanbari, and Richard B. Diver; *Hazard Analyses Of Glint and Glare From Concentrating Solar Power Plants*. SolarPACES 2009 Berlin, Germany.

C.K. Ho, C.M. Ghanbari, and R.B. Diver, 2010, Methodology to Assess Potential Glare Hazards from Concentrating Solar Power Plants: Analytical Models and Experimental Validation, ES2010-90053, in proceedings of the ASME 2010 4th International Conference on Energy Sustainability, Phoenix, AZ, May 17-22, 2010.

Brumleve, T.D. (1977). *Eye Hazard and Glint Evaluation for the 5-MWt Solar Thermal Test Facility*, SAND76-8022, Sandia National Laboratories, Livermore, CA.

Brumleve, T.D. (1984). *10 MWe Solar Thermal Central Receiver Pilot Plant: Beam Safety Tests and Analyses*, SAND83-8035, Sandia National Laboratories, Livermore, CA.

Clifford Ho, email correspondence; 21 Jun 2010 13:59:52 -0700

Power Engineers Report (26 Apr 10). *Tessera Solar Calico Valley Solar Project Glint*

and Glare Study.

Definitions Related to Daytime Intrusive Light

Actinic Effect- photochemical reactions through having exposure to a significant short wavelength or ultraviolet light component.

Candela- the SI unit of luminous intensity; equal to one lumen per steradian.

Diffuse Reflection- if a reflecting surface is rough, it spreads the outgoing ray in all directions according to the cosine law.

Disability Glare- the effect of intrusive light in the eye whereby visibility and visual performance are reduced.

Discomfort Glare- glare that produces discomfort but does not interfere with visual performance.

Erythema- reddening of the skin as a result of an irritation caused by exposure to high levels of solar flux; in the case of daylight flux, ultra violet light (UV) is the most dangerous.

Glare- the sensation produced by a point luminance within the visual field that is sufficiently greater than the luminance to which the eyes are adapted, which causes annoyance, discomfort, or loss of visual performance and visibility.

Insolation- the solar electromagnetic radiation measured at a given location on Earth with a surface element perpendicular to the Sun's rays.

Intrusive (obtrusive) Light- Light that produces sky glow, light trespass, glare or other undesirable environmental impacts.

Lumen- SI unit for luminous flux.

Luminance- perceived brightness created by luminous flux reflecting off objects in the visual environment (candela per square meter or cd/m^2).

Luminous Flux- the measure of the perceived power of light. It differs from radiant flux, the measure of the total power of light emitted, in that luminous flux is adjusted to reflect the varying sensitivity of the human eye to different wavelengths of light.

Nuisance or Distracting Glare- intrusive light impacting the observers eye (s) in a manner creating a visual distraction in the field of view.

Point Source- a source of radiation whose dimensions are sufficiently small, compared with the distance between the source and the irradiated surface, that these dimensions can be neglected in calculations and measurements, e.g.. the Sun.

Specular Reflection- if a reflecting surface is smooth or mirror-like, the light from a single incoming direction (a ray) is reflected into a single outgoing direction.

Spread Reflection or Mixed Reflection- if a reflecting surface is not smooth, it spreads parallel rays into a cone of reflected rays with large irregularities.

Veiling Reflection- a specular reflection that when perceived by the human eye deceases visual acuity to either side of the specular reflection and progressively gets better as one moves the eye away from the intrusive light source.

F. LIST OF PREPARERS

CALICO SOLAR PROJECT
08-AFC-13
LIST OF PREPARERS

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Cultural Resources..... Sarah Allred, Michael McGuirt, and Kathleen Forrest

Traffic and Transportation ..... Marie McLean, James Jewell; and Alan Lindsley

Project Assistant ..... Sabrina Savala

G. WITNESS QUALIFICATIONS AND DECLARATIONS

CHRISTOPHER MEYER

Senior Associate,
Energy and Infrastructure/Cultural Resources

ACADEMIC BACKGROUND

B.A., Biological Anthropology/Archaeology
California State University, Hayward, 1993

PROFESSIONAL EXPERIENCE

Mr. Meyer's has over thirteen years with Aspen in support of CEQA/NEPA projects including EIR/EIS, IS/MND, and EA. His background combines strong experience in environmental inspection, compliance management, and project management on large-scale construction projects with a solid background in archaeological field investigations. With over 18 years experience as an archaeologist, Mr. Meyer is familiar with the cultural settings of California and Oregon and the regulatory requirements for cultural resource management under CEQA/NEPA. He has worked closely with construction contractors, agency representatives, and Native American tribal governments to ensure projects are built on time, within budget, and in compliance with all environmental requirements. In addition to field experience, he has worked as a project manager, produced reports, document, and permit applications, and has reviewed mitigation measures for federal, State, and local government agencies as well as corporations.

Aspen Environmental Group — 1997 to present

California Energy Commission (CEC), Technical Assistance in Application for Certification Review, Siting Project Manager. In response to California's power shortage, Aspen is assisting the CEC in evaluating the environmental and engineering aspects of new power plant applications throughout the State. As part of this effort, Mr. Meyer serves as a Project Manager and supervises technical staff members, preparing the CEC's CEQA-equivalent Preliminary Staff Assessments and Final Staff Assessments in response to applications for the construction of new power plants across the State. Responsibilities include: review of applications for new power plants; identifying potential issues with proposed power plants; preparation of conditions of certification for proposed power plants; review and editing of CEC technical staff's analysis, scheduling and coordinating public workshops; tracking status of permitting process; coordinating with affected agencies to resolve potential concerns; detailed reporting; conflict resolution; and preparing briefings for the CEC Siting Committee.

California Energy Commission (CEC), Technical Assistance in Application for Certification Review, Compliance Project Manager. In response to California's power shortage, Aspen is assisting the CEC in evaluating the environmental and engineering aspects of new power plant applications throughout the State. As part of this effort, Mr. Meyer served as a Compliance Project Manager and supervised technical staff members, preparing the CEC's Conditions of Certification for construction of power plants across the State as well as managing on-going operational issues with power plants currently under license with the CEC. Responsibilities included: preparation of amendments to conditions of certification for existing power plants; review of applications for new power plants; drafting of Memoranda of Understanding with Chief Building Officials; coordinating with affected agencies to resolve concerns with potential impacts to cultural resources or threatened or endangered species; maintaining contractor construction milestones, detailed reporting; development of mitigation measures; conflict resolution; and inspection for compliance with the Conditions of Certification.

MARIE McLEAN

QUALIFICATIONS SUMMARY

Twenty years experience in the field of environmental research, analysis, and planning, with specific emphasis on the economics of water, energy, and land use and its social, visual, and cultural ramifications. Specific projects involved (1) assessing economic costs and benefits of water delivery contracts and energy sales; (2) conducting and presenting visual analyses of historic and other local, state, and federal resources; (3) preparing local, state, and federal resource assessment forms; (4) determining and communicating benefits and costs of proposed development projects (housing, energy, and water) on the social and economic life of communities in which they are located; and (5) as member of local design review, historic preservation, and housing boards, recommended programs and policies and monitored their implementation.

RECENT PROFESSIONAL EXPERIENCE

California Energy Commission, Planner II, Environmental Office-Facilities Siting, January 2008—present.

Conduct technical analyses for complex facility siting cases and planning studies in the area of socioeconomics and visual resources.

Electricity Oversight Board; June 1, 2007—December 31, 2008.

Developed, conducted, and presented economic studies on energy markets and transmission projects; California Independent System Operator (CAISO) market redesign and technology upgrade program; and investigated, analyzed, and reported the effects of existing and proposed energy programs on supply, demand, and rates.

California Department of Water Resources, State Water Project Analysis Office, June 2001—July 31, 2007.

Developed and implemented complex analyses of the social, economic, and financial ramifications of contracted and proposed water deliveries and transfers and changes to valuation methods for selling energy in deregulated markets. Researched, identified, and reported on market activities in energy and water and their economic effects on ratepayers.

EDUCATION

Bachelor of Arts, Economics, California State University, Sacramento, 1983

SDG&E Miguel-Mission 230 kV #2 Project Construction Monitoring and Supplemental Environmental Review Program, Lead Environmental Monitor. Under contract to the California Public Utilities Commission (CPUC), Mr. Meyer served as Lead Environmental Monitor and supervised one environmental monitor in the field, monitoring the implementation of the CPUC environmental impact report's conditions of approval for construction of the overhead 230 kV electric transmission line and substations upgrades. The project included installing a new 230 kV circuit on existing towers along the 35-mile right-of-way, as well as relocating 69 kV and 138 kV circuits on approximately 80 steel pole structures. In addition, the Miguel Substation and Mission Substation was modified to accommodate the new 230 kV transmission circuit. Responsibilities included: supervision, guidance and development of environmental monitors in field monitoring as well as the compliance review of pre-construction plans and mitigation compliance documentation, review of variance requests and temporary extra work space (TEWS) requests; recommendations for CPUC issuance of Notices to Proceed with construction and variance approvals; approval of TEWS requests; and coordination with SDG&E, construction managers and subcontractors, and landowners, local municipalities, affected and interested agencies and the public.

SCE Viejo Systems Project Construction Monitoring and Supplemental Environmental Review Program, Lead Environmental Monitor. Under contract to the California Public Utilities Commission (CPUC), Mr. Meyer served as Lead Environmental Monitor and supervises one environmental monitor in the field, monitoring the implementation of the CPUC negative declaration's conditions of approval for construction of the overhead 66 kV and 220 kV electric transmission lines and substation upgrades and construction. This Southern California Edison (SCE) project involves the installation of a 220/66/12 kV substation and 3.1-mile 66 kV transmission line in southern Orange County, California. The transmission line will traverse residential and recreational areas in the City of Mission Viejo and the substation is located in a business park adjacent to a wilderness area in the City of Lake Forest. Responsibilities include: supervision, guidance and development of environmental monitors in field monitoring as well as the compliance review of pre-construction plans and mitigation compliance documentation, review of variance requests and temporary extra work space (TEWS) requests; recommendations for CPUC issuance of Notices to Proceed with construction and variance approvals; approval of TEWS requests; and coordination with SDG&E, construction managers and subcontractors, and landowners, local municipalities, affected and interested agencies and the public.

PG&E Tri-Valley 2002 Capacity Increase Project Construction Monitoring and Supplemental Environmental Review Program, Lead Environmental Monitor. Under contract to the California Public Utilities Commission (CPUC), Mr. Meyer serves as Lead Environmental Monitor and supervises two environmental monitors in the field, monitoring the implementation of the CPUC environmental impact report's conditions of approval for construction of this combination overhead and underground 230 kV electric transmission lines and substations. Construction involves underground installation of the double-circuit 230 kV transmission line conduit and construction of a substation and several transition stations as three separate phases. Responsibilities include: supervision, guidance and development of environmental monitors in field monitoring as well as the compliance review of pre-construction plans and mitigation compliance documentation, variance requests and temporary extra work space (TEWS) requests; recommendations for CPUC issuance of Notices to Proceed with construction and variance approvals; approval of TEWS requests; and coordination with PG&E, construction managers and subcontractors, and landowners, local municipalities, affected and interested agencies and the public.

PG&E Jefferson-Martin 230 kV Transmission Line Project, Lead Environmental Monitor. Under contract to CPUC, Mr. Meyer served as Lead Environmental Monitor and supervised two environmental monitors in the field, monitoring the implementation of the CPUC compliance, and reporting program for the PG&E Jefferson-Martin Project. This project involved the installation of a 27-mile 230 kV transmission line through scenic San Mateo County in the Highway 280 corridor, urban Colma and Daly City, and across San Bruno Mountain. Responsibilities included: supervision,

guidance and development of environmental monitors in field monitoring as well as the compliance review of pre-construction plans and mitigation compliance documentation, variance requests and temporary extra work space (TEWS) requests; recommendations for CPUC issuance of Notices to Proceed with construction and variance approvals; approval of TEWS requests; and coordination with PG&E, construction managers and subcontractors, and landowners, local municipalities, affected and interested agencies and the public.

California Energy Commission Emergency Siting Team, Power Plant Development, Compliance Project Manager. Under contract to the California Energy Commission (CEC), Mr. Meyer served as a Compliance Project Manager and supervised technical staff members, preparing the CEC's Conditions of Certification for construction of emergency power plants across the State. Responsibilities included: review of applications for new emergency power plants; drafting of Memoranda of Understanding with Chief Building Officials; coordinating with affected agencies to resolve concerns with potential impacts to cultural resources or threatened or endangered species; maintaining contractor construction milestones, detailed reporting; development of mitigation measures; conflict resolution; and inspection for compliance with the Conditions of Certification.

California Energy Commission Coastal Power Plant Study, Archaeologist. This research study undertaken by the California Energy Commission (CEC) examined the engineering and environmental issues associated with 24 coastal power plants. The purpose of the study was to identify, describe, and analyze issues with the potential to substantially delay or complicate the certification process for future applications to the Energy Commission for expansion or modernization of existing coastal power plants. For this study, Mr. Meyer was responsible for performing site surveys and reviewing documentation for cultural resources for all 24 Coastal Power Plants.

CEC Hydroelectric Power Plant Inventory Study, Natural Resources Analyst. Mr. Meyer assisted in the collection of power and environmental data on over 200 hydroelectric power plants located in California. Physical power data included electrical output, system upgrades, water storage capacity and peaking availability. Environmental information included developing a data base addressing sensitive species issues, fish screens and ladders, monitoring parameters and a map of known hydroelectric facilities and barriers to anadromous fish passage.

Devers-Palo Verde 500 kV Transmission Line Project EIS/EIR, southern California/western Arizona. For this EIR/EIS prepared by US Bureau of Land Management and CPUC, Mr. Meyer assisted in the review and development of construction mitigation measures for SCE's proposed 250-mile long transmission line project from the Palo Verde Nuclear power plant in Arizona to the northern Palm Springs area in California. Major issues of concern include EMF and visual impacts on property values, impacts on the area's vast recreational resources and tribal lands, and the development and evaluation of several route alternatives, including the Devers-Valley No. 2 Route Alternative, which eventually was approved by the CPUC.

Antelope-Pardee 500 kV Transmission Line Project EIS/EIR, Los Angeles County, CA. For this EIR/EIS prepared by USFS, Angeles National Forest and CPUC, Mr. Meyer assisted in the review and development of construction mitigation measures for SCE's proposed 25-mile long transmission line project from the Antelope Substation in the City of Lancaster, through the ANF, and terminating at SCE's Pardee Substation in Santa Clarita. Major issues of concern included impacts to biological, recreational, and cultural resources within Forest lands, EMF and visual impacts on property values, impacts on residences in the urbanized southern regions of the route, and the development and evaluation of several route alternatives.

Tehachapi Renewable Transmission Project (TRTP) EIR/EIS, Kern, Los Angeles, and San Bernardino Counties, CA. For this EIR/EIS prepared by USFS, Angeles National Forest and CPUC, Mr. Meyer assisted in the review and development of construction mitigation measures for

SCE's proposal to construct, use, and maintain a series of new and upgraded high-voltage electric transmission lines and substations to deliver electricity generated from new wind energy projects in eastern Kern County. Approximately 46 miles of the project would be located in a 200- to 400-foot right-of-way on National Forest System land (managed by the Angeles National Forest) and approximately three miles would require expanded right-of-way within the Angeles National Forest. The proposed transmission system upgrades of TRTP are separated into eight distinct segments: Segments 4 through 11. Segments 1 (Antelope-Pardee) and Segments 2 and 3 (Antelope Transmission Project) were evaluated in separated CEQA and NEPA documents as described above.

PG&E Northeast San Jose Transmission Reinforcement Project Construction Monitoring and Supplemental Environmental Review Program, Lead Environmental Monitor. Under contract to the California Public Utilities Commission (CPUC), Mr. Meyer served as Lead Environmental Monitor and supervised two environmental monitors in the field, monitoring the implementation of the CPUC environmental impact report's conditions of approval for construction of this combination overhead and underground 230 kV electric transmission lines and substations in the Cities of San Jose, Milpitas, and Fremont. Construction of the dual 230kV circuit involved underground construction, single-pole tower installation, and construction of the Los Esteros Substation. Given the proximity of the project to the Bay, sensitive biological resources were present, including the burrowing owl and wetland mitigation sites. Responsibilities included: supervision, guidance and development of environmental monitors in field monitoring as well as the compliance review of pre-construction plans and mitigation compliance documentation, variance requests and temporary extra work space (TEWS) requests; recommendations for CPUC issuance of Notices to Proceed with construction and variance approvals; approval of TEWS requests; and coordination with PG&E, construction managers and subcontractors, and landowners, local municipalities, affected and interested agencies and the public.

Pacific Pipeline Project EIR/EIS for the U.S. Forest Service, Angeles National Forest, and the California Public Utilities Commission, Environmental Monitor. Served as an Environmental Monitor and supervised mitigation monitoring for all sensitive resources for a construction segment along a 132-mile crude oil pipeline within southern California. Coordinated construction activities with the applicant's inspection team, archaeological specialists and Native American monitors through areas with sensitive cultural, biological, and visual resources. Monitored for hazardous materials management, storm water pollution prevention, and biological and cultural resources. Maintained daily written documentation of compliance activities.

ESSEX ENVIRONMENTAL **1995 TO 1997**

Sierra Pacific Power Co., Alturas 345 kV Electric Transmission Project, Associate. Assisted in the development of the environmental management program implementation plan for a 164-mile electric transmission line. Wrote the Storm Water Pollution Protection Plan (SWPPP) for the California and Nevada segments.

DECLARATION OF
Kathleen Forrest

I, Kathleen Forest, declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Office of the Siting, Transmission and Environmental Protection Division as a Cultural Resources Specialist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Cultural Resources**, for the Calico Solar Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8/9/10 Signed: Original signed by Kathleen Forrest

At: Sacramento, California

DECLARATION OF
JAMES EARL JEWELL

I, James Earl Jewell, declare as follows:

1. I am currently under contract with the Aspen Environmental Group to provide environmental technical assistance to the California Energy Commission. I am serving as an Illuminating Engineer to provide Peak Workload Support for the Siting, Transmission, and Environmental Protection Division.

2. A copy of my professional qualifications and experience is attached hereto and incorporated herein.

3. I assisted in the preparation of the final staff testimony on Glint and Glare for the Calico Solar Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable sources and documents, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is accurate and valid with respect to the issues addressed therein.

5. I am familiar personally with the facts and conclusions applicable to matters of intrusive light and glare and relative brightnesses, and if called as a witness, could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8/9/10 Signed: Original signed

At: San Francisco, California

DECLARATION OF
Marie McLean

I**,** Marie McLean, declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Office of the Siting, Transmission, and Environmental Protection Division as an Environmental Planner ll.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Traffic and Transportation for the Final Staff Assessment for the Calico Solar Project (08-AFC-13) based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: _____ Signed: _____

At: Sacramento, California

DECLARATION OF
Michael D. McGuirt

I, **Michael D. McGuirt**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Siting, Transmission, and Environmental Protection Division** as a **Planner II**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the portion of the staff testimony on archaeological resources for the **Cultural Resources and Native American Values** section of the supplemental staff assessment for the Calico Solar project, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared subject portion of the testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the subject portion of the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: August 9, 2010 Signed: _____

At: _____

DARCANGELO, JENNIFER, JOHN SHARP, MICHAEL D. MCGUIRT, AND ANDREA GALVIN

2005 ***How to Consult with the California SHPO***. Workshop presented on 23 April 2005 at the 39th Annual Meeting of the Society for California Archaeology, Sacramento, California (6 hours).

JONES & STOKES

1999a ***Cultural Resource Inventory Report for Williams Communications, Inc. Fiber Optic Cable System Installation Project, Wendover, Nevada to the California State Line***. Volume 1: Draft Report. July. (JSA 98-358.) Sacramento, California. Prepared for Williams Communications, Inc., Tulsa, Oklahoma.

1999b ***Cultural Resources Report for the Williams Communications, Inc. Interstate 80 Fiber Optic Cable System Installation Project***. Volume I. September. (JSA 98-358.) Submitted to Williams Communications, Inc., Tulsa, Oklahoma. On file with the State Historic Preservation Office, Carson City, Nevada.

1999c ***Archaeological Site Avoidance and Monitoring Plans for Williams Communications' Fiber Optic Cable Installation In the Union Pacific Railroad Right-of-Way, Doña Ana County to Hidalgo County, New Mexico***. October. (JSA98-379.) Sacramento, California. Prepared for Williams Communications, Inc., Tulsa, Oklahoma.

2001 ***Final Phase II Cultural Resource Evaluation for the Kramer Mining District, Edwards AFB, Kern and San Bernardino Counties, California***. Volume I. November. Sacramento, California. On file with the Base Historic Preservation Officer, Edwards AFB, California.

LEBO, SUSAN A. AND MICHAEL D. MCGUIRT

1997 ***Geoarchaeology at 800 Nuuanu: Archaeological Inventory Survey of Site 50-80-14-5496 (TMK1-7-02:02), Honolulu, Hawai`i***. Department of Anthropology, Bishop Museum, Honolulu. (100 pp.) Submitted to Bank of Hawaii, Honolulu. On file with the State Historic Preservation Division, Honolulu.

1998a ***Assessments of Stone Architecture: a Case Study from North Hālawa Valley, O`ahu***. Paper presented at the 11th Annual Hawaiian Archaeology Conference of the Society for Hawaiian Archaeology, Kailua-Kona, Hawai`i.

1998b ***Pili Grass, Wood Frame, Brick, and Concrete: Archaeology at 800 Nuuanu***. Department of Anthropology, Bishop Museum, Honolulu. (142 pp.) Submitted to Bank of Hawaii, Honolulu. On file with the State Historic Preservation Division, Honolulu.

LENNSTROM, HEIDI A., P. CHRISTIAAN KLIEGER, MICHAEL D. MCGUIRT, AND SUSAN A. LEBO

1997 ***Archaeological Reconnaissance of Pouhala Marsh, `Ewa District, O`ahu***. Department of Anthropology, Bishop Museum, Honolulu. (14 pp.) Submitted to Ducks

ENERGY PLANNER II, California Energy Commission, Sacramento, California
November 2007 to December 2009, June 2010 to present

Develop environmental impact analyses of the potential effects that the construction and operation of proposed thermal power plants may have on significant cultural resources. Apply applicable Federal, State, and local statutes and regulations, as they relate to the consideration of cultural resources. Design and execute cultural resource impact analyses that are appropriate to the specific regulatory context for each proposed project. Gather and evaluate information on projects and on cultural resources in project areas. Develop and maintain agency and public relationships to acquire the most useful data and to elicit input in the development of California Energy Commission conditions of certification. Succinctly convey, orally in different public forums and in different written technical formats, the results of cultural resource impact analyses and proposed conditions of certifications meant to mitigate adverse impacts to significant cultural resources. Periodic reviews of licensees' actions to ensure compliance with extant conditions of certification. Oversight of consultants' who are preparing cultural resource impact analyses.

ASSOCIATE STATE ARCHAEOLOGIST, Office of Historic Preservation, California Department of Parks and Recreation (California State Parks), Sacramento, California
May 2001 to November 2007

Regulator, in the California Office of Historic Preservation (OHP), of the Advisory Council on Historic Preservation's (Advisory Council) process implementing Section 106 of the National Historic Preservation Act (NHPA). Conducted among the most complex Section 106 reviews, and participated in, and often guided, the consultations of which those reviews were a part. Formally advised other OHP units and the California State Historical Resources Commission on the appropriate disposition and treatment of archaeological resources in the context of other State and Federal historic preservation programs that OHP either administers or in which OHP participates. Worked out of class for two consecutive, six-month terms as a Senior State Archeologist, from December 2004 through December 2005, supervising the Project Review Unit for the State Historic Preservation Officer (SHPO). As the Acting Chief of Project Review, managed and trained a staff of eight professionals and one clerical assistant to conduct, on behalf of the SHPO, the review of all Federal agency actions in the State of California under 36 CFR Part 800, the Advisory Council's Section 106 regulation.

ENVIRONMENTAL SPECIALIST III, Jones & Stokes, Sacramento, California
February 1999 to May 2001

Designed, conducted, and managed short- and long-term archaeological projects in California, Nevada, and New Mexico to comply with Sections 106 and 110 of the NHPA. Prepared proposals. Assisted with client contract negotiations. Conducted archaeological record searches and archival research. Directed Phase I pedestrian inventory surveys and test excavations for Phase II evaluations. Analyzed material culture assemblages. Prepared technical reports and regulatory compliance documents including National Register property and district evaluations, and monitoring and discovery plans. Represented clients in consultations with federal and state agencies, and coordinated and managed clients' compliance with federal cultural resource

regulations and the cultural resource regulations of California, Nevada, and New Mexico.

ASSISTANT ANTHROPOLOGIST, Bernice Pauahi Bishop Museum, Honolulu, Hawai`i
August 1996 to June 1998

Assisted with archaeological project design, preparation of proposals, and client contract negotiations, directed Phase I pedestrian inventory surveys, test excavations for Phase I subsurface inventory surveys, test excavations for property evaluations, and data recovery excavations, and assisted with preparation of technical reports on short-term cultural resource management contracts. Analyzed field records, prepared site reports and synthetic report chapters, and analyzed and prepared reports on lithic assemblages for Phases I–III of a long-term federal highway project (Interstate Route H–3). Conducted research in Hawaiian archaeology, and delivered public and professional presentations of that research. Advised on the integration of geoarchaeological methods and techniques into cultural resource management field efforts, and on geoarchaeological interpretations of extant field records, and designed and conducted geoarchaeological components of fieldwork for short–term cultural resource management contracts.

RECENT PROFESSIONAL DEVELOPMENT

CULTURAL RESOURCE AND ENVIRONMENTAL LAW

Successful CEQA Compliance: An Intensive Two-Day Seminar
Sacramento, California, University of California, Davis, Continuing and Professional Education, Terry Rivasplata and Maggie Townsley
June 2009

ACHP - FHWA Advanced Seminar: Reaching Successful Outcomes in Section 106 Review
Vancouver, Washington, Advisory Council on Historic Preservation, Don Klima and Carol Legard; Federal Highway Administration, Mary Ann Naber
October 2007

NEPA Compliance and Cultural Resources
Portland, Oregon, National Preservation Institute, Joe Trnka
October 2007

Section 106: How to Negotiate and Write Agreements
Sacramento, California, National Preservation Institute, Claudia Nissley
November 2004

Consultation with Indian Tribes on Cultural Resource Issues
Sacramento, California, National Preservation Institute, Thomas F. King and Reba Fuller
September 2003

Section 106: How to Negotiate and Write Agreements
The Presidio, San Francisco, California, National Preservation Institute, Thomas F. King
May 2002

Introduction to CEQA

Sacramento, California, University of California, Davis, Continuing and Professional Education, Ken Bogdan and Terry Rivasplata
July 2000

TECHNICAL ARCHAEOLOGY

Introduction to Historic Site Survey, Preliminary Evaluation, and Artifact ID
West Sacramento, California, California Department of Transportation, Julia Huddleson, Anmarie Medin, Judy Tordoff, and Kimberly Wooten; California Department of Parks and Recreation, Glenn Farris, Larry Felton, and Pete Schulz
September 2006

Principles of Geoarchaeology for Transportation Projects (Course No. 100246)
Sacramento, California, California Department of Transportation, Graham Dalldorf, Glenn Gmoser, Jack Meyer, Stephen Norwick, Adrian Praetzellis, and William Silva
October 2006

INFORMATION TECHNOLOGY AND CULTURAL RESOURCE MANAGEMENT

GIS: Practical Applications for Cultural Resource Projects
Sacramento, California, National Preservation Institute, Deidre McCarthy
September 2006

RECENT PAPERS AND REPORTS

BASTIAN, BEVERLY E. AND MICHAEL D. MCGUIRT

2009 **Cultural Resources**. In *Final Staff Assessment, Canyon Power Plant, Application for Certification (07-AFC-9), Orange County* (CEC-700-2009-008-FSA, September 2009), edited by Siting, Transmission and Environmental Protection Division, California Energy Commission, pp. 4.3-1–4.3-51. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

BLOSSER, AMANDA, MICHAEL D. MCGUIRT, AND BEVERLY E. BASTIAN

2008 **Cultural Resources**. In *Staff Assessment, Orange Grove Project, Application for Certification (08-AFC-4), San Diego County* (CEC-700-2008-009, November 2008), edited by Siting, Transmission and Environmental Protection Division, California Energy Commission, pp. 4.3-1–4.3-43. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

DARCANGELO, JENNIFER, JOHN SHARP, MICHAEL D. MCGUIRT, ANDREA GALVIN, AND CLARENCE CAESAR

2004 ***Section 106 for Experienced Practitioners: Consulting with the California SHPO*** *(GEV4111)*. Course taught on 8 September 2004 in Oakland to California Department of Transportation cultural resources personnel and private sector cultural resource consultants (8 hours).

MICHAEL D. MCGUIRT, MA, RPA

SUMMARY OF PROFESSIONAL EXPERIENCE

Fifteen years of professional academic and cultural resources management experience in western North America, Hawai'i, Central America, and Eastern Europe. Former regulator and present planner with expert knowledge of Section 106 of the National Historic Preservation Act of 1966 (NHPA). Thorough knowledge of the California Environmental Quality Act of 1970, Section 110 of the NHPA, and the US Army Corps of Engineers' Appendix C. Working knowledge of the National Environmental Policy Act of 1969, Native American Graves Protection and Repatriation Act of 1990, and the Archaeological Resources Protection Act of 1979. Expert in developing and coordinating historic preservation solutions that comply with complex Federal, state, and local regulatory environments for large-scale energy, transportation, and telecommunications projects. Expert technical skills in geoarchaeology, mapping and spatial analysis, archaeological survey and excavation, and material culture analyses.

EDUCATION

MASTER OF ARTS, Anthropology, University of Texas at Austin
May 1996

BACHELOR OF ARTS, Anthropology and Archaeological Studies, University of Texas at Austin
December 1990

PROFESSIONAL AFFILIATIONS

Register of Professional Archaeologists
Society for American Archaeology
Society for California Archaeology
National Trust for Historic Preservation
California Preservation Foundation

HONORARY AFFILIATIONS

Honor Society of Phi Kappa Phi

RECENT PROFESSIONAL EMPLOYMENT

ENERGY PLANNER III, California Energy Commission, Sacramento, California
December 2009 to May 2010

Supervised an Energy Commission staff of five professional cultural resources analysts and a varying number of equivalent consultants in the development of CEQA and NEPA analyses of the potential effects that the construction and operation of proposed thermal power plants may have on significant cultural resources, developed and supervised the implementation of agency-wide programs to facilitate agency compliance with Federal historic preservation regulations, and supervised the periodic staff reviews of licensees' actions to ensure compliance with conditions of certification for extant licenses.

Unlimited, Inc., Rancho Cordova, California. On file with the State Historic Preservation Division, Honolulu.

MCGUIRT, MICHAEL D.

1996 ***The Geoarchaeology and Palynology of an Early Formative Pithouse Village in West-Central New Mexico***. Unpublished M.A. thesis, Department of Anthropology, University of Texas at Austin.

1998 **50-80-10-2010, 50-80-10-2016, 50-80-10-2088, and 50-80-10-2134**. In *Activities and Settlement in an Upper Valley: Data Recovery and Monitoring Archaeology in North Hālawa Valley, O`ahu*, vols. 2a and 2b, edited by Department of Anthropology, Bishop Museum, pp. 1–3, 1–44, 1–5, and 1–46. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

2002 **Committee Reports, OHP Liaison**. *SCA Newsletter* 36(3):4–5.

2004 **Committee Reports, OHP Liaison**. *SCA Newsletter* 38(2):7, 38(3):6–8.

2006 **Preservation Archaeology**. In *California Statewide Historic Preservation Plan: 2006–2010*, edited by Marie Nelson, pp. 8–15. California Department of Parks and Recreation's Office of Historic Preservation, Sacramento. Submitted to the National Park Service, Washington, D.C. On file at the California Office of Historic Preservation, Sacramento.

2007 **Dealing with Multi-element Cultural Resources under Section 106**. In *Historic Properties Are More Than Meets the Eye: Dealing with Historical Archaeological Resources under the Regulatory Context of Section 106 and CEQA*. Session presented on 25 April 2008 at the *33rd Annual California Preservation Conference* of the California Preservation Foundation in Napa, California, moderated by Michelle Messinger and Michael D. McGuirt (1 1/2 hours).

2010 **Cultural Resources and Native American Values**. In *Imperial Valley Solar Project (Formerly SES Solar Two), Supplemental Staff Assessment, Part II* (CEC-700-2010-013 SUP, August 2010), edited by Siting, Transmission and Environmental Protection Division, California Energy Commission, pp. C.3-1–C.3-409 plus appendix B (118 pp.). Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

MCGUIRT, MICHAEL D., AMANDA BLOSSER, AND BEVERLY E. BASTIAN

2009 **Cultural Resources**. In *Final Staff Assessment, Beacon Solar Energy Project, Application for Certification (08-AFC-2), Kern County* (CEC-700-2009-005-FSA, August 2009), edited by Siting, Transmission and Environmental Protection Division, California Energy Commission, pp. 4.3-1–4.3-131. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

McGuirt, Michael D. and Leslie H. Hartzell

1997 **50-80-10-2139 and 50-80-10-2459**. In *Imu, Adzes, and Upland Agriculture: Inventory Survey Archaeology in North Hālawa Valley, O`ahu*, vols. 2c and 2d, edited by Department of Anthropology, Bishop Museum, pp. 1–17 and 1–5. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

1998 **Chapter 1: Introduction**. In *Activities and Settlement in an Upper Valley: Data Recovery and Monitoring Archaeology in North Hālawa Valley, O`ahu*, vol. 1, edited by Department of Anthropology, Bishop Museum, pp. 1–14. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

McGuirt, Michael D. and Shannon P. MacPherron

1998 **50-80-10-2137**. In *Activities and Settlement in an Upper Valley: Data Recovery and Monitoring Archaeology in North Hālawa Valley, O`ahu*, vol. 2b, edited by Department of Anthropology, Bishop Museum, pp. 1–86. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

McGuirt, Michael and Sarah C. Murray

2008 **Cultural Resources**. In *Preliminary Staff Assessment, Ivanpah Solar Electric Generating System, Application for Certification (07-AFC-5), San Bernardino County* (CEC-700-2008-013-PSA, December 2008), edited by Siting, Transmission and Environmental Protection Division, California Energy Commission, pp. 5.3-1–5.3-73. Siting, Transmission and Environmental Protection Division, California Energy Commission, Sacramento. On file with the California Energy Commission, Sacramento.

McGuirt, Michael D. and Deborah I. Olszewski

1997 **50-80-10-2256**. In *Imu, Adzes, and Upland Agriculture: Inventory Survey Archaeology in North Hālawa Valley, O`ahu*, vol. 2d, edited by Department of Anthropology, Bishop Museum, pp. 1–9. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

Mikesell, Stephen, Michael McGuirt, and Trish Fernandez

2008 **Introduction to the White Papers in State Historical Resources Commission Archaeology Committee White Papers**. *SCA Newsletter* 41(1):18–21.

Sharp, John, Michael D. McGuirt, Jennifer Darcangelo, and Andrea Galvin

2004 ***How to Consult with the California SHPO***. Workshop presented on 18 March 2004 at the 38th Annual Meeting of the Society for California Archaeology, Riverside, California (4 hours).

DECLARATION OF
Sarah Allred

I, Sarah Allred, declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Office of the Siting, Transmission and Environmental Protection Division as a Cultural Resources Specialist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Cultural Resources**, for the Calico Solar Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated:_____ Signed:_____

At: Sacramento, California

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION	**Docket No. 08-AFC-13**
For the CALICO SOLAR (Formerly SES Solar One)	**PROOF OF SERVICE** ***(Revised 8/9/10)***

APPLICANT
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& Project Manager
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Adams Broadwell Joseph
& Cardozo
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Kevin Emmerich
P.O. Box 70
Beatty, NV 89003
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San Dimas, CA 91773
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85 Second Street, Second floor
San Francisco, CA 94105
gloria.smith@sierraclub.org
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Steven.lamb@kattenlaw.com
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ANTHONY EGGERT
Commissioner and Presiding Member
aeggert@energy.state.ca.us

JEFFREY D. BYRON
Commissioner and Associate Member
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DECLARATION OF SERVICE

I, Sabrina Savala, declare that on August 9, 2010, I served and filed copies of the attached Supplemental Staff Assessment Part II, dated July, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [www.energy.ca.gov/sitingcases/solarone].

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(*Check all that Apply*)

FOR SERVICE TO ALL OTHER PARTIES:

x sent electronically to all email addresses on the Proof of Service list;

____ by personal delivery;

x by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses NOT marked "email preferred."

AND

FOR FILING WITH THE ENERGY COMMISSION:

____ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

OR

____ depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 08-AFC-13
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

Original Signed by: _____
Sabrina Savala

*indicates change

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION FOR THE ***CALICO SOLAR PROJECT*** ***(Formerly SES SOLAR 1)***	**DOCKET NO. 08-AFC-13**

NOTICE OF AVAILABILITY OF THE PRESIDING MEMBER'S PROPOSED DECISION
AND
NOTICE OF COMMITTEE CONFERENCE
AND
NOTICE OF FULL COMMISSION HEARING

I. NOTICE OF AVAILABILITY

On September 25, 2010, the Committee issued the Presiding Member's Proposed Decision (PMPD) for the ***Calico Solar Project***. The 30-day public comment period on the PMPD ends on October 25, 2010. Copies of the PMPD have been sent to the Proof of Service list. The PMPD may also be viewed on the Commission's internet website at: **[www.energy.ca.gov/sitingcases/calicosolar].**

For a printed copy, call the Energy Commission's Publications Unit at 916-654-5200, and ask for Publication No. **CEC 800-2010-012-PMPD**.

The parties in the case and any other person who wishes to do so are encouraged to file and serve their written comments on the PMPD to the Proof of Service list and via e-mail **no later than 5 p.m. on October 19, 2010**. This will facilitate an informed discussion of the comments, especially proposed changes to the Conditions of Certification, during the October 22 Committee Conference, below.

II. NOTICE OF COMMITTEE CONFERENCE

PLEASE TAKE NOTICE that the Committee will hold a Committee Conference on the PMPD as follows:

***FRIDAY*, October 22, 2010**
Beginning at 10:00 a.m.

California Energy Commission
Hearing Room B
1516 Ninth Street
Sacramento, CA 95814

TELECONFERENCE OPTION: You may participate in the Committee Conference by telephone and/or by computer via our "WebEx" web conferencing system. For details on how to participate, please see the "Participation through WebEx" directions attached to this Notice.

Comments on the PMPD

The purpose of the Committee Conference is to consider oral and written comments on the PMPD from the parties, governmental agencies, and members of the public. Members of the public and governmental agency representatives are encouraged to submit their written comments by the close of the 30-day review period. The Energy Commission encourages comments by e-mail. Please include your name or organization's name in the name of the file. Those submitting attached comments by electronic mail should provide them in either Microsoft Word format or as a Portable Document (.pdf) to [**docket@energy.state.ca.us**]. **One paper copy** must also be sent to the Energy Commission's Docket Unit, 1516 Ninth Street, MS-4, Sacramento, CA 95814. Identify all comments with "**Docket No. 08-AFC-13."**

In order to assure that your comments are considered, your e-mail must be received by 4:00 p.m. on Monday, October 25, 2010 or your mailed comment physically delivered on that date (postmarks do not count).

III. NOTICE OF COMMISSION HEARING

PLEASE TAKE NOTICE the full Commission will consider the PMPD, released on September 24, 2010, and the Errata, if applicable, for possible adoption at a special business meeting scheduled as follows:

Thursday, October 28, 2010
Beginning at 10 a.m.

California Energy Commission
Hearing Room B
1516 Ninth Street
Sacramento, California 95814

The purpose of this hearing is to consider whether the Energy Commission should adopt, modify, or reject the PMPD. Parties and members of the public may participate and offer oral and written comments on the PMPD. Identify all comments with "**Docket No. 08-AFC-13**."

Participating by Telephone at a Business Meeting

If you want to participate by telephone, call toll free 1-888-823-5065 on Business Meeting days after 10:01 a.m. (PDT). When asked, please answer "Business Meeting and Harriet K" and the operator will connect you into the meeting. Should you want to speak on a specific item, please inform the operator and provide the item

number. The Business Meeting is also broadcast via **WebEx**, the Energy Commission's on-line meeting service. To listen to the meeting and view any presentations, please click the following link or paste it into your browser:

https://energy.webex.com/energy/onstage/g.php?t=a&d=927863388

You may also go to https://energy.webex.com/ec and enter Meeting Number **927 863 388**. The meeting password is "mtg@10am."

Public Participation

The Energy Commission's Public Adviser's Office is available to assist the public in participating in the application review process. For information on how to participate, please contact the Public Adviser's Office at (916) 654-4489 or (800) 822-6228 or e-mail: **[publicadviser@energy.state.ca.us]**.

If you have a disability and need assistance to participate in this event, contact Lourdes Quiroz at (916) 654-5146 or e-mail: [**lquiroz@energy.state.ca.us**]. Media inquiries should be directed to the Office of Media and Public Communications at (916) 654-4989 or e-mail: **[mediaoffice@energy.state.ca.us].**

Questions of a legal or procedural nature should be directed to Paul Kramer, the Hearing Officer, at (916) 654-5103 or e-mail: **[pkramer@energy.state.ca.us]**.

Technical questions concerning the Project should be addressed to Christopher Meyer, Staff Project Manager, at (916) 653-1639, or e-mail: **[cmeyer@energy.state.ca.us]**.

Media inquiries should be directed to the Energy Commission's Office of Media and Communications at (916) 654-4989 or e-mail: **[mediaoffice@energy.state.ca.us]**.

Information concerning the status of the project, as well as notices and other relevant documents, including the AFC, may be viewed on the Energy Commission's Internet web page at: **[www.energy.ca.gov/sitingcases/calicosolar]**.

Dated: September 25, 2010, at Sacramento, California.

ANTHONY EGGERT
Commissioner and Presiding Member
Calico Solar AFC Committee

JEFFREY D. BYRON
Commissioner and Associate Member
Calico Solar AFC Committee

CALICO SOLAR

OCTOBER 22, 2010, 10 AM, COMMITTEE CONFERENCE ON THE PMPD

PARTICIPATION THROUGH WEBEX
THE ENERGY COMMISSION'S ON-LINE MEETING SERVICE

***Meeting number*:** **922 943 695**

***Meeting password*:** **calico@10am**

1. COMPUTER LOG-ON WITH A DIRECT PHONE NUMBER:

- Please go to https://energy.webex.com and enter the above ***meeting number.***
- When prompted, enter your information and the above ***meeting password.***
- After you login, a prompt will appear on-screen for you to provide your phone number. In the ***Phone Number box screen,*** type your area code and phone number and click OK. ***You will receive a call back to your phone which will allow you to listen and/or participate in the audio of the meeting***. International callers can use the "Country/Region" button to help make their connection.

2. COMPUTER LOG-ON FOR CALLERS WITH AN EXTENSION PHONE NUMBER, ETC:

- Please go to https://energy.webex.com and enter the above ***meeting number.***
- When prompted, enter your information and the above ***meeting password.***
- *After you login, a prompt will ask for your phone number. Click "**CANCEL**."*

Instead *call 1-866-469-3239 (toll-free in the U.S. and Canada). When prompted, enter the meeting number above and your unique Attendee ID number which is listed in the top left area of your screen after you login.*

3. TELEPHONE ONLY (NO COMPUTER ACCESS):

- ***Call 1-866-469-3239 (toll-free in the U.S. and Canada) and when prompted enter the above meeting number.***

If you have difficulty joining the meeting, please call the WebEx Technical Support number at 1-866-229-3239. To see if your computer is compatible, visit [http://support.webex.com/support/system-requirements.html].

*Please be aware that the meeting's WebEx audio and on-screen activity may be recorded

Mailed to Lists: POS, 7337, 7338, 7339, 7340

CALICO SOLAR POWER PROJECT

Presiding Member's Proposed Decision

CALIFORNIA
ENERGY COMMISSION
Arnold Schwarzenegger, Governor

SEPTEMBER 2010
CEC-800-2010-012-PMPD

DOCKET NUMBER 08-AFC-13

II. PROJECT ALTERNATIVES

The California Environmental Quality Act (CEQA) Guidelines and the Energy Commission's regulations require an evaluation of the comparative merits of a range of feasible site and facility alternatives which meet the basic objectives of the proposed project but would avoid or substantially lessen potentially significant environmental impacts. [Cal. Code Regs., tit. 14, §§ 15126.6(c) and (e); tit. 20, § 1765.]

The range of alternatives, including the "No Project" alternative, is governed by the "rule of reason" and need not include those alternatives whose effects cannot be reasonably ascertained and whose implementation is remote and speculative. [Cal. Code Regs. tit. 14, § 15126.6(f).] Rather, the analysis is necessarily limited to alternatives that the "lead agency determines could feasibly attain most of the basic objectives of the project." (*Id*.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

Energy Commission staff used the following methodology to analyze project alternatives for the Calico Solar Project (CSP):

- identified basic objectives of the project and its potentially significant adverse impacts;
- identify and evaluate alternative sites to determine whether an alternative site would mitigate impacts of the proposed site and whether an alternative site would create impacts of its own;
- identify and evaluate technology alternatives, including alternative equipment and processes; and
- evaluated consequences of not constructing the project, i.e., the "No Project" alternative. (Ex. 300, p. 4-4.)

1. Project Objectives

For our analysis, we will consider the following objectives, a reduction and refinement of those proposed by the applicant:

- To construct and operate an up to 663.5 MW renewable power generating facility in California capable of selling competitively priced renewable energy consistent with the needs of California utilities;

- To locate the facility in areas of high insolation with ground slope of less than 5%.
- To provide clean, renewable electricity to support California's Renewable Portfolio Standard Program (RPS);
- To assist in reducing its greenhouse gas emissions as required by the California Global Warming Solutions Act;
- To contribute to the achievement of the 33% RPS target set by California's governor and legislature; and
- To complete the review process in a timeframe that would allow the applicant to start construction or meet the economic performance guidelines by December 31, 2010 to potentially qualify for the 2009 ARRA cash grant in lieu of tax credits for certain renewable energy projects. (Ex. 300, p. B.2-9.)

2. Project Impacts

In this Decision, the Commission has found the following significant impacts. Based on the evidence presented, the following impacts have been identified as issues of concern for the CSP project.

- **Cultural Resources**. The CSP cumulative contribution to permanent long term, potentially unmitigable, adverse impacts to historic Route 66 in the project vicinity as a result of the physical degradation of and visual intrusion on significant cultural resources on those sites and an overall net reduction in cultural resources in the area

- **Land Use**. The CSP project would permanently change the nature of land use at the project site from Government Special Public Limited Use and Moderate Use to an intensive utility use for the generation of power. Therefore, the combined effect of the overall cumulative past, present, and proposed and reasonably foreseeable projects, including the proposed project, in the desert region of San Bernardino County would adversely affect recreation and wilderness resources, resulting in a significant and unavoidable impact under CEQA

- **Visual Resources**. The CSP project will result in the installation of a large, industrial facility on a presently undeveloped (although partially disturbed) landscape. It will have significant unmitigable impacts to visual vistas from three of five vantage points used in our analysis. In addition it will, in combination with the other renewable energy projects proposed in the project's viewshed, make a cumulatively considerable contribution to significant cumulative visual impacts.

This alternatives analysis focuses on the consideration of these impacts and the extent to which they could be reduced or eliminated by the selection of a project alternative.

3. Summary of Alternatives Considered

Various site alternatives, technology alternatives, a reduced size alternative and the no project alternative were initially evaluated and retained or eliminated from further detailed analysis as summarized in **Alternatives Table 1**, below. More information about the eliminated alternatives may be found in the Supplemental Staff Assessment (Ex. 300, pp. B.2-49 — B.2-84). Further analysis of the retained alternatives follows the table.

Alternatives Table 1
Summary of Alternatives Retained and Eliminated

Alternative	Rationale for Retention or Elimination
Proposed Project/Action **Presently:** - 663.5 MW - 4,613 acres 26,450 SunCatchers **Formerly:** - 850 MW - 6,215 acres - 34,000 SunCatchers	Retained. Evaluated as the applicant's proposal.
Reduced Acreage Alternative - 275 MW (up to 350 MW)[6] - 2,600 acres (41% of originally proposed) - 11,000 SunCatchers	Retained. Evaluated in the SSA because it would substantially reduce impacts of the Calico Solar Project while meeting most or all of the project objectives.
No Project/No Action Alternative	Retained. Required under CEQA.
Private Land Alternative	Retained. Would substantially reduce impacts of the Calico Solar Project while meeting most project objectives.
Public Land Alternatives	

[6] The Calico Solar Project as described in the SA/DEIS would require approximately 10 acres per MW of power generated. Since publication of the SA/DEIS, the Calico Solar Project boundaries have been revised and the project as currently proposed would require 7.3 acres per MW generated. As such, the amount of energy generated by the Reduced Acreage Alternative could be up to 350 MW.

Alternative	Rationale for Retention or Elimination
Avoidance of Donated and Acquired Lands Alternative - 850 MW - 7,050 acres (over 100 % of proposed) - 28,800 SunCatchers	Eliminated. Would not substantially reduce impacts of the Calico Solar Project; it would create the same general impacts to Mojave fringe-toed lizard, Nelson big-horn sheep, and other wide-ranging species as the proposed Calico Solar Project.
Camp Rock Road (AS1)	Eliminated. Would not substantially reduce impacts of the Calico Solar Project; located in Category I desert tortoise habitat, partially located in the Johnson Valley OHV area and would require use of LWCF acquisition lands.
Upper Johnson Valley (AS2)	Eliminated. Would not substantially reduce impacts of the Calico Solar Project; located entirely within the Upper Johnson Valley OHV Area and in study area for MCAGCC Twentynine Palms expansion.
West of Twentynine Palms Military Base (AS3)	Eliminated. Would not substantially reduce impacts of the Calico Solar Project; located entirely within the Upper Johnson Valley OHV Area and in study area for MCAGCC Twentynine Palms expansion, would require use of LWCF acquired lands.
I-40 South (AS4)	Eliminated. Would not substantially reduce impacts of the Calico Solar Project; located in desert tortoise critical habitat, would impact approximately 3 miles of the Pisgah Crater Lava Flow, would potentially impact access to three existing mines.
Broadwell Lake (AS5)	Eliminated. Would not substantially reduce impacts of the Calico Solar Project; potentially located within proposed national monument; pending right-of-way grant application for the site, therefore not considered a viable alternative.
SES Solar Three Alternative	Eliminated. Pending right-of-way grant application for the site, therefore not considered a viable alternative.
Technology Alternatives Evaluated	
Parabolic Trough Technology	Eliminated. Would not substantially reduce impacts of the Calico Solar Project
Solar Power Tower Technology	Eliminated. Would not substantially reduce impacts of the Calico Solar Project
Linear Fresnel Technology	Eliminated. Would reduce area required by 40% but would not eliminate significant impacts of the Calico Solar Project
Solar Photovoltaic Technology – Utility Scale	Eliminated. Would not substantially reduce impacts of the Calico Solar Project

Alternative	Rationale for Retention or Elimination
Distributed Solar Technology	Eliminated. While it will very likely be possible to achieve 850 MW of distributed solar energy over the coming years, the limited numbers of existing facilities make it difficult to conclude with confidence that this much distributed solar will be available within the timeframe required for the Calico Solar Project. Barriers exist related to interconnection with the electric distribution grid. Solar PV is one components of the renewable energy mix required to meet the California Renewable Portfolio Standard requirements, and additional technologies like solar thermal generation, would also be required.
Wind Energy	Eliminated. While there are substantial wind resources in the region, environmental impacts could also be significant so wind would not reduce impacts in comparison to the Calico Solar Project. Also, wind is one of the components of the renewable energy mix required to meet the California Renewable Portfolio Standard requirements; additional technologies like solar thermal generation, would also be required.
Geothermal Energy	Eliminated. Despite the encouragement provided by Renewable Portfolio Standards and ARRA funding, few new geothermal projects have been proposed in the California and no geothermal projects are included on the Renewable Energy Action Team list of projects requesting ARRA funds. Therefore, the development of 850 MW of new geothermal generation capacity within the timeframe required for the Calico Solar Project is considered speculative.
Biomass Energy	Eliminated. Most biomass facilities produce only small amounts of electricity (in the range of 3 to 10 MW) and so could not meet the project objectives related to the California Renewable Portfolio Standard. In addition, between 85 and 250 facilities would be needed to achieve 850 MW of generation, creating substantial adverse impacts.
Tidal Energy	Eliminated. Tidal fence technology is commercially available in Europe. However, it has not been demonstrated and proven at the scale that would be required to replace the proposed project, particularly with Pacific tides. Therefore, it would not substantially reduce impacts of the Calico Solar Project.

Alternative	Rationale for Retention or Elimination
Wave Energy	Eliminated. Unproven technology at the scale that would be required to replace the proposed project; it may also result in substantial adverse environmental impacts
Natural Gas	Eliminated. Would not attain the objective of generating renewable power meeting California's renewable energy needs
Coal	Eliminated. Would not attain the objective of generating renewable power meeting California's renewable energy needs and is not a feasible alternative in California
Nuclear Energy	Eliminated. The permitting of new nuclear facilities in California is not currently allowable by law
Conservation and Demand-side Management	Eliminated. Conservation and demand-management alone are not sufficient to address all of California's energy needs, and would not provide the renewable energy required to meet the California Renewable Portfolio Standard requirements

Ex. 300, pp. B.2-3 – B.2-6.

Alternatives Retained for Further Evaluation

Reduced Acreage Alternative

The Reduced Acreage Alternative would be a 275 MW solar facility located within the boundaries of the proposed project as defined by Calico Solar. This alternative is analyzed because (1) it eliminates about 59% of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources, and (2) it could transmit the power generated without requiring an upgrade to 65 miles of the existing 220 kV SCE Pisgah-Lugo transmission line.

The Reduced Acreage Alternative would consist of 11,000 SunCatchers with a net generating capacity of approximately 275 MW (potentially up to 350 MW)[7] occupying approximately 2,600 acres of land. This alternative would retain 31% of the proposed SunCatchers and would affect 41% of the land of the previously proposed 850 MW project.

[7] The Calico Solar Project as described in the SA/DEIS would require approximately 10 acres per MW of power generated. Since publication of the SA/DEIS, the Calico Solar Project boundaries have been revised and the project as currently proposed would require 7.3 acres per MW generated. As such, the amount of energy generated by the Reduced Acreage Alternative could be up to 350 MW.

The boundaries of the Reduced Acreage Alternative are shown in **Alternatives Figure 1**. This area was designed to avoid sensitive cultural resources and areas that were mapped as occupied tortoise habitat (live tortoise and/or active burrows and sign). It also excludes all donated lands and lands acquired by BLM with conservation funds. The boundaries of the Reduced Acreage Alternative do not coincide with the Applicant's Phase I project boundaries.

Similar to the proposed project, the Reduced Acreage Alternative would transmit power to the grid through the SCE Pisgah Substation and would require infrastructure including water storage tanks, a transmission line, road access, a main services complex, and a substation (SES 2008a). However, as stated above, the Reduced Acreage alternative would not require the 65-mile upgrade to the SCE transmission line. SCE would complete system upgrades within existing substation boundaries to accommodate the 275 MW, and the 220 kV transmission line would be used. The main services complex, primary water well, and substation and onsite transmission line for the Reduced Acreage Alternative would remain at the location proposed for the proposed project.

The applicant believes this alternative is economically infeasible because it would have higher unit costs for SunCatcher manufacturing and higher operations and maintenance costs on a "per MW basis," increasing by as much as 30 percent. In addition, the applicant says that this smaller alternative would potentially put its receipt of ARRA funds at risk. However, the applicant did not provided details regarding its cost analysis for the Reduced Acreage Alternative. Absent more, we cannot conclude that this alternative is in feasible for the reasons advanced by the applicant. (Ex. 300, pp. B.2-13 – B.2-14.)

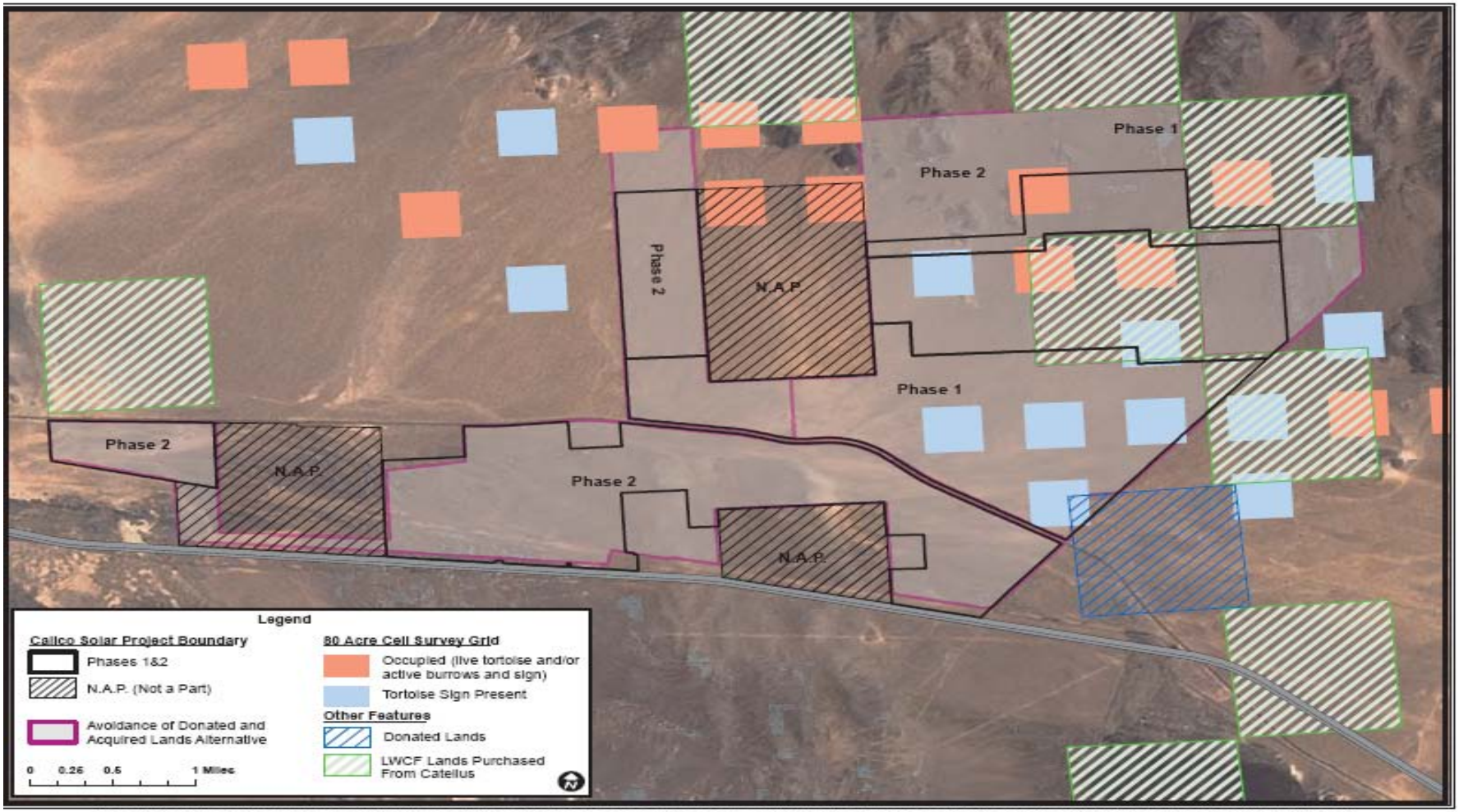
While the Reduced Acreage Alternative would reduce many of the impacts of the proposed project, it would also reduce the project's benefits of replacing fossil fuel fired generation and reducing associated criteria pollutant and greenhouse gas emissions.

Private Land Alternative

Multiple scoping comments requested that an alternative site be considered on disturbed land, and specifically on the agriculture lands and brownfields in the Daggett/Yermo area, thereby lessening the potential project impacts to the desert environment. Commenters also noted that because the technology allows for distributed units, a contiguous site may not be necessary.

ALTERNATIVES FIGURE 1

Calico Solar Project - Avoidance of Donated and Acquired Lands Alternative

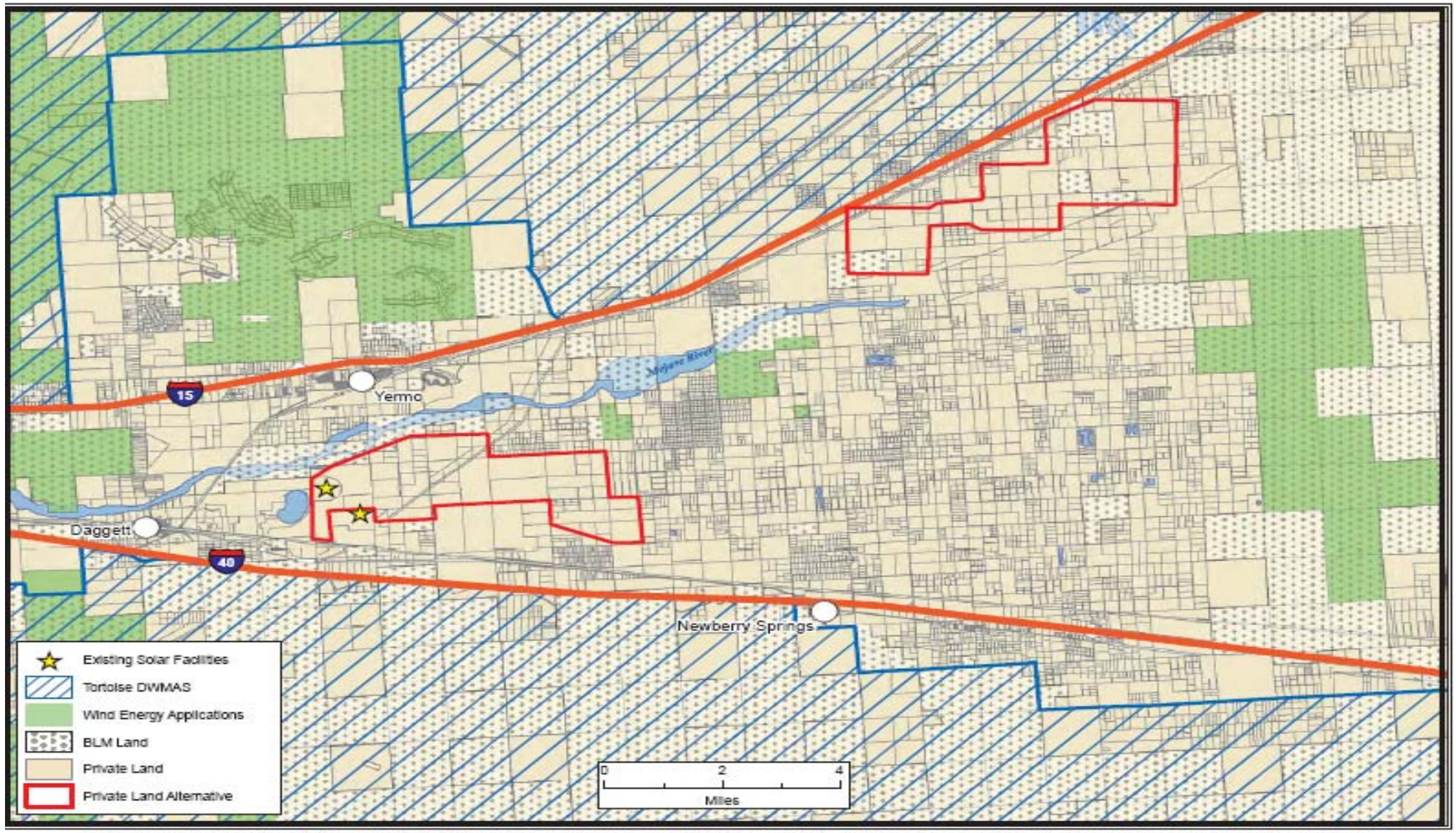


U.S. BUREAU OF LAND MANAGEMENT & CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission - Tele Atlas Data - San Bernardino County

ALTERNATIVES FIGURE 2

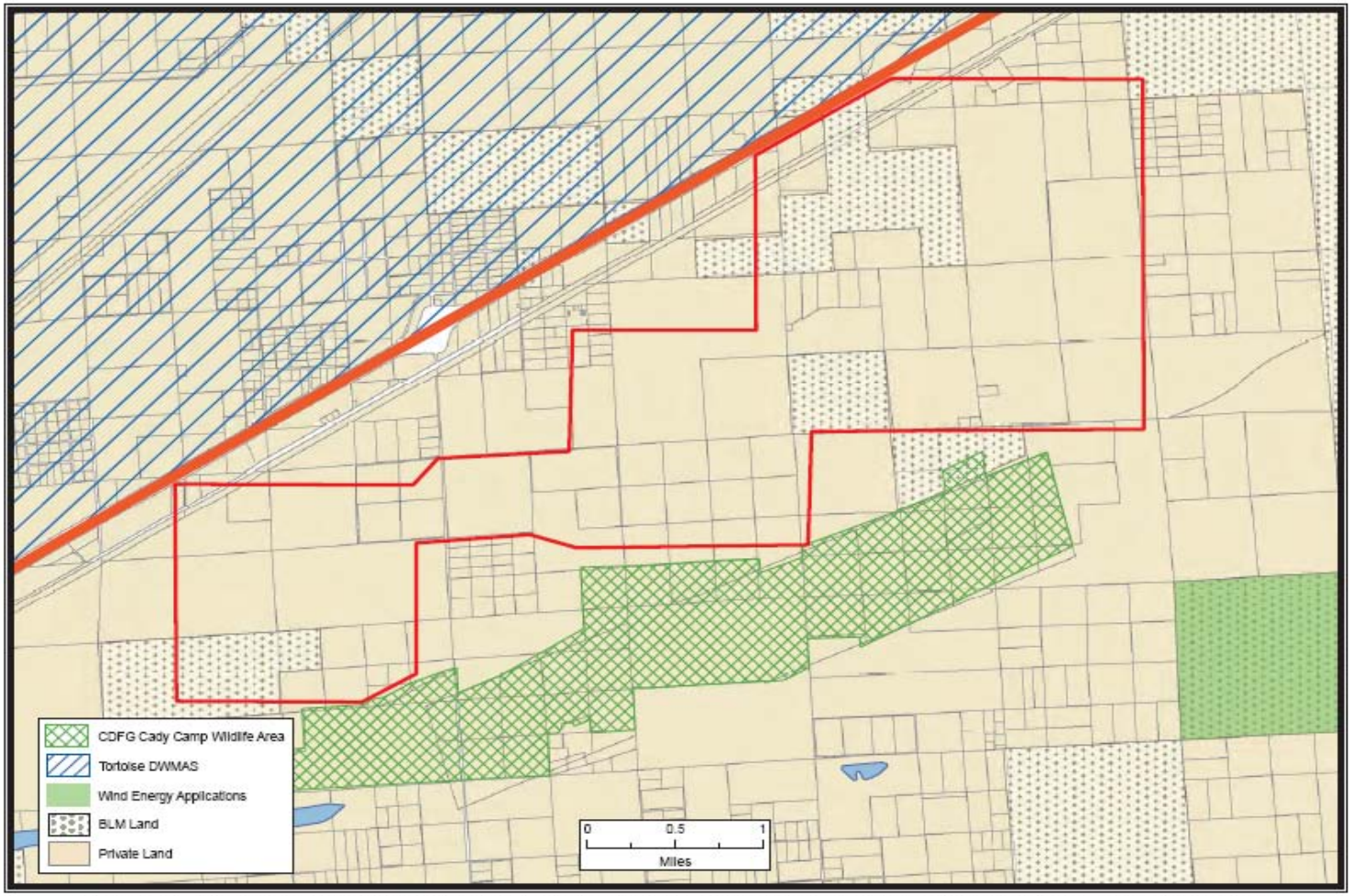
Calico Solar Project - Private Land Alternative



U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: California Energy Commission - Tele Atlas Data - San Bernardino County

ALTERNATIVES - FIGURE 3A

Calico Solar Project - Private Land Alternative Northern Section



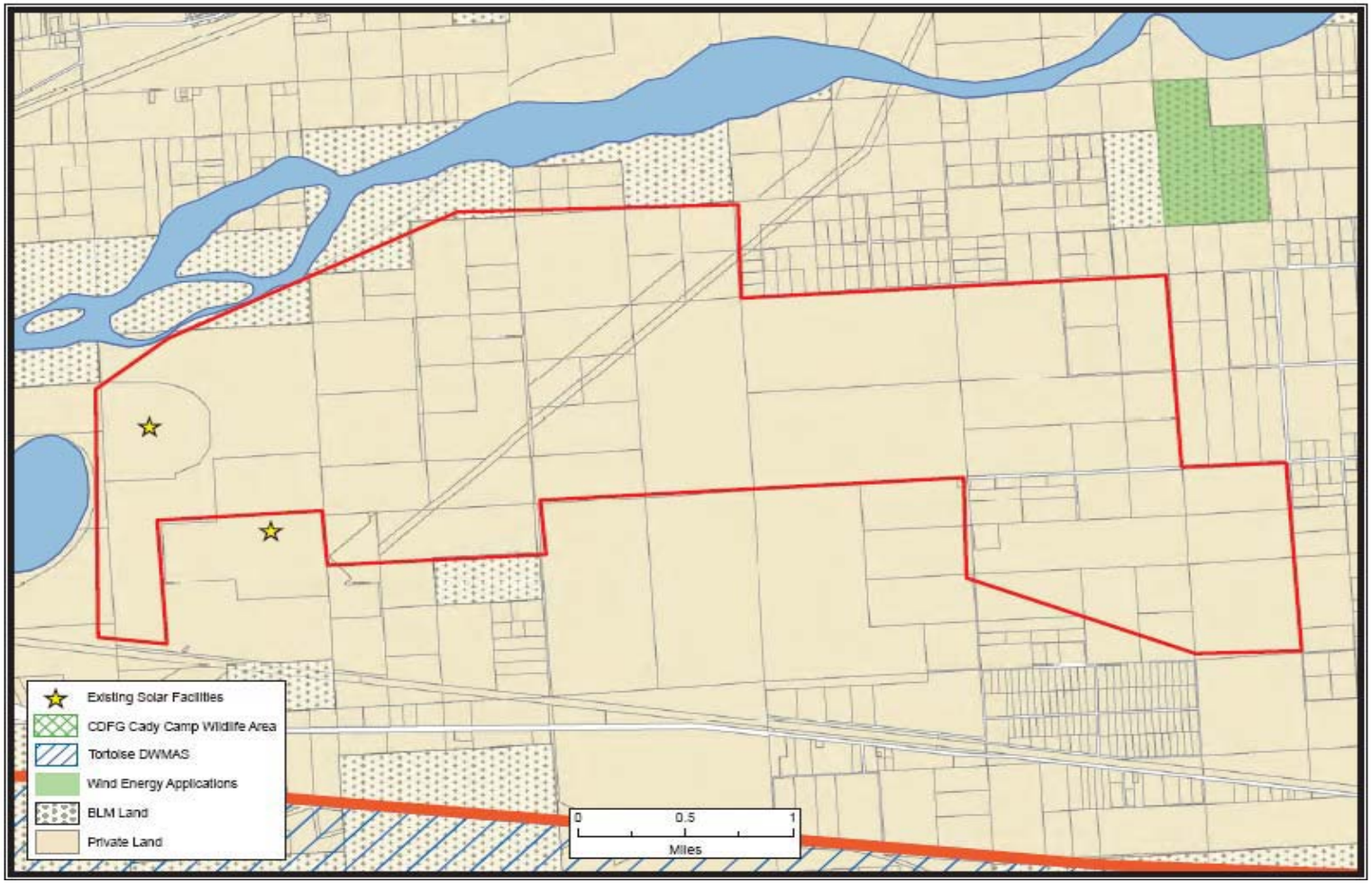
ALTERNATIVES

U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission - Tele Atlas Data - San Bernardino County

ALTERNATIVES - FIGURE 3B

Calico Solar Project - Private Land Alternative Southern Section



ALTERNATIVES

001017

The applicant considered two alternatives in the AFC that included the use of some private land (Upper Johnson Valley – AS2, and I-40 South – AS4). These sites were eliminated from further consideration by the applicant because they lacked railroad access and major highway access and conflicted with other uses.

There are limited areas where undeveloped contiguous private land exists within the California desert with the slope and solarity requirements defined by the applicant. The RETI Phase 2A Draft Final Maps (9/01/09) identified private, disturbed land appropriate for solar development east of Barstow, bounded by I-15 on the north and I-40 on the south. The Mojave River passes through this region, and its floodplain ranges from about 2,000 feet to one mile wide. The river parallels I-15 on a northeasterly trend.

Alternatives Figure 2 shows this area of private land and **Alternatives Figures 3A and 3B** illustrate the alternative in more detail. This alternative is made up of two separate and unconnected sections. The Private Land Alternative northern section has a total of approximately 64 parcels (27 separate landowners) making up approximately 4,000 acres. The Private Land Alternative southern section has a total of approximately 45 parcels (22 separate landowners), also comprising approximately 4,000 acres. Because each section is approximately 4,000 acres, the alternative would require two phases, each approximately 425 MW. The alternative is considered viable as an alternative site because the Calico Solar project defines construction of separate groups of SunCatchers. However, because the alternative would not be one contiguous parcel, additional major equipment and substations would be required for at this site, increasing the cost of the project.

The Private Land Alternative northern section would be located on private land with a few BLM parcels included, south of and adjacent to Interstate 15 in the community of Harvard, north of Newberry Springs. The Private Land Alternative northern section has appropriate insolation and minimal slope. The elevation of the site is approximately 1,800 feet above mean sea level. The site would be accessed via Harvard Road, off Interstate 15 at the Harvard Road exit. The California Department of Fish and Game (CDFG) owns lands located just south of the site boundary. Additionally, there are several existing structures and residences on some of this private land, and removal of houses or other structures may be required.

The Private Land Alternative southern section is located north of the National Trails Highway and BNSF railroad. This land has appropriate insolation and minimal slope and has been previously graded for agriculture use. Existing solar thermal projects (SEGS I and II) are sited immediately south of the alternative and the original U.S. DOE Solar Two project was located at this site; however, it was decommissioned in November, 2009 and the site may potentially be developed as a solar energy project. The elevation of the site is between sea level and 20 feet below sea level. The site would be accessed via I-40 at the Hidden Springs Road exit.

The Private Land Alternative would require acquisition of approximately 110 parcels, although the number of separate landowners is fewer. Due to the number of parcels that would have to be acquired, this alternative would be substantially more challenging for an applicant to obtain site control (in comparison to BLM land). The applicant would have to negotiate separately with multiple landowners. The Draft Phase 2a Report published by the Renewable Energy Transmission Initiative (RETI) in early June 2009 identified private land areas for solar development only if there were no more than 20 owners in a 2 square mile (1,280 acre) area.

The Mojave River is located in between the Private Land Alternative northern section and the Private Land Alternative southern section. The river is dry most of the year and flows only during the largest rain events. The land use character of the immediate alternative site area is open space, agriculture, and rural residential. Desert Wildlife Management Areas (DWMA) for protection of desert tortoise are located north and south of the alternative.

Approximately five residences are located within the Private Land Alternative northern section. Existing agriculture structures are located on the Private Land Alternative southern section. The Private Land Alternative would also be located adjacent to low density residential areas near Daggett and Newberry Springs. The Private Land Alternative southern section would be located adjacent to an area zoned as regional industrial.

SCE Coolwater-Dunn Siding 115 kV transmission line runs through the Private Land Alternative northern and southern sections. The Private Land Alternative sites would require either an upgrade of the SCE Coolwater-Dunn Siding 115 kV transmission line or the construction of a new 10-mile 230 kV transmission line that would follow the existing corridor southwest to the Coolwater Substation. Both the Private Land Alternative sections would require substations; however, one transmission line could be used for both sites.

The Private Lands Alternative would have impacts similar to those of the proposed site in many disciplines. However, because this alternative would be on disturbed agricultural lands, the alternative site is likely to have less severe cultural, visual, and biological resources impacts but greater noise and land use (agricultural lands) impacts than the proposed site. The Private Land Alternative presents an additional challenge: its northern section is made up of approximately 64 parcels with 27 separate landowners and the southern portion is made up of 45 parcels with 22 separate landowners. Due to the number of parcels that would have to be acquired, obtaining site control would be more challenging than at the proposed site where BLM is the only land management entity. In addition, detailed site engineering and transmission interconnection would require additional time for this site to be developed; as a result this alternative would not meet the project objective requiring that a decision to be made in 2010. (Ex. 300, p B.2-19 – B.2-49.)

6. No Project Alternative

CEQA requires an evaluation of the "No Project" alternative "… to allow decision-makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project." [14 Cal. Code Regs., § 15126.6(e)(1).] The "No Project" analysis assumes that baseline environmental conditions would not change because the project would not be constructed, and that the events or actions reasonably expected to occur in the foreseeable future would occur if the project were not approved.

If the "no project" alternative were selected, the construction and operational impacts of the CSP project would not occur. There would be no grading of the site, no loss or disturbance of approximately 4,600 acres of desert habitat, and no installation of extensive power generation and transmission equipment. The "no project" alternative would also eliminate contributions to cumulative impacts in the project viewshed. It is the environmentally preferred alternative.

In the absence of the CSP project, however, other power plants, both renewable and nonrenewable, would have to be constructed to serve the demand for electricity. If the "no project" alternative were chosen, other solar renewable power plants may be built, and the impacts to the environment would likely be similar to those of the proposed project because solar renewable technologies require large amounts of land and similar slope and solarity requirements as the proposed CSP project. The "no project" alternative may also lead to development

of other non-solar renewable technologies to help achieve the California Renewable Portfolio Standard.

Additionally, if the “no project” alternative were chosen, it is likely that additional gas-fired power plants would be built or that existing gas-fired plants could operate longer. If the project were not built, California would not benefit from the reduction in greenhouse gases that this facility would provide. SCE would not receive the 663.5 MW contribution to its renewable state-mandated energy portfolio. (Ex. 300, p. B.2-14.)

Eliminated alternatives of special note

Although eliminated from further consideration during the screening analysis, two alternatives deserve additional discussion because they were specifically advanced in testimony or comments as viable alternatives. They are distributed solar generation and conservation and demand side management.

a. Distributed Solar Technology

Distributed solar generation is generally considered to use PV technology, but at slightly larger scales, distributed solar can also be implemented using solar thermal technologies.

Rooftop Solar Systems. A distributed solar photovoltaic (PV) alternative would consist of PV panels that would absorb solar radiation and convert it directly to electricity. The PV panels could be installed on residential, commercial, or industrial building rooftops or in other disturbed areas. In order to be a viable alternative to this project, there would have to be a sufficient number of panels to provide 650 MW of capacity.

California currently has over 500 MW of distributed solar PV systems which cover over 40 million square feet (CPUC 2009). During 2008, 158 MW of distributed solar PV was installed in California, doubling the amount installed in 2007 (78 MW), and with 78 MW installed through May 2009, installation data suggests that at least the same amount of MW could be installed in 2009 as in 2008 (CPUC 2009).

Distributed Solar Thermal Systems. Solar thermal technology, specifically Concentrated Solar Power (CSP) technology, has also been adapted for use at distributed locations. This technology uses small, flat mirrors which track the sun

and reflect the heat to tower-mounted receivers that boil water to create superheated steam.

Installations of 850 MW distributed solar PV would require up to 255 million square feet (approximately 5,700 acres). Distributed solar PV is assumed to be located on already existing structures or disturbed areas so little to no new ground disturbance would be required and there would be few associated biological impacts. Minimal grading or new access roads would be required and relatively minimal maintenance and washing of the solar panels would be required. It is unlikely that the rooftop solar PV alternative would create erosion impacts. Relatively large amounts of water would be required to wash the solar panels, especially with larger commercial rooftop solar installations; however, the commercial facilities would likely already be equipped with drainage systems. Therefore, the wash water would not contribute to runoff or to erosion.

Because most PV panels are black to absorb sun, rather than mirrored to reflect it, glare would not create visual impacts as with the power tower, Fresnel, and trough technologies. Additionally, the distributed solar PV alternative would not require the additional operational components, such as dry-cooling towers, substations, transmission interconnection, maintenance and operation facilities with corresponding visual impacts. Solar PV panels would be visible to passing residents and may be viewed by a larger number of people.

The rate of PV manufacturing and installation is expected to continue to grow very quickly. However, given that there are currently only about 500 MW of distributed solar PV in California, the addition of an additional 850 MW to eliminate the need for the Calico Solar Project cannot be guaranteed. This would require an even more aggressive deployment of PV at more than double the historic rate of solar PV than the California Solar Initiative program currently employs. Challenges to an accelerated implementation of distributed solar PV include:

- **RETI Consideration of Subsidies, Tariffs, Cost, and Manufacturing.** The RETI Discussion Draft Paper *California's Renewable Energy Goals – Assessing the Need for Additional Transmission Facilities* published with the RETI Final Phase 2A Report (September 2009), addresses the likelihood of a scenario of sufficient distributed solar PV to remove the need for utility scale renewable development. This discussion paper identified the factors likely to influence the pace of large scale deployment of distributed solar PV: subsidies, feed-in tariffs, manufacturing and installation cost, and manufacturing scale-up.

- **Cost.** The 2009 IEPR states that solar PV technology has shown dramatic cost reductions since 2007, and is expected to show the most improvement of all the technologies evaluated in the 2009 IEPR model, bringing its capital cost within range of that of natural gas–fired combined cycle units. However, the CPUC *33% Renewables Portfolio Standard Implementation Analysis Preliminary Results* considered a number of cases to achieve a 33% RPS standard. The results of this study state that the cost of a high distributed generation case is significantly higher than the other 33% RPS alternative cases. The study explains that this is due to the heavy reliance on solar PV resources which are more expensive than wind and central station solar.
- **Tariffs.** Additionally, the IEPR discusses the need to adjust feed-in tariffs to keep downward pressure on costs. Feed-in tariffs should be developed based on the size and type of renewable resources, given that the cost of generating energy from a 100 MW wind farm is less than the cost of generating to ensure a good mix of new renewable energy projects. According to the report, differentiating feed-in tariffs by type and size can ensure a good mix of new renewable energy projects and avoid paying too much for some technologies and too little for others.
- **Limited Installations**. Examples of large scale distributed solar projects are still limited. In the spring of 2008, SCE proposed 250 to 500 MW of rooftop solar PV to be installed in 5 years. As of January 2010, SCE had installed only 3 MW. As the 2009 IEPR points out, the potential for distributed resources remains largely untapped and integrating large amounts of distributed renewable generation on distribution systems throughout the State presents challenges.
- **Electric Distribution System**. The State's electric distribution systems are not designed to easily accommodate large quantities of randomly installed distributed generation resources at customer sites. Accomplishing this objective efficiently and cost-effectively will require the development of a new transparent distribution planning framework.

(Ex. 300, pp. B.2-66 to B.2-69.)

Conservation and Demand-Side Management. Conservation and demand-side management consists of a variety of approaches to reduction of electricity use, including energy efficiency and conservation, building and appliance standards, and load management and fuel substitution. Energy efficiency helped flatten the state's per capita electricity use and saved consumers more than $56 billion between 1978 and 2005. However, with population growth, increasing demand for energy, and the need to reduce greenhouse gases, there is a greater need for energy efficiency.

Conservation and demand-side management is important for California's energy future and cost effective energy efficiency is considered as the resource of first choice for meeting California's energy needs. However, with population growth and increasing demand for energy, conservation and demand-management alone is not sufficient to address all of California's energy needs. Additionally, it will not provide the renewable energy required to meet the California Renewable Portfolio Standard requirements. (Ex. 300, p. B.2-84.)

FINDINGS OF FACT

Based upon the evidence, we find and conclude as follows:

1. The record contains an acceptable analysis of a reasonable range of site location and generation alternatives to the project as proposed.
2. The Reduced Acreage Alternative would reduce many of the impacts of the proposed project, but in doing so itt would also reduce the project's benefits of replacing fossil fuel fired generation and reducing associated criteria pollutant and greenhouse gas emissions.
3. The Private Lands alternative, while reducing the biological, cultural, and visual impacts of the proposed project, would have greater land use and noise impacts and be difficult to implement in the time desired due to the need to assemble upwards of 100 separate parcels with nearly 50 separate owners.
4. The No Project alternative is the environmentally superior alternative. It fails, however, to achieve the project objectives.
5. None of the site location or other alternatives to the project offer a superior alternative in terms of feasibly meeting project objectives and reducing its significant environmental impacts.

CONCLUSION OF LAW

1. The record contains a sufficient analysis of Alternatives and complies with the requirements of the California Environmental Quality Act, the Warren-Alquist Act, and their respective regulations.

No Conditions of Certification are required for this topic.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

IN REPLY REFER TO:
81440-2010-F-0246

October 15, 2010

Memorandum

To: Field Manager, Barstow Field Office, Bureau of Land Management, Barstow, California

From: Field Supervisor, Ventura Fish and Wildlife Office, Ventura, California

Subject: Biological Opinion on Tessera Solar's Calico Solar Power Generating Facility, San Bernardino County, California [(3031) P CA-680.33] (8-8-10-F-34)

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the Bureau of Land Management's (Bureau) proposed issuance of a right-of-way grant to Tessera Solar (Tessera) for the Calico Solar Power Generating Facility (Calico) and its effects on the federally threatened desert tortoise (*Gopherus agassizii*) in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). The proposed project involves construction, operation, maintenance, and decommissioning of a 4,613-acre solar power generating facility and the establishment of a 3,617-acre solar development exclusion zone on an 8,230-acre Bureau right-of-way. Your April 1, 2010 request for formal consultation was received by our office on April 7, 2010.

This biological opinion is based on information that accompanied your April 1, 2010, request for consultation (Bureau 2010a, URS 2010a) and additional information regarding changes in the project description obtained from Bureau staff during the formal consultation process. This additional information includes the revised biological assessment (URS 2010b), supplemental biological assessment (URS 2010c), supplemental biological assessment supplement: phased development of the Phase 1 component of the Calico Solar Project (URS 2010d), supplement #5 to the biological assessment (URS 2010e), final desert tortoise translocation plan (URS 2010g), draft staff assessment/environmental impact statement (Bureau and California Energy Commission [CEC] 2010), supplemental staff assessment (CEC 2010a), and final environmental impact statement and proposed amendment to the California Desert Conservation Area Plan (Bureau 2010b). A complete record of this consultation is on file at the Ventura Fish and Wildlife Office.

TAKE PRIDE IN AMERICA

Consultation History

On April 1, 2010, the Bureau initiated consultation for construction, operation, maintenance, and decommissioning of the Calico facility (Bureau 2010a). On April 22, 2010, we responded to your request with a memorandum that identified specific insufficiencies in the biological assessment (Service 2010a). On May 17, 2010, the Bureau submitted a revised biological assessment for the proposed project (URS 2010b), which we determined to contain sufficient information to initiate formal consultation (Service 2010b). Following release of the draft staff assessment/environmental impact statement (Bureau and CEC 2010), Tessera modified its project to reduce adverse effects to desert tortoises and rare plant species. The Bureau developed a supplemental biological assessment to describe the changes in the project description and the addition of critical habitat, and submitted it on July 19, 2010 (URS 2010c). The Service shared a draft biological opinion with the Bureau on the proposed project on August 18, 2010 (Service 2010c). Subsequent to the development of the supplemental biological assessment and the issuance of the draft biological opinion, Tessera further refined the project description to include phasing of the Phase 1 component of the proposed project construction, dividing Phase 1 into Phase1a and Phase 1b; the Bureau provided a description of the new project in a supplement on August 30, 2010 (URS 2010d). On September 3, 2010, the CEC directed Tessera to explore alternatives to the proposed project with a further reduced project footprint (CEC 2010b). The Bureau submitted a final project description with a project footprint of 4,613 acres on September 27, 2010 (URS 2010e). This biological opinion analyzes the effects associated with the reduced project footprint, phasing of the proposed project construction, and establishment of the solar development exclusion zone.

In addition, by electronic mail dated July 17, 2010 (Otahal 2010), you requested our concurrence with your determination that translocation of desert tortoises from the project site is not likely to adversely affect the critical habitat of the desert tortoise; the information to support your determination is contained in the supplemental biological assessment (URS 2010c). Tessera proposes to translocate a portion of the desert tortoises from the project site into the Ord-Rodman Critical Habitat Unit and monitor them for a period of no less than 5 years. In addition, Tessera would monitor resident desert tortoises in the critical habitat unit for the same period. Translocation and monitoring activities would consist of driving on Bureau- designated open routes, parking in small areas immediately adjacent to roads, and foot traffic within habitat to translocate and monitor desert tortoises. We concur with your determination that the proposed action is not likely to adversely affect critical habitat of the desert tortoise. We have reached this conclusion because most activities would occur on existing roads designated as open routes by the Bureau, which do not support the primary constituent elements of desert tortoise critical habitat. Activities associated with translocation could temporarily disturb a small amount of critical habitat adjacent to roads as a result of parking adjacent to the open routes and walking through areas to release and monitor desert tortoises; however, we expect the size of this disturbance to be minimal and its effect on the function of critical habitat to be insignificant. Construction, operation, maintenance, and decommissioning of the Calico facility would not occur within or indirectly affect critical habitat in any manner. Accordingly, we will not address critical habitat in this biological opinion. If the proposed action changes in a manner that may

affect critical habitat, the Bureau should contact us as soon as possible to determine whether further consultation would be appropriate.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Introduction

The proposed site is approximately 37 miles east of Barstow, south of the Cady Mountain Wilderness Study Area and directly adjacent to the southeastern boundary of the Pisgah Crater Area of Critical Environmental Concern (ACEC). The Ord-Rodman Desert Wildlife Management Area (DWMA) is located southwest of the project and south of Interstate 40. Tessera would construct the solar facility in three phases (Phase 1a, Phase 1b and Phase 2; URS 2010d). Phase 1 would be 275 MW covering approximately 1,876 acres and sub-divided into 2 phases, Phase 1a and Phase 1b. Construction of Phase 1a would consist of 250 acres of ground disturbance and would include the construction of the main access road, a 990-foot underground water pipeline, a main services area, a substation area, a temporary at-grade crossing, a permanent bridge spanning the Burlington Northern Santa Fe (BNSF) railroad tracks and the installation of 60 solar dish Stirling systems (SunCatchers) pedestals. Prior to completion of the at-grade railroad crossing, the existing BNSF crossing and right-of-way (ROW) would be used to access Phase 1a. Phase 1b would cover the remainder of Phase 1, approximately 1,626 acres. The third phase, Phase 2, would cover approximately 2,737 acres and bring the total number of installed SunCatchers to 26,390. In addition, Tessera would construct an approximately 2-mile transmission line to connect the on-site Calico substation to the Pisgah substation located just east of the project site. The Bureau will also establish a 3,617-acre solar development exclusion zone through amendment of the California Desert Conservation Area Plan to prevent future solar development in portions of the right-of-way not disturbed by project activities. We summarized the description of the proposed action from your request for consultation (Bureau 2010a), the revised biological assessment (URS 2010b), the supplemental biological assessment (URS 2010b), the supplemental biological assessment supplement (URS 2010d), supplement #5 to the biological supplement (URS 2010e), the supplemental staff assessment (CEC 2010a), and the Calico Solar Power Project presiding member's proposed decision (CEC 2010b).

Construction

Construction of the Calico facility would occur over approximately 44 months (CEC 2010b) and require a workforce of 400 to 750 people. Heavy construction would typically occur from 7:00 a.m. to 7:00 p.m., Monday through Friday. Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. The temporary fencing for Phase 1a may be installed throughout the night to expedite project construction (URS 2010e). Access to the facility during construction and operation would be via the Hector Road exit at an existing interchange from Interstate 40.

All project site construction would occur within desert tortoise exclusion fencing. Tessera would install this fencing in conjunction with the construction phases. Within the project site, Tessera proposes to build surface-treated roadways, north-south access routes and east-west access routes, including a combination of roadway dips and elevated sections across drainage features. The Calico facility includes an on-site substation (approximately 15 acres), a main services complex (37.6 acres), water supply and treatment system, a buried septic tank system with a dual sanitary leach field, two hydrogen generating and distribution systems, an electrical collection system (both underground and overhead), railroad overpass to cross the existing BNSF railroad tracks, a temporary at-grade railroad crossing, two 3,000,000-gallon evaporation ponds, and security perimeter fencing. Localized channel grading would be used on a limited basis to improve channel hydraulics and to control the direction of storm water flow. If retention basins are necessary, they would be designed to be empty within 72 hours. The main services complex would contain three SunCatcher assembly buildings, administrative offices, operations control room, maintenance facility, demineralized water storage tank, and a potable water tank. The Calico facility solar field includes 26,450 38-foot-tall SunCatchers. Tessera would vibrate the base of each SunCatcher unit into place. Paired rows of SunCatchers would have access roads on either side, allowing for 40 to 80 feet of vegetation to remain between each alternate row of SunCatchers. The construction and operation of most of these facilities would not affect the desert tortoise in any manner; consequently, we will not discuss them further in this document.

The proposed project would transmit electricity to the existing Pisgah substation via an approximately 2-mile-long, 220-kilovolt transmission line, requiring the installation of 12 to 15 structures, 90 to 110 feet high. The transmission line would extend outside of the project site fencing by 2,800 feet. Construction of the portion of the line outside of the project site would occur within temporary desert tortoise exclusion fence.

An underground pipeline would deliver water to the Calico facility from a production well on private lands north of the facility, identified as "Not a Part Area 1" (NAP 1) (URS 2010c). This pipeline would extend outside of the project boundary fence; construction would occur within temporary desert tortoise exclusion fence.

Operation and Maintenance

The Calico facility would have an operating life of 40 years; however, the Bureau would issue the right-of-way grant for 20 years and has considered the life of the project to be 30 years. The Calico facility would likely operate 7 days a week with a staff of approximately 180 full-time employees. Including maintenance, the proposed facility would operate 24 hours a day. Workers would access the Calico facility by way of the Hector Road exit, which would connect to new and existing access roads, which Tessera would fence with desert tortoise exclusion fencing. All maintenance activities would occur within fenced areas.

On a monthly basis, Tessera would wash each SunCatcher mirror surface with 14 gallons of demineralized water. During a 3-month period each year, every SunCatcher would receive a "scrub" wash that could require up to 42 gallons of water per SunCatcher (SES 2008). In total, Tessera would use approximately 36.2 acre-feet of well water per year for washing SunCatchers,

dust control, and water treatment system discharge. (Water consumption may actually be less than 36.2 acre-feet per year, which was the estimated use associated with the original, larger project; Tessera did not provide an updated estimate on water consumption in association with the reduction of the number of SunCatchers for the proposed project.) Tessera would mow or trim vegetation between the rows of SunCatchers to allow for proper operation, maintenance, and fire safety.

Decommissioning and Restoration

If the Calico facility were permanently closed, all the project equipment, facilities, structures and associated facilities would be removed from the site. Prior to decommissioning, Tessera would coordinate with the appropriate agencies to develop a decommissioning plan acceptable to the Bureau (Bureau and CEC 2010). At that time, the Bureau would determine if decommissioning requires additional consultation, pursuant to section 7(a)(2) of the Endangered Species Act. Consequently, we will not analyze the potential effects of decommissioning and associated restoration on the desert tortoise at this time.

Minimization Measures

General Protective Measures

To minimize adverse effects to the desert tortoise, Tessera will implement the following protective measures during construction, operation and maintenance activities. We have changed the wording of some measures identified in the biological assessment and incorporated some of the conditions of certification from the CEC supplemental staff assessment (CEC 2010a), but we have not changed the substance of the measures that Tessera has proposed.

1. Tessera will employ authorized biologists, approved by the Bureau, Service, CEC and California Department of Fish and Game (CDFG) and desert tortoise monitors to ensure compliance with protective measures for the desert tortoise. Use of authorized biologists and desert tortoise monitors will be in accordance with the most up-to-date Service guidance and will be required for monitoring of any construction, operation, or maintenance activities that may result in adverse effects to the desert tortoise. The current guidance is entitled *Desert Tortoise – Authorized Biologist and Monitor Responsibilities and Qualifications* (Service 2008a).

2. Tessera will provide the credentials of all individuals seeking approval as authorized biologists to the Bureau. The Bureau will review these and provide the credentials of appropriate individuals to the Service, CEC and CDFG for approval at least 30 days prior to the time they must be in the field for construction-related ground disturbance.

3. Tessera will designate a field contact representative who will oversee compliance with protective measures during construction, operation, and maintenance activities that may result in injury or mortality of desert tortoises. If the field contact representative, authorized biologist, or desert tortoise monitor identifies a violation of the desert tortoise

protective measures, they will halt work until the violation is corrected.

4. Individuals approved to handle desert tortoises (i.e., authorized biologists and desert tortoise monitors approved by the authorized biologist) will do so in compliance with the most up-to-date guidance from the Service. The Service is currently using the *Desert Tortoise Field Manual* (Service 2009a).

5. Tessera will develop and implement a worker environmental awareness program approved by the Bureau, Service, CEC and CDFG. The worker environmental awareness program will be administered to all onsite personnel including surveyors, construction engineers, employees, contractors, contractor's employees, supervisors, inspectors, subcontractors, and delivery personnel. The worker environmental awareness program will be implemented during site preconstruction, construction, and operation and will include, but is not limited to, the following:

   (a) a presentation in which supporting written material and electronic media, including photographs of protected species, is made available to all participants.
   (b) special emphasis on desert tortoises, including information on physical characteristics, distribution, behavior, ecology, sensitivity to human activities, legal protection, penalties for violations, reporting requirements, and protection measures.
   (c) identification of a contact if workers have further comments and questions about the material discussed in the program.

6. Prior to any ground-disturbing activities, Tessera will fence the area with desert tortoise exclusion fence, either temporary or permanent, and conduct desert tortoise clearance surveys. Desert tortoise exclusion fencing will follow the specifications provided in the *Desert Tortoise Field Manual* (Service 2009a). We have provided a description of the procedures for clearance, translocation, and monitoring of these animals below. Workers will perform all ground-disturbing activities in areas fenced with desert tortoise exclusion fence. Only activities related to desert tortoise translocation and translocation monitoring will occur outside of these areas.

   Following installation of the desert tortoise exclusion fencing for both the permanent site fencing and temporary and permanent exclusionary fencing, the fencing shall be regularly inspected. Permanent and temporary fencing will be inspected at least two times a day for the first 7 days to ensure a recently moved tortoise has not been trapped within the fence. Thereafter, permanent and temporary fencing will be inspected monthly and within 24 hours following all major rainfall events. A major rainfall event is defined as one for which flow is detectable within the fenced drainage. Any damage to the fencing will be temporarily repaired immediately to keep tortoises out of the site, and permanently repaired within 48 hours of observing damage. Inspections of permanent site fencing will occur for the life of the Project. If the fence may have permitted tortoise entry while damaged, the DETO monitors will inspect the area for tortoise. If fencing is not repaired within 48 hours, the BLM, USFWS, and CDFG Wildlife Biologists will be

notified immediately to determine if additional remedial action is required, such as the need for conducting additional clearance surveys within the Project footprint.

7. Tessera will confine all construction activities (including staging and material storage), project vehicles, and equipment within the delineated boundaries of construction areas that authorized biologists or designated desert tortoise monitors have identified and cleared of desert tortoises.

8. Tessera will prohibit project personnel from driving off road or performing ground-disturbing activities outside of designated areas during construction, operation, and maintenance except to deal with emergencies.

9. During operation and maintenance activities at the completed project site, Tessera will confine all vehicle parking, material stockpiles, and construction related materials to the permanently fenced project site. Vehicular traffic will be confined to existing routes of travel to and from the project site; cross country vehicle and equipment use outside designated work areas will be prohibited except to deal with emergency situations.

10. To reduce the potential for vehicle strikes of desert tortoises, Tessera will enforce a 25-mile-per-hour speed limit for project-related travel (i.e., construction, operation, and maintenance) within the site and on non-public access roads in areas surrounding the site. All project personnel will maintain this speed limit when traveling outside of a fenced area; this measure does not apply to public roads that have been posted with speed limits.

11. With the exception of security personnel, Tessera will prohibit firearms on the project site.

12. Project personnel working outside of fenced areas will check under vehicles or equipment before moving them. If project personnel encounter a desert tortoise, they will contact an authorized biologist. The desert tortoise will be allowed to move a safe distance away prior to moving the vehicle. Alternatively, an authorized biologist may move the desert tortoise to a safe location to allow for movement of the vehicle.

Management of Common Ravens

Tessera will implement the following project design features and protective measures to reduce the adverse effects associated with predation of desert tortoises by common ravens (*Corvus corax*). The draft management plan for common ravens (URS 2010g) contains more detailed information on the following actions. The Bureau, Service, CEC, and CDFG must approve this plan prior to the initiation of any ground-disturbing activity.

1. Tessera will dispose of all trash- and food-related waste associated with the project in secure, self-closing receptacles to prevent the introduction of subsidized food resources for common ravens.

2. Tessera will promptly remove and dispose of all road-killed animals on the project site or its access roads.

3. Tessera will use water for construction, operation, and maintenance (e.g., truck washing, dust suppression, SunCatcher washing, landscaping, etc.) in a manner that does not result in puddling. Because mirror cleaning will be conducted at night, Tessera anticipates that water will either evaporate or sink into the ground by morning and therefore be unavailable to wildlife.

4. Tessera will monitor the evaporation ponds on site for common raven use according to the approved Calico Solar Evaporation Pond Design Monitoring and Management Plan.

5. Tessera will install generation tie-lines on utility poles designed to be incompatible with nesting of common ravens in accordance with Avian Power Line Interaction Committee guidelines (2006) and will monitor the effectiveness of these deterrence measures. Tessera will implement alternative measures if the current effort is unsuccessful.

6. All transmission lines associated with the Calico facility will be designed in a manner that will reduce the likelihood of nesting by common ravens. Tessera will monitor all of these utility lines and other potential nesting structures and remove common raven nests that it identifies, following authorization by the Bureau and the Service.

7. Tessera will monitor the Calico facility to identify frequently used perching locations for common ravens. If it identifies such locations, Tessera will install bird barrier spikes or other functional equivalents.

8. Tessera will fund lethal removal of problem common ravens if deemed appropriate by the Bureau and the Service. Problem common ravens are individuals that have been shown, through monitoring, to prey on desert tortoises.

9. Tessera will monitor the effectiveness of its management plan for common ravens during construction and for 5 years following completion of the project. After this initial period, Tessera will monitor once every 5 years, unless results indicate more or less frequent monitoring is necessary.

Tessera will develop and implement adaptive management measures if monitoring shows that the management plan is not effective in controlling common raven use of the project site. Tessera will consult with the Bureau, the Service, CEC and CDFG prior to implementing adaptive management changes.

To address indirect and cumulative effects that it cannot fully eliminate through implementation of an onsite common raven management plan CEC is requiring Tessera to contribute funds to the regional common raven management program. The fee will contribute to an account established with the National Fish and Wildlife Foundation, discussed later under the Compensation section

of this biological opinion, to implement recommendations in the Service's *Environmental Assessment to Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise* (Service 2008b). This environmental assessment identifies several activities to reduce common raven predation on desert tortoises, including reduction of human-provided subsidies (e.g., food, water, sheltering and nesting sites), education and outreach, the removal of common ravens and their nests, evaluation of effectiveness, and adaptive management. In addition to the fees described in the Compensation section, Tessera will contribute $105 per acre of disturbance for the 4,613 acres of desert tortoise habitat affected by this project. The Bureau has informed the Service that this CEC condition is also part of its action and thus has been considered in this analysis (Pogacnik 2010).

Weed Management

Tessera has submitted a draft plan to the Bureau that provides monitoring, preventative, and management strategies for weed control during construction activities and a long-term strategy for weed control and management during the operation of the project. The Bureau, Service, CEC and CDFG must approve the plan prior to the initiation of any ground-disturbing activity.

1. Tessera will designate an environmental compliance manager to provide oversight of construction practices and ensure compliance with weed management provisions.

2. Tessera will provide training to all personnel charged with environmental management responsibilities that will include the following: a) weed plant identification, b) effects of non-native invasive weeds on native vegetation, wildlife, and fire activity, and c) required measures to prevent the spread of non-native invasive weeds on the site.

3. Tessera will survey for new invasive weed populations and monitor identified and treated populations at the Calico facility as well as within a 250-foot buffer area surrounding the site on Bureau-managed lands and accessible private lands. Tessera will quantify the baseline weed abundance in the portion of the Pisgah Crater ACEC adjacent to and within 500 meters of the eastern project boundary, north of the BNSF railroad tracks.

4. Tessera will maintain vehicle wash and inspection stations and closely monitor materials brought onto the site to minimize the potential for weed introduction.

5. Vehicles traveling into the areas used for desert tortoise translocation (i.e., recipient and control sites) will follow the requirements of the Calico Weed Management Plan to minimize the potential for the introduction of non-native species to these areas.

6. Tessera will apply all herbicides used in weed treatments according to a plan approved by the Bureau and in accordance with the herbicide labels. Tessera will only use licensed individuals for herbicide application and will suspend herbicide use when any of the following conditions are met: a) wind velocity exceeds 6 miles-per-hour during application of liquids or 15 miles-per-hour during application of granular herbicides, b)

snow or ice covers the foliage of weeds, c) precipitation is occurring or is imminent, or d) air temperatures exceed 90 degrees Fahrenheit.

7. Tessera will only use herbicides that have shown empirically-proven low toxicity to test animals. Tessera will request and receive approval of herbicides from the Bureau and Service prior to use.

8. Mulch or green waste from mown weed infestations on site will be removed from the Calico facility in a covered vehicle and transported to a licensed landfill or composting facility.

Desert Tortoise Translocation

Fencing and Clearance Surveys

Tessera will fence the Calico facility with a standard security fence and construct a boundary road around the project site to maintain public access to Bureau and private lands. To minimize adverse effects to desert tortoises from the project and the boundary road, Tessera will install desert tortoise exclusion fencing on the edge of the boundary road furthest from the site to prevent desert tortoises from accessing the road or the Calico facility. Where the fenced project boundary road intersects any other designated route or open road, Tessera will install cattle guards to prevent desert tortoises from gaining entry to the project site and associated roads. For the construction of each phase of the Calico facility, Tessera will install any additional temporary or permanent exclusion fence around the planned construction area to prevent desert tortoises from gaining access. Tessera will install temporary exclusion fencing around the construction area for the 2,800-foot interconnect line, the 990-foot underground pipeline, and the groundwater well, all of which extend outside the project site fence. Tessera will remove this temporary fence following completion of construction.

Within 24 hours prior to construction of the desert tortoise exclusion fence, authorized biologists will survey the staked fence alignment for desert tortoises. Tessera will conduct desert tortoise clearance surveys with transects 5 meters apart, covering a 30-meter-wide band centered on the fence alignment. During these surveys, an authorized biologist will inspect all burrows to determine occupancy and collapse unoccupied burrows. To the extent feasible, Tessera will modify the fence alignment to fence occupied burrows out of the Calico site and associated boundary road. If the fence cannot avoid a desert tortoise burrow, an authorized biologist will remove the individual and process it as detailed in the desert tortoise translocation plan.

For Phase 1a, Tessera will construct the 15.5 miles desert tortoise exclusion fence in 2 shifts, one during the day and one at night (night defined as: 1 hour before sunset until one hour after sunrise). To minimize the potential adverse effects to desert tortoises specific to night construction, Tessera will implement the following measures during the fencing of Phase 1a of the Calico project:

1. Tessera will delineate the 30-meter survey area centered on the fence line during daylight hours so that all workers can identify the authorized construction area. No work, during the day or night, will occur outside of the delineated area.

2. Tessera will inspect all the desert tortoise burrows in the 30-meter survey area during the day before night activities are to occur to determine occupancy, using an optical scope if necessary. If a burrow is determined to be occupied, a temporary desert tortoise exclusion fence will be built around the burrow and the Phase 1a exclusion fence will be built around the burrow. If the fence re-alignment excludes the desert tortoise from Phase 1a, Tessera will remove the temporary fencing around the burrow after construction in the area is complete. If the fence re-alignment encompasses the burrow within Phase 1a, the fencing will remain in place and Tessera will begin monitoring this burrow according to the translocation plan. The fencing around the burrow should encompass the entire burrow including the front apron and allow room for the desert tortoise to exit the burrow; approximately 3 square feet of open area extending from the outer edge of the burrow apron edge should remain at the mouth of the burrow.

3. Tessera will collapse burrows that are determined to be empty in accordance with the Service's guidelines. The Service is currently using guidance provided in the *Desert Tortoise Field Manual* (Service 2009a).

4. Tessera will collect any desert tortoises found on the surface during nighttime construction activity and hold them in a sanitized tub. In the morning, Tessera will move the desert tortoise to a previously constructed quarantine pen outside of Phase 1a. Quarantine pens will be constructed as described in the project's desert tortoise translocation plan.

5. Tessera will not clear any vegetation during the night shift of Phase 1a; any vegetation removal will take place during daytime hours.

6. Tessera will stage all fencing material within the previously delineated construction area the day before night fencing activities will occur.

7. Tessera will ensure that work areas have adequate lighting to minimize potential shadow effects, to ensure authorized biologists can detect desert tortoises without added difficulty, and to ensure that work crews stay within the allowed work area.

8. Tessera will ensure that all vehicles observe a 5-mile-per-hour speed limit during nighttime construction activities including access to construction areas.

Following construction of the desert tortoise exclusion fence around any given portion of the Calico project (i.e., Phase 1a, Phase 1b, Phase 2, transmission line, underground water pipeline, fences which may be constructed to allow for small areas of phased development), Tessera will perform a full clearance survey of the fenced area during the spring (i.e., April to May) or fall

(i.e., late August to mid-October). Authorized biologists and supervised desert tortoise monitors will conduct a minimum of 2 complete clearance sweeps over the entire project site with transects no wider than 5 meters. Surveyors will conduct transects for each sweep in different directions to allow for opposing angles of observation. Tessera will consider the site clear after no new desert tortoises have been discovered during two complete passes. Authorized biologists will excavate all potential desert tortoise burrows by hand to confirm occupancy status. Tessera will collect data on all desert tortoises handled as outlined in the project translocation plan.

Because construction of Phase 1a will not begin until after the end of the fall clearance window in mid-October, Tessera will conduct special clearance surveys for this phase of the project. Tessera will follow all clearance survey methodology with the exception of clearance windows provided above; however, any desert tortoises found in burrows will be left undisturbed and a desert tortoise exclusion fence will be built around the burrow. Tessera will check the desert tortoises enclosed in the pen weekly to ensure that they remain in hibernation. If a desert tortoise is found above ground during a weekly check, Tessera will move the desert tortoise to a quarantine pen outside of Phase 1a. Any desert tortoise detected above ground during surveys will be collected and placed in a quarantine pen. Tessera will translocate all of the desert tortoises found in Phase 1a in the spring as provided in the project translocation plan.

Translocation

Tessera will follow the procedures outlined in the translocation plan for the proposed project (URS 2010f). An authorized biologist will move all desert tortoises found during clearance surveys to pre-selected recipient sites. Recipient sites for the translocated desert tortoises include portions of the Pisgah Crater ACEC to the east of the project (Pisgah ACEC translocation site), the area north of the project site between the Cady Mountains and the desert tortoise exclusion fence (Linkage translocation site), and the northeastern portion of the Ord-Rodman DWMA (Ord-Rodman DWMA translocation site; URS 2010c).

All desert tortoises determined to be appropriate for translocation (i.e., having good body condition and showing no sign of diseases such as upper respiratory tract disease, herpes virus, shell disease, or other diseases) will be marked with a unique identifier determined by the Desert Tortoise Recovery Office and released in a safe location underneath a shrub. If desert tortoises show signs of disease, they will not be released until Tessera has coordinated with the Service. Prior to translocation, Tessera will ensure that all desert tortoises receive a visual health assessment to verify that each individual does not show signs of disease. Desert tortoises translocated a distance greater than 500 meters will be tested for disease [i.e., Enzyme-linked immunosorbent assay, (ELISA) test] via blood sampling. Any desert tortoises that are moved a distance less than 500 meters will not require a blood sample as part of the health assessment. Tessera will quarantine desert tortoises that show signs of disease at a location agreed upon by the Bureau, CDFG, CEC, and Service. Tessera will not translocate desert tortoises outside of the recommended temperature guidelines or outside of the desert tortoise active season (generally between April 1 and May 31), with the exception of the desert tortoises in Phase 1a, which will be moved to quarantine pens within the project site if they are detected above ground during

clearance surveys. Tessera will maintain a record of all desert tortoises encountered and translocated during project surveys and monitoring.

For Phases 1b and 2, Tessera will quarantine desert tortoises requiring blood samples for disease testing (individual translocated greater than 500 meters) within the desert tortoise exclusion fence constructed for the particular construction phase. During clearance surveys, Tessera will fit each desert tortoise with a transmitter and give it a unique identifier when blood samples are collected. These desert tortoises will move freely within the project fence boundary until disease test results are received (i.e., *in situ* quarantine). Tessera will hold juvenile desert tortoises, which are too small to receive transmitters, in a quarantine pen within the project site until disease results are available. In some instances, Tessera may move subadult and adult desert tortoises (i.e., those greater than 180 millimeters in length) located during clearance surveys into a quarantine pen on another portion or the project site rather than proceeding with *in situ* quarantine. (By "subadult and adult desert tortoises," we mean any combination of individuals of these age classes.) Desert tortoises with negative disease test results that are found within 500 meters of a desert tortoise with positive test results (either on day of blood collection or translocation) will be retested for infections prior to translocation. Tessera will not translocate any desert tortoises prior to the Service's concurrence with the health assessment and disposition plan for that individual. (Each disposition plan will describe the conditions regarding a specific desert tortoise; staff from the Service's Desert Tortoise Recovery Office will review each plan and approve it before any desert tortoise is translocated. Based on the specific conditions of the desert tortoise, the capture area, the translocation area, and possibly other factors, the Desert Tortoise Recovery Office may allow for minor modifications of the guidance in the translocation plan as a result of the information in the disposition plan. For example, if the Desert Tortoise Recovery Office deems the conditions to be appropriate, a desert tortoise found slightly more than 500 meters from the project's boundary may be moved under the prescriptions for a short-distance translocation (i.e., less than 500 meters from the fence).)

To reduce the potential that translocated desert tortoises could become infected by disease from contact with individuals within the recipient area, Tessera will conduct surveys within the Ord-Rodman DWMA translocation area to demonstrate the prevalence of disease. The disease rate in the Ord-Rodman DWMA translocation area must be less than 5 percent (95 percent confidence level) to be considered a valid recipient area for translocated desert tortoises. To further decrease the potential for disease spread associated with translocation, Tessera will establish a 6-kilometer buffer around any resident desert tortoise that is determined to be diseased or seropositive (i.e., a seropositive animal is one that has a positive result from blood testing) based on the health assessment and blood testing.

Monitoring

Tessera will attach transmitters to and monitor all desert tortoises cleared from the Calico project site which are of sufficient size to accommodate transmitters. Smaller animals will be blood tested (when being moved greater than 500 meters) and translocated without transmitters if found to be in good health. Tessera will also attach transmitters to and monitor desert tortoises

that are resident to the recipient and control areas. Tessera will attempt to locate and attach transmitters to equal numbers of recipient, control, and translocated desert tortoises. In the event that too few resident desert tortoises can be located, Tessera will confer with the Service, Bureau, CEC, and CDFG to determine if additional searches to located more desert tortoises are needed. The location of the control population will be in habitat similar to but at least 6.2 miles distant from the recipient area or in an area separated from the recipient area by a physical barrier that prevents desert tortoise movement. The area selected for the Calico facility is north of the project site on the western edge of the Cady Mountain Wilderness Study area (URS 2010c). Tessera will use qualified biologists, authorized by the Service, Bureau, CEC, and CDFG to monitor these populations.

In addition to attaching transmitters to desert tortoises in the recipient and control areas, Tessera will collect blood samples on the resident subadults and adults located in the recipient areas receiving desert tortoises from more than 500 meters away and all subadult and adult desert tortoises receiving transmitters in the control site. Tessera will not translocate any desert tortoises from the project site to a location within 6 kilometers of a resident desert tortoise showing either clinical signs of disease or with a blood test result indicating that the individual is seropositive.

During monitoring, Tessera will collect information on survivorship, mortality rates, health status, body condition, movement of individuals, and predation to inform adaptive management. Tessera will monitor the translocated, resident, and control desert tortoises for a minimum of 5 years. Tessera has provided a more detailed description of the monitoring program in its translocation plan (URS 2010f). Following more intensive monitoring immediately after translocation, locations for individuals will be collected at a minimum of once per week from March to November and once every other week from November to February.

To minimize adverse effects to the desert tortoises, Tessera will implement the following protective measures when implementing clearance surveys, desert tortoise translocation and monitoring:

1. Tessera will design all desert tortoise exclusion fencing in accordance with the Service guidelines. The Service is currently using guidance provided in the *Desert Tortoise Field Manual* (Service 2009a).

2. Tessera will comply with the most up-to-date guidance for performing clearance surveys and handling desert tortoises. The Service is currently using the *Desert Tortoise Field Manual* (Service 2009a).

3. Tessera will use authorized biologists for the performance of clearance surveys and for any other activities that require the handling of desert tortoises. If Tessera uses desert tortoise monitors during clearance surveys or for other activities that require identification of sign or handling of desert tortoises, they will do so under the direct supervision of an authorized biologist.

4. Tessera will use authorized biologists with additional qualifications approved by the Service for attaching transmitters and collecting blood samples.

5. Following clearance of the fenced project phases, an authorized biologist will be onsite during initial clearing and grading to move any desert tortoises missed during the clearance surveys. Following initial clearing and grading, an authorized biologist will be on-call during construction, should a desert tortoise be located inside the project construction site.

6. An authorized biologist will hydrate all desert tortoises scheduled for translocation within 12 hours prior to release in accordance with the translocation plan.

7. Tessera will only use Service-authorized individuals that have experience identifying the clinical signs of upper respiratory tract disease, herpes virus, and cutaneous dyskeratosis for the performance of health assessments. Tessera will provide the Service with the qualifications of any authorized biologists that it will use to perform health assessments on desert tortoises during clearance and translocation activities.

8. The number of desert tortoises translocated into each translocation area will not exceed the Service (2010g) recommended percentage over the estimated population density (i.e., 30 percent above 5.0 subadult and adult desert tortoises per square kilometer for the Pisgah ACEC translocation area and 30 percent above 8.2 subadult and adult desert tortoises per square kilometer for the Ord-Rodman DWMA translocation area). Because desert tortoises translocated into the Linkage translocation area will be moved less than 500 meters, no density threshold has been applied for this translocation area.

Compensation

We summarized the following information from the Bureau's final environmental impact statement for the proposed action (Bureau 2010b). The Bureau will require Tessera to compensate for the loss of desert tortoise habitat at a compensation ratio of 1:1 per the provisions of the West Mojave Plan (Bureau et al. 2005). Tessera will pay the Bureau's compensation as a fee based on the July 23, 2010 Renewable Energy Action Team (REAT) fee schedule (total $16,196,623.95) or as modified by the REAT at the time of compensation payment. Furthermore, Tessera may pay this fee in a phased manner, pending discussions with the REAT, rather than as a lump sum. The memorandum of agreement between the REAT agencies and National Fish and Wildlife Foundation allows the REAT agencies to require additional funding to be deposited into the project-specific account if the agencies find the money is not adequate to implement the required biological mitigation (REAT 2010). The funds will be used for enhancement of desert tortoise habitat within the Ord-Rodman DWMA. The enhancement funds may be used to cover environmental review and implementation of the activities listed below, including the hiring of contractors to carry out the activities. The following is a list of potential habitat enhancement and rehabilitation actions, identified by the Bureau that could be implemented to fulfill the Bureau's compensation requirements:

1. Construction of 40 miles of desert tortoise exclusion fence along State Route 247 from Barstow to Lucerne Valley to prevent desert tortoises from entering the roadway, with the primary focus area being between Barstow and Stoddard Ridge.

2. Installation of 60 miles of barrier fencing (post and cable) along Camp Rock road to prevent unauthorized vehicular use of desert tortoise habitat within the DWMA.

3. Addressing road needs within the Ord-Rodman DWMA including signing of 280 miles of open routes, signing and closure of 172 miles of undesignated routes, and rehabilitation of at least 100 miles of these routes.

4. Habitat enhancement via exotic weed control.

5. Installation of desert tortoise exclusion fence along Interstate 40.

6. Securing mines in which desert tortoises may become trapped.

7. Funding a headstart program for desert tortoises developed in coordination with the Service's Desert Tortoise Recovery Office.

In addition to the required compensation described above, the CDFG and CEC will require compensation for loss of desert tortoise habitat at a ratio of 2:1 for the lands north of the BNSF railroad. The State agencies will require compensation at a ratio of 4:1 for 369 acres of this area, because of their high value to desert tortoises. The portion of compensation required by these agencies will be used to acquire desert tortoise habitat in the Ord-Rodman, Superior-Cronese, or Fremont-Kramer DWMAs. The Bureau informed the Service that this compensation requirement is part of the project description for its action, and thus has been considered in this analysis (Pogacnik 2010).

ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATION

The jeopardy analysis in this biological opinion relies on four components: (1) the Status of the Species, which describes the range-wide condition of desert tortoises, the factors responsible for that condition, and its survival and recovery needs; (2) the Environmental Baseline, which analyzes the condition of the desert tortoise in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the desert tortoise; (3) the Effects of the Action, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the desert tortoise; and (4) the Cumulative Effects, which evaluates the effects of future, non-Federal activities in the action area on the desert tortoise.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the current status of the desert tortoise, taking into account any cumulative effects, to determine if implementation of the proposed

action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the desert tortoise in the wild.

The jeopardy analysis in this biological opinion places an emphasis on consideration of the range-wide survival and recovery needs of the desert tortoise and the role of the action area in the survival and recovery of the desert tortoise as the context for evaluation of the significance of the effects of the proposed federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

STATUS OF THE SPECIES

Basic Ecology of the Desert Tortoise

The desert tortoise is a large, herbivorous reptile found in portions of the California, Arizona, Nevada, and Utah deserts. It also occurs in Sonora and Sinaloa, Mexico. In California, the desert tortoise occurs primarily within the Creosote, Shadscale, and Joshua Tree Series of Mojave Desert Scrub, and the Lower Colorado River Valley subdivision of Sonoran Desert Scrub. Optimal habitat has been characterized as creosote bush scrub in areas where precipitation ranges from 2 to 8 inches, diversity of perennial plants is relatively high, and production of ephemerals is high (Luckenbach 1982, Turner and Brown 1982, Schamberger and Turner 1986). Soils must be friable enough for digging of burrows, but firm enough so that burrows do not collapse. In California, desert tortoises are typically associated with gravelly flats or sandy soils with some clay, but occasionally occur in windblown sand or in rocky terrain (Luckenbach 1982). Desert tortoises occur in the California desert from below sea level to an elevation of 7,300 feet, but the most favorable habitat occurs at elevations of approximately 1,000 to 3,000 feet (Luckenbach 1982, Schamberger and Turner 1986). Recent range-wide monitoring efforts have consistently documented desert tortoises above 3,000 feet (Service 2006a).

Desert tortoises may spend more time in washes than in flat areas outside of washes; Jennings (1997) notes that, between March 1 and April 30, desert tortoises "spent a disproportionately longer time within hill and washlet strata" and, from May 1 through May 31, hills, washlets, and washes "continued to be important." Jennings' paper does not differentiate between the time desert tortoises spent in hilly areas versus washes and washlets; however, he notes that, although washes and washlets comprised only 10.3 percent of the study area, more than 25 percent of the plant species on which desert tortoises fed were located in these areas. Luckenbach (1982) states that the "banks and berms of washes are preferred places for burrows;" he also recounts an incident in which 15 desert tortoises along 0.12 mile of wash were killed by a flash flood. Desert tortoises are most active in California during the spring and early summer when annual plants are most common. Additional activity occurs during warmer fall months and occasionally after summer rain storms. Desert tortoises spend most of their time during the remainder of the year in burrows, escaping the extreme conditions of the desert; however, recent work has demonstrated that they can be active at any time of the year. Further information on the range, biology, and ecology of the desert tortoise can be found in Burge (1978), Burge and Bradley

(1976), Hovik and Hardenbrook (1989), Luckenbach (1982), Weinstein et al. (1987), and Service (1994).

Food resources for desert tortoises are dependent on the availability and nutritional quality of annual and perennial vegetation, which is greatly influenced by climatic factors, such as the timing and amount of rainfall, temperatures, and wind (Beatley 1969, 1974, Congdon 1989, Karasov 1989, Polis 1991; all in Avery 1998). In the Mojave Desert, these climatic factors are typically highly variable; this variability can limit the desert tortoise's food resources.

Desert tortoises will eat many species of plants. However, at any time, most of their diet consists of a few species (Nagy and Medica 1986 and Jennings 1993 in Avery 1998). Additionally, their preferences can change during the course of a season (Avery 1998) and over several seasons (Esque 1994 in Avery 1998). Possible reasons for desert tortoises to alter their preferences may include changes in nutrient concentrations in plant species, the availability of plants, and the nutrient requirements of individual animals (Avery 1998). In Avery's (1998) study in the Ivanpah Valley, desert tortoises consumed primarily green annual plants in spring; they ate cacti and herbaceous perennials once the winter annuals began to disappear. Medica et al. (1982 in Avery 1998) found that desert tortoises ate increased amounts of green perennial grass when winter annuals were sparse or unavailable; Avery (1998) found that desert tortoises rarely ate perennial grasses.

Desert tortoise females typically produce one to two clutches of 1 to 7 eggs per year (Turner et al. 1986 *in* Service 1994). On rare occasions, clutches can contain up to 15 eggs; most clutches contain 3 to 7 eggs. Multi-decade studies of the Blanding's turtle (*Emydoidea blandingii*), which, like the desert tortoise, is long lived and matures late, indicate that approximately 70 percent of the young animals must survive each year until they reach adult size; after this time, annual survivorship exceeds 90 percent (Congdon et al. 1993). Research has indicated that 50 to 60 percent of young desert tortoises typically survive from year to year, even in the first and most vulnerable year of life. We do not have sufficient information on the demography of the desert tortoise to determine whether this rate is sufficient to maintain viable populations; however, it does indicate that maintaining favorable habitat conditions for small desert tortoises is crucial for the continued viability of the species.

Desert tortoises typically hatch from late August through early October. At the time of hatching, the desert tortoise has a substantial yolk sac; the yolk can sustain them through the fall and winter months until forage is available in the late winter or early spring. However, neonates will eat if food is available to them at the time of hatching; when food is available, they can reduce their reliance on the yolk sac to conserve this source of nutrition. Neonate desert tortoises use abandoned rodent burrows for daily and winter shelter; these burrows are often shallowly excavated and run parallel to the surface of the ground.

Neonate desert tortoises emerge from their winter burrows as early as late January to take advantage of freshly germinating annual plants; if appropriate temperatures and rainfall are present, at least some plants will continue to germinate later in the spring. Freshly germinating

plants and plant species that remain small throughout their phenological development are important to neonate desert tortoises because their size prohibits access to taller plants. As plants grow taller during the spring, some species become inaccessible to small desert tortoises.

Neonate and juvenile desert tortoises require approximately 12 to 16 percent protein content in their diet for proper growth. Desert tortoises, both juveniles and adults, seem to selectively forage for particular species of plants with favorable ratios of water, nitrogen (protein), and potassium. The potassium excretion potential model (Oftedal 2001) predicts that, at favorable ratios, the water and nitrogen allow desert tortoises to excrete high concentrations of potentially toxic potassium, which is abundant in many desert plants. Oftedal (2001) also reports that variation in rainfall and temperatures cause the potassium excretion potential index to change annually and during the course of a plant's growing season. Therefore, the changing nutritive quality of plants, combined with their increase in size, further limits the forage available to small desert tortoises to sustain their survival and growth.

In summary, the ecological requirements and behavior of neonate and juvenile desert tortoises are substantially different from those of subadults and adults. Smaller desert tortoises use abandoned rodent burrows, which are typically more fragile than the larger ones constructed by adults. They are active earlier in the season. Finally, small desert tortoises rely on smaller annual plants with greater protein content; the smaller plant size allows them to gain access to food and the higher protein content promotes growth.

Status of the Desert Tortoise

The Mojave population of the desert tortoise includes those animals living north and west of the Colorado River in the Mojave Desert of California, Nevada, Arizona, southwestern Utah, and in the Colorado Desert in California. On August 4, 1989, the Service published an emergency rule listing the Mojave population of the desert tortoise as endangered (54 *Federal Register* 32326). In its final rule, dated April 2, 1990, the Service determined the Mojave population of the desert tortoise to be threatened (55 *Federal Register* 12178).

The Service listed the desert tortoise in response to loss and degradation of habitat caused by numerous human activities including urbanization, agricultural development, military training, recreational use, mining, and livestock grazing. The loss of individual desert tortoises to increased predation by common ravens, collection by humans for pets or consumption, collisions with vehicles on paved and unpaved roads, and mortality resulting from diseases also contributed to the Service's listing of this species.

Recovery Plan for the Desert Tortoise

The recovery plan for the desert tortoise is the basis and key strategy for recovery and delisting of the desert tortoise. The recovery plan divides the range of the desert tortoise into 6 distinct population segments or recovery units and recommends the establishment of 14 DWMAs throughout the recovery units. Within each DWMA, the recovery plan recommends

implementation of reserve-level protection of desert tortoise populations and habitat, while maintaining and protecting other sensitive species and ecosystem functions. The recovery plan also recommends that DWMAs be designed to follow the accepted concepts of reserve design and be managed to restrict human activities that negatively affect desert tortoises (Service 1994). The delisting criteria established by the recovery plan are:

1. The population within a recovery unit must exhibit a statistically significant upward trend or remain stationary for at least 25 years;

2. Enough habitat must be protected within a recovery unit or the habitat and desert tortoises must be managed intensively enough to ensure long-term viability;

3. Populations of desert tortoises within each recovery unit must be managed so discrete population growth rates (lambdas) are maintained at or above 1.0;

4. Regulatory mechanisms or land management commitments that provide for long-term protection of desert tortoises and their habitat must be implemented; and

5. The population of the recovery unit is unlikely to need protection under the Endangered Species Act in the foreseeable future.

The recovery plan based its descriptions of the six recovery units on differences in genetics, morphology, behavior, ecology, and habitat use over the range of the Mojave population of the desert tortoise. The recovery plan contains generalized descriptions of the variations in habitat parameters of the recovery units and the behavior and ecology of the desert tortoises that reside in these areas (pages 20 to 22 in Service 1994). The recovery plan (pages 24 to 26 from Service 1994) describes the characteristics of desert tortoises and variances in their habitat, foods, burrow sites, and phenotypes across the range of the listed taxon. Consequently, to capture the full range of phenotypes, use of habitat, and range of behavior of the desert tortoise as a species, conservation of the species across its entire range is essential.

The Service has released a revised recovery plan for public review (Service 2008c). The revised recovery plan includes a discussion of reducing the number of recovery units to four, based on information that has been generated since the release of the original document.

Relationship of Recovery Units, Distinct Population Segments, Desert Wildlife Management Areas, and Critical Habitat Units

The recovery plan (Service 1994) recognized six recovery units or evolutionarily significant units across the range of the listed taxon, based on differences in genetics, morphology, behavior, ecology, and habitat use of the desert tortoises found in these areas. The boundaries between these areas are vaguely defined. In some cases, such as where the Western Mojave Recovery Unit borders the Eastern Mojave Recovery Unit, a long, low-lying, arid valley provides a fairly substantial separation of recovery units. In other areas, such as where the Eastern Mojave

Recovery Unit borders the Northern Colorado Recovery Unit, little natural separation exists. Because of the vague boundaries, the acreage of these areas has not been quantified. Over the years, the Service has commonly referred to the areas as "recovery units;" the term "distinct population segment" has not been in common use.

The recovery plan recommended that land management agencies establish one or more DWMAs within each recovery unit. As mentioned previously in the Recovery Plan for the Desert Tortoise section of this biological opinion, the recovery plan recommended that these areas receive reserve-level management to remove or mitigate the effects of the human activities responsible for declines in the number of desert tortoises. As was the case for the recovery units, the recovery plan did not determine precise boundaries for the DWMAs; the recovery team intended for land management agencies to establish these boundaries, based on the site-specific needs of the desert tortoise. At this time, DWMAs have been established throughout the range of the desert tortoise.

Based on the recommendations contained in the draft recovery plan for the desert tortoise, the Service designated critical habitat throughout the range of the desert tortoise (59 *Federal Register* 5820). The 14 critical habitat units have defined boundaries and cover specific areas throughout the 6 recovery units.

The Bureau used the boundaries of the critical habitat units and other considerations, such as conflicts in management objectives and more current information, to propose and designate DWMAs through its land use planning processes. In California, the Bureau also classified these DWMAs as areas of critical environmental concern, which allows the Bureau to establish management goals for specific resources in defined areas. Through the land use planning process, the Bureau established firm boundaries for the DWMAs.

The Department of Defense installations and National Park Service units in the California desert did not establish DWMAs on their lands. Where the military mission is compatible with management of desert tortoises and their habitat, the Department of Defense has worked with the Service to conserve desert tortoises and their habitat. Examples of such overlap include the bombing ranges on the Navy's Mojave B and the Chocolate Mountains Aerial Gunnery Ranges; although the target areas are heavily disturbed, most of the surrounding land remains undisturbed. Additionally, the U.S. Army has established several areas along the boundaries of Fort Irwin where training with vehicles is prohibited; desert tortoises persist in these areas, which are contiguous with lands off-base. The National Park Service did not establish DWMAs within the Mojave National Preserve, because the entire preserve is managed at a level that is generally consistent with the spirit and intent of the recovery plan for the desert tortoise.

The following table depicts the relationship among recovery units, DWMAs, and critical habitat units through the range of the desert tortoise.

Critical Habitat Unit	Desert Wildlife Management Area	Recovery Unit	State	Size of Critical Habitat Unit (acres)
Chemehuevi	Chemehuevi	Northern Colorado	CA	937,400
Chuckwalla	Chuckwalla	Eastern Colorado	CA	1,020,600
Fremont-Kramer	Fremont-Kramer	Western Mojave	CA	518,000
Ivanpah Valley	Ivanpah Valley	Eastern Mojave/Northeastern Mojave	CA	632,400
Pinto Mountain	Joshua Tree	Western Mojave/ Eastern Colorado	CA	171,700
Ord-Rodman	Ord-Rodman	Western Mojave	CA	253,200
Piute-Eldorado- CA Piute-Eldorado- NV	Fenner Piute-Eldorado	Eastern Mojave Northeastern Mojave/ Eastern Mojave	CA NV	453,800 516,800
Superior-Cronese	Superior-Cronese Lakes	Western Mojave	CA	766,900
Beaver Dam: NV UT AZ	 Beaver Dam Beaver Dam Beaver Dam	Northeastern Mojave (all)	 NV UT AZ	 87,400 74,500 42,700
Gold Butte-Pakoon NV AZ	 Gold Butte-Pakoon Gold Butte-Pakoon	Northeastern Mojave (all)	 NV AZ	 192,300 296,000
Mormon Mesa	Mormon Mesa Coyote Spring	Northeastern Mojave	NV	427,900
Upper Virgin River	Upper Virgin River	Upper Virgin River	UT	54,600

Methods of Estimating the Number of Desert Tortoises

Before entering into a discussion of the status and trends of the desert tortoise in the Western Mojave Recovery Unit where the proposed action is located, a brief discussion of the methods of estimating the numbers of desert tortoises would be useful. Three primary methods have been widely used: permanent study plots, triangular transects, and line distance sampling.

Generally, permanent study plots are defined areas that are visited at roughly 4-year intervals to determine the numbers of desert tortoises present. Desert tortoises found on these plots during the spring surveys were registered; that is, they were marked so they could be identified individually during subsequent surveys. Between 1971 and 1980, 27 plots were established in California to study the desert tortoise; 15 of these plots were used by the Bureau to monitor desert tortoises on a long-term basis (Berry 1999). Range-wide, 49 plots have been used at one time or another to attempt to monitor desert tortoises (Tracy et al. 2004).

Triangular transects are used to detect sign (i.e., scat, burrows, footprints, etc.) of desert tortoises. The number of sign is then correlated with standard reference sites, such as permanent study plots, to allow the determination of density estimates.

Finally, line distance sampling involves walking transects while trying to detect live desert tortoises. Based on the distance of the desert tortoise from the centerline of the transect, the length of the transect, and a calculation of what percentage of the animals in the area were likely to have been above ground and visible to surveyors during the time the transect was walked, an estimation of the density can be made. This density only represents an estimation of the number of desert tortoises that are greater than 180 millimeters in size. Desert tortoises that are larger than this size are typically classified as subadult or adult desert tortoises.

Each of these methods has various strengths and weaknesses. In general, permanent study plots have been used to estimate the status of desert tortoises across large areas over time. Triangular transects were used to assess the density of desert tortoises on specific sites at a point in time; this method was commonly used to determine how many desert tortoises may be affected by a specific proposed action. In 2001, the Service initiated line-distance sampling to estimate the density of desert tortoises in desert wildlife management areas and critical habitat throughout the range.

Note that, when reviewing the information presented in the following sections, determining the number of desert tortoises over large areas is extremely difficult. The report prepared by the Desert Tortoise Recovery Plan Assessment Committee (Tracy et al. 2004) acknowledges as much. Desert tortoises spend much of their lives underground or concealed under shrubs, are not very active in years of low rainfall, and are distributed over a wide area in several different types of habitat. Other factors, such as the inability to sample on private lands and rugged terrain, further complicate sampling efforts. Consequently, the topic of determining the best way to estimate the abundance of desert tortoises has generated many discussions over the years. As a result of this difficulty, we cannot provide concise estimations of the density of desert tortoises in each recovery unit or DWMA that have been made in a consistent manner.

Given the difficulty in determining the density of desert tortoises over large areas, the reader needs to understand fully that the differences in density estimates in the recovery plan and those derived from subsequent sampling efforts may not accurately reflect on-the-ground conditions. Despite this statement, the reader should also be aware that the absence of live desert tortoises and the presence of carcasses over large areas of some desert wildlife management areas provide at least some evidence that desert tortoise populations seem to be in a downward trend in some regions.

Status and Trends of Desert Tortoise Populations

The following paragraphs provide general information on the status and trends of the desert tortoise population in the Western Mojave Recovery Unit, where the proposed action is located. We have not included detailed information on the status of the desert tortoise in the other

recovery units throughout the range of the species in this biological opinion. This omission will not compromise the analysis in the biological opinion because our determination regarding whether a proposed action is likely to jeopardize the continued existence of a species must be conducted at the level of the listed taxon. When the range of the listed taxon is divided into recovery units, our level of analysis begins with the recovery unit; if the effects of the proposed action have the potential to compromise the ability of the species to survive and recover within the recovery unit, the next level of analysis considers how the compromised recovery unit would affect the listed taxon throughout its range (Service 2005). Our analysis can therefore be conducted in a comprehensive manner through an iterative process. The Western Mojave Recovery Unit comprises one of six recovery units for the desert tortoise; consequently, our level of analysis in this biological opinion will begin at this level.

In the Western Mojave Recovery Unit, desert tortoises generally occur from Olancha and the northern Panamint Valley in the north to Joshua Tree National Park in the south and from the lower foothills of the southern Sierra Nevada and Tehachapi Mountains in the west east to Death Valley and the eastern side of Joshua Tree National Park. Although desert tortoises were historically widespread in the western Mojave Desert, their distribution within this region was not uniform. For example, desert tortoises likely occurred at low densities in the juniper woodlands of the western Antelope Valley and in the sandier habitats in the Mojave River valley. They were also likely largely absent from the higher elevations of the area's mountains and from playas and the areas immediately surrounding dry lakes.

In the following paragraphs, we present information regarding the status of the desert tortoise in areas of the Western Mojave Recovery Unit that are outside of critical habitat and desert wildlife management areas. Most of these areas are at the range limits of the species or are near areas that have undergone extensive habitat disturbance as a result of human activities. Much of this area is privately owned.

We do not have extensive data on the density or status of desert tortoises in the areas of the Western Mojave Recovery Unit that lie outside of critical habitat and desert wildlife management areas. The lack of data may be because at least some of this area had been extensively disturbed prior to the listing of the desert tortoise and includes large amounts of private land; consequently, researchers have not conducted large-scale surveys in most of these areas. Where data do exist (e.g., a Bureau study of desert tortoise density west of Highway 14 between Red Rock Canyon State Park and Highway 178 (Keith et al. 2005); various surveys of the eastern Antelope Valley, Victor Valley, and near the town of Rosamond), they were collected using methods other than line distance sampling and are not comparable to the numbers obtained through the line distance sampling. Much of the information in the following paragraphs was gathered from these sources; additionally, we used anecdotal information as a partial basis for the following discussion and conclusions reached by the Service (e.g., "I saw desert tortoises all the time here when I was young but have not seen one in the last 15 years").

Desert tortoises occur over large areas of Fort Irwin where the U.S. Army conducts realistic, large-scale exercises with large numbers of wheeled and tracked vehicles. The distribution and

abundance of the desert tortoise within the boundary of Fort Irwin have been greatly affected by military exercises. They have been essentially eliminated from most of the valleys and bajadas where vehicles frequently travel off road. They persist in small numbers on the steep, rugged slopes of the mountain ranges and in incised washes that occur throughout Fort Irwin where they are protected from vehicles by the terrain.

We do not have specific information on the numbers of desert tortoises in these areas. We expect that desert tortoises that reside away from the most active training areas will persist long into the future as small aggregations of animals that are likely isolated from desert tortoises in the remainder of the Western Mojave Recovery Unit; some exchange may occur with desert tortoises in the South Range portion of the Naval Air Weapons Station to the west of Fort Irwin and a narrow strip of Bureau lands and Death Valley National Park to the north.

Because of the U.S. Army's proposal to expand the area that is available for training at Fort Irwin, the Service and U.S. Army concluded formal consultation (Service 2004) that resulted in an agreement to remove all desert tortoises from the areas of the base south of the UTM 90 line (i.e., the southern expansion area) and in the Superior Valley (i.e., the western expansion area). To date, 569 desert tortoises of all class sizes have been translocated from the southern expansion area (U.S. Army 2009). Eighty-nine desert tortoises of all class sizes remain to be translocated. Therefore, 658 desert tortoises of all class sizes have been detected in the southern expansion area. Walde et al. (2009 in U.S. Army 2009) estimate between 583 and 895 (95 percent confidence interval) desert tortoises occupy the western expansion area; this estimate is based on transects conducted in 2009. This estimate reflects the number of adult desert tortoises; consequently, the total number of animals within the southern and western expansion areas is likely somewhat greater.

The Naval Air Weapons Station, China Lake, is divided into two large units. The southern unit lies to the west of Fort Irwin and north of the western expansion area; the northern portion of the Naval Air Weapons Station lies to the northwest of the southern unit. The Department of the Navy (Navy) has designated approximately 200,000 acres of the South Range at the Naval Air Weapons Station, China Lake as a management area for the desert tortoise (Service 1995a). Through a consultation with the Service (1992a), the Navy agreed to try to direct most ground-disturbing activities outside of this area, to use previously disturbed areas for these activities when possible, and to implement measures to reduce the effects of any action on desert tortoises. This area also encompasses the Superior Valley Tactical Bombing Range located in the southernmost portion of the Mojave B South land management unit of the Naval Air Weapons Station; it continues to be used as an active bombing range for military test and training operations by the Navy and Department of Defense. In the 9 years for which we had annual reports, activities conducted by the Navy did not kill or injure any desert tortoises (see Navy 1995); one carcass was found at a bombing site but the cause of mortality could not be determined. In general, desert tortoises occur in low densities on the North Range of the Naval Air Weapons Station; Kiva Biological Consulting and McClenahan and Hopkins Associates (in Service 1992a) reported that approximately 136 square miles of the North Range supported densities of 20 or fewer desert tortoises per square mile. The South Range supported densities of

20 or fewer desert tortoises per square mile over an area of approximately 189 square miles and densities of greater than 20 per square mile on approximately 30 square miles. The higher elevations and latitude in this area may be responsible for these generally low densities (Weinstein 1989 in Bureau et al. 2005).

The Indian Wells Valley, which is located to the southwest of the northern portion of the Naval Air Weapons Station, likely supported desert tortoises at higher densities in the past. Urban, suburban, and agricultural development is the likely cause of the lower densities that are currently found in this area; the city of Ridgecrest and town of Inyokern are located in this valley. Rose Valley, which lies generally to the north of the Indian Wells Valley and west of the northern portion of the Naval Air Weapons Station seems to support few desert tortoises and is likely the northern extent of the species' range in this portion of the Western Mojave Recovery Unit.

Edwards Air Force Base, which lies in the eastern portion of the Antelope Valley, is used primarily to test aircraft and weapons systems used by the Department of Defense. Desert tortoises occur over approximately 220,800 acres of the installation. Approximately 80,640 acres of the base have been developed for military uses or are naturally unsuitable for use by desert tortoises, such as Rogers and Rosamond dry lakes. Based on surveys conducted between 1991 and 1994, approximately 160,640 acres of the base supported 20 or fewer desert tortoises per square mile. Approximately 55,040 acres supported densities between 21 and 50 desert tortoises per square mile; from 51 to 69 desert tortoises per square mile occurred on several smaller areas that totaled 5,120 acres (U.S. Air Force 2004). We expect that current densities are somewhat lower, given the regional declines in desert tortoise numbers elsewhere in the Western Mojave Recovery Unit.

Four townships of private land east of the city of California City, north of Edwards Air Force Base, and south of the Rand Mountains supported large numbers of desert tortoises as late as the 1970s. High levels of off-road vehicle use, extensive grazing of sheep, scattered development, and possibly poaching have greatly reduced the density of desert tortoises in this area.

South of Edwards Air Force Base, the direct and indirect effects of urban and suburban development have largely eliminated desert tortoises from this area of primarily private lands that extends from Lancaster in the west to Lucerne Valley in the east. A few desert tortoises remain on the northern slopes of the San Bernardino Mountains, south of Lucerne Valley; however, they seem to be largely absent from the portion of this area in Los Angeles County (Bureau et al. 2005). The Bureau manages the 24,000-acre El Mirage Off-highway Vehicle Management Area, which lies south of the eastern portion of Edwards Air Force Base; the Bureau has designated this and three other off-highway vehicle management areas in the western Mojave Desert for use by off-road vehicles. Low numbers of desert tortoises persist in the area that generally lies between the off-highway vehicle management area and Edwards Air Force Base.

Continuing to the east, the northern portion of Joshua Tree National Park is within the Western Mojave Recovery Unit. Given the general patterns of visitor use at Joshua Tree National Park (i.e., most visitors remain close to established roads and trails), we expect that most of this area receives little visitor use. Private lands between the northern boundary of Joshua Tree National Park and the southern boundary of the Marine Corps Air Ground Combat Center continue to support desert tortoises; the primary threat to desert tortoises in this area is urbanization. The cities of Twentynine Palms, Yucca Valley, Joshua Tree, and Morongo Valley are located in this area.

The Marine Corps Air Ground Combat Center is located north of the cities mentioned in the previous sentence and southeast of Barstow; the center generally supports a wide variety of training exercises that include the use of tracked and wheeled vehicles and live fire. The Marine Corps' integrated natural resource management plan for the center notes that the number of desert tortoises may have declined in its more heavily disturbed areas and that vehicles, common ravens, and dogs are responsible for mortalities (Natural Resources and Environmental Affairs Division 2001). Desert tortoises occur within the Marine Corps Air Ground Combat Center in densities of greater than 50 per square mile in limited areas; most of the installation, however, supports from 0 to 5 animals per square mile (Jones and Stokes Associates 1998 in Natural Resources and Environmental Affairs Division 2001).

The 189,000-acre Johnson Valley Off-highway Vehicle Management Area lies to the west of the Marine Corps Air Ground Combat Center (Service 1991b). The Stoddard Valley Off-highway Vehicle Management Area lies to the west of the Johnson Valley Off-highway Vehicle Management Area. Desert tortoises remain in suitable habitat in these areas, primarily in the portions that are less heavily used for recreation.

The Mojave River valley lies to the northwest of the Marine Corps Air Ground Combat Center. It is generally a low-lying area with current and fallow agricultural use; private lands dominate this area. We are aware of a few records of desert tortoises in this area, primarily in creosote scrub habitat near the Marine Corps Logistics Base, Nebo, and around Elephant Mountain, which lie at the western end of the valley.

The city of Barstow lies at the western end of the Mojave River valley. A large expanse of primarily private land lies between Barstow and the city of Victorville. This area, which is subjected to heavy unauthorized use by off-road vehicles, likely supported high densities of desert tortoises prior to the development of surrounding areas. The cities of Adelanto, Apple Valley, and Hesperia and the Southern California Logistics Airport generally surround Victorville.

Death Valley National Park lies to the north of Fort Irwin. Desert tortoises are uncommon in the national park, primarily because much of the habitat lies either lower or higher than optimal elevations for the species; Greenwater Valley, to the east of Death Valley, seems to support a moderate number of desert tortoises. Panamint Valley lies to the west of Death Valley and east

of the northern section of the Naval Air Weapons Station. It supports low densities of desert tortoises, likely because of unsuitable habitat over large areas of the valley.

The Spangler Hills Off-highway Vehicle Management Area lies to the southwest of the Panamint Valley and southeast of Ridgecrest. We do not have recent information on the number of desert tortoises in this area; we expect that the area supports low densities as a result of extensive recreational use.

Major roads in the Western Mojave Recovery Unit include Interstates 15 and 40, U.S. Route 395, and State Routes 14, 18, 58, 62, 127, 138, 178, and 247. These roads fragment habitat; vehicles using these roads strike and kill numerous desert tortoises every year. Portions of Interstate 15 and Routes 58 and 395 are fenced to prevent entry by desert tortoises. Smaller paved roads and unpaved roads probably do not fragment habitat to a substantial degree but are responsible for additional mortalities of desert tortoises.

The following paragraphs describe efforts to define the density of desert tortoises in and near critical habitat and desert wildlife management areas in the Western Mojave Recovery Unit. The Pinto Mountains DWMA is located in the southeastern portion of the Western Mojave Recovery Unit, generally to the southeast of the Marine Corps Air Ground Combat Center and abutting the northeastern portion of Joshua Tree National Park. No permanent study plots are located in this desert wildlife management area. Tracy et al. (2004) noted that the distribution of carcasses and live desert tortoises appeared to be what one would expect in a "normal" population of desert tortoises; that is, carcasses occurred in the same areas as live animals and were not found in extensive areas in the absence of live desert tortoises. Through line distance sampling, the Service estimated the density of desert tortoises in this DWMA to be approximately 6.2 subadults and adults per square mile in 2007 (Service 2009b).

The Ord-Rodman DWMA is located to the southeast of the city of Barstow, north of the Johnson Valley Off-highway Vehicle Management Area, and west of the Marine Corps Air Ground Combat Center. The recovery plan notes that the estimated density of desert tortoises in this area is 5 to 150 animals per square mile (Service 1994). Three permanent study plots are located within and near this DWMA. The following table contains the density estimates for these plots; the data are from Berry (1996); all data are in the approximate number of desert tortoises of all sizes per square mile.

	Stoddard Valley	**Lucerne Valley**	**Johnson Valley**
1980		176	114
1981	146		
1986		150	80
1987	178		
1990		82	18
1991	225		
1994		73	73

Berry (1996) notes that, for various reasons, surveys at the Stoddard Valley plot encountered various difficulties; some desert tortoises from this plot were taken by poachers and at least one animal became ill with upper respiratory tract disease and contained environmental contaminants. Common ravens and feral dogs have killed desert tortoises at the Lucerne Valley plot; Berry (1996) notes that little recruitment into adult size classes was occurring. Berry also notes that at least two desert tortoises from the Johnson Valley plot were killed by off-road vehicle use or cattle; at least one ill and salvaged animal contained environmental contaminants. Through line distance sampling, the Service estimated the density of desert tortoises in this DWMA to be approximately 21.3 subadults and adults per square mile in 2007 (Service 2009b). Note that, for all desert wildlife management areas, the densities estimated by different methods are not directly comparable; i.e., the differences in numbers depicted in Berry (1996) and Service (2009b) do not necessarily represent a specific change in the density of desert tortoises in the area. For example, the information from study plots may reflect changes in the density of desert tortoises in those specific areas over time, while line distance sampling provides information regarding the density of the entire DWMA.

The Superior-Cronese DWMA is located north of the Ord-Rodman DWMA; two interstate freeways and rural, urban, and agricultural development separate them. This DWMA is located south of Fort Irwin and the southern portion of the Naval Air Weapons Station, China Lake. No permanent study plots have been established in this area; the density of desert tortoises has been estimated through numerous triangular transects and line distance sampling efforts. The recovery plan notes that this DWMA supports densities of approximately 20 to 250 desert tortoises per square mile (Service 1994). Through line distance sampling, the Service estimated the density of desert tortoises in this DWMA to be approximately 16.4 subadults and adults per square mile in 2007 (Service 2009b).

The Fremont-Kramer DWMA is located west of the Superior-Cronese DWMA; the two DWMAs are contiguous. The recovery plan notes that the estimated density of desert tortoises in this area was 5 to 100 animals per square mile (Service 1994). Five permanent study plots are located within this DWMA; one plot, the Interpretive Center plot at the Desert Tortoise Natural Area, is split into two subplots. The following table contains the density estimates for these plots; the data are from Berry (1996); all data are in the approximate number of desert tortoises of all sizes per square mile.

	Fremont Valley	**Desert Tortoise Natural Area, Interior**	**Desert Tortoise Natural Area, Interpretive Center**		**Fremont Peak**	**Kramer Hills**
			Inside Fence	**Outside Fence**		
1979		387	339	296		
1980					99	223
1981	278					
1982		332				314
1985			229	134	45	

1987	179					130
1988		195				
1989			106	80	32	
1991	101					60
1992		47				
1993			61	42	8	
1995						139
1996		18				
1997		8*	34#	23#		
2001	19*					
2002			28#	10#		

* These values represent the actual numbers of desert tortoises found on the plot and do not represent a density estimate; the data are from Berry (2005).
# These data are from Connor (2003).

Berry (1996) noted that the overall trend in this DWMA is "a steep, downward decline" and lists predation by common ravens and domestic dogs, off-road vehicle activity, illegal collecting, upper respiratory tract disease, and environmental contaminants as contributing factors. Through line distance sampling, the Service estimated the density of desert tortoises in this DWMA to be approximately 7.0 subadults and adults per square mile in 2007 (Service 2009b).

We estimate that the overall density of desert tortoises in critical habitat and desert wildlife management areas in the Western Mojave Recovery Unit is approximately 12.2 subadults and adults per square mile (Service 2009b). The 95 percent confidence intervals for this estimate range from approximately 7.8 to 22.1 subadults and adults per square mile (Service 2009b).

By multiplying the approximate area of desert tortoise habitat in the Western Mojave Recovery Unit by the average density of 12.2 subadult and adult desert tortoises per square mile, we estimate that approximately 125,855 subadult and adult desert tortoises may reside within the recovery unit. To estimate the area of desert tortoise habitat within the Western Mojave Recovery Unit, we used a model developed by Nussear et al. (2009), which is based on desert tortoise habitat across the range of the species. This model does not consider habitat loss, fragmentation, or degradation associated with human-caused effects; however, it provides a reference point relative to the amount of desert tortoise habitat. We then used urbanized area cartographic boundary files (Census Bureau 2000) to estimate the portion of modeled habitat that has been lost as a result of human activities; this model depicts areas where human activity has caused substantial ground disturbance (i.e., urbanization, agriculture, and military training). By subtracting the amount of area no longer considered suitable habitat [i.e., the census data] from the area of potential habitat (i.e., from the Nussear et al. model), we estimate that the Western Mojave Recovery Unit contains approximately 10,316 square miles of potential desert tortoise habitat (Waln 2010). The Nussear et al. model does not account for habitat disturbance and variations caused by other factors that affect the density of desert tortoises (e.g., highways). Additionally, the data from line distance sampling were collected in DWMAs, where,

presumably, the density of desert tortoises is greater than in other portions of the Western Mojave Recovery Unit; however, we applied this density for the entire Western Mojave Recovery Unit. Consequently, we recognize that the number of subadult and adult desert tortoises in the Western Mojave Recovery Unit we provide here may be an overestimate.

We estimate that approximately 56,544 to 130,992 juvenile desert tortoises (i.e., smaller than 180 millimeters) reside within the Western Mojave Recovery Unit. This estimate is based on the assumption that 125,855 subadults and adults occur in the Western Mojave Recovery Unit and that 31 to 51 percent of the total population of desert tortoises in the recovery unit are juveniles (Turner et al. 1987). Reproductive success and neonate survival is likely to vary significantly across the range of the desert tortoise. The Turner et al. (1987) study was conducted in the eastern Mojave Desert where we would expect to detect lower mortality for juvenile desert tortoises because of fewer threats. In addition, juvenile desert tortoises are extremely difficult to detect because of their small size and cryptic nature. Consequently, the result of the Turner et al. (1987) study may not adequately represent demography throughout the Western Mojave Recovery unit and the number of juvenile desert tortoises could be greater than or less than our estimates.

The biological opinion for the Bureau's amendment to the California Desert Conservation Area Plan for the western Mojave Desert (Service 2006b) contains a description of the results of studies done on permanent plots in the Western Mojave Recovery Unit. Based on this work, the Desert Tortoise Recovery Plan Assessment Committee (Tracy et al. 2004) concluded that the population densities of adult desert tortoises in the Western Mojave Recovery Unit exhibited a significant downward trend ($P < 0.0001$) from approximately 1975 through 2000. Some of the permanent study plots are located outside of the DWMAs; therefore, the trends within and outside of DWMAs may not be precisely the same. However, data from the permanent study plots provide the only long-term assessment of the status of the desert tortoise in this area.

ENVIRONMENTAL BASELINE

Action Area

The implementing regulations for section 7(a)(2) of the Act define the "action area" as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). For the purposes of this biological opinion, we consider the action area to include all areas of the 4,613-acre project site and its necessary components as described in the Description of the Proposed Action section of this biological opinion, the privately owned parcels adjacent to and protruding into the project area (NAP areas; see URS 2010a), the 3,617-acre solar development exclusion area, a 2,617-foot buffer from the project boundary, the proposed desert tortoise translocation control site (control site), the proposed translocation areas, all contiguous desert tortoise habitat within 1.5 kilometers of the translocation areas receiving desert tortoises from less than 500 meters and all contiguous desert tortoise habitat within 12.6 kilometers of translocation areas receiving desert tortoises from greater than 500 meters away.

We included the 2,617-foot buffer from the project boundary to address adverse effects to desert tortoises whose home ranges overlap the proposed solar facility; the buffer is based on the assumption that the home range of a male desert tortoise is approximately 2 square kilometers (O'Conner et al. 1994, Duda et al. 1999, Harless et al. 2009). We included habitat within 1.5 and 12.6 kilometers of the translocation areas to address the area in which desert tortoises may disperse following translocation. For situations where desert tortoises are translocated less than 500 meters, the buffer is based on the maximum straight-line distance that a male desert tortoise traveled in the first year following translocation (Walde et al. 2008). For situations where desert tortoises are translocated more than 500 meters, the buffer is based on the maximum straight-line distance the majority of male desert tortoises were observed to disperse during the first year after release (Field et al. 2007, Walde et al. 2008). This distance does not include one male that traveled 14 miles after release; we consider this behavior to be anomalous when compared with that of the majority of translocated desert tortoises.

The action area defined for this biological opinion covers approximately 87,767.6 acres and includes 84,626.1 acres of desert tortoise habitat modeled as 0.5 or greater by U.S. Geological Survey (Nussear et al. 2009); 22,702 acres of this total is desert tortoise critical habitat. The northeast corner of the Ord-Rodman DWMA comprises 25,893.84 acres of the action area and contains 9,402 acres identified as the Ord-Rodman DWMA translocation area. The Pisgah ACEC translocation area is adjacent to the east side of the project site, and includes 604 acres of the Pisgah Crater ACEC. The linkage translocation area includes 576 acres and is located directly north of the project boundary and does not include the area north of NAP 1. All of the identified translocation areas are composed entirely of desert tortoise habitat modeled as 0.5 or greater by U.S. Geological Survey. The control site covers 6,929 acres located northwest of the project site and adjacent to the west edge of the Cady Mountain Wilderness Study Area.

Past Consultations in the Action Area

On December 21, 1990, the Service issued a biological opinion for the Kern River and Mojave Pipeline projects (1-5-87-F-36R, Service 1990). The biological opinion anticipated that pipeline installation would kill or injure 15 desert tortoises along the Mojave River portion of the line in addition to harassing 120 desert tortoises and eliminating 16 nests. For the operation and maintenance of the pipeline, the biological opinion anticipated the harm or mortality of five desert tortoises and the harassment of ten desert tortoises. A portion of the Mojave Pipeline crosses the Calico facility action area. In total, 38 desert tortoises were killed during the construction of these 2 pipelines (Circle Mountain Biological Consultants 1996).

On August 12, 1991, the Service issued a biological opinion to the Bureau for expansion of the existing Hector Mine (1-6-91-F-40, Service 1991a). This biological opinion anticipated the harassment, as a result of moving them from harm's way, of 10 desert tortoises during construction and operation, the mortality of 1 desert tortoise from expansion and operation of the facility, and the loss of 174 acres of desert tortoise habitat.

On October 8, 1992, the Service issued a biological opinion to the Bureau for construction and operation of a disposal and storage facility for dry, treated, and stabilized hazardous waste materials (1-6-92-F-57, Service 1992b). This biological opinion anticipated the harassment, as a result of moving them from harm's way, of 15 desert tortoises during construction and operation, the mortality of 2 desert tortoises during construction, and the mortality of 1 desert tortoise every 2 years as a result of operation of the project facility. Although this proposed project was authorized, the facility was never constructed.

On October 29, 1992, the Service issued a biological opinion to the Bureau for the construction and operation of a boron mine and processing plant (1-6-92-F-54, Service 1992c). This biological opinion anticipated the harassment, as a result of moving them from harm's way, of 30 desert tortoises during construction and operation, the mortality of 3 desert tortoises during the construction of the facility, and the mortality of 1 desert tortoise every 2 years as a result of operation of the project.

On November 28, 1995, the Service issued a biological opinion to the Bureau for the maintenance and repair of Southern California Gas Company's pipeline system in the California deserts (1-8-95-F-28, Service 1995b). This biological opinion anticipated the mortality of two desert tortoises per year as a result of maintenance activities including travel on all associated access roads. A portion of the pipeline system passes through the action area considered in this biological opinion.

On August 15, 1997, the Service issued a biological opinion to the Bureau for the issuance of a temporary use permit to the County of San Bernardino to construct and operate a waste disposal transfer station in Newberry Springs (1-8-97-F-35, Service 1997). This biological opinion anticipated the harassment, as a result of moving them from harm's way of all the desert tortoises found within the 5-acre parcel, and the mortality of 2 desert tortoises as a result of construction and operation of the facility.

On March 7, 2002, the Service issued a biological opinion to the U.S. Marine Corps for base wide operations and training on the Air Ground Combat Center in Twentynine Palms (1-8-99-F-41, Service 2002). Since the issuance of this biological opinion, the Marine Corps generally reports the mortality of two or three desert tortoises per year. Given the nature of training activities, some desert tortoises that are killed are likely not observed. Only the northwestern corner of the installation is within the action area for this biological opinion; this area of the Air Ground Combat Center includes extensive lava flows. We do not have specific information about desert tortoises in this area or whether the Marine Corps' activities have resulted in mortalities there.

On June 30, 2003, the Service issued a biological opinion to the Bureau regarding the effects of the designation of routes of travel in the western Mojave Desert on the desert tortoise and its critical habitat (1-8-03-F-21, Service 2003). As a result of the proposed action, the Bureau designated routes of travel on public lands as open, closed, or limited to vehicular use. The proposed action resulted in a reduction in the mileage of open routes on public lands;

additionally, any route that was not designated as open was considered to be an unauthorized route. The Service concluded that the Bureau's designation of routes of travel was not likely to jeopardize the continued existence of the desert tortoise or adversely modify its critical habitat. Although the Service did not estimate the number of desert tortoises that could be killed or injured by the project because of the large size of the action area and the patchy distribution of desert tortoises, it required the Bureau to contact the Service to determine if re-initiation was necessary if more than five desert tortoises were found dead or injured in a 12-month period.

On January 9, 2006, the Service issued a biological opinion to the Bureau regarding the effects of a proposed amendment to the California Desert Conservation Area Plan for the western Mojave Desert on the desert tortoise and its critical habitat (1-8-03-F-08, Service 2006b). In this case, the Bureau's proposed action was a substantial revision of the California Desert Conservation Area Plan, with the fundamental goal of adopting numerous management prescriptions that were intended to promote the recovery of the desert tortoise. These prescriptions addressed grazing, land use classification, recreation, and numerous other elements of the Bureau's management of the western Mojave Desert, including a minor revision of the route network considered in the consultation discussed in the previous paragraph. The Service concluded that the Bureau's amendment of the California Desert Conservation Area Plan for the western Mojave Desert was not likely to jeopardize the continued existence of the desert tortoise or adversely modify its critical habitat because the vast majority of changes addressed in the amendment reduced the intensity of use and were protective of the desert tortoise.

The Service also issued a biological opinion to the Federal Highway Administration for the development of a materials site near the transfer station mentioned previously in this section. The Service concluded that the development of the approximately 88-acre site was not likely to jeopardize the continued existence of the desert tortoise and was likely to result in the injury or mortality of few, if, any, desert tortoises.

In aggregate, the number of desert tortoises that we anticipated would likely be killed or injured by the actions proposed in the aforementioned biological opinions comprises a relatively small portion of the desert tortoises in the action area. Furthermore, several of the biological opinions analyzed the effects of actions that extended over action areas many times the size of the action area being considered in this consultation. Therefore, the mortality associated with these larger actions would not occur or has not occurred entirely within the action area for the Calico project. Consequently, we conclude that the mortality associated with these biological opinions has not substantially affected the environmental baseline of the desert tortoise within the current action area.

Habitat Characteristics of the Action Area

The proposed Calico project site, control site, and translocation sites are located entirely on land managed by the Bureau. The NAP areas (URS 2010b) adjacent to and protruding into the project site are privately owned by multiple landowners, but contain the same habitat characteristics as the project site. We summarized the information in the remainder of the

Environmental Baseline section from the revised biological assessment, supplemental biological assessment, supplement #5 to the biological assessment, and the California Energy Commission's supplemental staff assessment (URS 2010a, URS 2010b, URS 2010d, CEC 2010a).

Habitat within the project site consists primarily of Mojave creosote bush scrub (4,372 acres) and desert saltbush scrub (242 acres). Additional plant communities detected on the project site include catclaw acacia thorn scrub, smoke tree woodland, and big galleta shrub-steppe. The Cady Mountains provide a source of sediments that are transported by fluvial processes onto the project site and redistributed by wind, particularly on the southeastern part of the project site (CEC 2010a). Based on graphic information system (GIS) analysis, Tessera estimated vegetation coverage on the remainder of the action area to be 95 percent Mojave creosote bush scrub with 5 percent saltbush scrub and 5 percent big galleta dune habitat (Miller 2010a).

Both the proposed control area and the Ord-Rodman DWMA have historically supported cattle grazing. The vegetation in the control area, northwest of the project site, shows effects of varying levels of grazing. However, the Bureau does not anticipate authorizing any future grazing in this area (URS 2010b, Chavez 2010). A portion of the Ord-Rodman DWMA still supports grazing within the Ord Mountain Cattle Allotment. This allotment includes approximately 154,948 acres, of which 117,363 acres are within the DWMA (Fesnock 2010b). In addition to cattle grazing, other factors that have affected the habitat within the action area include off-road vehicle use, non-native species, the indirect effects of Interstate 40, a utility corridor, and the BNSF railroad (URS 2010a, URS 2010b).

Status of the Desert Tortoise in the Action Area

From March 29 to April 15, 2010, URS Corporation conducted desert tortoise surveys over an 8,230-acre area, which included the 4,613-acre project site (URS 2010a). URS performed additional surveys in the proposed translocation and control areas to determine suitability, collecting habitat data during desert tortoise surveys. All of these surveys followed the Service's pre-project survey protocol (Service 2010d). During the 2010 surveys on the 4,613-acre project site, URS located 6 subadult and adult desert tortoises, 4 juvenile desert tortoises, and 122 burrows, with the greatest density of sign in the northern portion of the project site. URS detected 12 subadult and adult desert tortoises in the Pisgah ACEC translocation area, and 79 subadult and adult desert tortoises within a 3,616-acre area surveyed north of the project site, which contains the Linkage translocation area (URS 2010e).

The following table depicts the estimated numbers of desert tortoises in the action area. Because of the wide confidence interval in this estimate and the inherent difficulties in developing an accurate estimate, we will assume that the actual project site population may be as high as 29 subadult and adult desert tortoises. We have selected this more conservative approach because it will provide a more robust analysis and identify any potential issues associated with the proposed translocation strategy.

Location	Estimated Density and Number of Desert Tortoises (subadults and adults)	Source of Information
Project site	- 29	2010 survey results (URS 2010d)
Linkage translocation area and its dispersal buffer	8.4 per square kilometer 115	(Miller 2010b, 2010d)
Pisgah ACEC translocation area and its dispersal buffer	7.4 per square kilometer 130	2010 survey results (Miller 2010b, 2010d)
Ord-Rodman DWMA within the action area	8.2 per square kilometer 859	range wide monitoring in conducted in 2007; the density of desert tortoises in the Ord-Rodman DWMA (Service 2009b)
Action area outside of the project boundary, Linkage and Pisgah ACEC translocation areas and their 1.5-kilometer dispersal buffers, and the Ord-Rodman DWMA	4.7 per square kilometer 945	range wide monitoring in conducted in 2007; the density of desert tortoises in the Western Mojave Recovery Unit (Service 2009b)
Total Number of Desert Tortoises in the Action Area	2,078	

Juvenile desert tortoises are extremely difficult to detect because of their small size and cryptic nature. Based on a 4-year study, Turner et al. (1987) determined that juveniles accounted for 31.1 to 51.1 percent of the overall population. Reproductive success and neonate survival is likely to vary substantially across the range of the desert tortoise. Consequently, the demography of desert tortoises on Calico project site may differ from the results of the Turner study. Therefore, as we estimated with the subadults and adults, we have used the upper end of the range to will provide a more robust analysis and identify any potential problems associated with the proposed translocation strategy. Therefore, using estimated numbers for subadult and adult desert tortoises, we estimate the action area may support 2,172 juveniles and the 4,613-acre project site may support 30 juvenile desert tortoises.

Using the average number of eggs that a reproductive female produces in a given year (5.8 eggs; Turner et al. 1986 in Service 1994), we estimate that each reproductive female on the project site could produce 5.8 eggs in a given year. Using our population estimates and assuming a 1:1 sex ratio, we estimate that the project site and action area may contain as many as 15 and 1,039 reproductive females, respectively. These individuals could produce approximately 87 and 6,026

eggs in a given year in the project site and action area, respectively. For the project site, fewer eggs are likely to be present at any given time because the territories of some of the female desert tortoises likely extend outside of the Calico project boundary and individuals may establish nests in these areas. In addition, at the time the project site is cleared, not all of the reproductive females may have deposited their eggs for the season, because not all females will lay their eggs at the same time.

Tessera performed additional protocol surveys on the control and translocation sites. In spring 2010, URS surveyed the Pisagah ACEC translocation area, the Linkage translocation area, the control area and 3,170 acres of the Ord-Rodman DWMA translocation area. URS will conduct surveys for the remainder of the Ord-Rodman DWMA translocation area in spring 2011. The following table includes our estimates of the number of desert tortoises that likely occur in the translocation sites. We used the densities discussed above and the area of the translocation sites and control sites to derive this estimate. We did not anticipate that the proposed action will adversely affect desert tortoise nests in the translocation and control areas; therefore we will not provide estimates for eggs for these areas.

Translocation Area	Subadults and Adults	Juveniles	Total
Pisgah ACEC	18	19	37
Linkage	20	21	41
Ord-Rodman	300	314	614
Control Site	132	138	270

Two additional construction areas outside of the project footprint include the underground water pipeline and transmission line to the Pisgah substation. The associated ground disturbance with each component is 4.5 and 12.9 acres, respectively. Because of the small size of the work sites and the uncertainty associated with estimating the numbers of desert tortoises and their eggs, we have not included estimates for these areas. If desert tortoises or eggs are present in these areas, the numbers would be so low that the overall estimate for the project site would easily encompass any animals or eggs likely to occur on these two sites.

We emphasize that, although our estimate of the number of subadult and adult desert tortoises, juveniles, and eggs on the project site and within action area is based on the best scientific and commercial data, as required by the implementing regulations for section 7(a)(2) (50 Code of Federal Regulations 402.14(g)(8), these numbers represent only an estimate; the overall number of animals and eggs on site may be different. We recognize that the survey data used for these estimates represents a single point in time and the number of individuals in these areas may change by the onset of construction. For example, some desert tortoises may leave or die. Alternatively, the number of desert tortoises present on the site may increase by the time construction commences. For example, one or more desert tortoises may not have been detected during the initial survey; other desert tortoises may have moved on to the site since the time of the surveys. Finally, desert tortoises may have emerged from a nest on the site; this scenario could increase the overall number of individuals; for example, if a clutch of seven eggs (i.e., the number of eggs in a clutch that would be considered large) hatched, this increase would be much

more than we would expect from individuals moving on to the site. However, because we have selected to consider the high range for our estimates for the population sizes, we expect that we have a reasonably accurate baseline for analysis.

EFFECTS OF THE ACTION

In the previous section of this biological opinion, we derived our estimates of the numbers of juvenile, subadult, and adult desert tortoises and eggs that are likely present in the action area from the pre-project survey data and published literature. These sources constitute the best available information. Consequently, we have used the estimates of the numbers of juvenile, subadult, and adult desert tortoises and eggs from the Environmental Baseline in the following analysis. Because of the desert tortoise's cryptic coloration, fossorial habits, and relatively small size, we recognize that not all individuals that are injured or killed during construction, operations, and maintenance will be detected by monitors and workers and reported to us. Juvenile desert tortoises and eggs will be even more difficult to detect, because they are even smaller and, in the case of eggs, always hidden from sight. Lastly, scavengers may find the carcass before monitors or workers and remove it or dismember it to the extent that the cause of death may not be determinable.

Effects of the Translocation Strategy

The primary effects of the proposed action on desert tortoises will result from the capture and translocation of desert tortoises prior to ground disturbance associated with the proposed construction activities. We anticipate that Tessera will capture and translocate all subadult and adult desert tortoises from the fenced project areas, and any other portion of the action area, that are in harm's way due to project-related activities. Because of the difficulty in locating juvenile desert tortoises, Tessera may not find all juveniles on site and thus may move some but not all juvenile desert tortoises from the project site. Tessera will move all desert tortoises to the translocation area nearest its point of capture.

Based on the current survey estimates that cover the Calico Solar project site, we estimate that Tessera will translocate 29 subadult and adult desert tortoises into the identified translocation areas. Tessera will move all desert tortoises located within 500 meters of the northern portion of the project boundary into the Linkage translocation area. Tessera proposed to move 2 desert tortoises located within 500 meters of the Pisgah ACEC translocation area into this receptor site. Based on the estimated density of this area, we anticipate that this receptor site cannot accommodate any additional desert tortoises without exceeding the 30 percent increase in density established as a minimization measure. Therefore, we base our analysis on the assumption that Tessera will translocate the remainder of the desert tortoises found on the project site to the Ord-Rodman DWMA translocation area. Based on the results of the project site surveys in 2010, we do not anticipate that clearance surveys will find desert tortoises in the southern portion of Phase 2; however, if clearance surveys locate any individuals, Tessera will move them to the Ord-Rodman DWMA.

Tessera has proposed numerous measures to minimize injury or mortality of desert tortoises and ensure success of the translocation effort. Although Tessera will install desert tortoise exclusion fencing around the project prior to commencement of construction, we cannot predict exactly how many desert tortoises it will remove from the project site and other related work areas. This is because prior to the fencing and clearance of the project site, desert tortoise numbers may increase or decrease as individuals move throughout the landscape, are born and die. However, based on current surveys, we estimate that Tessera will capture and translocate no more than 29 subadult and adult desert tortoises from the Calico Solar site. Project site surveys from spring 2010 indicate that highest density of subadult and adult desert tortoises were located in the northern portion of the project site and action area. Therefore, we anticipate that Tessera will move most desert tortoises less than 500 meters into the Linkage translocation area. We estimate that the project site contains approximately 30 juvenile desert tortoises and reproductive females on the project site collectively produce approximately 87 eggs per year. However, because of the difficulty in finding desert tortoise eggs and juvenile desert tortoises, we anticipate that Tessera will translocate few, if any, eggs or juveniles from the project site. Effects to juvenile desert tortoises and eggs that are missed on the project site are discussed later in this section.

To measure the effectiveness of translocation, Tessera will monitor desert tortoises in the recipient sites and a control site. The number of desert tortoises that Tessera monitored in a given recipient site will be equal to the number of desert tortoises translocated to that site. The number of desert tortoises that Tessera monitors in the control site will equal the total number of desert tortoises translocated. Monitoring will require the capture, handling, and attachment of transmitters to all monitored individuals. Based on the population estimate for the Calico project site, we anticipate that Tessera will capture, handle, and transmitter 29 resident subadult and adult desert tortoises in the recipient sites and 29 subadult and adult desert tortoises in the control site. We have addressed the effects of capturing, handling, and attaching transmitters to these animals later in our analysis. To minimize the potential adverse effects of disease, Tessera will perform visual health assessments and ELISA testing for all desert tortoises that it locates during protocol level surveys of the recipient and control sites regardless of whether these individuals are included in the population to be monitored. Because Tessera will use experienced biologists, authorized by the Service, to perform health assessments and blood collection, we do not anticipate that these activities will result in injury or mortality of individuals.

Translocation has the potential to increase the prevalence of diseases, such as upper respiratory tract disease, in a resident population. Tessera will conduct visual health assessments on all the desert tortoises that will be translocated. For desert tortoises moved greater than 500 meters, Tessera will also collect blood to test for antibodies to the pathogens that cause upper respiratory tract disease. Tessera will not release desert tortoises in the recipient sites prior to the receipt of the disease test results and Service approval of the desert tortoise disposition plan. While waiting for disease test results, Tessera will quarantine desert tortoises on the project site within their associated construction phase (i.e., *in situ* quarantine) within temporary or permanent desert tortoise exclusion fencing. Tessera will hold juvenile desert tortoises in quarantine pens while awaiting disease test results. For Phase 1a, Tessera will quarantine any desert tortoises found above ground during clearance surveys in quarantine pens outside of Phase 1a and within the

project site until they can be tested for disease and permanently translocated. We address the effects of the quarantine and blood collection on desert tortoises below.

Tessera will conduct health assessments on all resident and control desert tortoises that are handled and fitted with transmitters. This will include the collection of a blood sample for all the desert tortoises in the Ord-Rodman translocation area and the control site. The Linkage translocation area will only receive visual health assessment for resident and translocated individuals.

The prevalence and distribution of disease in the translocation areas will affect the number of desert tortoises that the recipient sites can accommodate. To assess the prevalence of disease, Tessera will handle, conduct visual health assessments, and collect blood samples for ELISA testing on desert tortoises within the Ord-Rodman DWMA translocation. To determine whether the translocation area is below the 5 percent disease prevalence threshold, established in the description of the proposed action, with a sufficient level of confidence (i.e., 95 percent), we estimate that Tessera may have to handle and draw blood from as many as 105 desert tortoises (Averill-Murray 2010). To further reduce the potential for disease transmission, Tessera will not translocate desert tortoises within 6 kilometers of any resident desert tortoises showing signs of disease or with a blood test result indicating that the individual is seropositive.

Tessera will collect blood, for disease testing, from all desert tortoises that it will move greater than 500 meters from their point of collection to their point of release. All desert tortoises fitted with transmitters in the control site, and a sample of desert tortoises in the Ord-Rodman DWMA translocation. Some potential exists that handling and drawing blood from desert tortoises for disease tests may cause elevated levels of stress that may render these animals more susceptible to disease or dehydration from loss of fluids. Because Tessera will use experienced biologists, approved by the Service, Bureau, CEC, and CDFG, and approved handling techniques, collected desert tortoises are unlikely to experience substantially elevated stress levels during handling and blood collection and, we do not expect any injury or mortality to result from handling or blood collection. Furthermore, the use of disease testing and quarantine procedures will reduce the potential for disease spread due to translocation.

In addition, stress associated with handling and movement or due to density dependent effects could exacerbate the threat of increased diseased prevalence if translocated individuals with subclinical upper respiratory tract disease or other diseases begin to exhibit clinical signs of disease. This conversion of translocated desert tortoises from a non-contagious to a contagious state may increase the potential for infection in the resident population above pre-translocation levels.

We cannot reasonably predict the increase in disease prevalence within the resident population that may occur due to translocation. However, the following mitigating circumstances are likely to reduce the magnitude of this threat: 1) Tessera will use experienced biologists and approved handling techniques that are unlikely to result in substantially elevated stress levels that can make translocated animals more susceptible to disease or make them convert from a non-

contagious to contagious state; 2) Tessera will conduct thorough health assessments using qualified biologists to identify any visual signs of disease for desert tortoises being moved less than 500 meters to reduce the potential of introducing disease into the resident population; 3) Tessera will collect blood and perform additional disease tests (i.e., ELISA testing) for all desert tortoises that it moves greater than 500 meters per the recommendation of the Desert Tortoise Recovery Office (Service 2010e) to reduce the potential of introducing disease into the resident population; 4) The desert tortoises on the project site are currently part of a continuous population with the resident populations in the Linkage translocation area where the majority of desert tortoise will be moved and are likely to share similar pathogens and immunities; 5) Tessera will not translocate any animal that either has clinical signs of disease or tests ELISA-positive to reduce the potential of introducing disease into the resident population; 6) Tessera will buffer any resident individual showing signs of disease in the Ord-Rodman DWMA translocation area by 6 kilometers; and 4) density-dependent stress is unlikely to occur for the reasons discussed later in our analysis.

Although the measures proposed by the Bureau and the other mitigating circumstances described above are substantial barriers to disease spread, the potential for post-translocation disease transmission remains. Specifically, the Bureau is not proposing to perform pre-translocation surveys to determine disease prevalence in areas into which translocated animals may move following release in the translocation areas. Additionally, the Bureau is not proposing to establish sufficiently large buffers around diseased resident animals to account for the movement of translocated desert tortoises that is likely to occur after their release (see discussion of post-translocation movement distance later in this section). Without consideration of post-translocation dispersal in analysis of resident disease prevalence at translocation sites, some potential exists that dispersing desert tortoises may move into areas where they may contract diseases from resident animals. In addition, the buffer proposed by the Bureau to reduce the potential of placing translocated animals in close proximity to diseased resident animals is not sufficient to account for some long-range movements that we are likely to see after release of translocated individuals.

Because ELISA testing can result in false positive results (i.e., an animal may test positive even though it is not a carrier of the disease), the potential exists for removal of healthy individuals from the translocated population due to concern over disease. These individuals would not be released into the wild and would no longer contribute to the population. In addition, removal of these animals may reduce the resistance of the population to disease outbreaks because they may carry immunities that could buffer the population against an outbreak that results in high mortality of animals that are not immune. Because Tessera would coordinate with the Service and perform follow-up testing of ELISA-positive individuals, the potential for removing false-positive individuals from the translocated population is low. We expect that, of the 29 subadults and adults and any juveniles to be translocated more than 500 meters, only a small subset are likely to test positive for upper respiratory tract disease. Of these positive desert tortoises, an even smaller subset would test positive on a second ELISA screening. Consequently, we conclude that few desert tortoises will be incorrectly removed from the population due to false positive results.

Translocating desert tortoises may also adversely affect resident desert tortoises within the translocation area due to local increases in population density. The density of resident desert tortoises observed in translocation sites during surveys will determine the number of desert tortoises translocated into the Pisgah ACEC and Ord-Rodman translocation areas. The 2010 survey data indicated that the density of the Pisgah ACEC translocation area was 19.16 sub adult and adult desert tortoises per square mile (Miller 2010c), already greater than 30 percent above 5.0 subadult and adult desert tortoises per square kilometer (12.95 per square mile); therefore, no desert tortoises will be translocated into this area. For the Ord-Rodman DWMA translocation area, Tessera will ensure that the post-translocation density is not more than 30 percent above 8.2 subadult and adult desert tortoises per square kilometer (21.2 per square mile). The number of desert tortoises translocated into the Linkage translocation area will not be restricted based on the density of desert tortoises in this area this area will only be used for desert tortoises moved less than 500 meters. We anticipate that the biological benefits (e.g., remaining within the individual's anticipated home range where burrow locations, resources, and other neighboring desert tortoises are familiar) of moving these individual desert tortoises less than 500 meters is greater than any negative effects that could result from a slight increase in the density in the Linkage translocation area.

Increased densities may result in an increased spread of upper respiratory tract disease, an increased incidence of aggressive interactions between individuals, and an increased incidence of predation that may not have occurred in the absence of translocation. Saethre et al. (2003) evaluated the effects of density on desert tortoises in nine semi-natural enclosures at the Desert Tortoise Conservation Center in Nevada. The enclosures housed from approximately 289 to 2,890 desert tortoises per square mile. Saethre et al. (2003) observed a greater incidence of fighting during the first year of the experiment but did not detect any trends in body condition index, reproduction, or presence of the symptoms of upper respiratory tract disease among the enclosures. Body condition index and reproduction are important indicators of how translocation may affect resident desert tortoises; generally, stress suppresses body condition index and reproduction in desert tortoises. This study did not draw any conclusions regarding density-dependent effects on predation of desert tortoises. Additionally, as discussed previously in this section, desert tortoises tend to move substantial distances from the release sites; this behavior reduces the likelihood of overcrowding in smaller areas.

We anticipate that density-dependent effects on resident populations are likely to be minor for the following reasons: 1) Tessera will perform health assessments on all desert tortoises prior to translocation thus decreasing the potential of moving an individual with poor health into the area; 2) a threshold for density for the Ord-Rodman translocation site has been set so as not to exceed 30 percent of the current estimated densities for each area; 3) translocation will result in a dispersed release of individuals; 4) the translocation areas are not a confined space, so released individuals would be able to disperse into other areas; and 5) density limits at which adverse effects were observed in previous studies are significantly greater than the post-translocation densities that are likely to be in the action area. In addition, Tessera will perform health assessments on the translocated and recipient desert tortoises wearing transmitters during monitoring, which could provide the opportunity for adaptive management, should an

unanticipated effect be observed. Adaptive management could include actions like predator control, removal of desert tortoises showing clinical signs of disease, removal of some translocated animals to new translocation areas to reduce densities, or other measures. However, specific adaptive management measures have not been identified for our evaluation, so we cannot predict their effectiveness in this biological opinion.

Based on these density requirements and the resident population sizes that were estimated for the translocation areas in the Environmental Baseline Section of this biological opinion and the density estimates determined from surveys in 2010, the Ord-Rodman DWMA translocation area should accommodate 90 translocated desert tortoises in total (subadult, adult, and juvenile desert tortoises combined). The Linkage translocation area will accommodate the limited number of individual desert tortoises moved less than 500 meters into the 3,617-acre translocation area. Although this is sufficient to facilitate translocation of the upper end of the 95 percent confidence interval for the project site population estimate (i.e., 29 subadult and adult desert tortoises) and all of juvenile desert tortoises estimated, the proposed areas may not be sufficient to support all project site desert tortoises if the level of disease determined to be present in the translocation areas is above 5 percent or if the establishment of buffers around diseased individuals restricts the number of desert tortoises that the translocation area can accommodate. Consequently, we anticipate that Tessera could have to expand the boundaries of its translocation areas in some locations. Because we cannot predict if or how these expansions would occur, we are not analyzing this contingency in our biological opinion. Expansion of the translocation areas would necessitate re-initiation of consultation.

The proposed translocation strategy and the best available information regarding translocation site densities and project site population size indicate that Tessera's translocation strategy will accommodate more than 90 desert tortoises in the Ord-Rodman DWMA and Linkage translocation areas. Consequently, we anticipate that these areas will accommodate all of the desert tortoises that Tessera will clear from the project site. However, disease prevalence in the Ord-Rodman DWMA translocation area may prevent the translocation of desert tortoises to this recipient area. If project site clearance surveys locate a number of desert tortoises greater than the translocation areas can accommodate due to density or disease constraints, Tessera will need to identify additional areas for translocation, and this would constitute a change in the project description requiring re-initiation of consultation.

For Phase 1a, Tessera will use quarantine pens to hold desert tortoises located above ground during clearance surveys and other desert tortoises that emerge from hibernation during the winter. In addition, Tessera may use quarantine pens in other phases of project construction to hold individual desert tortoises while waiting for disease test results. Tessera will construct all quarantine pens following the specifications of the desert tortoise translocation plan (URS 2010f). The quarantine pens will be 20 by 20 meters, and a veterinarian-approved plan will guide care of the desert tortoises during quarantine. Maintaining the desert tortoises within quarantine pens could affect desert tortoises by increasing their vulnerability to exposure, stress, dehydration, inadequate food resources, and increased predation. Because Tessera will regularly monitor the desert tortoises and provide care based on a veterinarian approved plan, and the

desert tortoises will be held for a limited amount of time, we anticipate that the quarantined individuals are unlikely to experience from exposure, stress, dehydration, or inadequate nutrition. However, the potential exist that predators or poachers could target desert tortoises in the quarantine pens. Tessera will monitor and reduce these threats through regular observations of the quarantined individuals as identified in the proposed construction of Phase 1a and the desert tortoise translocation plan.

Once it receives test results, Tessera will translocate all desert tortoises identified as healthy to the nearest available translocation site. Restricting the desert tortoises to within the phased project elements could affect desert tortoises by increasing their vulnerability to exposure, stress, dehydration, and inadequate food resources. Because Tessera will allow the desert tortoise to wander freely within the area, we anticipate that desert tortoises will be within their individual home ranges where the potential for stress would be relatively low and animals could find adequate shelter and nutrition.

Following release, we cannot predict the movement patterns that all translocated animals are likely to exhibit. Desert tortoises translocated shorter distances (i.e., less than 500 meters) are not likely to move as far following release as desert tortoises moved longer distances. Walde et al. (2008) found that maximum straight-line dispersal distance for male desert tortoises was approximately 1.5 kilometers in the first year following translocation. For desert tortoises translocated greater than 500 meters, mean straight-line dispersal distances of adult translocated desert tortoises (males and females) reported by Nussear (2004, Figures 2 and 4) were approximately 1, 1.5, 1.8, 3.5, and 6 kilometers. Walde et al. (2008) reported mean straight-line dispersal distances of adult translocated desert tortoises using 2 experimental treatments as 2.6 and 4.2 kilometers for males and 1.5 and 2.3 kilometers for females. Maximum straight-line dispersal distances for translocated male desert tortoises ranged from 6.2 to 23 kilometers in the first year following translocation (Field et al. 2007, Walde et al. 2008). Maximum straight-line dispersal distances for translocated males at each site reported in these studies varied from 6.2 kilometers (Field et al. 2007) to 7.3, 7.4, 11.3, 11.6, and 12.6 kilometers (Walde et al. 2008).

Translocated populations can also expand the area they occupy in the first year following translocation (e.g., from 3.9 to 6.9 square miles at a Nevada site; from 0.2 to 10.3 square miles at a Utah site). The degree to which these animals expand the area they use depends on whether the translocated animals are released into typical or atypical habitat; that is, if the translocation area supports habitat that is similar to that of the source area, desert tortoises are likely to move less (Nussear 2004). Translocated animals appear to reduce movement distances following their first post-translocation hibernation to a level that is not significantly different from resident populations (Field et al. 2007, Nussear 2004). As time increases from the date of translocation, most desert tortoises change their movement patterns from dispersed, random patterns to more constrained patterns, which indicate an adoption of a new home range (Nussear 2004).

We cannot predict the direction that translocated animals are likely to move. In some studies, translocated desert tortoises have exhibited a tendency to orient toward the location of their capture and attempt to move in that direction (Berry 1986), but in other instances, no discernible

homing tendency has been observed in translocated animals (Field et al. 2007). Information specific to short-distance translocations indicates that at least some individuals will attempt to return to their former home ranges after release (Stitt et al. 2003, Rakestraw 1997).

Based on this information, at least a portion of the translocated animals are likely to make extensive, long-distance movements during the first year following translocation, and the area that the translocated population occupies is likely to increase. We anticipate that the desert tortoises moved greater than 500 meters will likely make the largest movements since they have been moved the greatest distance. Based on the maximum straight-line dispersal distances discussed above, which constitute the best available scientific and commercial data at this time, we anticipate that some of the desert tortoises translocated long distances (greater than 500 meters) may disperse up to approximately 12.6 kilometers from the point of release in first year following translocation. We consider the 23-kilometer dispersal distance identified above to represent an outlier since only one male desert tortoise moved this far. Because female desert tortoises were found to move shorter distances than males following translocation (Field et al. 2007, Walde et al. 2008), the 12.6-kilometer distance captures the maximum straight-line dispersal distance of translocated females as well. We anticipate that most of the translocated individuals moved into the Ord-Rodman DWMA translocation area are likely to make long distance movements that are not typical of normal desert tortoise movement patterns.

Based on the distribution of desert tortoises in the Pisgah Valley portion of the action area, we anticipate that Tessera will translocate the majority of the animals found on the Calico facility site less than 500 meters into the Linkage translocation site. We anticipate that these individuals are likely to move much shorter distances and remain within the maximum straight-line dispersal distance observed for male desert tortoises (1.5 kilometers) discussed above for short-distance translocations. Some of the translocated desert tortoises, especially those moved into the Linkage translocation area, are likely to attempt to return to the project site, where they would encounter the project site fence and either turn around or walk the fence line. Because the action area for this project includes buffers that encompass all the contiguous desert tortoise habitat extending outside the translocation areas based on the maximum straight-line dispersal distances predicted for desert tortoises to move following translocation, we anticipate that all translocated animals, including those that make long-distance movements, will remain in the action area. Following the first hibernation period after translocation, individuals are likely to reduce movement distances and establish new home ranges.

In one study, the majority of the dispersal movement away from the release site occurred during the first 2 weeks after translocation (Field et al. 2007). During this time and over the period prior to home range establishment, desert tortoises may experience higher potential for mortality because they are moving great distances through unfamiliar territory and are less likely to have established cover sites for protection. Desert tortoises that make long-distance movements following translocation can travel for 5 to 10 days and average 671.5 yards per day (Berry 1986). Studies have documented various sources of mortality for translocated individuals, including predation, exposure, fire, disease, crushing by cattle, and flooding (Nussear 2004, Field et al. 2007, Berry 1986, U.S. Army 2009, 2010). Of these, predation appears to be the primary source

of mortality in most translocation studies (Nussear 2004, Field et al. 2007, U.S. Army 2009, 2010). Based on the description of the action area in the Environmental Baseline section of this biological opinion, the potential exists for all six sources of mortality within the action area. However, fire is likely to be localized and highly dependent on the abundance of non-native grasses and other weeds. In addition to these threats, the potential exists for desert tortoises to be killed on roads during the period when translocated individuals are seeking new home range locations.

Tessera has selected translocation areas in desert tortoise habitat that should serve as suitable recipient sites for these animals based on habitat suitability, proximity to home ranges of the translocated animals, and density of the resident population. It has proposed numerous protective measures in its translocation plan that are likely to reduce the potential for mortality of translocated individuals. Tessera will fence the perimeter road around the project site, and require all project associated personnel to follow a 25-mile-per-hour speed limit, reducing the likelihood of mortality along the road. Tessera has selected translocation areas within the Ord-Rodman DWMA that are a great distance from heavily traveled roads, and outside of the active grazing allotment, further reducing the likelihood for mortality. The length of monitoring will provide for some form of adaptive management to occur in association with the translocation. However, adaptive management measures are not available for our evaluation, so we cannot predict their effectiveness in this biological opinion.

Studies have documented mortality rates of 0, 15, 21, and 21.4 percent of translocated animals in other areas (Nussear 2004, Cook et al. 1978 in Nussear 2004, Field et al 2007). Nussear (2004) found that mortality among translocated animals was not statistically different from mortality observed in resident populations. This study did not compare mortality rates in resident populations to those in control groups; therefore, we cannot determine if the translocation caused increased mortality rates in the resident population. In addition, Esque et al. (2010) found that mortality rates in resident (29 of 140 desert tortoises; 20.7 percent mortality), control (28 of 149 desert tortoises; 18.8 percent mortality), and translocated populations did not differ statistically and concluded that the translocation was not the cause of the observed mortality. With the exception of the Esque et al. (2010) study, none of the studies cited in this paragraph used controls to compare mortality rates in resident and translocated populations to the mortality rate experienced in populations not affected by translocation.

Based on the information that we have gathered and considering the uncertainty of site-specific applicability, we estimate that translocated, resident, and control desert tortoises are likely to experience mortality rates of approximately equal proportions due to predation, exposure, fire, disease, crushing by vehicles, and flooding. We conclude that mortality rates in the resident and translocated populations are unlikely to be elevated above levels that these populations would experience in the absence of translocation, based on the information provided in Esque et al. (2010). Therefore, we do not anticipate this mortality will be the result of translocation and, consequently, we anticipate that few, if any, eggs, juveniles, subadults, or adults will die or be injured as a result of translocation. The monitoring of a nearby control population will assist us in determining whether this prediction is realized.

Based largely on one study (Esque et al. 2010), we anticipate that the mortality of translocated and resident desert tortoises is not likely to differ significantly from that of control animals. Such a finding indicates that we do not anticipate desert tortoises are likely to die after being translocated or having translocated animals released within their home ranges specifically because of the translocation. Because the best available data indicate that mortality is unlikely, we are not anticipating any take associated with post-translocation effects to resident or translocated animals; because we are not anticipating any incidental mortality of that nature, this biological opinion cannot contain any reasonable and prudent measures or terms and conditions that address such post-translocation mortality. However, because the survival of the translocated and resident animals (with regard to any effects of translocation) is key to the success of the Bureau's and Tessera's efforts to minimize the effects of the proposed action on the desert tortoise, being able to address any unforeseen effects of translocation is a key component of ensuring that unforeseen effects of the proposed action are not likely to jeopardize the continued existence of the desert tortoise. Consequently, we have added language to the Re-initiation Notice section of this biological opinion to specifically identify when new information reveals effects of the action that may affect the desert tortoise in a manner or to an extent that was not previously considered (i.e., 50 Code of Federal Regulations 402.16(b)).

We have estimated that few, if any, desert tortoises may be moved during installation of the water pipeline and the portion of the transmission line outside the project site. Because disturbance areas on these projects are small, movement of desert tortoises immediately outside of the work areas is not likely to remove them from their current home ranges. Consequently, any desert tortoise moved from the water pipeline and transmission line will likely continue to occupy familiar territory and use known shelter sites and is unlikely to experience post-translocation mortality associated with displacement from the work areas. Furthermore, following completion of construction, desert tortoises occupying these areas will be able to move through and return to the area.

Juvenile desert tortoises will comprise a portion of the overall mortality predicted above for resident and translocated populations. We anticipate that translocated juveniles are likely to experience a higher mortality rate than translocated subadult and adult desert tortoises, simply because smaller and younger desert tortoises in general have higher mortality rates than larger individuals. Because we anticipate that Tessera will move few, if any, juvenile desert tortoises, we do not anticipate large numbers of juveniles will die as a result of translocation because surveyors will miss most of these individuals during clearance surveys of the project site. We have discussed juvenile mortality during construction below. Because juvenile desert tortoises experience high mortality rates under natural circumstances, many of these individuals would likely not survive to reproductive age in the absence of project-related effects.

Effects of Post-translocation Monitoring

Based on the description of the post-translocation monitoring program and our estimate of the number of desert tortoises on the project site, we anticipate that Tessera will transmitter no more than 87 subadult and adult desert tortoises to facilitate monitoring of the translocated, resident,

and control populations. This will require desert tortoises to carry transmitters and will require periodic monitoring and handling of individuals to perform visual health assessments and assess body condition. Some potential exists that handling of desert tortoises may cause elevated levels of stress that may render these animals more susceptible to disease or dehydration from loss of fluids. Because Tessera will use experienced biologists, approved by the Service, Bureau, CEC and CDFG, and approved handling techniques, these desert tortoises are unlikely to experience substantially elevated stress levels resulting from handling and monitoring activities. Any effects would be limited to Subadult and adult desert tortoises because Tessera has not proposed to monitor juveniles.

Effects of Construction of Calico Facility

Prior to construction, Tessera will permanently fence the entire Calico project facility with desert tortoise exclusion fence. On the portions of the project where Tessera must maintain a perimeter road to allow for public access, it will install the desert tortoise exclusion fence on the outside of the road to prevent desert tortoises from accessing the road or project site. Tessera will install cattle guards at every location where the perimeter road intersects a Bureau open route or county road. Tessera will clear all desert tortoises from the 4,613-acre site prior to ground disturbance. During construction of the permanent and temporary exclusion fencing, Tessera will perform pre-activity clearance surveys and employ monitors to move desert tortoises out of harm's way if they re-enter work areas. For these reasons, we anticipate that construction, including construction access, is unlikely to kill subadult and adult desert tortoises. Some potential always exists that surveyors may miss an individual during clearance surveys and construction monitoring. We cannot predict how many subadult and adult desert tortoises that clearance surveys and construction monitoring would miss. However, because Tessera will use qualified biologists, authorized by the Service for clearance surveys, we anticipate the number is likely to be small.

In addition, construction of the transmission line and water pipeline has the potential to result in injury or mortality of individuals on work sites. We have estimated that work areas associated with these activities would have few if any desert tortoises. However, Tessera would conduct clearance surveys and move desert tortoises out of harm's way if they are found on work sites. In addition, Tessera would use experienced biologists to monitor work activities on these project sites and move any desert tortoises out of harm's way that they may have missed during clearance surveys. For these reasons, we anticipate that construction activities associated with the water pipeline and transmission line are unlikely to kill subadult and adult desert tortoises. Some potential always exists that surveyors may miss an individual during clearance surveys and construction monitoring. We cannot predict how many subadult and adult desert tortoises that clearance surveys and construction monitoring would miss. However, because Tessera will use qualified biologists, authorized by the Service for clearance surveys, we anticipate the number is likely to be small.

In addition, juvenile desert tortoises and eggs are difficult to detect during clearance surveys and construction monitoring; therefore, the potential exists that surveyors may miss most of them and

they are likely to remain in the work areas during construction. Construction activities are likely to kill juvenile desert tortoises and eggs that surveyors miss during clearance surveys or project monitoring. Because Tessera will not be grading the entire project site and vegetation will remain between SunCatcher rows, some small portion of juveniles and nests may survive through construction in the remaining habitat. Based on the estimates in the Environmental Baseline section of this biological opinion, we estimate that up to 30 juvenile desert tortoises may reside on site. We anticipate that construction may kill or injure these individuals, if they are not translocated from the site. Because juvenile desert tortoises experience high mortality rates under natural circumstances, many of these individuals would be unlikely to survive to reproductive age in the absence of project-related effects.

We have estimated that the reproductive females on the project site collectively produce as many as 87 eggs per year. However, we cannot estimate how many of these eggs that construction activities would destroy because this number covers the entire year's production and we do not know what portion of this total will be present on site when construction activities are occurring on a given phase. We anticipate that construction may kill or injure up to 87 desert tortoise eggs on the project site, if they are not translocated; the eggs are unlikely to be translocated, given their small size and the fact that they are underground and, therefore, difficult to detect.

Because clearance surveys are likely to miss juvenile desert tortoises, we anticipate that many, if not all desert tortoises associated with work areas on the water pipeline and transmission line would be injured or killed. However, we have estimated that few, if any, juvenile desert tortoises would occupy these work areas because the areas would be small and are unlikely to support more than a few juveniles. Because juvenile desert tortoises experience high mortality rates under natural circumstances, many of these individuals would be unlikely survive to reproductive age in the absence of project-related effects.

Effects of Operations and Maintenance Activities

As discussed above, rows of vegetation may provide for the survival of a small portion of juvenile desert tortoises and nests through construction. Therefore, some potential exists that regular operations and maintenance activities could kill or injure juvenile and newly hatched desert tortoises during the early years of operations. Because Tessera will collapse desert tortoise burrows during clearance surveys, only small areas of vegetation will remain, vegetation is likely to be mowed, and maintenance activities will be fairly continuous; we do not expect that a population of desert tortoises will subsist within the Calico project site. We cannot predict the number of juvenile desert tortoises that will survive through construction and will be killed during operations and maintenance; however, based on our estimate of the numbers of juveniles and eggs on the site, we anticipate that up to 30 juveniles and 87 eggs may be killed or injured due to operation and maintenance, if they are not captured and translocated. We have discussed additional indirect effects associated with operation and maintenance of this facility in the Miscellaneous Effects section of this biological opinion.

Tessera plans to conduct most operation and maintenance activities inside the desert tortoise exclusion fence over the 30-year life of this project anticipated by the Bureau; however, Tessera may perform some ground-disturbing maintenance activities outside of fenced areas while conducting perimeter fence repair. Activities associated with fence repair have the potential to injure or kill desert tortoises primarily as a result of vehicle strikes, as workers travel to and from work sites outside of the fenced areas, by workers walking the perimeter of the fence during inspections, and during repair of the perimeter fence. Additionally, if the perimeter fence is damaged, desert tortoises that enter the facility could be killed or injured during routine activities. Because Tessera plans to conduct all maintenance activities inside the desert tortoise exclusion fence and has proposed several protective measures such as limiting speed limits to 25 miles per hour, and regular inspections of the perimeter fence, we anticipate few desert tortoises will be affected.

Effects of Restoration/Reclamation Activities for Construction and Operation

Restoration activities within the permanently fenced project area are unlikely to result in injury or mortality of desert tortoises because few if any desert tortoises are likely to occupy the project site after clearance surveys and construction activities. Tessera will restore temporarily disturbed areas associated with the water pipeline and the portion of the transmission line extending outside of the project boundary. Tessera will implement restoration as identified in the restoration plan. The restoration plan will include measures to insure that no activities injure or kill desert tortoises (e.g., pre-activity clearance surveys, use of desert tortoise monitors, and use of tortoise exclusion fencing). Consequently, restoration activities will injure or kill few, if any, desert tortoises.

Effects of Accessing Worksites

The primary access road to the Calico facility will be almost entirely within the fenced project facility. Tessera will install desert tortoise exclusion fencing on the short segment of the main access road that is outside the project facility. Tessera will fence any temporary access roads that it uses while the main access road is constructed and the project facility is fenced. Tessera will also install desert tortoise exclusion fencing on the outside edge of the project perimeter boundary fence. Because Tessera will fence all of the roads associated with worksite access, it is unlikely that access to the Calico facility will result in injury or mortality of desert tortoises. In the event that the fence is damaged, a small number of desert tortoises could enter the roadway and be injured or killed. Because all workers will undergo an education program about desert tortoises and will be limiting travel speeds to 25 miles per hour, workers may be less likely to strike desert tortoises than a casual user. We cannot predict how many individuals will be killed or injured because of the variables involved, such as weather conditions, the nature and condition of the road, and activity patterns of desert tortoises at the time the roads are being used; however we expect this number to be small.

Effects of Partial Loss of Desert Tortoise Home Ranges

Construction of the Calico facility and the surrounding desert tortoise exclusion fence will result in the partial loss of desert tortoise home ranges. Construction of the Calico facility could exclude desert tortoises that occupy the area adjacent to the proposed site from a portion of their home range. There are approximately 6,100 acres of land within a 797-meter buffer of the proposed project. We used the 797-meter buffer as an index for the home range of desert tortoises based on a male desert tortoise home range of approximately 2 square kilometers (O'Conner et al. 1994; Duda et al. 1999; Harless et al. 2009). Using the same desert tortoise density used for the action area outside of the project boundary, 4.7 subadult and adult desert tortoises per square kilometer (12.2 per square mile), determined by the 2007 range wide monitoring to represent the density of desert tortoises in the Western Mojave Recovery Unit (Service 2009b), we estimate that approximately 116 subadult and adult desert tortoises may have home ranges within the area surrounding the project site and an additional 121 juvenile desert tortoises may occupy this area. Displacement of these desert tortoises from a portion of their home range could have similar effects to those described for translocation such as elevated levels of stress that may render these animals more susceptible to disease or dehydration from loss of fluid, increase density of animals and associated effects, and increased exposure to disease. Because desert tortoise home ranges vary greatly in size, we cannot determine how many desert tortoises will actually lose part of their home range as a result of the construction of the Calico facility; however, we expect that the number of desert tortoises that will be injured or killed due to the partial loss of home range to be low because we expect these individuals will all maintain some portion of their home range, be in familiar surroundings, and will be able to expand their territory into contiguous habitat.

Effects of Loss of Habitat

Construction of the Calico facility would cause the long-term loss of a maximum of 4,613 acres of desert tortoise habitat. Tessera estimates that 30 percent of the solar field would be undisturbed, as the SunCatcher solar arrays will allow for approximately 40 to 80 feet of vegetation to be left generally undisturbed between alternate rows of SunCatchers. However, Tessera may trim vegetation to approximately 3 inches throughout the disturbed portions of the project site (i.e., portions of the project site not included in the alternating rows of undisturbed vegetation) to provide for reduced shading and fire hazards.

The Calico facility will remove approximately 4,613 acres of desert tortoise habitat for a period of more than 30 years. Tessera will restore the habitat in the fenced project area when the project is decommissioned, but it is unlikely to function as suitable desert tortoise habitat for many years following facility closure. We cannot predict the amount of time required to return areas of long-term disturbance to suitable desert tortoise habitat because of numerous variables associated with restoration success. The following table provides details on the habitat loss associated with the Calico Solar facility.

Permanent Disturbance[1]	**Acres**
Calico facility - Solar Field	3,175.9
Calico facility – rows between SunCatchers	1,361.1[2]
Temporary Disturbance	
Water pipeline	4.5
Transmission line (between Calico and Pisgah substation)	12.9
Temporary Functional Loss (through isolation)	
N.A.P. 2	429
Lands adjacent to N.A.P. 2	245
Total	5,228.4

[1]Bellows 2010; [2]Potential temporary loss of habitat depending on the extent of mowing activities

Outside the project site, the groundwater pipeline and transmission line will result in the temporary loss of desert tortoise habitat that Tessera will restore following completion of construction of these linear features. The underwater pipeline will result in 4.5 acres of disturbance, while the transmission line will affect 12.9 acres.

In the southern portion of the project, the NAP 2 and the adjacent project exclusion areas include 674 acres of desert tortoise habitat (Miller 2010c). This area will have a severely restricted connection to other desert tortoise habitat in the surrounding area due to development of the project facilities. Although project activities would not disturb this portion of desert tortoise habitat, it will have little, if any, future value to desert tortoises.

These disturbances are likely to result in desert tortoise habitat loss that will persist for various periods. Following extensive disturbance and compaction, Mojave Desert soils can take between 92 and 124 years to recover in the absence of active restoration (Webb 2002). In addition, recovery of plant cover and biomass in the Mojave Desert can require 50 to 300 years in the absence of restoration efforts (Lovich and Bainbridge 1999). Although active restoration, including decompaction, seeding, and planting, can reduce the time required to restore desert ecosystems, success is varied and dependent on numerous variables. Based on this information, 3,175.9 acres, currently characterized as desert tortoise habitat are likely to be permanently lost or unsuitable as habitat for several decades following decommissioning of the facilities and commencement of restoration work. However, we anticipate that the mowed and un-mowed areas within the project facility will respond more quickly to restoration efforts and may provide desert tortoise habitat value more rapidly than the rest of the project site. Because active restoration will occur on the linear components, we estimate that Tessera will restore 17.4 acres of desert tortoise habitat prior to decommissioning of the facility. If additional development

does not occur within NAP 2, we anticipate that following the decommissioning of the facility, the 674 acres that were functionally lost to desert tortoise will be again be available for their use.

We estimate that the Western Mojave Recovery Unit contains approximately 10,316 square miles of potential desert tortoise habitat (Waln 2010, see Status of the Desert Tortoise - Status and Trends of Desert Tortoise Populations section of this biological opinion). The habitat that would be disturbed on a long-term basis (i.e., approximately 7.21 square miles) constitutes approximately 0.07 percent of the remaining modeled habitat in the Western Mojave Recovery Unit. Although this percentage does not constitute a numerically substantial portion of the recovery unit, we do not have the ability to place a numerical value on edge effects that the proposed action may cause or that occurs in the recovery unit as a whole. Given that, this low percentage of the recovery unit that would be lost likely underestimates the biological value of the area.

Miscellaneous Effects

The noise produced by the Calico facility during operation has the potential to affect desert tortoises in the areas surrounding the project site. Operation of the Calico facility will generate noise of 63 to 74 adjusted decibel, equivalent sound level (dBA Leq), primarily from the operation of the SunCatchers. This increase of constant noise within the valley could disturb desert tortoises or discourage them from using the area near the project site. Tessera will install all of the SunCatchers greater than 100 feet from the project boundary, thereby reducing the amount of noise extending outside of the project to below 74 dBA Leq. Rabin et al. (2006) illustrated that some species can successfully adapt to ambient sound levels of 90-118 dB decibel sound pressure level (SPL). Limited data exists on the effect of noise on desert tortoises, Bowels et al. (1999 in Service 2008c) demonstrated that desert tortoises hearing is relatively sensitive (mean = 34 dB SPL) and that few physiological effects were observed with short-term exposures to jet air craft noise and sonic booms. However, we cannot extrapolate this result to determine the effects of chronic noise exposure over a desert tortoise's life-time (Service 2008c). Chronic elevated noise levels could lead to elevated levels of stress that may render these animals more susceptible to disease or dehydration from loss of fluid, decreased reproduction, or shifts in home ranges leading to increased density-dependent effects. We cannot reasonably predict the magnitude of the effect that noise will have on desert tortoises in the surrounding area; however, we expect the number of desert tortoises that will be injured or killed will be low based on the ability of other species to adapt to noise disturbance, the level of noise and any effects will attenuate as distance from the project site increases, and the fact that desert tortoises do not appear to rely on auditory cues for their survival. In addition, some portions of the population of desert tortoises occupying this site are likely affected to some extent already by noise generated by Interstate 40 and the railroad that runs through the project site.

Indirect effects associated with construction, operation and maintenance of the Calico facility may injure or kill desert tortoises. These effects include increased predation by common ravens and modification of the habitat and diet of desert tortoises due to the spread of non-native plant species.

Common ravens are attracted to human activity in the desert. Securing trash and reducing other subsidies will likely reduce the attractiveness of the area to predators. We expect that common ravens are still likely to frequent the site because it would offer perching, roosting, and nesting sites within the solar field. Consequently, the proposed facility has the potential to attract common ravens to some degree and lead to further predation on desert tortoises in the vicinity; the proposed measures to monitor use of the site by common ravens and to attempt to remove any subsidies are likely to reduce the attractiveness of the facility to these birds to some degree.

Tessera will contribute funds to the regional common raven management program to address the indirect and cumulative impacts associated with project development that facilitate the expansion of common raven populations into desert tortoise habitat. The one-time fee of $105 per acre of disturbance to 4,613 acres of desert tortoise habitat impacted by this project will fund the project's portion of the regional raven management plan for the 30-year life of the project anticipated by the Bureau. Tessera's funding of the regional management plan for common ravens will contribute to a large-scale management action that the Service and other agencies are undertaking to control and manage common ravens on a regional basis. We expect that implementation of this plan will promote the recovery of the desert tortoise by reducing the number of common ravens that prey on desert tortoises and by implementing actions that are likely to reduce subsidies for common ravens on a regional basis.

Non-native plant species currently occur on the proposed project site and are likely to occur in other portions of the action area at varying densities. Within the action area, numerous features serve as vectors for infestation by non-native plant species (e.g., BNSF railroad, Interstate 40). However, construction and operation of the Calico facility has the potential to increase the distribution and abundance of non-native species within the action area due to ground-disturbing activities that favor the establishment of non-native species. In addition, access to the project site and other project features by construction and operations personnel is likely to increase the volume and distribution of non-native seed carried into the action area. The increased abundance in non-native species associated with this project may result in an increased fire risk, which may result in future habitat loss. Tessera has proposed numerous measures to address control of non-native plant species within the project site and a surrounding 250-meter (820-foot) buffer and to minimize the potential for fire in and around the facility, including an onsite fire response team. We cannot reasonably predict the increase in non-native species abundance that this project will create within the action area, but we anticipate that the program proposed by Tessera will be reasonably effective in reducing the increase in some species. However, we anticipate that the amount of disturbance created by the 4,613-acre solar field and the activities in the action area will result in an increase in the abundance of non-native species and thereby elevate the risk of fire, which, in turn, heightens the risk of future habitat loss. This could reduce the number and distribution of desert tortoises within the action area.

The loss of habitat associated with this project has the potential to reduce the connectivity between desert tortoise populations. Maintaining a functional corridor through the Pisgah Valley is critical for the long term recovery of the desert tortoise. Specifically, Pisgah Valley is an important part of the desert tortoise habitat which connects desert wildlife management areas in

the West Mojave Recovery Unit (e.g., Ord-Rodman) with the Mojave National Preserve. The valley serves as an important corridor connecting not only the critical habitat units (Ord-Rodman, Superior-Cronese, and Ivanpah), but it also provides one of the few pathways connecting the Western Mojave and Eastern Mojave recovery units, as well as the Western Mojave and Colorado Desert recovery units, as described in the draft revised desert tortoise recovery plan (Service 2008c). However, based on the currently reduced size of the project site, the establishment of the solar development exclusion area, and the amount of remaining desert tortoise habitat in this area, we conclude that the reduced project design will not eliminate connectivity in this area.

Effects of Compensation

The Bureau is proposing to require compensation for loss of habitat associated with this project at a ratio of 1 to 1 per the provisions of the West Mojave Plan (Bureau et al. 2005). The Bureau will use compensation funds for enhancement of desert tortoise habitat within the Ord-Rodman DWMA. Specific habitat enhancement and rehabilitation actions will include all or some of the following: construction of a fence along State Route 247 from Barstow to Lucerne Valley to prevent desert tortoises from entering the roadway, with the primary focus area being Barstow to Stoddard Ridge; installation of barrier fencing along Camp Rock road to prevent unauthorized vehicular use; signing open routes within Ord-Rodman DWMA and visually obscuring routes that have been administratively closed but continue to be used by vehicles; and installation of desert tortoise fencing along Interstate 40. The Bureau may also use these funds to support head start programs for desert tortoises developed in coordination with the Service's Desert Tortoise Recovery Office.

In addition to the Bureau's compensation strategy, the CEC and CDFG will collect additional compensation for loss of desert tortoise habitat north of the BNSF railroad at a ratio of 2 to 1 with an additional ratio of 4 to 1 compensation collected for 369 acres of this habitat. CDFG will use these compensation funds to acquire mitigation lands with potential to contribute to desert tortoise habitat connectivity and linkages between critical habitat, known populations of desert tortoise, and other preserve lands inside the Western Mojave Recovery Unit. To satisfy this mitigation condition, Tessera will acquire, protect, and transfer to a management entity no fewer than 10,302 acres of desert tortoise habitat and provide funding for the initial improvement and long-term maintenance and management of the acquired lands (CEC 2010b). All acquisition and habitat enhancements or rehabilitation actions associated with the Bureau's and the State of California's compensation requirements will be performed within the Western Mojave Recovery Unit.

Although the purchase, protection, and enhancement of suitable desert tortoise habitat through these compensation requirements will not create new habitat within the recovery unit, it will result in an increase in the amount of desert tortoise habitat managed for the conservation of this species in protected areas. These actions will increase the quality of habitat for desert tortoises and reduce the number of existing threats and mortality sources in the areas where they occur. Because habitat enhancement actions and land acquisition would occur in DWMAs or other

locations that are important to desert tortoise conservation, the proposed compensation requirements would provide a positive recovery benefit to desert tortoises.

Implementation of some habitat enhancement actions has the potential to result in adverse effects to the desert tortoise. Because we do not have specific information regarding future habitat enhancement and rehabilitation projects, we cannot perform a detailed analysis of these actions. The Bureau has indicated that these actions would likely require future project-specific authorizations prior to implementation. Consequently, we will address their potential adverse effects to the desert tortoise in future project-specific, section 7 consultations.

Summary

Prior to construction of the Calico facility, we estimate that Tessera will capture and translocate no more than 29 subadult and adult desert tortoises from the project worksite. We anticipate the size and configuration of the current recipient sites will accommodate all of these animals. However, Tessera may have to identify new translocation areas if it cannot demonstrate compliance with the density and disease thresholds in its translocation plan. Because we cannot predict if or how the translocation strategy might change, these changes would require further analysis and consultation. We anticipate that they will translocate few if any juvenile desert tortoises or desert tortoise eggs. Because they will implement a variety of measures to reduce stress to translocated desert tortoises, we do not anticipate that injury or mortality will result from handling of these animals. Following release of translocated animals, we anticipate that mortality rates in the resident and translocated populations are unlikely to be elevated above normal levels, and that mortality rates will be approximately equal among the translocated, resident, and control desert tortoises.

In addition to the 29 translocated subadult and adult desert tortoises that Tessera will monitor following release, we estimate that it will capture and monitor an additional 29 subadult or adult desert tortoises in the resident and control populations. Furthermore, based on our current estimates, Tessera will collect blood samples from 105 resident desert tortoises located in the Ord-Rodman DWMA translocation area, 29 desert tortoises in the control site, and 29 desert tortoises on the project site. We do not anticipate that placing transmitters on these animals and periodic handling for the purposes of monitoring or collection of blood samples will result in substantial adverse effects because Tessera will use experienced biologists, approved by the Service, and approved handling techniques.

Because Tessera will surround all of its work areas with desert tortoise exclusion fencing, perform clearance surveys on all work areas, and implement numerous measures to prevent injury and mortality of desert tortoises, we anticipate that construction of the Calico project site, including use of access routes, is likely to kill or injure few, if any, subadult and adult desert tortoises. Because of the difficulty detecting and removing them, we estimate that project construction may kill or injure a portion of the 30 juvenile desert tortoises we anticipate to be on site. We also anticipate that project construction will destroy some portion of the 87 desert

tortoise eggs. Given the numerous variables discussed in this section, we cannot predict the precise number of eggs with any certainty.

Following construction, we anticipate that operations and maintenance within the permanently fenced portions of the Calico facility would kill or injure few, if any, subadult and adult desert tortoises and this is only likely to occur in the event that a portion of the exclusion fencing is washed out and a desert tortoise gains access to the site. We anticipate that this occurrence would be rare. Because Tessera will not grade the entire project site, some potential exists for juvenile desert tortoises to survive through construction and for some nests to hatch eggs within the remaining vegetation. Because of the difficulty in detecting juveniles, we estimate that project operations and maintenance will kill or injure all juvenile desert tortoises that survive through construction, and thus will kill or injure a portion of the 30 juveniles we anticipate to be on site. We expect that restoration activities outside of the project site are unlikely to injure or kill desert tortoises because of the numerous protective measures that Tessera will implement. With the exception of activities associated with fence repair, all maintenance activities for the project site will occur within the permanent desert tortoise fencing. Because of the protective measures that Tessera will implement and the nature of the fence repair activities, we anticipate fence maintenance activities will kill or injure few, if any, desert tortoises. Tessera has not identified any specific maintenance activities, other than fence repair after storm events, which will be conducted outside of the desert tortoise fencing; any activities identified in the future are not covered by this biological opinion and may require additional consultation.

Project development will result in 4,613 acres of long-term/permanent disturbance to desert tortoise habitat and a large reduction in the functionality of an additional 674 acres of desert tortoise habitat. Although all disturbed areas will undergo restoration/reclamation work upon decommissioning, it is unlikely to serve as suitable desert tortoise habitat for many years following facility closure. We cannot predict the amount of time required to return areas of long-term disturbance to suitable desert tortoise habitat because of numerous variables associated with restoration success, including the timing and amount of rainfall. We estimate that Tessera will return an additional 17.4 acres of short-term disturbance to suitable desert tortoise habitat by the end of the 40-year project lifespan, and re-open the 674 acres isolated for desert tortoise occupancy following decommissioning.

Construction, operation, and maintenance of the Calico facility have the potential to increase common raven predation on desert tortoises within the action area. In addition, this project is likely to result in an increased abundance of non-native plant species and a subsequent increase in fire frequency within the action area. The measures proposed by Tessera to address these threats will reduce the magnitude of these effects, but some level of adverse effect will likely persist. We cannot reasonably predict the number of desert tortoises that these threats will adversely affect.

The compensation required by the Bureau and the State of California would, to some degree, offset the adverse effects of the proposed solar power facility. All of the actions that would be undertaken as compensation will be consistent with recommendations for recovery of the desert

tortoise. However, the lack of specificity with regard to which actions will be implemented, the uncertainty of success of the actions, and the time lag between implementation of the conservation actions and a substantive effect on recovery of the desert tortoise prohibit us from concluding that the compensation measures would completely offset the adverse effects of the solar facility. Because of the long-term or permanent loss of approximately 4,613 acres of desert tortoise habitat, the project will likely result in a net decrease in desert tortoise habitat.

Areas permanently disturbed by the proposed solar facility and its ancillary features would no longer support reproduction of desert tortoises unless the site closes and habitat restoration is successful. Most of the desert tortoises that currently reside within these areas will likely continue to reproduce after translocation. Consequently, we anticipate that the proposed action will not appreciably diminish the reproductive capacity of the species.

Implementation of the proposed action would not appreciably reduce the number of desert tortoises in the Western Mojave Recovery Unit. Based on the amount of modeled desert tortoise habitat (10,316 square miles) and the average density (12.2 desert tortoises per square mile) that the Service has estimated for this recovery unit, we could estimate that approximately 125,855 subadult and adult desert tortoises occur in the Western Mojave Recovery Unit. Using this estimate and the information and methods described above for estimating the number of juvenile desert tortoises and eggs on the project site, action area, and translocation area, we estimate that the Western Mojave Recovery Unit may contain between 56,544 to 130,992 juvenile desert tortoises at any given time and reproductive females within the Western Mojave Recovery Unit may produce as many as 583,972 desert tortoise eggs over the course of a year. Consequently, we conclude that the number of desert tortoises and eggs that are likely to be lost as a result of the Calico project comprises a relatively small portion of the overall population in the Western Mojave Recovery Unit.

In previous consultations, we estimated the number of desert tortoises found in the desert wildlife management areas and critical habitat by multiplying the average density of animals found in these areas by their total size. For the numbers of desert tortoises outside of those areas, we used a density value of one-tenth of that estimated within desert wildlife management areas and critical habitat, which we multiplied by the estimated area of available desert tortoise habitat. We did not correct for areas that were unsuitable habitat in either case in these past consultation estimates. Because the method of estimating the number of desert tortoises we use in this biological opinion takes into account a conservative estimate of modeled desert tortoise habitat, we used the same average density across all areas of desert tortoise habitat for our estimate. The distribution of the desert tortoise would be reduced by approximately 7.21 square miles, based on the amount of long-term and permanent disturbance associated with the proposed action. This loss comprises approximately 0.07 percent of the modeled habitat in the Western Mojave Recovery Unit. Although this percentage does not constitute a numerically substantial portion of the Western Mojave Recovery Unit, we do not have the ability to place a numerical value on edge effects and fragmentation that the proposed action may cause or that occurs in the recovery unit as a whole. Therefore, even though the percentage of habitat lost is low, the biological effect of the loss could be greater if the actual biological value of the area is greater and has been

underestimated. The Bureau's designation of the area north of the project site and south of the Cady Mountains as a solar exclusion zone is important in reducing habitat fragmentation caused by the proposed action.

Although the effects of this project on desert tortoises are substantial, we do not anticipate that it will result in effects that appreciably reduce the current distribution, numbers, or reproduction of the overall population within the Western Mojave Recovery Unit or range wide. We anticipate that the compensation programs (i.e., one proposed by the Bureau and the other approved by the California Energy Commission) will result in an increase in the amount of habitat that is managed for the conservation of this species and will result in many advances in the implementation of recovery actions. We anticipate that this compensation will offset many adverse effects associated with this project. Taking into consideration the compensation that is proposed and considering the relative scale of the adverse effects in context with our current estimates of the species' status in the Western Mojave Recovery Unit and range wide, we do not anticipate that construction of this project would appreciably reduce our ability to recover the desert tortoise.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. Most of the land within the action area is managed by the Bureau. According to the County of San Bernardino, no future projects are reasonably certain to occur on the small amount of private land occurring in the action area. (URS 2010b).

CONCLUSION

After reviewing its status, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the proposed action is not likely to jeopardize the continued existence of the desert tortoise. We have reached this conclusion because:

1. Project activities are likely to kill or injure few subadult or adult desert tortoises because Tessera will implement numerous measures to reduce the potential that desert tortoises will occupy project work sites (i.e., clearance surveys, exclusion fencing, translocation, qualified biologists, desert tortoise monitors).

2. The number of desert tortoises injured or killed as a direct result of translocation activities (e.g., blood tests, handling, quarantine, etc.) will likely be small because only highly skilled biologists will perform this work in accordance with techniques approved by the Service.

3. Post-translocation mortality in the translocated or resident populations is unlikely to be elevated above that experienced by desert tortoises not affected by translocation.

4. Tessera will implement numerous measures to reduce the potential for increased predation by common ravens and spread of non-native plant species.

5. Regional management actions are likely to aid in reducing common raven predation of desert tortoises in a portion of the desert tortoise's range.

6. This project would not result in loss of desert tortoise habitat in areas that the Bureau or other agencies have designated for intensive management to achieve conservation of desert tortoises (e.g., desert wildlife management areas, critical habitat, etc.).

7. Compensation requirements through the Bureau and CDFG will result in an increase in the amount of existing habitat that is managed for the conservation of the desert tortoise and will likely lead to restoration of lost or degraded habitat within these areas.

We recognize the loss of individual desert tortoises as a result of this project will contribute to a decrease in the population; however, we anticipate that the proposed compensation will offset this effect to at least some degree, maintain a linkage in the Pisgah Valley, and reduce the overall impact of the Calico project. Furthermore, the land acquisition within the DWMAs and participation in the regional raven management plan support actions identified for the recovery of the species in the recovery plan (Service 1994).

As we noted previously in this biological opinion, the analysis we conduct under section 7(a)(2) of the Endangered Species Act must be conducted in relation to the status of the entire listed taxon. We based the analysis in this biological opinion within the context of the Western Mojave Recovery Unit because of the wide range of the desert tortoise. Because we have determined that the effects of this action would not compromise the integrity of the Western Mojave Recovery Unit or impede the survival or recovery of the desert tortoise in a measurable manner in this portion of its range, we have not extended the analysis of the effects of this proposed action to the remainder of the range of the Mojave population of the desert tortoise.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined

as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of an incidental take statement.

The measures described in this document are non-discretionary. The Bureau has a continuing duty to regulate the activities covered by the incidental take statement in the biological opinion. If the Bureau fails to include the terms and conditions of this incidental take statement as enforceable conditions of its right-of-way grant, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the Bureau must report the progress of its action and its impact on the desert tortoise to the Service as specified in the incidental take statement [50 Code of Federal Regulations 402.14(i)(3)].

Translocation of Desert Tortoises

We anticipate that the translocation of approximately 29 subadult and adult desert tortoises from the Calico facility would take, in the form of capture, of all of these individuals. We emphasize that this number is an estimate, based on the best available information. The number of individuals requiring translocation may be somewhat lower; our estimate of the number of desert tortoises that Tessera would translocate from the project site is based on use of the upper limit of the 95 percent confidence range for the project sites population estimate. Consequently, we do not anticipate that Tessera would capture more than 29 subadult and adult desert tortoises for translocation during construction of the project. We do not anticipate that the act of translocating desert tortoises is likely to kill or injure any subadults and adults.

Due to the difficulty in locating juveniles and eggs, we anticipate the capture of few, if any, juvenile desert tortoises and eggs. However, the potential exists that up to 30 juveniles and 87 eggs may be taken through capture if they are found and translocated. We do not anticipate that the act of translocating these individuals will kill or injure any juveniles or eggs.

Because of the small work areas associated with the underground water pipeline and transmission line, we anticipate the translocation of few, if any, desert tortoises or eggs from construction areas for these linear features. Because desert tortoises can move through narrow, linear features quickly, past survey results do not provide a precise estimate of the number of individuals likely to be encountered along these portions of the proposed action. Consequently, we cannot provide an estimate of the number of individuals that may be translocated. We do not anticipate that the act of translocating these individuals will result in injury or mortality.

Disease Testing

We anticipate that as many as 163 subadult and adult desert tortoises (i.e., 29, 29, and 105 in the project site, control, and Ord-Rodman translocation areas, respectively) will be taken, in the form of capture and harassment, when Tessera handles desert tortoises and collects blood to assess

disease prevalence. Although such an invasive procedure presents some likelihood that individuals could be injured or killed, we do not anticipate that blood collection will result in the injury or mortality of any individuals because Tessera would use experienced biologists, authorized by the Service, and approved handling techniques.

Post-translocation Monitoring

We anticipate the take, in the form of capture, of approximately 58 desert tortoises for monitoring of the resident and control populations. Although these animals and the 29 desert tortoises from the translocated population would be captured multiple times over the course of the post-translocation monitoring effort, we do not anticipate injury or mortality of these individuals as a result of the post-translocation monitoring.

Construction of Calico Solar Facility

Because Tessera will fence all of its work areas with desert tortoise exclusion fencing, perform clearance surveys on all work areas, and implement numerous measures to prevent adverse effects to desert tortoises, we anticipate that construction of the Calico project site, including use of access routes, is likely to take few, if any, subadult and adult desert tortoises in the form of mortality or injury.

If juvenile desert tortoises and eggs are not detected and translocated from the project site prior to construction, we anticipate that construction of the Calico facility is likely to take, in the form of mortality or injury, up to 30 juvenile desert tortoises and 87 eggs. Locating juvenile desert tortoises and eggs is difficult because of their small size; consequently, we anticipate that many of these individuals are likely to be injured or killed during construction. We anticipate that construction of the water pipeline and transmission line will injure or kill few, if any, desert tortoises.

Operation and Maintenance of Calico Solar Facility

We anticipate that operation and maintenance activities, including site access, within permanently fenced areas are likely to take few desert tortoises. A small portion of the 30 juveniles and 87 eggs estimated to be on the project site could survive construction in the rows of vegetation between the SunCatchers. Because of the difficulty in locating juvenile desert tortoises, we anticipate that all of the remaining juveniles on the project site and any eggs that hatch will be killed or injured at some point during operations and maintenance. Based on the estimated numbers of juvenile desert tortoises and eggs on site, we anticipate that operation and maintenance may injure or kill up to 30 juveniles and 87 eggs.

A limited potential exists that a very small number of desert tortoises may find their way into a fenced area. Most of these individuals are likely to be taken in the form of capture as they are removed to offsite habitat; a small fraction of these individuals may be taken, in the form of

injury or mortality, if they are exposed to adverse weather conditions or crushed by vehicles before they are detected.

All operations and maintenance for the proposed project, except fence repair, will be within the permanent desert tortoise exclusion fence. Any maintenance activities associated with repair of the desert tortoise exclusion fence would kill or injure few, if any, desert tortoises because the need for this action would be localized and infrequent, access to repair sites would require little, if any, off-road travel, and Tessera would implement numerous protective measures to reduce the potential for take. Tessera has not identified any other maintenance activities that it will conduct outside of the desert tortoise fencing; any activities identified in the future are not covered by this biological opinion and will require additional consultation.

Restoration of Temporary Disturbance for the Calico Solar Facility

Restoration of temporary disturbance areas within fenced construction areas is unlikely to result in take of desert tortoises because Tessera will clear all fenced areas of desert tortoises prior to construction of the facilities. Restoration of temporary disturbances that occurs outside of fenced work areas has the potential to kill or injure desert tortoises because the desert tortoises have not been excluded from the restoration area. However, we estimate that Tessera will kill or injure few, if any, desert tortoises during restoration outside of fenced areas because Tessera will implement restoration as identified in its restoration plan and the plan will include measures to insure that all activities do not injure or kill desert tortoises (e.g., pre-activity clearance surveys and use of desert tortoise monitors).

Compensation

All actions associated with the Bureau's compensation requirements will likely require future Bureau authorizations. Consequently, we have provided no incidental take exemptions for these actions in this biological opinion. These actions will require future project-specific consultation if they may affect the desert tortoise or other listed species.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of desert tortoises during the implementation of the Calico Solar project:

1. The Bureau must ensure that desert tortoises do not enter fenced project facilities.

2. The Bureau must ensure that the level of incidental take anticipated in this biological opinion is commensurate with the analysis contained herein.

3. The Bureau must ensure desert tortoises held in quarantine pens while awaiting results from disease testing are not poached by humans or killed by natural predators.

4. The Bureau must ensure that injury and mortality of desert tortoises, missed during construction clearance and monitoring, is minimized during operation of the Calico facility.

5. The Bureau must ensure that the potential for disease transmission with the recipient translocation populations is minimized.

6. The Bureau must ensure that Tessera safeguards that the maximum number of desert tortoises are found during clearance surveys.

7. The Bureau must ensure that translocation does not result in density-dependent effects or disease related effects to the resident or translocated populations.

Because of the complex nature of this incidental take statement, we have attached a summary of the levels of incidental take that would necessitate re-initiation of formal consultation.

Our evaluation of the proposed action includes consideration of the protective measures described in the Description of the Proposed Action section of this biological opinion. Consequently, any changes in these protective measures may constitute a modification of the proposed action that causes an effect to the desert tortoise that was not considered in the biological opinion and require re-initiation of consultation, pursuant to the implementing regulations of the section 7(a)(2) of the Act (50 Code of Federal Regulations 402.16).

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the Bureau must comply with the following terms and conditions, which implement the reasonable and prudent measures described in the previous section or make them enforceable conditions of its right-of-way grant and the reporting and monitoring requirements. These conditions are non-discretionary.

1. The following term and condition implements reasonable and prudent measure 1:

   The Bureau must ensure that Tessera monitors the integrity of all desert tortoise exclusion fencing and the effectiveness of the cattle guards at keeping desert tortoises out of the project site. The Bureau must ensure that Tessera implements adaptive measures if the cattle guards are found to be ineffective in preventing desert tortoise from accessing the road or if smaller desert tortoises become entrapped in them.

2. The following terms and conditions implement reasonable and prudent measure 2:

   a. To ensure that the measures proposed by the Bureau and Tessera are effective and are being properly implemented, the Bureau must contact the Service immediately if it becomes aware that a desert tortoise has been killed or injured by project activities. At that time, the Bureau must review the circumstances surrounding the incident with the

Service to determine whether additional protective measures are required. Project activities may continue during the review, provided that the proposed protective measures in the project description and any appropriate terms and conditions of this biological opinion have been and continue to be fully implemented. Because we do not expect that capturing and removing desert tortoises from work areas outside of the project site is likely to result in injury or mortality of desert tortoises, we are not establishing a re-initiation criterion or notification requirement for that activity.

b. If 6 desert tortoises are directly killed or injured as a result of any construction, operation, maintenance, or restoration activities covered by this biological opinion over the life of the Calico project, the Bureau must re-initiate consultation, pursuant to the implementing regulations for section 7(a)(2) of the Endangered Species Act at 50 Code of Federal Regulations 402.16, on the proposed action. This term and condition also applies to direct mortality and injury of desert tortoises during translocation and post-translocation monitoring on the resident, control, and translocated populations (i.e., due to handling, road kills, or other effects caused by personnel working on the project). However, it does not apply to post-translocation mortality within these populations that is not connected directly to an action required to carry out the translocation and monitoring effort (e.g. predation).

c. If 2 desert tortoises are directly killed or injured in any 1 year as a result of any construction, operation, maintenance, or restoration activities covered by this biological opinion, the Bureau must re-initiate consultation, pursuant to the implementing regulations for section 7(a)(2) of the Endangered Species Act at 50 Code of Federal Regulations 402.16, on the proposed action. This term and condition also applies to direct mortality associated handling of desert tortoises during translocation and post-translocation monitoring on the resident, control, and translocated populations (i.e., due to handling, road kills, or other effects caused by personnel working on the project). However, it does not apply to post-translocation mortality within these populations that is not connected directly to an action required to carry out the translocation and monitoring effort (e.g., predation).

3. The following term and condition implements reasonable and prudent measure 4:

   If 1 desert tortoise is depredated or poached from a quarantine pen, the Bureau must ensure that Tessera implements additional protective measures in consultation with the Bureau and Service to prevent any additional loss of individuals.

4. The following terms and conditions implement reasonable and prudent measure 5:

   a. The Bureau must ensure that Tessera has an authorized biologist available to handle desert tortoises that may be located on the project site during operations and maintenance. If more than 3 desert tortoises are located within the project area during operation,

Tessera must perform additional full coverage surveys of available habitat within the project area to ensure that all desert tortoises are removed.

b. If Tessera locates desert tortoises within the rows of vegetation between the SunCatchers during operations, the Bureau must ensure that Tessera consults with the Service as to the appropriate translocation and disposition of the individual.

c. If Tessera locates desert tortoise burrows within the rows of vegetation between the SunCatchers during operations, the Bureau must ensure that an authorized biologist visits the project site and conducts surveys to locate any desert tortoises in proximity to the burrow. Once a desert tortoise is located, the Bureau must ensure that Tessera consults with the Service as to the appropriate translocation and disposition of the individual, and the burrow is collapsed in a manner consistent with current Service guidance.

5. The following terms and conditions implement reasonable and prudent measure 6:

a. The Bureau must ensure that the disease prevalence within the Linkage and Pisgah ACEC translocation areas is less than 5 percent within a 95 percent confidence interval. The disease prevalence must be determined through visual health assessments of the resident population and the desert tortoises in the associated dispersal buffer (those animals within 1.5 kilometers of the translocation area), consistent with dispersal distances for translocations less than 500 meters.

b. The Bureau must ensure that Tessera conducts disease sampling of all areas that desert tortoises may move to following translocation to the Ord-Rodman DWMA translocation area (i.e., 12.6-kilometer dispersal buffer).

c. The Bureau must ensure that translocated desert tortoises are not placed within 1.5 kilometers of any desert tortoises within the Linkage and Pisgah ACEC translocation areas determined to be positive for disease based on the visual health assessment.

6. The following term and condition implements reasonable and prudent measure 7:

The Bureau must ensure that two consecutive clearance surveys do not detect any desert tortoises for Tessera to consider the area clear of desert tortoises.

7. The following terms and conditions implement reasonable and prudent measure 8:

a. If pre-translocation surveys of any translocation area indicate that it cannot accommodate the projected number of desert tortoises from the Calico project under the threshold established in the Description of the Proposed Action section of this biological opinion, the Bureau must re-initiate consultation, pursuant to the implementing regulations for section 7(a)(2) of the Endangered Species Act at 50 Code of Federal Regulations 402.16 to address modifications to the translocation plan.

b. If pre-translocation surveys of the translocation areas indicate a disease prevalence of more than 5 percent or indicate that additional translocation areas will be required to accommodate the disease buffering requirements identified in the Description of the Proposed Action section of this biological opinion, the Bureau must re-initiate consultation, pursuant to the implementing regulations for section 7(a)(2) of the Endangered Species Act at 50 Code of Federal Regulations 402.16 to address modifications to the translocation plan.

Because of the complex nature of this incidental take statement, we have attached a summary of the levels of incidental take that would necessitate re-initiation of formal consultation.

REPORTING REQUIREMENTS

Within 60 days of the completion of the proposed action, the Bureau must provide a report to the Service that provides details on the effects of the action on the desert tortoise. The Bureau must also provide an annual report by December 31of each year during construction of each phase and during the subsequent translocation monitoring. Specifically, these reports must include information on any instances when desert tortoises were killed, injured, or handled; the circumstances of such incidents; and any actions undertaken to prevent similar instances from re-occurring. In addition, these reports should provide detailed information on the results of translocation monitoring to include the following: 1) location of all transmittered desert tortoises, 2) mortality rate from each population, 3) statistical analysis of differences in the mortality rates among all three populations, and 4) health status and body condition of all transmittered desert tortoises.

We recommend that the Bureau provide us with any recommendations that would facilitate the implementation of the protective measures while maintaining protection of the desert tortoise. We also request that the Bureau provide us with the names of any monitors who assisted the authorized biologist and an evaluation of the experience they gained on the project; the qualifications form on our website (http://www.fws.gov/ventura/sppinfo/protocols/deserttortoise_monitor-qualifications-statement.pdf), filled out for this project, along with any appropriate narrative would provide an appropriate level of information. This information would provide us with additional reference material in the event these individuals are submitted as potential authorized biologists for future projects.

DISPOSITION OF DEAD OR INJURED DESERT TORTOISES

Within 3 days of locating any dead or injured desert tortoises, you must notify the Ventura Fish and Wildlife Office by telephone (805 644-1766) and by facsimile (805 644-3958) or electronic mail. The report must include the date, time, location of the carcass, a photograph, cause of death, if known, and any other pertinent information.

We will advise you on the appropriate means of disposing of the carcass when you contact us.

We may advise you to provide it to a laboratory for analysis. Until we provide information on the disposition of the carcass, you must handle it such that the biological material is preserved in the best possible state for later analysis. If possible, the carcass should be kept on ice or refrigerated (not frozen) until we provide further direction.

Injured desert tortoises must be taken to a qualified veterinarian for treatment. If any injured desert tortoises survive, the Service must be contacted regarding their final disposition.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. We recommend that the Bureau work with Tessera and the Service to determine if the transmittered desert tortoises associated with the resident, control, and translocated populations can be used to answer additional research questions related to translocation or desert tortoise biology.

2. We recommend that the Bureau amend the California Desert Conservation Area Plan to prohibit further large-scale development (e.g., solar energy facilities, wind development, etc.) within the Pisgah Valley. We offer this recommendation because the Service has determined that maintaining a functional corridor through the Pisgah Valley is critical for the long term recovery of the desert tortoise. The importance of this corridor is heightened given the need to allow for the shifting distribution of the desert tortoise and the potential adverse effects of climate change (Service 2010f). While re-design of this project has reduced adverse effects to connectivity, given the uncertainty surrounding this issue, and the critical nature of this connection, we believe a conservative approach is warranted.

The Service requests notification of the implementation of any conservation recommendations so we may be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats.

REINITIATION NOTICE

This concludes formal consultation on the Bureau's proposal to issue a right-of-way grant to Tessera for construction of the Calico Solar facility in San Bernardino County, California. Re-initiation of formal consultation is required where discretionary federal involvement or control over the action has been retained or is authorized by law and: (a) if the amount or extent of taking specified in the incidental take statement is exceeded; (b) if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent

not previously considered; (c) if the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or (d) if a new species is listed or critical habitat designated that may be affected by the identified action (50 Code of Federal Regulations 402.16).

In instances where the amount or extent of incidental take is exceeded, the exemption issued pursuant to section 7(o)(2) will have lapsed and any further take would be a violation of section 4(d) or 9. Consequently, we recommend that any operations causing such take cease pending re-initiation. If monitoring of translocated and resident desert tortoises indicates a statistically significant elevation in mortality rates above that observed in control populations, this information would constitute new information regarding the effects of the action that may affect desert tortoise in a manner or to an extent not previously considered.

If you have any questions regarding this biological opinion, please contact Ashleigh Blackford of my staff at (805) 644-1766, extension 234.

Attachment

LITERATURE CITED

Averill-Murray, R. 2010. Electronic mail: disease sample numbers. Dated October 1. Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service. Reno, Nevada.

Avery, H.W. 1998. Nutritional ecology of the desert tortoise (*Gopherus agassizii*) in relation to cattle grazing in the Mojave Desert. Ph.D. Dissertation, Department of Biology, University of California. Los Angeles, California.

Avian Power Line Interaction Committee. 2006. Suggested practices for avian protection on power lines: the state of the art in 2006. Edison Electric Institute, Avian Power Line Interaction Committee, and California Energy Commission. Washington, D.C., and Sacramento, California.

Bellows, F. 2010. Electronic mail: information on habitat disturbance acreage based on the 4,613-acre project site. Dated October 5. Tessera Solar. Scottsdale, Arizona.

Berry, K.H. 1986. Desert tortoise (*Gopherus agassizii*) relocation: implications of social behavior and movements. Herpetologica 42(1):113-125.

Berry, K.H. 1996. Summary of the results of long-term study plots for the desert tortoise in California. Letter to Molly Brady, Bureau of Land Management, Riverside, California. Dated October 1. Riverside Field Station, U.S. Geological Survey. Riverside, California.

Berry, K.H. 1999. Preliminary report from the 1999 spring survey of the desert tortoise long-term study plot in Chemehuevi Valley and Wash, California. Box Springs Field Station, Western Ecological Research Center, U.S. Geological Survey. Riverside, California.

Berry, K.H. 2005. Electronic mail: information on the number of desert tortoises detected on select permanent study plots in California. Dated February 28. Box Springs Field Station, Western Ecological Research Center, U.S. Geological Survey. Moreno Valley, California.

Bureau of Land Management. 2005. Final environmental impact report and statement for the West Mojave Plan; a habitat conservation plan and California Desert Conservation Area Plan amendment. Moreno Valley, San Bernardino, and Barstow, California.

Bureau of Land Management. 2010a. Formal consultation on the Calico Solar Power Generating Facility, San Bernardino County, California. Barstow Field Office. Barstow, California.

Bureau of Land Management. 2010b. Final environmental impact statement and proposed amendment to the California Desert Conservation Area Plan for the Calico Solar (formally SES Solar One) Project. San Bernardino County, California. Barstow Field Office. Barstow, California.

Bureau of Land Management and California Energy Commission. 2010. Staff assessment and draft environmental impact statement for Calico Solar Project. Application for Certification (08-AFC-13). San Bernardino, California. CEC-700-2010-009-SA-DES-10-13. Dated March. Sacramento, California.

Burge, B.L. 1978. Physical characteristics and patterns of utilization of cover sites by *Gopherus agassizii* in southern Nevada. Proceedings of the 1978 Symposium, Desert Tortoise Council.

Burge, B.L., and W.G. Bradley. 1976. Population density, structure and feeding habits of the desert tortoise, *Gopherus agassizii*, in a low desert study area in southern Nevada. Proceedings of the 1976 Symposium, Desert Tortoise Council.

California Energy Commission. 2010a. Supplemental staff assessment for Calico Solar Power Project. CEC-700-2010-009-SSA. Docket Number 08-AFC-13. Dated July 2010.

California Energy Commission. 2010b. Calico Solar Power Project Presiding Member's Proposed Decision. CEC-800-2010-012-PMPD. Docket Number 08-AFC-13. Dated September. Sacramento, California.

Census Bureau. 2000. Urbanized areas cartographic boundary files [computer file, ArcView Shapefile (.shp) format]. Geography Division, Department of Commerce. (geo_2000_d_dec_00000_400_py_z1). Available at http://www.census.gov/geo/www/ua/ua2kdetshape.zip

Chavez, R. 2010. Electronic mail: information on the cattle grazing in relation to the proposed Calico Solar facility. Dated July 6. Barstow Field Office, Bureau of Land Management. Barstow, California.

Circle Mountain Biological Consultants. 1996. Federal biological opinion analysis for the proposed Eagle Mountain landfill Project. Job #95-001. Prepared for CH2MHill, Santa Ana, California. Wrightwood, California.

Congdon, J.D., A.E. Dunham, and R.C. Van Loben Sels. 1993. Delayed sexual maturity and demographics of Blanding's turtles (*Emydoidea blandingii*): implications for conservation and management of long-lived organisms. Conservation Biology 7:826-833.

Connor, M.J. 2003. Desert tortoise conservation project #2001-0123-000. Final report. Desert Tortoise Preserve Committee. Riverside, California.

Duda, J.J., A.J. Krzysik, and J.E. Freilich. 1999. Effects of drought on desert tortoise movement and activity. The Journal of Wildlife Management 63:1181-1192.

Fesnock, A. 2010a. Electronic mail: information on compensation for Calico Solar. Dated October 7. Bureau of Land Management. Sacramento, California.

Fesnock, A. 2010b. Electronic mail: acreage of the Ord Mountain Cattle Allotment. Dated October 8. Bureau of Land Management. Sacramento, California.

Field, K.J., C.R. Tracy, P.A. Medica, R.W. Marlow, and P.S. Corn. 2007. Return to the wild: translocation as a tool in conservation of the desert tortoise (*Gopherus agassizii*). Biological Conservation 136:232-245.

Harless, M.L., A.D. Walde, D.K. Delaney, L.L. Pater, W.K. Hayes. 2009. Home range, spatial overlap, and burrow use of the desert tortoise in the West Mojave Desert. Copeia 2009:378-389.

Hovik, D.C., and D.B. Hardenbrook. 1989. Summer and fall activity and movements of desert tortoises in Pahrump Valley, Nevada. Abstract of paper presented at Fourteenth Annual Meeting and Symposium of the Desert Tortoise Council.

Jennings, W.B. 1997. Habitat use and food preferences of the desert tortoise, *Gopherus agassizii*, in the western Mojave Desert and impacts of off-road vehicles. In Van Abbema, J., (Ed.). Proceedings: Conservation, restoration, and management of tortoises and turtles – an international conference. New York Turtle and Tortoise Society. Purchase, New York.

Keith, K., K. Berry, and J. Weigand. 2005. Surveys for desert tortoises in the Jawbone-Butterbredt Area of Critical Environmental Concern, Eastern Kern County, California. U.S. Geological Survey and Bureau of Land Management. Moreno Valley and Sacramento, California.

Lovich, J.E., and D. Bainbridge. 1999. Anthropogenic degradation of the Southern California Desert ecosystem and prospects for natural recovery and restoration. Environmental Management 25(3):309-326.

Luckenbach, R.A. 1982. Ecology and management of the desert tortoise (*Gopherus agassizii*) in California. In: R.B. Bury (ed.). North American Tortoises: Conservation and Ecology. U.S. Fish and Wildlife Service, Wildlife Research Report 12. Washington, D.C.

Miller, T. 2010a. Electronic mail: information on the number habitat in the Calico Solar proposed translocation sites. Dated July 6. URS Corporation. San Diego, California.

Miller, T. 2010b. Electronic mail: information on the density of desert tortoises in the Pisah ACEC and Linkage area proposed translocation areas based on 2010 survey data. Dated August 11. URS Corporation. San Diego, California.

Miller, T. 2010c. Electronic mail: information on the acres of desert tortoise habitat in the "Not a Part" areas in the southern portion of the proposed Calico Solar facility. Dated July 13. URS Corporation. San Diego, California.

Miller, T. 2010d. Electronic mail: information on the density of desert tortoises in the Pisgah ACEC translocation area, revised. Dated October 5. URS Corporation. San Diego, California.

Natural Resources and Environmental Affairs Division. 2001. Integrated natural resources management plan and environmental assessment. Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center. Twentynine Palms, California.

Nussear, K.E. 2004. Mechanistic investigation of the distributional limits of the desert tortoise *Gopherus agassizii* . Dissertation. University of Nevada. Reno, Nevada.

Nussear, K.E., T.C. Esque, R.D. Inman, L. Gass, K.A. Thomas, C.S.A. Wallace, J.B. Blainey, D.M. Miller, and R.H.Webb. 2009. Modeling habitat of the desert tortoise (*Gopherus agassizii*) in the Mojave and parts of the Sonoran Deserts of California, Nevada, Utah, and Arizona. U.S. Geological Survey Open-File Report 2009-1102.

O'Connor, M.P., L.C. Zimmerman, D.E. Ruby, S.J. Bulova, and J.R. Spotila. 1994. Home range size and movement by desert tortoises, *Gopherus agassizii*, in the eastern Mojave Desert. Herpetological Monographs 8:60-71.

Oftedal, O.T. 2001. Low rainfall affects the nutritive quality as well as the total quantity of food available to the desert tortoise. Abstract of paper presented at the Twenty-sixth Annual Meeting and Symposium of the Desert Tortoise Council.

Otahal, C. 2010. Electronic mail: request for Calico Solar consultation to include consultation on desert tortoise critical habitat. Dated July, 17. Barstow Field Office, Bureau of Land Management. Barstow, California.

Pogacnik, T. 2010. Electronic mail regarding inclusion of the California Energy Commission's requirements in the Bureau of Land Management's description of the proposed project for the Calico Solar Power Generating Facility. Dated October 14. From Deputy State Director, Natural Resources, Bureau of Land Management. Sacramento, California.

Rabin, L.A., R.G. Coss, and D.H. Owings. 2006. The effects of wind turbines on antipredator behavior in California ground squirrels (*Spermophilus beecheyi*). Biological Conservation 131:410-420.

Rakestraw, D.L. 1997. Desert tortoise relocation at Yucca Mountain, Nevada. Abstract of paper presented at the 1997 Annual Meeting and Symposium of the Desert Tortoise Council.

Renewable Energy Action Team. 2010. Mitigation Account Memorandum of Agreement between the Renewable Energy Action Team Agencies and the National Fish and Wildlife Foundation.

Saethre, M.B., T.C. Esque, P.A. Medica, R. Marlow, and C.R. Tracy. 2003. Determining carrying capacity of desert tortoises. Abstract of a paper present at the 28th Annual Meeting and Symposium of the Desert Tortoise Council.

Schamberger, M., and F.B. Turner. 1986. The application of habitat modeling to the desert tortoise (*Gopherus agassizii*). Herpetologica 42(1):134-138.

SES. 2008. Stirling Energy Systems/R. Liden (tn 49181). Application for Certification. Submitted to CEC/Docket Unit on December 1.

Stitt, E.W., C.R. Schwalbe, D.E. Swann, R.C. Averill-Murray, and A.K. Blythe. 2003. Sonoran desert tortoise ecology and management: effects of land use change and urbanization on desert tortoises. Final report to Suaguaro National Park.

Tracy, C.R., R. Averill-Murray, W.I. Boarman, D. Delehanty, J. Heaton, E. McCoy, D. Morafka, K. Nussear, B. Hagerty, and P. Medica. 2004. Desert tortoise recovery plan assessment. Prepared for the U.S. Fish and Wildlife Service. Reno, Nevada.

Turner, F.B., and D.E. Brown. 1982. Sonoran desertscrub. In: D.E. Brown (editor). Biotic communities of the American Southwest - United States and Mexico. Desert Plants 4(1-4):181-222.

Turner, F.B., P.A. Medica, and C. Lyons. 1984. Reproduction and survival of the desert tortoise (*Scaptochelys agassizii*) in Ivanpah Valley, California. Copeia (4):811-820.

Turner, F.B., K.H. Berry, D.C. Randall, and G.C. White. 1987. Population ecology of the desert tortoise at Goffs, California, 1983-1986. Report prepared for the Southern California Edison Company.

URS. 2010a. Biological assessment for the Calico Solar Project, San Bernardino County, California. Prepared for U.S. Fish and Wildlife Service and Bureau of Land Management, Barstow Field Office, Barstow, California. San Diego, California.

URS. 2010b. Biological assessment for the Calico Solar Project (Revised May 17), San Bernardino County, California. Prepared for U.S. Fish and Wildlife Service and Bureau of Land Management, Barstow Field Office, Barstow, California. San Diego, California.

URS. 2010c. Supplemental biological assessment for the Calico Solar Project, San Bernardino County, California. Prepared for U.S. Fish and Wildlife Service and Bureau of Land Management, Barstow Field Office, Barstow, California. San Diego, California.

URS. 2010d. Supplemental biological assessment supplement: phased development of the phase 1 component of the Calico Solar Project, San Bernardino County, California. Prepared for U.S. Fish and Wildlife Service and Bureau of Land Management, Barstow Field Office, Barstow, California. San Diego, California.

URS. 2010e. Supplement # 5 to the biological assessment for the Calico Solar Project, San Bernardino County, California. Prepared for U.S. Fish and Wildlife Service and Bureau of Land Management, Barstow Field Office, Barstow, California. San Diego, California.

URS. 2010f. Revised draft plan, desert tortoise translocation plan Calico Solar Project. Prepared for Tessera Solar North America. Scottsdale, Arizona. San Diego, California.

URS. 2010g. Draft raven monitoring management and control plan for Calico Solar Project, San Bernardino County, California. Prepared for Tessera Solar North America. Scottsdale, Arizona. San Diego, California.

U.S. Air Force. 2004. Integrated natural resources management plan for Edwards Air Force Base, California. Edwards Air Force Base 32-7064. September update. Edwards Air Force Base, California.

U.S. Department of the Army. 2009a. Biological assessment. Reinitiation of consultation, Service biological opinion 1-8-03-F-48, proposed addition of maneuver training lands at Fort Irwin, California. Dated May 21. Directorate of Public Works. Fort Irwin, California

U.S. Army. 2009. Fort Irwin annual permit report for 2008. Submitted to the Desert Tortoise Recovery Office, Reno, Nevada. Fort Irwin, California.

U.S. Army. 2010. 2009 Annual reports for Fort Irwin biological opinions and desert tortoise permit for the Fort Irwin translocation project. Submitted to the Desert Tortoise Recovery Office, Reno, Nevada. Fort Irwin, California.

U.S. Department of the Navy. 1995. Annual reports for desert tortoise management issues at the Naval Air Weapons Station, China Lake for 1995, 1996, 1997, 2000, 2001, 2002, 2003, 2004, 2007. China Lake, California.

U.S. Fish and Wildlife Service. 1990. Biological opinion for the Kern River Gas Transmission Company, Mojave Pipeline Company for interstate natural gas pipelines.] (1-1-87-F-36R). Dated December 21. Letter to Environmental Compliance and Projects Analysis Branch, Federal Energy Regulatory Commission, Washington, D.C. Portland, Oregon.

U.S. Fish and Wildlife Service. 1991a. Biological opinion for the proposed expansion of existing mining activities at Hector Mine, San Bernardino County, California. (6840 CAMC-42050 CA-068-0-30 3809(CA-068.28)) (1-6-91-F-40). Dated August 12. Memorandum to State Director, Bureau of Land Management, Sacramento, California. Southern California Field Station. Laguna Niguel, California.

U.S. Fish and Wildlife Service. 1991b. Biological opinion for the Johnson Valley Off-highway Vehicle Area management plan, San Bernardino County, California. (6840 CA-932.5) (1-6-90-F-39). Dated November 14. Memorandum to State Director, Bureau of Land Management, Sacramento, California. Laguna Niguel, California.

U.S. Fish and Wildlife Service. 1992a. Biological opinion for the proposed desert tortoise habitat management plan for the Naval Air Weapons Station, China Lake, California (5090 Ser 008/C0808/1309) (1-6-92-F-60). Dated December 3. From Acting Field Supervisor, Ventura Field Office to Thomas McGill, U.S. Navy, China Lake, California. Ventura, California.

U.S. Fish and Wildlife Service. 1992b. Biological opinion for the proposed Hidden Valley resources residual repository proposal, San Bernardino County, California. (CA-24320 2800(CA0068.06)) (1-6-92-F-57). Dated October 8. Memorandum to State Director, Bureau of Land Management, Sacramento, California. Carlsbad, California.

U.S. Fish and Wildlife Service. 1992c. Biological opinion for the Fort Cady project mining plan proposal, San Bernardino County, California. (3809 CAMC 20175 (CA-068.28)) (1-6-92-F-54). Dated October 29. Memorandum to State Director, Bureau of Land Management, Sacramento, California. Carlsbad, California.

U.S. Fish and Wildlife Service. 1994. Desert tortoise (Mojave population) recovery plan. Portland, Oregon.

U.S. Fish and Wildlife Service. 1995a. Reinitiation of formal consultation for the desert tortoise habitat management plan for the Naval Air Weapons Station, China Lake, California (5090 Ser 823EOOD C8305) (1-8-95-F-30R). Dated June 27. From Field Supervisor, Ventura Field Office to Carolyn Shepherd, U.S. Navy, China Lake, California. Ventura, California.

U.S. Fish and Wildlife Service. 1995b. Biological opinion for the ongoing maintenance activities on Southern California Gas Company's pipeline system in Southern California deserts. (6840 CA-063.50 CA-930.6) (1-8-95-F-28). Dated November 28. Memorandum to State Director, Bureau of Land Management, Sacramento, California. Ventura, California.

U.S. Fish and Wildlife Service. 1997. Biological opinion for the issuance of a temporary use permit for the County of San Bernardino's proposed community transfer station, Newberry Springs, California. (2800, CA-068.33) (1-8-97-F-35). Dated August 17. Memorandum to District Manager, California Desert District, Bureau of Land Management, Riverside, California. Ventura, California.

U.S. Fish and Wildlife Service. 2002. Biological opinion for the base-wide operations and routine maintenance program at U.S. Marine Corps Air Ground Combat Center, Twentynine Palms, California (1-8-99-F-41). Dated March 7. Letter to Commanding General J.F. Weber, Marine Corps Air Ground Combat Center ,Twentynine Palms, California. Ventura, California.

U.S. Fish and Wildlife Service. 2003. Biological opinion for the designation of routes of travel in the Western Mojave Desert, California (6842 CA-063.50) (1-8-03-F-21). Dated June 30. Memorandum to District Manager, California Desert District, Bureau of Land Management, Moreno Valley, California. Ventura, California.

U.S. Fish and Wildlife Service. 2004. Biological opinion for the proposed addition of maneuver training lands at Fort Irwin, California (1-8-03-F-48). Letter to Colonel Edward Flynn, Fort Irwin, California. Dated March 15. Ventura, California.

U.S. Fish and Wildlife Service. 2005. Guidance on conducting Endangered Species Act (ESA) section 7 consultations on the desert tortoise and other species. Ecological Services, California Nevada Operations Office. Sacramento, California.

U.S. Fish and Wildlife Service. 2006a. Range-wide monitoring of the Mojave population of the desert tortoise: 2001-2005 summary report. Desert Tortoise Recovery Office. Reno, Nevada.

U.S. Fish and Wildlife Service. 2006b. Biological opinion for the California Desert Conservation Area Plan [West Mojave Plan] (6840(P) CA-063.50) (1-8-03-F-58). Dated January 9. Memorandum to District Manager, California Desert District, Bureau of Land Management, Moreno Valley, California. Ventura, California.

U.S. Fish and Wildlife Service. 2007. Biological opinion for the Newberry Materials Site Reopening, San Bernardino County, California (HDA-CA, File #08-SBD-I-40, PM 22.5, Document # P55480) (1-8-06-F-51). Dated June 7. Letter to Division Administrator, California Division Federal Highway Administration, Sacramento, California. Ventura, California.

U.S. Fish and Wildlife Service. 2008a. Desert tortoise – authorized biologist and monitor responsibilities and qualifications. http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt/DT%20Auth%20Bio%20qualifications%20statement%2010_20_08.pdf

U.S. Fish and Wildlife Service. 2008b. Environmental assessment to implement a desert tortoise recovery plan task: reduce common raven predation on the desert tortoise. Ventura, California.

U.S. Fish and Wildlife Service. 2008c. Draft revised recovery plan for the Mojave population of the desert tortoise (*Gopherus agassizii*). Sacramento, California.

U.S. Fish and Wildlife Service. 2009a. Desert tortoise field manual. http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/

U.S. Fish and Wildlife Service. 2009b. Range-wide monitoring of the Mojave population of the desert tortoise: 2007 annual report. Desert Tortoise Recovery Office. Reno, Nevada.

U.S. Fish and Wildlife Service. 2010a. Acknowledgement of request to initiate formal consultation for Calico Solar Power Generating Facility, San Bernardino County, California, (3030 P CA-680.33). Dated April 22. Ventura, California.

U.S. Fish and Wildlife Service. 2010b. Acknowledgement of request to initiate formal consultation for Calico Solar Power Generating Facility, San Bernardino County, California, ((3030 P CA-680.33)). Dated June 21. Ventura, California.

U.S. Fish and Wildlife Service. 2010c. Draft biological opinion on Tessera Solar's Calico Solar Power Generating Facility, San Bernardino County, California, [(30300 P CA-680.33](8-8-10-F-34). Dated August 18. Ventura, California.

U.S. Fish and Wildlife Service. 2010d. Revised pre-project survey protocols for the desert tortoise (*Gopherus agassizii*). http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt/DT%20Pre-project%20Survey%20Protocol_2010%20Field%20Season.pdf

U.S. Fish and Wildlife Service. 2010e. Revision of disease testing requirements based on translocation distance. Desert Tortoise Recovery Office. Reno, Nevada.

U.S. Fish and Wildlife Service. 2010f. Connectivity of desert tortoise populations. Importance of Pisgah Valley for recovery of desert tortoises. Dated June 3. Desert Tortoise Recovery Office. Reno, Nevada.

U.S. Fish and Wildlife Service. 2010g. Translocation of desert tortoises (Mojave population) from project sites: plan development guidance. http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/

Walde, A.D., A.P. Woodman, and W.I. Boarman. 2008. Desert tortoises surveys and research in the southern and western expansion areas of Fort Irwin. 2008 summary report. ITS Corporation. Prepared for the Department of the Army. Fort Irwin, California.

Waln, K. 2010. GIS calculation of U.S. Geological Survey values from 0.5 to 1.0 for the Western Mojave Recovery Unit. Ventura Fish and Wildlife Office, U.S. Fish and Wildlife Service. Ventura, California.

Webb, R.H. 2002. Recovery of severely compacted soils in the Mojave Desert, California, USA. Arid Land Research and Management 16:291-305.

Weinstein, M., K.H. Berry, and F.B. Turner. 1987. An analysis of habitat relationships of the desert tortoise in California. A report to Southern California Edison Company. Rosemead, California.

CALICO SOLAR POWER PROJECT

Commission Decision

DECEMBER 2010
CEC-800-2010-012-CMF

CALIFORNIA
ENERGY COMMISSION
Arnold Schwarzenegger, Governor

DOCKET NUMBER 08-AFC-13

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http://www.energy.ca.gov/sitingcases/calicosolar/index.html

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PAUL KRAMER
Hearing Officer

DISCLAIMER

This report was prepared by the California Energy Commission Calico Solar Project AFC Committee as part of Calico Solar Project, Docket No. 08-AFC-13. The views and recommendations contained in this document are not official policy of the Energy Commission until the report is adopted at an Energy Commission Business Meeting.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION FOR THE
CALICO SOLAR PROJECT
(Formerly SES SOLAR 1)

DOCKET NO. 08-AFC-13

ORDER NO. 10-1201-23

COMMISSION ADOPTION ORDER (REVISED DECEMBER 1, 2010)

This Commission Order adopts the Commission Decision on the ***Calico Solar Project***. It incorporates the Presiding Member's Proposed Decision (PMPD) in the above-captioned matter and the Committee Errata. The Commission Decision is based upon the evidentiary record of these proceedings and considers the comments received at the October 28, 2010 business meeting. The text of the attached Commission Decision contains a summary of the proceedings, the evidence presented, and the rationale for the findings reached and Conditions imposed.

This **ORDER** adopts by reference the text, Conditions of Certification, Compliance Verifications, and Appendices contained in the Commission Decision. It also adopts specific requirements contained in the Commission Decision which ensure that the proposed facility will be designed, sited, and operated in a manner to protect environmental quality, to assure public health and safety, and to operate in a safe and reliable manner.

FINDINGS

The Commission hereby adopts the following findings in addition to those contained in the accompanying text:

1. The ***Calico Solar Project*** will provide a degree of economic benefits and electricity reliability to the local area.

2. The Conditions of Certification contained in the accompanying text, if implemented by the project owner, ensure that the project will be designed, sited, and operated in conformity with applicable local, regional, state, and federal laws, ordinances, regulations, and standards, including applicable public health and safety standards, and air and water quality standards.

3. Implementation of the Conditions of Certification contained in the accompanying text will ensure protection of environmental quality and assure reasonably safe and reliable operation of the facility. The Conditions of Certification also assure that the project's direct, indirect, and cumulative adverse environmental impacts will be mitigated to the extent feasible. Where full mitigation is not feasible, overriding considerations warrant acceptance of those impacts.

4. As is discussed in Section VIII (Override Findings) of the PMPD, the benefits of the ***Calico Solar Project*** outweigh any significant direct, indirect, or cumulative impacts which may result from its construction or operation

5. Existing governmental land use restrictions are sufficient to adequately control population density in the area surrounding the facility and may be reasonably expected to ensure public health and safety.

6. The project is subject to Fish and Game Code section 711.4 and the project owner must therefore pay a nine hundred forty-nine dollars and fifty cents ($949.50) fee to the California Department of Fish and Game.

7. No feasible mitigation measures or site or generation technology alternatives to the project, as described during these proceedings, exist which would reduce or eliminate any significant environmental impacts of the mitigated project.

8. An environmental justice screening analysis was conducted and that the project, as mitigated, will not have a disproportionate impact on low-income or minority populations.

9. The Decision contains a discussion of the public benefits of the project as required by Public Resources Code section 25523(h).

10. The Decision contains measures to ensure that the planned, temporary, or unexpected closure of the project will occur in conformance with applicable laws, ordinances, regulations, and standards.

11. The proceedings leading to this Decision have been conducted in conformity with the applicable provisions of Commission regulations governing the consideration of an Application for Certification and thereby meet the requirements of Public Resources Code sections 21000 et seq. and 25500 et seq.

ORDER

Therefore, the Commission **ORDERS** the following:

1. The Application for Certification of the ***Calico Solar Project*** as described in this Decision is hereby approved and a certificate to construct and operate the project is hereby granted.

2. The approval of the Application for Certification is subject to the timely performance of the Conditions of Certification and Compliance Verifications enumerated in the accompanying text and Appendices. The Conditions and Compliance Verifications are integrated with this Decision and are not severable therefrom. While the project owner may delegate the performance of a Condition or Verification, the duty to ensure adequate performance of a Condition or Verification may not be delegated.

3. This Decision is adopted, issued, effective, and final on December 1, 2010.

4. Reconsideration of this Decision is governed by Public Resources Code, section 25530.

5. Judicial review of this Decision is governed by Public Resources Code, section 25531.

6. The Commission hereby adopts the Conditions of Certification, Compliance Verifications, and associated dispute resolution procedures as part of this Decision in order to implement the compliance monitoring program required by Public Resources Code section 25532. All conditions in this Decision take effect immediately upon adoption and apply to all construction and site preparation activities including, but not limited to, ground disturbance, site preparation, and permanent structure construction.

7. This Decision licenses the project owner to commence construction on the project within five years of this Decision date. Subject to the provisions of California Code of Regulations, title 20, section 1720.3, this license expires by operation of law when the project's start-of-construction deadline passes with no construction.

8. The project owner shall provide the Executive Director a check in the amount of nine hundred forty-nine dollars and fifty cents ($949.50) payable to the California Department of Fish and Game.

9. The Executive Director of the Commission shall transmit a copy of this Decision and appropriate accompanying documents, including the Department of Fish and Game fee, as provided by Public Resources Code section 25537, California Code of Regulations, title 20, section 1768, and Fish and Game Code, section 711.4.

10. We order that the Application for Certification docket file for this proceeding be closed effective the date of this Decision, with the exception that the docket file shall remain open for 30 additional days solely to receive material related to a petition for reconsideration of the Decision.

Dated: December 1, 2010, at Sacramento, California.

KAREN DOUGLAS
Chair

JAMES D. BOYD
Vice Chair

JEFFREY D. BYRON
Commissioner

Absent
ANTHONY EGGERT
Commissioner

Absent
ROBERT B. WEISENMILLER
Commissioner

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INTRODUCTION

A. SUMMARY OF THE DECISION

This Decision contains the Commission's rationale for determining to approve a license for the proposed Calico Solar Project (CSP) in the modified "Scenario 5.5" format proposed by the Applicant in September, 2010. While many of the potentially significant environmental impacts of the CSP will be mitigated to insignificant levels by design changes and measures required in the Conditions of Certification, significant, unmitigated impacts remain. The nature of those impacts are described in the relevant topic sections and summarized, along with the Commission's rationale for determining that the benefits of the project outweigh or override those impacts, in the Override Findings section near the end of this Decision. In the remainder of this Decision we also find that the CSP will comply with all applicable laws, ordinances, regulations, and standards (LORS). Our Decision is based exclusively upon the record established during this certification proceeding and summarized in this document. We have independently evaluated the evidence, provided references to the record[1] supporting our findings and conclusions, and specified the measures required to ensure that the Calico Solar Project is designed, constructed, and operated in the manner necessary to protect public health and safety, promote the general welfare, and preserve environmental quality.

On December 1, 2008, Stirling Energy Systems (SES) Solar Three, LLC and Stirling Energy Systems Solar Six, LLC (Applicant), submitted an Application for Certification (AFC) to the Energy Commission to construct a concentrated solar thermal power plant facility approximately 37 miles east of Barstow, in San Bernardino County. At the May 6, 2009, Business Meeting, the Energy Commission deemed the project adequate beginning staff's analysis of the proposed project. The Energy Commission has exclusive jurisdiction to license this project and is considering the proposal under a review process established by Public Resources Code section 25540.6.

The proposed project will be constructed on an approximate 4,613-acre site located in San Bernardino County, California. The project site is approximately 37 miles east of Barstow, 17 miles east of Newberry Springs, 57 miles northeast

[1] The Reporter's Transcript of the evidentiary hearings is cited as "date of hearing RT page __." For example: 9/20/10 RT 77. The exhibits included in the evidentiary record are cited as "Ex. number." A list of all exhibits is contained in **Appendix B** of this Decision.

of Victorville, and approximately 115 miles east of Los Angeles (straight line distances). The Applicant has applied for a Right of Way (ROW) grant from the United States Bureau of Land Management (BLM) to construct and operate the CSP on BLM-managed public lands. CSP will use approximately 32 acre feet of water per year, produce a nominal 663.5 MW of electricity, and operate for a term of 40 years. The project is proposed for development in two phases. Phase I is located on approximately 1,876 acres. Phase II is located on approximately 2,737 additional acres. About 26,540 SunCatchers, configured in 442.5 MW groups of 60 SunCatchers will be constructed on the project site.

Project construction is planned to begin in late 2010. Although construction would take approximately 44 months to complete, power would be available to the grid as each 60-unit group of SunCatchers is completed. It is expected that the Project would be operated with a staff of approximately 182 full-time employees. The project would operate 7 days per week, generating electricity during normal daylight hours when the solar energy is available. Construction activities will employ an average of 400 workers a month, peaking at 700 workers per month, for an approximately four-year construction period.

B. SITE CERTIFICATION PROCESS

The Calico Solar Project and its related facilities are subject to Energy Commission licensing jurisdiction. (Pub. Res. Code, § 25500 et seq.). During licensing proceedings, the Commission acts as lead state agency under the California Environmental Quality Act (CEQA). (Pub. Res. Code, §§ 25519(c), 21000 et seq.) The Commission's regulatory process, including the evidentiary record and associated analyses, is functionally equivalent to the preparation of an Environmental Impact Report. (Pub. Res. Code, § 21080.5.) The process is designed to complete the review within a specified time period when the required information is submitted in a timely manner; a license issued by the Commission is in lieu of other state and local permits.

The Commission's certification process provides a thorough review and analysis of all aspects of a proposed power plant project. During this process, the Energy Commission conducts a comprehensive examination of a project's potential economic, public health and safety, reliability, engineering, and environmental ramifications.

Specifically, the Commission's process allows for and encourages public participation so that members of the public may become involved either informally or on a formal level as intervenor parties who have the opportunity to

present evidence and cross-examine witnesses. Public participation is encouraged at every stage of the process.

The process begins when an Applicant submits an AFC. Commission staff reviews the data submitted as part of the AFC and makes a recommendation to the Commission on whether the AFC contains adequate information to begin the certification process. After the Commission determines an AFC contains sufficient analytic information, it appoints a Committee of two Commissioners to conduct the formal licensing process. This process includes public conferences and evidentiary hearings, where the evidentiary record is developed and becomes the basis for the Presiding Member's Proposed Decision (PMPD). The PMPD determines a project's environmental impact and conformity with applicable laws, ordinances, regulations, and standards and provides recommendations to the full Commission.

The initial portion of the certification process is weighted heavily toward assuring public awareness of the proposed Project and obtaining necessary technical information. During this time, the Commission staff sponsors public workshops at which intervenors, agency representatives, and members of the public meet with Staff and Applicant to discuss, clarify, and negotiate pertinent issues. Staff publishes its initial technical evaluation of the Project in its Preliminary Staff Assessment (PSA), which is made available for a 30-day public comment period. Staff's responses to public comment on the PSA and its complete analyses and recommendations are published in the Final Staff Assessment (FSA, also Exhibit 300).

Following this, the Committee conducts a Prehearing Conference to assess the adequacy of available information, identify issues, and determine the positions of the parties. Based on information presented at this event, the Committee issues a Hearing Order to schedule formal evidentiary hearings. At the evidentiary hearings, all formal parties, including intervenors, may present sworn testimony, which is subject to cross-examination by other parties and questioning by the Committee. Members of the public may offer oral or written comments at these hearings. Evidence submitted at the hearings provides the basis for the Committee's analysis and recommendations to the full Commission.

The Committee's analysis and recommendations appear in the PMPD, which is available for a 30-day public comment period. Depending upon the extent of revisions necessary after considering comments received during this period, the Committee may elect to publish a revised version. If so, the Revised PMPD

triggers an additional public comment period. Finally, the full Commission decides whether to accept, reject, or modify the Committee's recommendations at a public hearing.

Throughout the licensing process, members of the Committee, and ultimately the Commission, serve as fact-finders and decision-makers. Other parties, including the Applicant, Commission staff, and formal intervenors, function independently with equal legal status. An "ex parte" rule prohibits parties in the case, or other persons with an interest in the case, from communicating on substantive matters with the decision-makers, their staffs, or assigned hearing officer unless these communications are made on the public record. The Office of the Public Adviser is available to assist the public in participating in all aspects of the certification proceeding.

C. PROCEDURAL HISTORY

Public Resources Code, sections 25500 et seq. and Energy Commission regulations (Cal. Code Regs., tit. 20, § 1701, et seq.) mandate a public review process and specify the occurrence of certain procedural events in which the public may participate. The key procedural events that occurred in the present case are summarized below.

On December 2, 2008, Stirling Energy Systems Solar One, LLC (SES Solar Three LLC and SES Solar Six LLC) submitted an Application for Certification (AFC) to construct and operate the Stirling Energy Systems Solar One Project (SES Solar One), a solar dish Stirling systems project in San Bernardino County, California. In January 2010, the project formally changed its name to the **Calico Solar Project**. The Applicant, SES Solar Three LLC, was merged into SES Solar Six LLC, and that surviving entity was re-named Calico Solar, LLC.

At the May 6, 2009, Business Meeting, the Energy Commission deemed the project adequate, beginning staff's analysis of the proposed project. The Energy Commission assigned a Committee of two Commissioners to conduct proceedings.

The formal parties included the Applicant, the Energy Commission staff (Staff), and Intervenors: California Unions for Reliable Energy (CURE); County of San Bernardino; Defenders of Wildlife; Basin and Range Watch; Society for the Conservation of Bighorn Sheep; The Sierra Club; Patrick C. Jackson; Newberry Community Service District; and the Burlington Northern Santa Fe Corporation.

On May 28, 2009, the Committee issued a Notice of Informational Hearing and Public Site Visit and Bureau of Land Management Scoping Meeting. The Notice was mailed to local agencies and members of the community who were known to be interested in the project, including any owners of land adjacent to or in the vicinity of the Calico Solar Project. The Public Adviser's Office also advertised the public hearing and site visit and distributed information to local officials and sensitive receptors surrounding the project site.[2]

On June 22, 2009, the Committee conducted a Site Visit to tour the proposed Calico site and then convened a public Informational Hearing at the Barstow Community College, Performing Arts Center, in Barstow, CA. At that event, the Committee, the parties, interested governmental agencies, and other public participants discussed issues related to development of the project, described the Commission's review process, and explained opportunities for public participation.

On July 29, 2009, the Committee issued an initial Scheduling Order. The Committee Schedule was based on both Applicant and Staff's proposed schedules and related discussion at the Informational Hearing. On November 24, 2009, and February 2, 2010, the Committee issued Revised Committee Scheduling Orders.

The Energy Commission's CEQA-equivalent process and the BLM's National Environmental Policy Act (NEPA) process provided opportunities for the public and other agencies to participate and consult in the scoping of the environmental analysis of this proposed project, and in the evaluation of the technical analyses and conclusions of that analysis. The Energy Commission and BLM typically seek comments from and work closely with other regulatory agencies that administer LORS that may be applicable to a proposed project. The agencies coordinating through this joint Staff Assessment/Environmental Impact Statement (SA/EIS) process for the proposed Calico Solar Project are the United States Army Corp of Engineers, the U.S. Fish and Wildlife Service, State Water Resources Control Board/Regional Water Quality Control Board, California Department of Fish and Game, and San Bernardino County.

[2] Sensitive receptors are people or institutions with people that are particularly susceptible to illness, such as the elderly, very young children, people already weakened by illness (e.g., asthmatics), and persons engaged in strenuous exercise.

In the course of the review process, the Energy Commission and BLM have held additional joint Issue Resolution, alternatives identification, and data response workshops which were announced and made available to the public. These workshops were held on September 16, 2009 and April 16, 2010 in Barstow, California, on December 22, 2009, August 24, 2010, and September 9, 2010 in Sacramento, California, and on August 12, 2010 via WebEx. The purposes of the workshops were to provide members of the community and governmental agencies opportunities to obtain project information, and to offer comments regarding any aspect of the proposed project.

The SA/DEIS for the Calico Solar Project (08-AFC-13) was published by the Energy Commission on March 30, 2010. The SA/DEIS contained the California Energy Commission staff's and U.S. Bureau of Land Management's (BLM's) environmental, public health and engineering evaluation of the proposed Calico Solar Project. A Supplemental Staff Assessment was published in two parts, the first issued on July 21, 2010, and the second on August 9, 2010.

The Committee conducted a Prehearing Conference on July 30, 2010 and held Evidentiary Hearings on August 4, 5, 6, 18 and 25, 2010. On September 3, 2010, the Committee directed that the parties explore reduced size alternatives to the 6,215 acre proposal that was the subject of the hearings. The applicant presented six proposals, which were reduced to two final proposals after discussion at a September 9, 2010, staff-conducted workshop. Those two proposals, labeled "Scenario 5.5" and "Scenario 6," were the subject of an additional evidentiary hearing on September 20, 2010. Both scenarios significantly reduce the number of desert tortoises likely to be affected by the project.

We note that staff (Ex. 317, p. ES-1) and the applicant (Ex. 114, p. 1 – 4) prefer Scenario 5.5 over Scenario 6 because it would produce more renewable energy power. We treat Scenario 5.5 as the new proposed project for purposes of this Decision.

The Committee published this PMPD, recommending approval of Scenario 5.5, on September 25, 2010, On October 22, 2010, the Committee held a Committee Conference to consider comments on the PMPD. That hearing was then continued to October 26, 2010 to receive further comments arising out of a staff workshop conducted among the parties on October 25, 2010 for consideration of Soil and Water Conditions of Certification. The 30-day public comment period on the PMPD expired on October 25, 2010. On October 28, 2010, the Energy

Commission met at a special Business Meeting to consider the PMPD and further recommendations of the Committee and other parties. This Decision was adopted at the conclusion of that Business Meeting.

D. COMMISSION OUTREACH

Several entities within the Energy Commission provide various notices concerning power plant siting cases. Staff provides notices of staff workshops and the release of the Preliminary and Final Staff Assessments. The Hearing Office notices Committee-led events such as the informational hearing and site visit, status conferences, the prehearing conference, and evidentiary hearings. The Public Adviser's Office provides additional outreach for critical events as well as provides information to interested persons that would like to become more actively involved in a power plant siting proceeding. Further, the Media Office provides notice of events to local and regional press through press releases. The public may also subscribe to the proceeding's e-mail List Server offered on the web page for each project which gives an immediate notification of documents posted to the project web page. Through the activities of these entities, the Energy Commission has made every effort to ensure that interested persons are notified of activities in this proceeding.

E. PUBLIC COMMENT

The record contains public comments from concerned individuals and organizations. Throughout these proceedings, as reflected in the transcribed record, the Committee provided an opportunity for public comment at each Committee-sponsored conference and hearing. Following publication of the PMPD, additional comments were received, largely from parties to this proceeding, including Commission Staff, the Applicant, California Unions for Reliable Energy (CURE), Burlington Northern Railway Company (BNSF), the Sierra Club, Defenders of Wildlife, Newberry Springs Community Services District, and two non-parties, Shaun Gonzales and Sarkis Avanian. Their comments raising substantial environmental issues not already discussed in the Decision and selected other comments are addressed by revisions to the topic sections appropriate to the comment.

I. PROJECT DESCRIPTION

On December 2, 2008, Stirling Engine Systems Solar One, LLC (SES Solar Three, LLC and SES Solar Six, LLC) submitted an Application for Certification (AFC) to the California Energy Commission to construct and operate the Stirling Energy Systems Solar One Project (SES Solar One) on public land managed by the Bureau of Land Management (BLM) in San Bernardino County, California. On May 6, 2009, the Energy Commission accepted the AFC as complete. In January 2010, the project formally changed its name to the Calico Solar Project (CSP). The applicant, SES Solar Three, LLC, was merged into SES Solar Six, LLC, and that surviving entity was re-named Calico Solar, LLC. Calico Solar is a subsidiary of Tessera Solar™. The Calico Solar Project was originally filed as a nominal 850 megawatt (MW) solar thermal power plant. In September, 2010, its proposed output was reduced to 663.5 MW. (Exs. 300, p. B.1-1; 317, p. B.1-2.)

We recognize the possibility that the electrical output of the CSP may be reduced by the need to set aside a portion of the project site for drainage and detention basins. If that is necessary, fewer power generating units will be installed on the project site and the electrical output will be reduced. The scope of such basins, if any, will become evident during the further design of the project's drainage systems and facilities. The Applicant estimates that the power output could be reduced by as much as 100 MW (to approximately 560 MW) if extensive basins are required. Our approval of the project is intended to authorize the maximum output, up to 663.5 MW, consistent with the need to properly handle the drainage needs of the project site.

SUMMARY AND DISCUSSION OF THE EVIDENCE

1. Project Location

The Calico Solar Project site is proposed to be located on public land managed by the BLM. The project is proposed for development in two phases, with the first phase further divided into subparts. Phase 1a is located on approximately 250 acres, Phase 1b is 1,626 acres and Phase 2 is 2,737 acres for a combined total of 4,613 acres. (Ex. 114, p. 2)

The Calico Solar Project also includes a new 230-kilovolt (kV) Calico Solar Substation, 2.0 miles of electrical transmission line, an administration building, maintenance complex, onsite routes interior to the project boundaries, a site access road, and a bridge over the Burlington Northern Santa Fe railroad tracks.

Approximately 739 feet of the 2-miles of single-circuit, 230-kV generation interconnection transmission line would be constructed off the project site but still on BLM managed land. The transmission line would connect the proposed Calico Solar Substation to the existing Southern California Edison (SCE) Pisgah Substation. (Ex. 300, p. B.1-4.)

2. Project Construction and Operation

The project would be constructed in two phases. Phase 1a would consist of 60 SunCatchers configured in a single group and much of the support facilities. Phase 1b and then Phase 2 would contain the remaining 26,480 SunCatchers arranged in 1.5-MW solar groups of 60 SunCatchers per group, bringing the CSP to its net nominal generating capacity of 663.5 MW. The Applicant expects that construction would take approximately 44 months to complete. However, power would be available to the grid as each 60-unit group of SunCatchers is completed. (Ex. 114, p. 2; Ex. 300, pp. B.1-7 and B.1-19)

The overall footprint for the CSP, as well as the individual phases are depicted on Project Description Figure 1, below.

Heavy construction for the project would be scheduled to occur between 0700 and 1900 Monday through Friday. Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. Some activities would continue 24 hours per day, 7 days per week. These activities include, but are not limited to, SunCatcher assembly, refueling of equipment, staging of materials for the next day's construction activities, quality assurance/control, and commissioning. (Ex. 300, pp. B.1-19 to B.1-20.)

The entire project would be fenced for security, however the design of the fencing is being determined in coordination with regulatory and resource agencies to protect sensitive ecological areas and address storm flows in washes. The project would have a laydown area on 14 acres adjacent to the Main Services Complex. (Ex. 300, p. B.1-8.)

Note: In September, 2010, in response to a Calico Siting Committee order, the Applicant presented two alternative reduced project size proposals for consideration. They were labeled Scenario 5.5 and Scenario 6. Scenario 5.5 is described above and is being considered as the Applicant's substitute proposal. Scenario 6 reduced the project's footprint slightly from Scenario 5.5's 4,613 acres to 4,244 acres, and power output from 663.5 MW to 603.9 MW. The Committee has chosen Scenario 5.5, the Applicant's obvious favorite, for its greater output, as the proposal to further analyze and consider for approval. Because not all of

the details, such as total roadway length have been provided, some of the information below relates to the larger 850 MW project no longer under consideration. As such, that data overstates the magnitude of the project, as well as its impacts, to a degree.

During project construction and operation, the main access to the project site would be from the south, off of Interstate 40 from the Hector Road exit. The applicant proposed the development of the following roadways on the project site: approximately 25.2 miles of surface-treated roadways, approximately 168 miles of north-south access routes, and approximately 102 miles of east-west access routes. The access routes would be surface-treated to reduce fug itive dust while allowing full access to all dishes and infrastructure. Polymeric stabilizers will be used in lieu of traditional road construction materials for paved roads and/or to stabilize unpaved roads. All access to the project site would be through controlled gates. (Ex. 300, p. B.1-8.)

It is expected that the CSP would be operated with a staff of approximately 182 full-time employees. The project would operate 7 days per week, generating electricity during normal daylight hours when the solar energy is available. Maintenance activities would occur 7 days a week, 24 hours a day to ensure SunCatcher availability when solar energy is available. (Ex. 300, p. B.1-20.)

The applicant has applied for a right-of-way (ROW) grant for the project site from the BLM Barstow Field Office. Although the project is phased, it is being analyzed as if all phases would be operational at the same time. (Ex. 300, p. B.1-7.)

3. Solar Field, Power Generation Equipment and Process

Project Description Table 1 lists the major equipment and significant structures required for the Calico Solar Project.

Project Description Table 1
Significant Structures and Equipment

Description	Quantity	Length (feet)	Width (feet)	Height (feet)
SunCatcher power generating system	26,540	38 diameter		40
Main Services Complex administration building	1	60	70	17
Main Services Complex maintenance building	1	70	70	17
Main SunCatcher assembly buildings	3	1,000	100	78
Well water storage tank and Fire Water 230,000 gallons	1	40 diameter		20
Demineralized water tank, 17,000 gallons	2	18 diameter		10
Potable Water Tank, 5,000 gallons	1	40 diameter		20
230kV transmission line towers, double-circuit with upswept arms	12 to 15	--	32	90 to 110
Generator collection sub-panel; distribution panel, 42 circuit, 400A, 600V, with circuit breakers in a weatherproof enclosure	2,834	1	2.67	5
Generator collection power center, 2,000-A distribution panels with six 400-A circuit breakers	567	2	3.33	7.5
Collector group generator step-up unit transformer (GSU), 1,750kVA, 575 V to 34.5kV, with taps	567	6.67	7.5	6.67
Power factor correction capacitor, 600V, 1,000kVAR, switched in five, each 200kVAR steps	567	2.5	6.67	7.5
Open bus switch rack, 35kV, 7 bay with five 35kV, 1,200-A, 40kVA INT, circuit breakers, insulators, switches, and bus work	6	105	20	30
Shunt capacitor bank, 34.5kV, 90 MVAR switched in six each 15 MVAR steps	6	15	8	20
Dynamic VAR (DVAR) compensation system in coordination with shunt capacitor banks – size to be determined by studies	1	60	12	16
Disconnect switch, 35kV, 3,000 A, 200kV BIL, group-operated	6	3	11	16
Power transformer, three phase, 100/133/167 mega volt amp, 230/132.8-34.5/19.9kV, 750kV BIL, oil filled	6	15	35	23
Power circuit breaker, 242kV, 2000A, 40 kilo amp interrupting capacity	7	12	20	16
Coupling capacitor voltage transformer for metering, 242kV, 900kV BIL, 60 Hertz, Potential Transformer ratio 1,200/2,000:1	6	1	1	25
Disconnect switch, 242kV, 2000A	9	10	25	25

Source: Ex. 300, p. B.1-9

Notes: A = ampere (amp), BIL = basic impulse level, gpd = gallons per day, HP = horsepower, Hz = hertz, INT = international, kA = kilo amps kV = kilovolt, kVA = kilovolt amps, Kvar = kilovolt amp reactive, kW = kilowatt, kWe = kilowatt-electric, MVA = megavolt amps MVAR = megavolt amp reactive MW = megawatts, V = volts, VAR = volt amp reactive W = watts

The SunCatcher™ is a 25-kilowatt-electrical (kW) solar dish Stirling system designed to automatically track the sun and collect and focus solar energy onto a power conversion unit (PCU), which generates electricity. The system consists of an approximately 40-foot-high and 38-foot in diameter solar concentrator in a dish structure that supports an array of curved glass mirror facets. These mirrors collect and concentrate solar energy onto the solar receiver of the PCU.

The PCU converts the focused solar thermal energy into grid-quality electricity. The conversion process in the PCU involves a closed-cycle, 4-cylinder, 35-horsepower reciprocating Stirling Engine utilizing an internal working fluid of hydrogen gas that is recycled through the engine. The Stirling Engine operates with heat input from the sun that is focused by the SunCatcher's dish assembly mirrors onto the PCU's solar receiver tubes, which contain hydrogen gas. The PCU solar receiver is an external heat exchanger that absorbs the incoming solar thermal energy. This heats and pressurizes the hydrogen gas in the heat exchanger tubing, the gas in turn powers the Stirling Engine.

A generator is connected to the Stirling Engine to produce the electrical output of the SunCatcher. Each generator is capable of producing 25 kW at 575 volts alternating current (VAC)/60 hertz (Hz) of grid-quality electricity when operating with rated solar input. Waste heat from the engine is transferred to the ambient air via a radiator system similar to those used in automobiles.

The hydrogen gas is cooled by a standard glycol-water radiator system and is continually recycled within the engine during the power cycle. The conversion process does not consume water. The only water consumed by the SunCatcher is for washing of the mirrors to remove accumulated dust and replenishing small losses to the cooling system radiator in a 50-50 ethylene glycol-water coolant.

4. Site Grading and Drainage

Brush trimming would be conducted between alternating rows and would consist of cutting the top of the existing brush while leaving the existing native plant root system in place to minimize soil erosion. To minimize shading on SunCatchers and prevent potential brush fire hazards, natural vegetation trimmings would be cleared in the area of each SunCatcher as well as on either side of the surface-treated arterial roadways. (Ex. 300, p. B.1-10.)

After brush has been trimmed, blading for roadways and foundations would be conducted between alternating rows to provide access to individual SunCatchers. Blading would consist of limited removal of terrain undulations. Although ground disturbance would be minimized wherever possible, the applicant proposes that

localized rises or depressions within the individual 1.5-MW solar groups would be removed to provide for proper alignment and operation of the individual SunCatchers. Surface-treated roadways would be constructed as close to the existing topography as possible, with limited cut-and-fill operations to maintain roadway design slope to within a maximum of 10 percent. (Ex. 300, p. B.1-10.)

The layout of the proposed Calico Solar Project would maintain the local pre-development drainage patterns where feasible, and water discharge from the site would remain at the southern and western boundaries. The paved roadways would have a low-flow, unpaved swale or roadway dip as needed to convey nuisance runoff to existing drainage channels. It is expected that storm water runoff would flow over the crown of the paved roadways, which are typically less than 6 inches from swale flow line to crown at centerline of roadway, thus maintaining existing local drainage patterns during storms. The applicant has proposed that low-flow culverts would be used on emergency access routes and all other roads would be at grade. (Ex. 300, p. B.1-10.)

The Applicant has proposed localized channel grading on a limited basis to improve channel hydraulics within the dry washes and to control flow direction where buildings and roadways are proposed. The Main Services Complex would be protected from a 100-year flood by berms or channels that would direct the flow around the perimeter of the building site, if required. (Ex. 300, p. B.1-10.)

Arizona Crossings (roadway dips) would be placed along the roadways, as needed to cross the minor or major channels/swales. These designs would be based on Best Management Practices (BMPs) for erosion and sediment control. Arizona Crossings would also be used for major washes where the channel cross section exceeds 8 feet in width and 3 feet in depth or exceeds 20 feet in width and 2 feet in depth. The roadway section at the channel flow line would be without a crown. (Ex. 300, p. B.1-10.)

It is anticipated that roadway maintenance would be required after rainfall events. For minor storm events, it is anticipated that the unpaved roadway sections may need to be bladed to remove soil deposition, along with sediment removal from stem pipe risers at the culvert locations. For major storm events, in addition to the aforementioned maintenance, roadway repairs may be required due to possible damage to pavement where the roadways cross the channels and where the flows exceed the culvert capacity. Additional maintenance may be required after major storm events to replace soil eroded from around SunCatcher pedestals located in washes. (Ex. 300, pp. B.1-10 to B.1-11.)

Building sites would be developed per San Bernardino County drainage criteria, with provision for soft bottom storm water retention basins, if necessary. Rainfall from paved areas and building roofs would be collected and directed to the storm water retention basins. Volume on retention or detention basins should have a total volume capacity for a 3-inch minimum precipitation covering the entire site. Volume can be considered by a combination of basin size and additional volume provided within paving and/or landscaping areas. (Ex. 300, p. B.1-11.)

The retention basins, if any are necessary, would be designed so that the retained flows would empty within 72 hours after the storm to provide mosquito abatement. This design can be accomplished by draining, evaporation, infiltration, or a combination thereof. (Ex. 300, p. B.1-11.)

The post-development flow rates released from the project site are expected to be less than the pre-development flow rates, thus complying with BMPs. The expected flow reduction is based on the following factors.

- Except for the building sites, roads, and two evaporation ponds, the majority of the project site would remain pervious; only a negligible portion of the site would be affected by pavement and SunCatchers foundations.
- The increased runoff expected from the Main Service Complex would be over-mitigated by capturing 100 percent of the runoff in a retention basin, where the storm runoff would be infiltrated and/or evaporated to the atmosphere.
- The proposed perforated risers to be constructed upstream of the roadway culverts would provide for additional detention. (Ex. 300, p. B.1-11.)

5. Buildings

The Main Services Complex would be located within the project site in a central location that provides for efficient access routes for maintenance vehicles servicing the SunCatcher solar field. The main control room would be located at the Main Services Complex.

Warehouse and shop spaces would provide work areas and storage for spare parts for project maintenance. The Main Services Complex would contain meeting and training rooms, maintenance and engineering offices, and administrative offices.

The project administration offices and personnel facilities would be located in a one-story operation and administration building. The operation and administration

building would measure approximately 60 feet long by 70 feet wide by 17 feet high. This building would also contain meeting and training rooms, engineering offices, a visitor's room, and support services.

The project maintenance facilities, shop, and warehouse storage would be located adjacent to the operation and administration building. The maintenance building would measure 70 feet wide by 70 feet long by 17 feet in height. This building would contain maintenance shops and offices, PCU rebuild areas, maintenance vehicle servicing bays, chemical storage rooms, the main electrical room, and warehouse storage for maintenance parts to service the SunCatchers.

The three assembly buildings will be located beside the Main Services Complex. Assembly buildings will be decommissioned after the project's SunCatchers are assembled and installed.

A water treatment shade structure will be located next to the Main Services Complex and to the northeast side of the Main Services Complex. The water treatment structure will house water treatment equipment and safe storage areas for water treatment chemicals. A motor control center for the water treatment equipment and pumps will be located within this structure. Two wastewater evaporative ponds designed for water treatment wastewater containment will be located just north of the water treatment structure. A control building will be located near the project substation. This building will contain relay and control systems for the substation in one room and the project operations control room in another room or rooms. A diesel-powered fire water pump and a diesel operated standby power generator will be located adjacent to the operation and administration building on the north side.

Electric service for the Main Services Complex will be obtained from SCE. Electric power will be provided via overhead service from an SCE overhead distribution line located on the north side of I-40. Communications service for the Main Services Complex will be obtained from the local phone company. Communications service will be provided via an overhead service from existing underground communications lines located on the north of I-40.

The operation and administration building, maintenance building, and Main Services Complex would be painted with a matching desert sand color called "Carlsbad Canyon" and would be manufactured buildings. The water treatment building and the water holding tanks, including the potable water, raw water, and demineralized/fire protection water tanks located at the Main Services Complex would also be painted with a matching desert sand color.

SunCatcher assembly would be performed on-site in temporary structures. These buildings would be decommissioned after all project SunCatchers are assembled and installed. The assembly buildings would be located beside the Main Services Complex.

The primary purpose of the SunCatcher assembly buildings would be the assembly of the SunCatcher superstructure, the main beam assembly and trusses, the pedestal trunnion, mirrors, wire harnesses, control systems, drive position motors, and the calibration of the mirrors and control systems before field installation. Each assembly bay would be equipped with an automated platform on locating rails to move the SunCatcher through the assembly process.

The exterior material for the assembly buildings would be a fire retardant vinyl fluoride film with ultraviolet blocking characteristics and would be chemical and weather resistant. The exteriors would be painted desert sand to match the other structures.

Transport trailer storage would be located adjacent to the assembly building. The storage area would allow the project to maintain a supply of 3 to 5 days of inventory of SunCatcher parts during the assembly phase of construction.

These assembly buildings would be decommissioned and salvaged after all SunCatchers for the Project are installed.

6. Water Supply and Treatment

The following types of water would be required for the project: equipment washing water; potable water; dust control water, and fire protection water. When completed, the Calico Solar Project would require a total of approximately 36.2 acre-feet of raw water per year. SunCatcher mirror washing and operations dust control under regular maintenance routines will require an average of approximately 10.4 gallons of raw water per minute.

The applicant proposes the use of ground water from the Lavic Groundwater Basin. The applicant initiated the drilling of four water wells adjacent to the project site, within the Lavic Groundwater Basin. As wells are drilled the flow rate (gallons per minute – gpm) were determined, concern over sufficiency of this water supply lead to the identification of a new primary water supply from Burlington Northern Santa Fe (BNSF). Initially, the Lavic Ground Basin wells were to be used as a backup water source since they were believed to lack the capacity to provide for construction water needs. The applicant subsequently discovered that one of the wells within the Lavic Groundwater Basin could

provide enough water for construction and operations of the proposed project and has returned to well water from the Lavic Groundwater Basin as the primary water source for the project.

The water from the Lavic Groundwater Basin well is characterized as raw water and will require treatment to remove dissolved solids for SunCatcher mirror wash water applications. The water will be required to be demineralized to prevent mineral deposits forming on the SunCatcher mirrors. Processes available for demineralization are Reverse Osmosis (RO) and ion exchange.

Potable Water: Potable water to meet plant requirements would satisfied by treated groundwater. The groundwater would first be demineralized, then stored in a designated storage facility equipped with chemical dosage for disinfection. This treated potable water would be available at the Main Services Complex.

Mirror Washing and Fire Protection Water: The Main Services Complex will include a location for an approximately 230,000-gallon tank that will be used to store water for SunCatcher mirror washing and fire protection applications. This volume of water will meet all LORS, including fire protection water for the Newberry Springs and the Harvard Station 46 (a County Fire Department staffed station), and for the San Bernardino Fire Department.

Dust Control Water: The water will be conveyed to the Main Services Complex via a 6 to 8-inch-diameter water line. The expected average well water consumption for the project during construction is approximately 50 acre-feet per year. Under normal operation (inclusive of mirror cleaning, dust control, and potable water usage), water required will be approximately 36.2 acre-feet per year. Emergency water may be trucked in from local municipalities. The Applicant would seek agreements at the time of the emergency.

The Calico Solar Project water supply requirements are tabulated in **Project Description Table 2**, Water Usage Rates for Operation. The table provides both the expected maximum water usage rates and the annual average usage rates.

Project Description Table 2
Water Usage Rates for Operation

Water Use	Daily Average (gallons per minute)	Daily Maximum (gallons per minute)	Annual Usage (acre feet)
Equipment Water Requirements			
SunCatcher Mirror Washing	11.8[1]	19.7[2]	16.1[3]
Water Treatment System Discharge			
Brine to Evaporation Ponds	6.0	11.1[4]	8.1
Potable Water Use			
For drinking and sanitary water requirements	3.8[5]	4.6[6]	5.2[7]
Dust Control			
Well water for dust control during operations	4.2[8]	8.3[9]	6.7[10]
Totals	**25.8**	**43.7**	**36.2**

Source: Ex. 300, p. B.1-14

[1] Based on 34,000 SunCatchers requiring a monthly wash with an average of 14 gallons of demineralized water per spray wash and a 5-day work week (21 work days per month).

[2] During a 3-month period, all SunCatcher mirrors are given a scrub wash requiring up to three times the normal wash of 14 gallons per SunCatcher. Therefore, the Daily Maximum usage rate is based on 2/3 of the SunCatchers receiving a normal wash and one third receiving a scrub wash.

[3] Based on every SunCatcher having approximately 8 normal washes per year with one additional scrub wash.

[4] Based on the maximum amount of demineralized water required for mirror washing and assumes a decrease in raw water quality requiring an additional 20% of system discharge.

[5] Assumes 30 gallons per person per day for 182 people. [6] Max. amount assumes a 20% contingency over the Daily Avg.

[7] Assumes a 6-day work week and average daily usage. [8] Assumes 5,000 gallons per day.

[9] Assumes up to 10,000 gallons per day. [10] Assumes daily average dust control operations.

7. Wastewater and Waste Management

The water treatment wastewater generated by the reverse osmosis (RO) unit would contain relatively high concentrations of total dissolved solids (TDS). Wastewater or brine generated by the RO unit would be discharged to a polyvinyl chloride (PVC)-lined concrete evaporation pond that meets the requirements of the local Regional Water Quality Control Board (RWQCB). Each pond would be sized to contain 1 year of discharge flow, approximately 2.44 million gallons. A minimum of 1 year is required for the water treatment waste to undergo the evaporation process. The second pond would be in operation while the first is

undergoing evaporation. The two ponds would alternate their functions on an annual basis.

After the brine has gone through the evaporation process, the solids that settle at the bottom of the evaporation pond will be tested by the applicant and disposed of in an appropriate non-hazardous waste disposal facility. The solids would be scheduled for removal during the summer months, when the concentration of solids is at its greatest due to an increase in evaporation rates, in order to achieve maximum solids removal.

Sanitary wastewater generated at the facility cannot be conveyed to an existing sewage facility or pipeline as there are no public or private entities that manage sanitary wastewater flows for locations in the vicinity of the project site. The wastewater generated at the Main Services Complex will be discharged into a sub-surface wastewater disposal system with septic tanks and leach fields, and will be designed in accordance with the applicable LORS, including San Bernardino County, California State Regional Water Quality Board, and the Department of Health Services.

The general threshold limit for a standard approval process for septic tanks and leach fields through the local RWQCB is 500 gallons per acre per day. The expected daily sanitary wastewater flow from Calico Solar ranges from an average of 5,500 gallons to a peak of 6,600 gallons; the required set aside area given this flow is approximately 14 acres. Given the project site area is much greater than 14 acres, the threshold limit for septic tank and leachfield applications will be met. The required leachfield area is estimated to be approximately 1,100 square-feet (0.025 acre).

8. Hazardous Waste Management

Hazardous materials used during facility construction and operations would include paints, epoxies, grease, transformer oil, caustic electrolytes (battery fluid), and products that would be generated by the construction equipment, such as waste fuel and waste oil. Several methods would be used to properly manage and dispose of hazardous materials and wastes. Waste lubricating oil would be recovered and recycled by a waste oil recycling contractor. Chemicals would be stored in appropriate chemical storage facilities. Bulk chemicals would be stored in large storage tanks, while most other chemicals would be stored in smaller returnable delivery containers. All chemical storage areas would be designed to contain leaks and spills in concrete containment areas.

9. Hydrogen System

The Applicant described the hydrogen use, supply and storage in the AFC, filed in December 2008. In the original design, it was proposed that hydrogen would be supplied to the SunCatchers through a distributed system. Each of the SCE, within the SunCatcher unit, would contain 14 cubic feet of hydrogen gas, and each SunCatcher unit would be equipped with a 196-scf k-bottle to replenish hydrogen gas lost within the gas circuit. K-bottles would be provided by a commercial hydrogen supplier. The Applicant responded to Energy Commission and BLM Data Requests 57-60 in July 2009, updating the hydrogen system to include a centralized hydrogen gas supply, storage and distribution system. (Ex. 5d.) The system included onsite generation of hydrogen through electrolysis and the storage of that hydrogen in a 36,400 scf steel storage tank. From the storage tank, the hydrogen would be piped to 95 individual compressor groups that include a compressor, a high pressure supply tank and a low pressure dump tank used to recover hydrogen from non-operational PCUs through a return line. (Ex. 300, p. B.1-16.)

At this time, the applicant is evaluating the relative advantages between the centralized hydrogen distribution system and a distributed system that utilizes k-bottles on the PCUs of all SunCatchers. Therefore, both systems are described below. (Ex. 300, p. B.1-16.)

Centralized Hydrogen System Description**.** Based on the evidence**,** the details of the centralized hydrogen system have been refined by the applicant as a result of experience from the applicant's Maricopa Solar Project and as a result of design having progressed to final engineering. The maximum amount of hydrogen stored for each SunCatcher would be increased from 3.4 to 11 scf which would accommodate two full charges of the PCU. In order to support this increased hydrogen storage at each SunCatcher, the high pressure supply tanks and low pressure dump tanks at each compressor group would accommodate 29,333 scf and 9,900 scf, respectively. In the July 2009 responses Energy Commission and BLM Data Requests 57-60, each high pressure supply tank was anticipated to be 648 scf and each low pressure dump tank was also reported to be 648 scf. (Ex. 300, p. B.1-16.)

If a centralized hydrogen system is used at the Calico Solar site, the hydrogen gas would be produced through electrolysis by two redundant hydrogen generators. Each proposed hydrogen generator would be capable of producing 1,820 scfh. Although the hydrogen generators could run full time if needed to supply sufficient amount of hydrogen to the SunCatchers, the generators would

be operated at off-peak electric hours using grid power and generated hydrogen would be stored onsite. Hydrogen gas produced by the onsite generators would be stored in a steel storage tank. The hydrogen tank, at approximately nine feet in diameter by 30 feet long, would be capable of storing approximately two-day supply of hydrogen (i.e., approximately 36,400 scf). (Ex. 300, p. B.1-16.)

The hydrogen storage tank would distribute hydrogen fuel to 95 individual compressor groups. Each compressor group would be electrically operated and would consist of a compressor and a high pressure supply tank with a 29,333 scf capacity, delivering gas at approximately 2,760 psi. Each compressor group would also be equipped with a low pressure dump tank with the same 9,900 scf capacity and used to recover hydrogen from non-operational PCUs through a ¼" and ½" stainless steel return line. In this option there are no other holding tanks or storage tanks in the compressor groups. Delivery of hydrogen is through pipelines. (Ex. 300, pp. B.1-16 to B.1-17.)

Distributed Hydrogen System Description. If the distributed hydrogen supply system utilizing k-bottles at each SunCatcher PCU is utilized at the Calico Solar site, the system would use two redundant hydrogen generators and one steel storage tank located at the Main Services Complex as described in the centralized system. However, the system would not deliver hydrogen through pipelines. In lieu of the distribution equipment, hydrogen would be filled from the hydrogen storage tank to each individual SunCatcher through trucks. Each SunCatcher would include an 82-scf high pressure supply tank, 28-scf low pressure dump tank, and a 489-scf local storage tank. In addition, each SunCatcher unit would contain a minimum of 11-scf of hydrogen at 580 psi at all times, resulting in a total of around 610-scf of hydrogen in each SunCatcher. (Ex. 300, p. B.1-17.)

The k-bottles would be delivered back to each SunCatcher, utilizing the mirror-washing truck trips. Hydrogen refilling and replacement trips are expected occur approximately three times per year. (Ex. 300, p. B.1-17.)

10. Transmission System Interconnection and Upgrades

The proposed project would include the construction of a new 230-kV Calico Solar Substation approximately in the center of the project site. The proposed project substation would consist of an open air bus with 15, 35-kV collection feeder circuit breakers. Each feeder breaker would be connected to one of the 48-MW or 51-MW overhead collection lines. Additional 35-kV circuit breakers would connect to power factor correction capacitor banks located in the

substation yard. This new substation would be connected to the existing SCE Pisgah Substation via an approximately 2-mile, single-circuit, 230-kV transmission line. Other than this interconnection transmission line, no new transmission lines or off-site substations would be required for the 275-MW Phase I construction. (Ex. 300, p. B.1-17.)

For the 275-MW Phase I of the project, the first interconnection substation would initially consist of two power transformers rated at 120/160/200 megavolt amperes (MVA) each to convert the generation collection voltage from 34.5 kV to the transmission tie voltage of 230 kV. The substation would ultimately contain 6 120/160/200-MVA, 34.5-kV to 230-kV step-up power transformers. Each power transformer would serve 3 of the 15 overhead collection lines (one 48-MW line and 2 51-MW lines). (Ex. 300, p. B.1-17.)

The power transformers would be protected by 230-kV power circuit breakers. Provisions would be made to expand the Calico Solar Substation from 275 to 850 MW with the addition of three power transformers in Phase II of the proposed project. Each transformer would collect 150 MW of generation via three overhead 34.5-kV collection circuits, each protected by a 35-kV power circuit breaker. The 34.5-kV feeders would be terminated on outdoor circuit breakers. (Ex. 300, pp. B.1-17 to B.1-18.)

Control, metering, and protection systems for the line, substation, and collection systems would be contained within a control building located within the Calico Solar Substation. The control building would also contain the necessary communications equipment to meet owner, California Independent System Operator (California ISO), and SCE requirements. Additional substation equipment would include a 34.5-kV power-factor correction capacitor control system designed to meet the power factor and zero and low-voltage ride-through requirements of the Interconnect Agreement. (Ex. 300, p. B.1-18.)

The on-site portion of the interconnection transmission line would be installed in a 100-foot ROW from the Calico Solar Project substation southeast to point of intersection with the SCE transmission ROW, then southwest to parallel the transmission ROW to the Pisgah Substation. (Ex. 300, p. B.1-18.)

The transmission line towers would consist of H-Frame towers at the undercrossing of the existing 500-kV transmission line and double-circuit lattice steel towers and/or steel poles elsewhere. Both circuits of the overhead 230-kV transmission line would be constructed with one 1,590-kilo circular miles/phase, aluminum steel-reinforced conductor per line, each thermally rated to carry full project output in emergency conditions and one-half of project output in normal

conditions. Two fiber optic cables would be provided for communication with SCE and the California ISO.

11. Facility Closure

Project closure can be temporary or permanent. Temporary closure is defined as a shutdown for a period exceeding the time required for normal maintenance. Causes for temporary closure include inclement weather and/or natural hazards (e.g., winds in excess of 35 mph, or cloudy conditions limiting solar insolation values to below the minimum solar insolation required for positive power generation, etc.), or damage to the project from earthquake, fire, storm, or other natural acts. Permanent closure is defined as a cessation in operations with no intent to restart operations owing to project age, damage to the project that is beyond repair, adverse economic conditions, or other significant reasons. (Ex. 300, p. B.1-21.)

In the unforeseen event that the project is temporarily closed, a contingency plan for the temporary cessation of operations will be implemented. The contingency plan will be followed to ensure conformance with applicable LORS and to protect public health, safety, and the environment. The plan, depending on the expected duration of the shutdown, may include the draining of chemicals from storage tanks and other equipment and the safe shutdown of equipment. Wastes will be disposed of according to applicable LORS, as discussed in the **Waste Management** section of this Decision. (Ex. 300, p. B.1-21.)

The planned life of the Calico Solar Project is 40 years. However, if the project is still economically viable, it could be operated longer. It is also possible that the project could become economically noncompetitive before 40 years have passed, forcing early decommissioning. Whenever the project is permanently closed, the closure procedure will follow a plan that will be developed as described below. (Ex. 300, p. B.1-21.)

The removal of the project from service, or decommissioning, may range from “mothballing” to the removal of equipment and appurtenant facilities, depending on conditions at the time. Because the conditions that would affect the decommissioning decision are largely unknown at this time, these conditions would be presented to the Energy Commission, the BLM, and other applicable agencies for review and approval as part of the decommissioning plan. The decommissioning plan would discuss the following:

- proposed decommissioning activities for the project and appurtenant facilities constructed as part of the project,

- conformance of the proposed decommissioning activities with applicable LORS and local/regional plans,
- activities necessary to restore the project site if the plan requires removal of equipment and appurtenant facilities,
- decommissioning alternatives other than complete restoration to the original condition, and
- associated costs of the proposed decommissioning and the source of funds to pay for the decommissioning.

In general, the decommissioning plan for the project would attempt to maximize the recycling of project components. Calico Solar would attempt to sell unused chemicals back to the suppliers or other purchasers or users. Equipment containing chemicals would be drained and shut down to ensure public health and safety and to protect the environment. Nonhazardous wastes will be collected and disposed of in appropriate landfills or waste collection facilities. Hazardous wastes will be disposed of according to applicable LORS. The site will be secured 24 hours per day during the decommissioning activities, and Calico Solar will provide periodic update reports to the Energy Commission, the BLM, and other appropriate parties. (Ex. 300, p. B.1-22.)

Similar to project construction and facility operations, decommissioning would be performed in accordance with plans and mitigation measures that would assure the project conforms to applicable LORS and would avoid significant adverse impacts. These plans that are to be developed by the applicant, for which some have already been prepared in draft and reviewed by staff to support this environmental analysis, and the necessary mitigation measures, are specified in the Conditions of Certification as appropriate for each technical area of this SSA. The BLM would also require mitigation and restoration as stipulated in the identified Plan of Development, as well as other federal agency requirements. The authorized project would be bonded consistent with agency policy. (Ex. 300, p. B.1-22.)

FINDINGS OF FACT

Based upon the evidentiary record, we find as follows:

1. Calico Solar LLC will own and operate the project, which will be located within San Bernardino County on 4,613 acres of public land managed by the BLM, 37 miles east of Barstow, California.

2. The project would be constructed in two phases, with the first phase divided into subphases. Phase 1a would consist of 60 SunCatchers configured in a single group and much of the support facilities. Phase 1b and then Phase 2 would contain the remaining 26,390 SunCatchers arranged in 1.5-MW solar groups of 60 SunCatchers per group, bringing the CSP to its net nominal generating capacity of 663.5 MW.

3. The primary equipment for the generating facility would include approximately 26,540 SunCatchers, their associated equipment and systems, and their support infrastructure.

4. The proposed Calico Solar Project also includes a new 230-kilovolt (kV) Calico Solar Substation, 2.0 miles of electrical transmission line, an administration building, maintenance complex, onsite routes interior to the project boundaries, a site access road and bridge over the Burlington Northern Santa Fe railroad tracks. Approximately 739 feet of the 2-miles of single-circuit, 230-kV generation interconnection transmission line would be constructed off the project site but still on BLM managed land. The transmission line would connect the proposed Calico Solar Substation to the existing Southern California Edison (SCE) Pisgah Substation.

5. The Lavic Groundwater Basin will be used as the primary water source for the project.

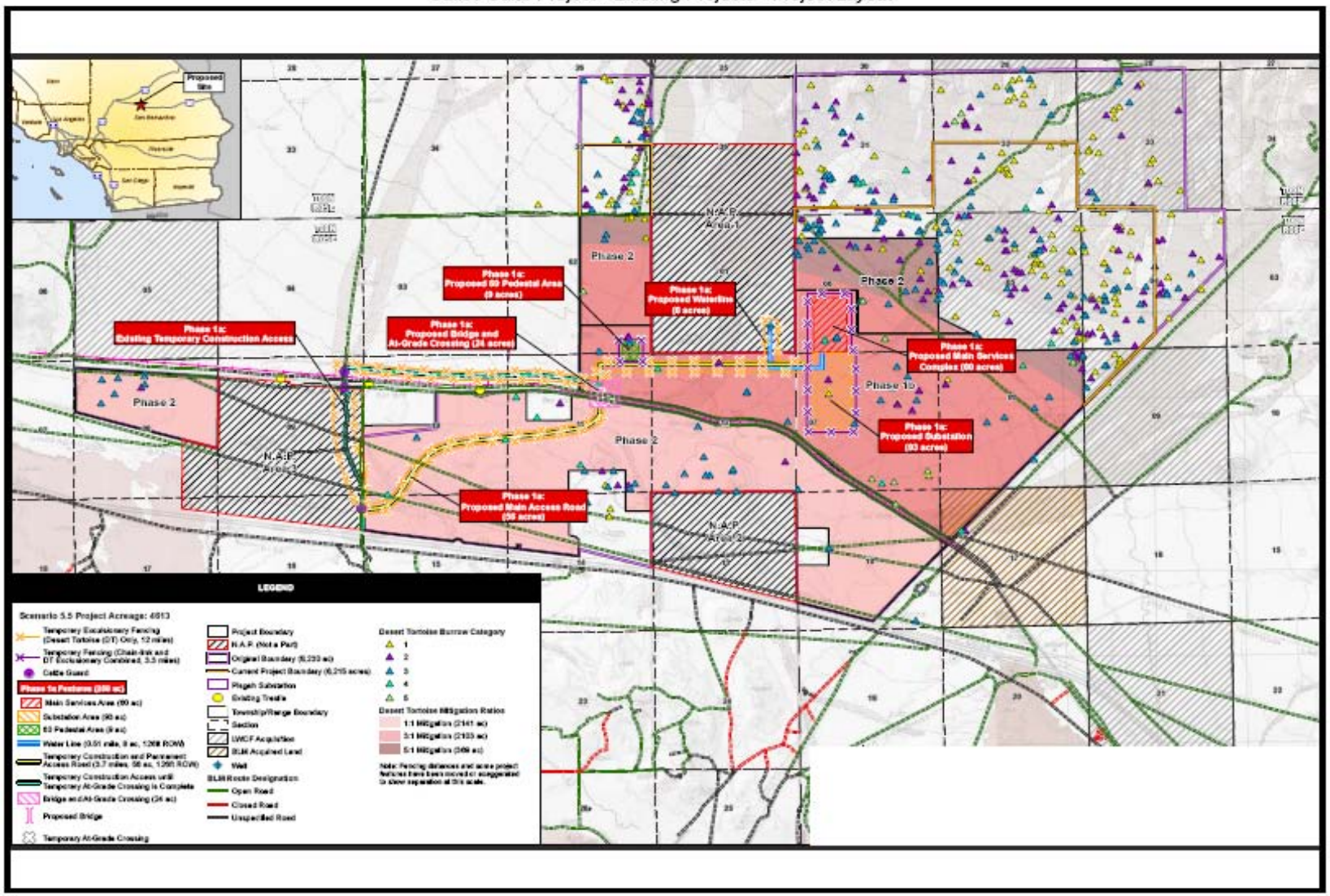
6. The proposed project would include the construction of a new 230-kV Calico Solar Substation approximately in the center of the project site. This new substation would be connected to the existing SCE Pisgah Substation via an approximately 2-mile, single-circuit, 230-kV transmission line. Other than this interconnection transmission line, no new transmission lines or off-site substations would be required for the 275-MW Phase I construction.

CONCLUSION OF LAW

1. We therefore conclude that the Calico Solar Project is described at a level of detail sufficient to allow review in compliance with the provisions of the Warren-Alquist Act, the California Environmental Quality Act, and the National Environmental Policy Act.

PROJECT DESCRIPTION - FIGURE 1

Calico Solar Project - Existing Projects - Project Layout



II. PROJECT ALTERNATIVES

The California Environmental Quality Act (CEQA) Guidelines and the Energy Commission's regulations require an evaluation of the comparative merits of a range of feasible site and facility alternatives which meet the basic objectives of the proposed project but would avoid or substantially lessen potentially significant environmental impacts. [Cal. Code Regs., tit. 14, §§ 15126.6(c) and (e); tit. 20, § 1765.]

The range of alternatives, including the "No Project" alternative, is governed by the "rule of reason" and need not include those alternatives whose effects cannot be reasonably ascertained and whose implementation is remote and speculative. [Cal. Code Regs. tit. 14, § 15126.6(f).] Rather, the analysis is necessarily limited to alternatives that the "lead agency determines could feasibly attain most of the basic objectives of the project." (*Id*.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

Energy Commission staff used the following methodology to analyze project alternatives for the Calico Solar Project (CSP):

- identified basic objectives of the project and its potentially significant adverse impacts;
- identify and evaluate alternative sites to determine whether an alternative site would mitigate impacts of the proposed site and whether an alternative site would create impacts of its own;
- identify and evaluate technology alternatives, including alternative equipment and processes; and
- evaluated consequences of not constructing the project, i.e., the "No Project" alternative. (Ex. 300, p. 4-4.)

1. Project Objectives

For our analysis, we will consider the following objectives, a reduction and refinement of those proposed by the Applicant:

- To construct and operate an up to 663.5 MW renewable power generating facility in California capable of selling competitively priced renewable energy consistent with the needs of California utilities;

- To locate the facility in areas of high insolation with ground slope of less than five percent.
- To provide clean, renewable electricity to support California's Renewable Portfolio Standard Program (RPS);
- To assist in reducing its greenhouse gas emissions as required by the California Global Warming Solutions Act;
- To contribute to the achievement of the 33 percent RPS target set by California's governor and legislature; and
- To complete the review process in a timeframe that would allow the Applicant to start construction or meet the economic performance guidelines by December 31, 2010 to potentially qualify for the 2009 ARRA cash grant in lieu of tax credits for certain renewable energy projects. (Ex. 300, p. B.2-9.)

2. Project Impacts

In this Decision, the Commission has found the following significant impacts. Based on the evidence presented, the following impacts have been identified as issues of concern for the CSP Project.

- **Cultural Resources**. The CSP cumulative contribution to permanent long term, potentially unmitigable, adverse impacts to historic Route 66 in the project vicinity as a result of the physical degradation of and visual intrusion on significant cultural resources on those sites and an overall net reduction in cultural resources in the area

- **Land Use**. The CSP Project would permanently change the nature of land use at the project site from Government Special Public Limited Use and Moderate Use to an intensive utility use for the generation of power. Therefore, the combined effect of the overall cumulative past, present, and proposed and reasonably foreseeable projects, including the proposed project, in the desert region of San Bernardino County would adversely affect recreation and wilderness resources, resulting in a significant and unavoidable impact under CEQA

- **Visual Resources**. The CSP Project will result in the installation of a large, industrial facility on a presently undeveloped (although partially disturbed) landscape. It will have significant unmitigable impacts to visual vistas from three of five vantage points used in our analysis. In addition it will, in combination with the other renewable energy projects proposed in the project's viewshed, make a cumulatively considerable contribution to significant cumulative visual impacts.

This alternatives analysis focuses on the consideration of these impacts and the extent to which they could be reduced or eliminated by the selection of a project alternative.

3. Summary of Alternatives Considered

Various site alternatives, technology alternatives, a reduced size alternative and the "No Project" alternative were initially evaluated and retained or eliminated from further detailed analysis as summarized in **Alternatives Table 1**, below. More information about the eliminated alternatives may be found in the Supplemental Staff Assessment (Ex. 300, pp. B.2-49 — B.2-84). Further analysis of the retained alternatives follows the table.

Alternatives Table 1
Summary of Alternatives Retained and Eliminated

Alternative	Rationale for Retention or Elimination
Proposed Project/Action **Presently:** - 663.5 MW - 4,613 acres 26,540 SunCatchers **Formerly:** - 850 MW - 6,215 acres - 34,000 SunCatchers	Retained. Evaluated as the Applicant's proposal.
Reduced Acreage Alternative - 275 MW (up to 350 MW)[6] - 2,600 acres (41% of originally proposed) - 11,000 SunCatchers	Retained. Evaluated in the SSA because it would substantially reduce impacts of the Calico Solar Project while meeting most or all of the project objectives.
No Project/No Action Alternative	Retained. Required under CEQA.
Private Land Alternative	Retained. Would substantially reduce impacts of the Calico Solar Project while meeting most project objectives.
Public Land Alternatives	

[6] The Calico Solar Project as described in the SA/DEIS would require approximately 10 acres per MW of power generated. Since publication of the SA/DEIS, the Calico Solar Project boundaries have been revised and the project as currently proposed would require 7.3 acres per MW generated. As such, the amount of energy generated by the Reduced Acreage Alternative could be up to 350 MW.

Alternative	Rationale for Retention or Elimination
Avoidance of Donated and Acquired Lands Alternative - 850 MW - 7,050 acres (over 100 % of proposed) - 28,800 SunCatchers	Eliminated. Would not substantially reduce impacts of the Calico Solar Project; it would create the same general impacts to Mojave fringe-toed lizard, Nelson big-horn sheep, and other wide-ranging species as the proposed Calico Solar Project.
Camp Rock Road (AS1)	Eliminated. Would not substantially reduce impacts of the Calico Solar Project; located in Category I desert tortoise habitat, partially located in the Johnson Valley OHV area and would require use of LWCF acquisition lands.
Upper Johnson Valley (AS2)	Eliminated. Would not substantially reduce impacts of the Calico Solar Project; located entirely within the Upper Johnson Valley OHV Area and in study area for MCAGCC Twentynine Palms expansion.
West of Twentynine Palms Military Base (AS3)	Eliminated. Would not substantially reduce impacts of the Calico Solar Project; located entirely within the Upper Johnson Valley OHV Area and in study area for MCAGCC Twentynine Palms expansion, would require use of LWCF acquired lands.
I-40 South (AS4)	Eliminated. Would not substantially reduce impacts of the Calico Solar Project; located in desert tortoise critical habitat, would impact approximately 3 miles of the Pisgah Crater Lava Flow, would potentially impact access to three existing mines.
Broadwell Lake (AS5)	Eliminated. Would not substantially reduce impacts of the Calico Solar Project; potentially located within proposed national monument; pending right-of-way grant application for the site, therefore not considered a viable alternative.
SES Solar Three Alternative	Eliminated. Pending right-of-way grant application for the site, therefore not considered a viable alternative.
Technology Alternatives Evaluated	
Parabolic Trough Technology	Eliminated. Would not substantially reduce impacts of the Calico Solar Project
Solar Power Tower Technology	Eliminated. Would not substantially reduce impacts of the Calico Solar Project
Linear Fresnel Technology	Eliminated. Would reduce area required by 40% but would not eliminate significant impacts of the Calico Solar Project
Solar Photovoltaic Technology – Utility Scale	Eliminated. Would not substantially reduce impacts of the Calico Solar Project

Alternative	Rationale for Retention or Elimination
Distributed Solar Technology	Eliminated. While it will very likely be possible to achieve 850 MW of distributed solar energy over the coming years, the limited numbers of existing facilities make it difficult to conclude with confidence that this much distributed solar will be available within the timeframe required for the Calico Solar Project. Barriers exist related to interconnection with the electric distribution grid. Solar PV is one components of the renewable energy mix required to meet the California Renewable Portfolio Standard requirements, and additional technologies like solar thermal generation, would also be required.
Wind Energy	Eliminated. While there are substantial wind resources in the region, environmental impacts could also be significant so wind would not reduce impacts in comparison to the Calico Solar Project. Also, wind is one of the components of the renewable energy mix required to meet the California Renewable Portfolio Standard requirements; additional technologies like solar thermal generation, would also be required.
Geothermal Energy	Eliminated. Despite the encouragement provided by Renewable Portfolio Standards and ARRA funding, few new geothermal projects have been proposed in the California and no geothermal projects are included on the Renewable Energy Action Team list of projects requesting ARRA funds. Therefore, the development of 850 MW of new geothermal generation capacity within the timeframe required for the Calico Solar Project is considered speculative.
Biomass Energy	Eliminated. Most biomass facilities produce only small amounts of electricity (in the range of 3 to 10 MW) and so could not meet the project objectives related to the California Renewable Portfolio Standard. In addition, between 85 and 250 facilities would be needed to achieve 850 MW of generation, creating substantial adverse impacts.
Tidal Energy	Eliminated. Tidal fence technology is commercially available in Europe. However, it has not been demonstrated and proven at the scale that would be required to replace the proposed project, particularly with Pacific tides. Therefore, it would not substantially reduce impacts of the Calico Solar Project.

Alternative	Rationale for Retention or Elimination
Wave Energy	Eliminated. Unproven technology at the scale that would be required to replace the proposed project; it may also result in substantial adverse environmental impacts
Natural Gas	Eliminated. Would not attain the objective of generating renewable power meeting California's renewable energy needs
Coal	Eliminated. Would not attain the objective of generating renewable power meeting California's renewable energy needs and is not a feasible alternative in California
Nuclear Energy	Eliminated. The permitting of new nuclear facilities in California is not currently allowable by law
Conservation and Demand-side Management	Eliminated. Conservation and demand-management alone are not sufficient to address all of California's energy needs, and would not provide the renewable energy required to meet the California Renewable Portfolio Standard requirements

Ex. 300, pp. B.2-3 – B.2-6.

Alternatives Retained for Further Evaluation

Reduced Acreage Alternative

The Reduced Acreage Alternative would be a 275 MW solar facility located within the boundaries of the proposed project as defined by Calico Solar. This alternative is analyzed because (1) it eliminates about 59 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources, and (2) it could transmit the power generated without requiring an upgrade to 65 miles of the existing 220-kV SCE Pisgah-Lugo transmission line.

The Reduced Acreage Alternative would consist of 11,000 SunCatchers with a net generating capacity of approximately 275 MW (potentially up to 350 MW)[7] occupying approximately 2,600 acres of land. This alternative would retain 31 percent of the proposed SunCatchers and would affect 41 percent of the land of the previously proposed 850 MW project.

[7] The Calico Solar Project as described in the SA/DEIS would require approximately 10 acres per MW of power generated. Since publication of the SA/DEIS, the Calico Solar Project boundaries have been revised and the project as currently proposed would require 7.3 acres per MW generated. As such, the amount of energy generated by the Reduced Acreage Alternative could be up to 350 MW.

The boundaries of the Reduced Acreage Alternative are shown in **Alternatives Figure 1**. This area was designed to avoid sensitive cultural resources and areas that were mapped as occupied tortoise habitat (live tortoise and/or active burrows and sign). It also excludes all donated lands and lands acquired by BLM with conservation funds. The boundaries of the Reduced Acreage Alternative do not coincide with the Applicant's Phase I project boundaries.

Similar to the proposed project, the Reduced Acreage Alternative would transmit power to the grid through the SCE Pisgah Substation and would require infrastructure including water storage tanks, a transmission line, road access, a main services complex, and a substation (SES 2008a). However, as stated above, the Reduced Acreage alternative would not require the 65-mile upgrade to the SCE transmission line. SCE would complete system upgrades within existing substation boundaries to accommodate the 275 MW, and the 220-kV transmission line would be used. The main services complex, primary water well, and substation and onsite transmission line for the Reduced Acreage Alternative would remain at the location proposed for the proposed project.

The Applicant believes this alternative is economically infeasible because it would have higher unit costs for SunCatcher manufacturing and higher operations and maintenance costs on a "per MW basis," increasing by as much as 30 percent. In addition, the Applicant says that this smaller alternative would potentially put its receipt of ARRA funds at risk. However, the Applicant did not provided details regarding its cost analysis for the Reduced Acreage Alternative. Absent more, we cannot conclude that this alternative is in feasible for the reasons advanced by the Applicant. (Ex. 300, pp. B.2-13 – B.2-14.)

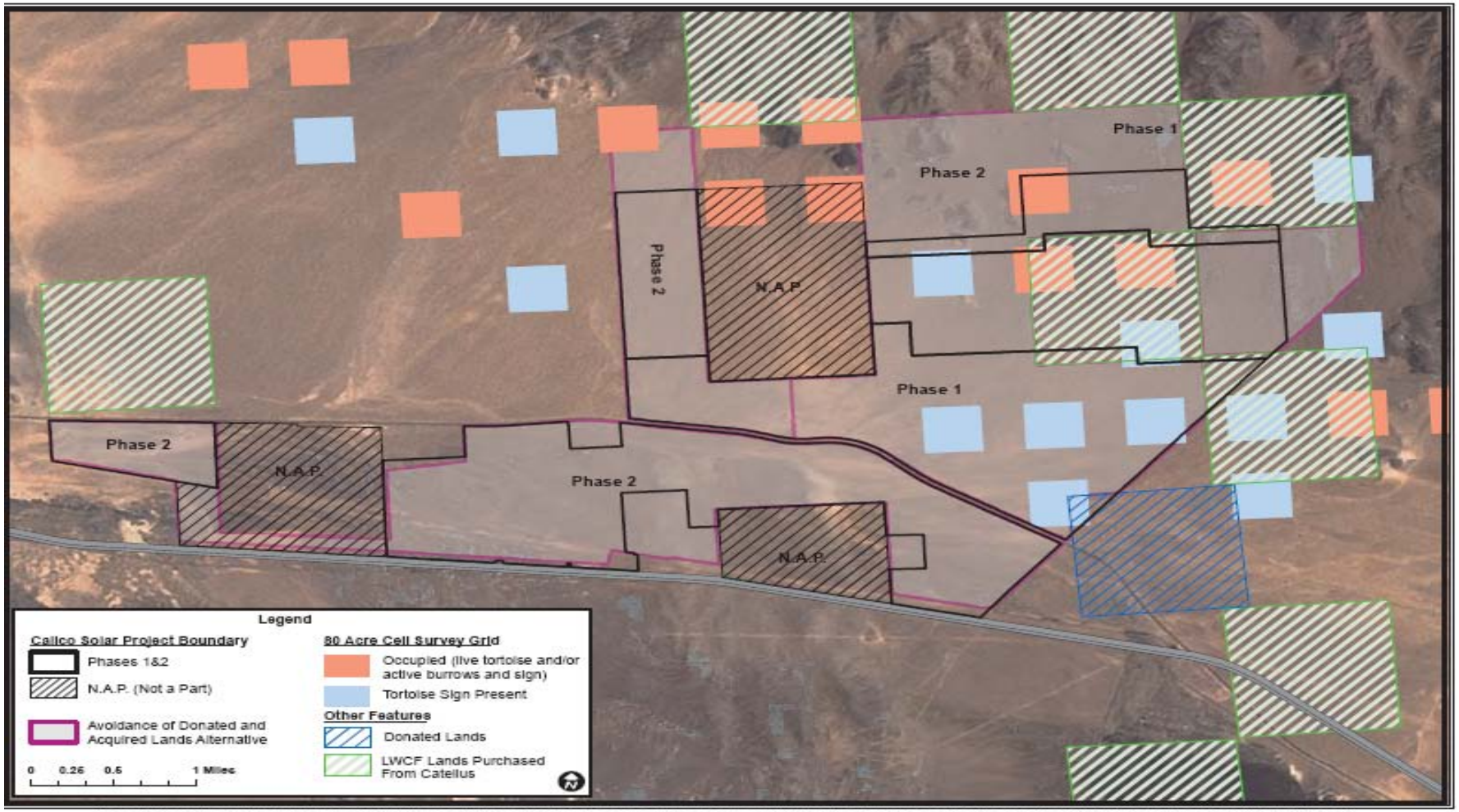
While the Reduced Acreage Alternative would reduce many of the impacts of the proposed project, it would also reduce the project's benefits of replacing fossil fuel fired generation and reducing associated criteria pollutant and greenhouse gas emissions.

Private Land Alternative

Multiple scoping comments requested that an alternative site be considered on disturbed land, and specifically on the agriculture lands and brownfields in the Daggett/Yermo area, thereby lessening the potential project impacts to the desert environment. Commenters also noted that because the technology allows for distributed units, a contiguous site may not be necessary.

ALTERNATIVES FIGURE 1

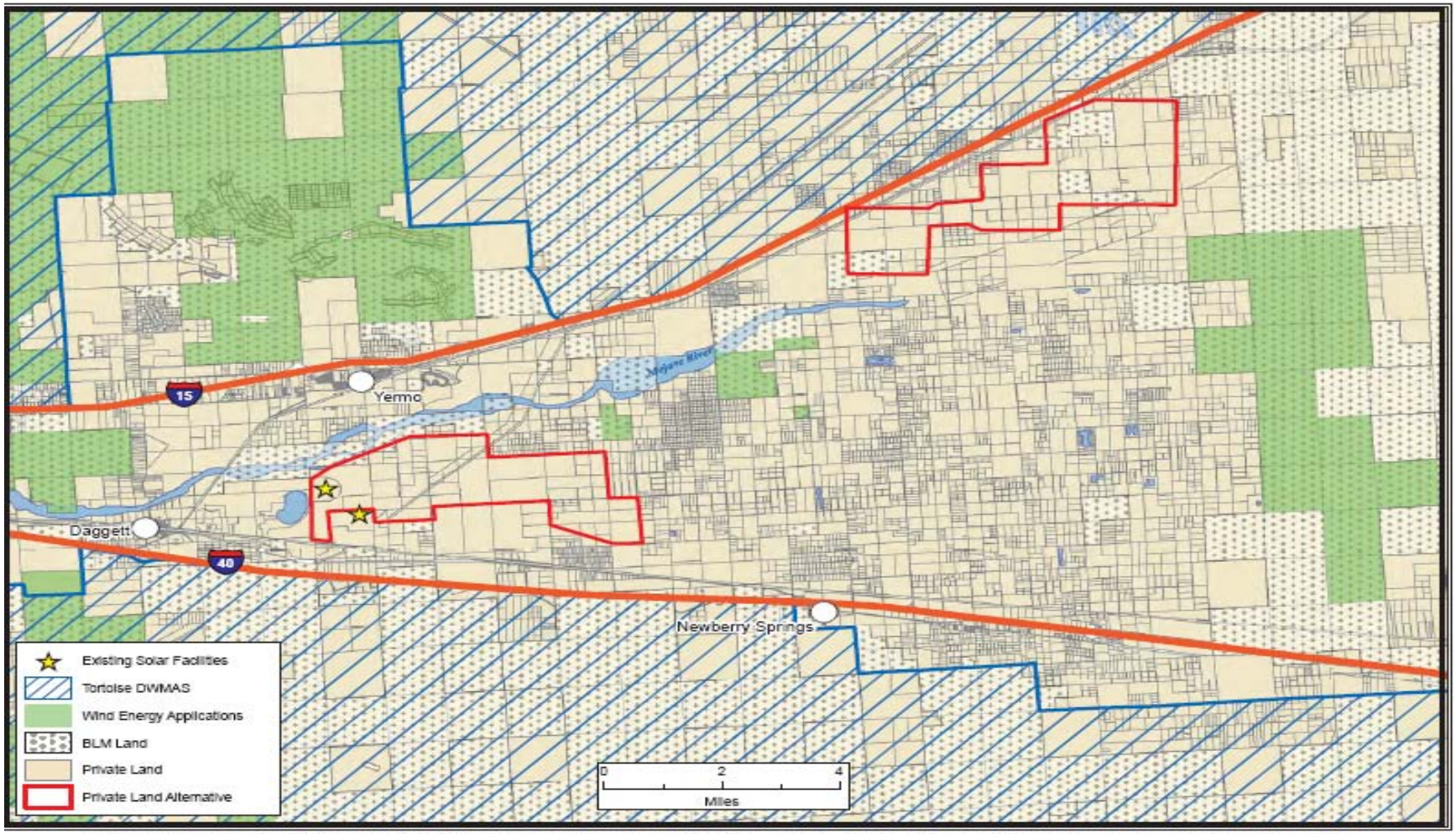
Calico Solar Project - Avoidance of Donated and Acquired Lands Alternative



U.S. BUREAU OF LAND MANAGEMENT & CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: California Energy Commission - Tele Atlas Data - San Bernardino County

ALTERNATIVES FIGURE 2

Calico Solar Project - Private Land Alternative



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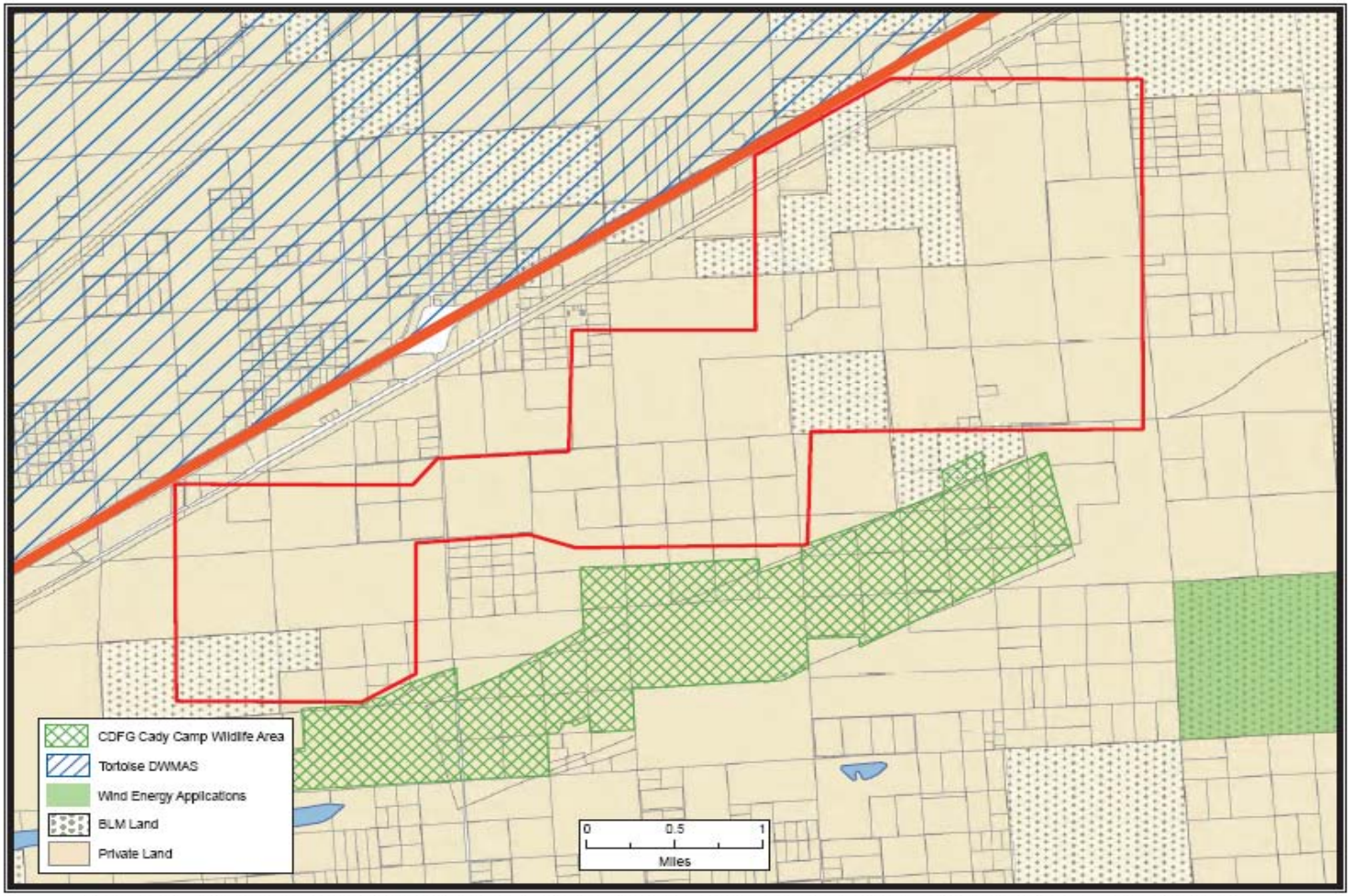
SOURCE: California Energy Commission - Tele Atlas Data - San Bernardino County

ALTERNATIVES - FIGURE 3A

Calico Solar Project - Private Land Alternative Northern Section



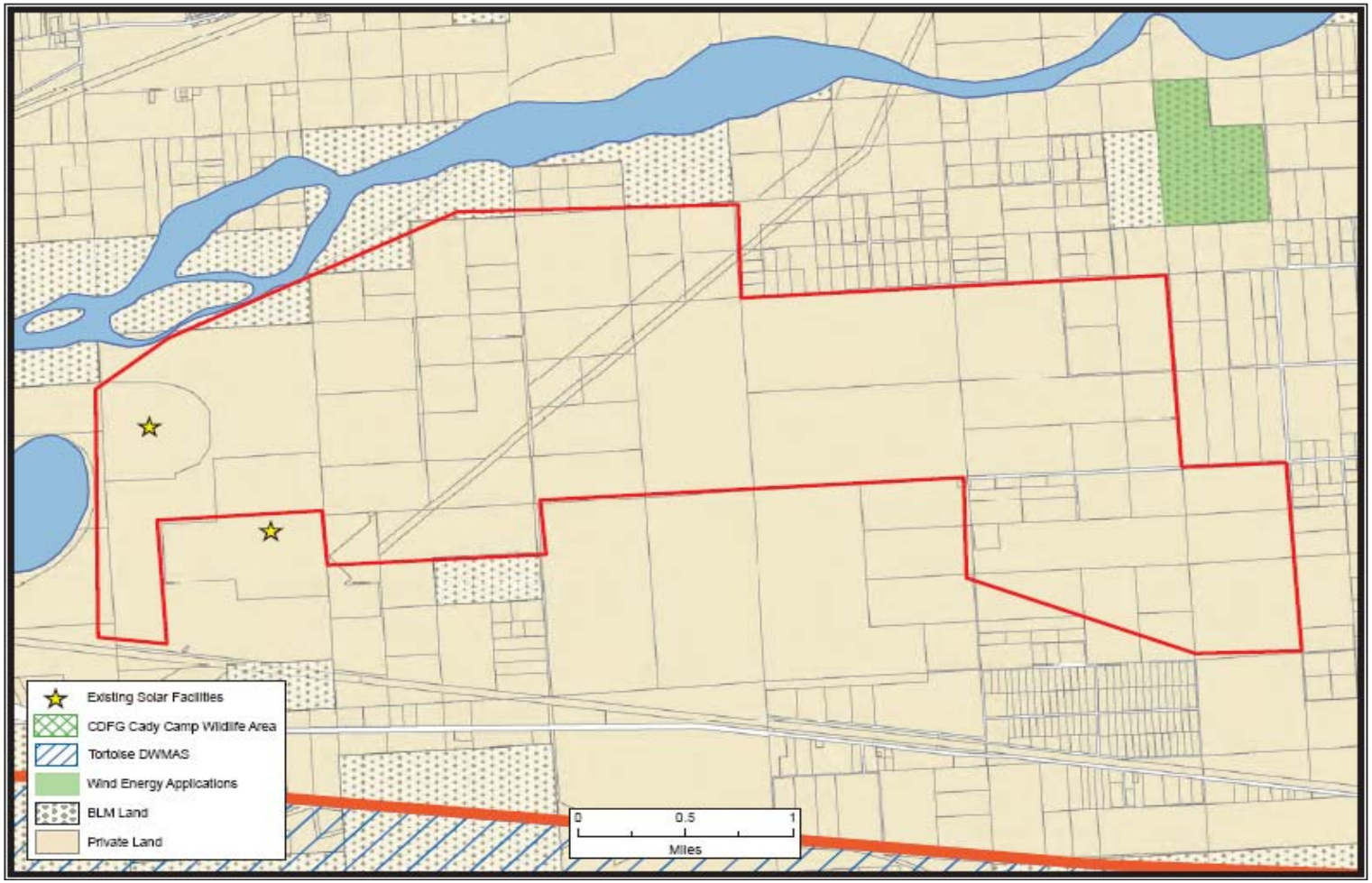
ALTERNATIVES

U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission - Tele Atlas Data - San Bernardino County

ALTERNATIVES - FIGURE 3B

Calico Solar Project - Private Land Alternative Southern Section



ALTERNATIVES

The Applicant considered two alternatives in the AFC that included the use of some private land (Upper Johnson Valley – AS2, and I-40 South – AS4). These sites were eliminated from further consideration by the Applicant because they lacked railroad access and major highway access and conflicted with other uses.

There are limited areas where undeveloped contiguous private land exists within the California desert with the slope and solarity requirements defined by the Applicant. The RETI Phase 2A Draft Final Maps (9/01/09) identified private, disturbed land appropriate for solar development east of Barstow, bounded by I-15 on the north and I-40 on the south. The Mojave River passes through this region, and its floodplain ranges from about 2,000 feet to one mile wide. The river parallels I-15 on a northeasterly trend.

Alternatives Figure 2 shows this area of private land and **Alternatives Figures 3A and 3B** illustrate the alternative in more detail. This alternative is made up of two separate and unconnected sections. The Private Land Alternative northern section has a total of approximately 64 parcels (27 separate landowners) making up approximately 4,000 acres. The Private Land Alternative southern section has a total of approximately 45 parcels (22 separate landowners), also comprising approximately 4,000 acres. Because each section is approximately 4,000 acres, the alternative would require two phases, each approximately 425 MW. The alternative is considered viable as an alternative site because the Calico Solar project defines construction of separate groups of SunCatchers. However, because the alternative would not be one contiguous parcel, additional major equipment and substations would be required for at this site, increasing the cost of the project.

The Private Land Alternative northern section would be located on private land with a few BLM parcels included, south of and adjacent to Interstate 15 in the community of Harvard, north of Newberry Springs. The Private Land Alternative northern section has appropriate insolation and minimal slope. The elevation of the site is approximately 1,800 feet above mean sea level. The site would be accessed via Harvard Road, off Interstate 15 at the Harvard Road exit. The California Department of Fish and Game (CDFG) owns lands located just south of the site boundary. Additionally, there are several existing structures and residences on some of this private land, and removal of houses or other structures may be required.

The Private Land Alternative southern section is located north of the National Trails Highway and BNSF railroad. This land has appropriate insolation and minimal slope and has been previously graded for agriculture use. Existing solar

thermal projects (SEGS I and II) are sited immediately south of the alternative and the original U.S. DOE Solar Two project was located at this site; however, it was decommissioned in November, 2009 and the site may potentially be developed as a solar energy project. The elevation of the site is between sea level and 20 feet below sea level. The site would be accessed via I-40 at the Hidden Springs Road exit.

The Private Land Alternative would require acquisition of approximately 110 parcels, although the number of separate landowners is fewer. Due to the number of parcels that would have to be acquired, this alternative would be substantially more challenging for an Applicant to obtain site control (in comparison to BLM land). The Applicant would have to negotiate separately with multiple landowners. The Draft Phase 2a Report published by the Renewable Energy Transmission Initiative (RETI) in early June 2009 identified private land areas for solar development only if there were no more than 20 owners in a 2 square mile (1,280 acre) area.

The Mojave River is located in between the Private Land Alternative northern section and the Private Land Alternative southern section. The river is dry most of the year and flows only during the largest rain events. The land use character of the immediate alternative site area is open space, agriculture, and rural residential. Desert Wildlife Management Areas (DWMA) for protection of desert tortoise are located north and south of the alternative.

Approximately five residences are located within the Private Land Alternative northern section. Existing agriculture structures are located on the Private Land Alternative southern section. The Private Land Alternative would also be located adjacent to low density residential areas near Daggett and Newberry Springs. The Private Land Alternative southern section would be located adjacent to an area zoned as regional industrial.

SCE Coolwater-Dunn Siding 115-kV transmission line runs through the Private Land Alternative northern and southern sections. The Private Land Alternative sites would require either an upgrade of the SCE Coolwater-Dunn Siding 115-kV transmission line or the construction of a new 10-mile 230-kV transmission line that would follow the existing corridor southwest to the Coolwater Substation. Both the Private Land Alternative sections would require substations; however, one transmission line could be used for both sites.

The Private Lands Alternative would have impacts similar to those of the proposed site in many disciplines. However, because this alternative would be on disturbed agricultural lands, the alternative site is likely to have less severe cultural, visual, and biological resources impacts but greater noise and land use (agricultural lands) impacts than the proposed site. The Private Land Alternative presents an additional challenge: its northern section is made up of approximately 64 parcels with 27 separate landowners and the southern portion is made up of 45 parcels with 22 separate landowners. Due to the number of parcels that would have to be acquired, obtaining site control would be more challenging than at the proposed site where BLM is the only land management entity. In addition, detailed site engineering and transmission interconnection would require additional time for this site to be developed; as a result this alternative would not meet the project objective requiring that a decision to be made in 2010. (Ex. 300, pp B.2-19 – B.2-49.)

6. No Project Alternative

CEQA requires an evaluation of the "No Project" alternative "… to allow decision-makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project." [14 Cal. Code Regs., § 15126.6(e)(1).] The "No Project" analysis assumes that baseline environmental conditions would not change because the project would not be constructed, and that the events or actions reasonably expected to occur in the foreseeable future would occur if the project were not approved.

If the "No Project" alternative were selected, the construction and operational impacts of the CSP Project would not occur. There would be no grading of the site, no loss or disturbance of approximately 4,600 acres of desert habitat, and no installation of extensive power generation and transmission equipment. The "No Project" alternative would also eliminate contributions to cumulative impacts in the project viewshed. It is the environmentally preferred alternative.

In the absence of the CSP Project, however, other power plants, both renewable and nonrenewable, would have to be constructed to serve the demand for electricity. If the "No Project" alternative were chosen, other solar renewable power plants may be built, and the impacts to the environment would likely be similar to those of the proposed project because solar renewable technologies require large amounts of land and similar slope and solarity requirements as the proposed CSP Project. The "No Project" alternative may also lead to

development of other non-solar renewable technologies to help achieve the California Renewable Portfolio Standard.

Additionally, if the “No Project” alternative were chosen, it is likely that additional gas-fired power plants would be built or that existing gas-fired plants could operate longer. If the project were not built, California would not benefit from the reduction in greenhouse gases that this facility would provide. SCE would not receive the 663.5 MW contribution to its renewable state-mandated energy portfolio. (Ex. 300, p. B.2-14.)

Eliminated alternatives of special note

Although eliminated from further consideration during the screening analysis, two alternatives deserve additional discussion because they were specifically advanced in testimony or comments as viable alternatives. They are distributed solar generation and conservation and demand side management.

a. Distributed Solar Technology

Distributed solar generation is generally considered to use PV technology, but at slightly larger scales, distributed solar can also be implemented using solar thermal technologies.

Rooftop Solar Systems. A distributed solar photovoltaic (PV) alternative would consist of PV panels that would absorb solar radiation and convert it directly to electricity. The PV panels could be installed on residential, commercial, or industrial building rooftops or in other disturbed areas. In order to be a viable alternative to this project, there would have to be a sufficient number of panels to provide 650 MW of capacity.

California currently has over 500 MW of distributed solar PV systems which cover over 40 million square feet (CPUC 2009). During 2008, 158 MW of distributed solar PV was installed in California, doubling the amount installed in 2007 (78 MW), and with 78 MW installed through May 2009, installation data suggests that at least the same amount of MW could be installed in 2009 as in 2008 (CPUC 2009).

Distributed Solar Thermal Systems. Solar thermal technology, specifically Concentrated Solar Power (CSP) technology, has also been adapted for use at distributed locations. This technology uses small, flat mirrors which track the sun

and reflect the heat to tower-mounted receivers that boil water to create superheated steam.

Installations of 850 MW distributed solar PV would require up to 255 million square feet (approximately 5,700 acres). Distributed solar PV is assumed to be located on already existing structures or disturbed areas so little to no new ground disturbance would be required and there would be few associated biological impacts. Minimal grading or new access roads would be required and relatively minimal maintenance and washing of the solar panels would be required. It is unlikely that the rooftop solar PV alternative would create erosion impacts. Relatively large amounts of water would be required to wash the solar panels, especially with larger commercial rooftop solar installations; however, the commercial facilities would likely already be equipped with drainage systems. Therefore, the wash water would not contribute to runoff or to erosion.

Because most PV panels are black to absorb sun, rather than mirrored to reflect it, glare would not create visual impacts as with the power tower, Fresnel, and trough technologies. Additionally, the distributed solar PV alternative would not require the additional operational components, such as dry-cooling towers, substations, transmission interconnection, maintenance and operation facilities with corresponding visual impacts. Solar PV panels would be visible to passing residents and may be viewed by a larger number of people.

The rate of PV manufacturing and installation is expected to continue to grow very quickly. However, given that there are currently only about 500 MW of distributed solar PV in California, the addition of an additional 850 MW to eliminate the need for the Calico Solar Project cannot be guaranteed. This would require an even more aggressive deployment of PV at more than double the historic rate of solar PV than the California Solar Initiative program currently employs. Challenges to an accelerated implementation of distributed solar PV include:

- **RETI Consideration of Subsidies, Tariffs, Cost, and Manufacturing.** The RETI Discussion Draft Paper *California's Renewable Energy Goals – Assessing the Need for Additional Transmission Facilities* published with the RETI Final Phase 2A Report (September 2009), addresses the likelihood of a scenario of sufficient distributed solar PV to remove the need for utility scale renewable development. This discussion paper identified the factors likely to influence the pace of large scale deployment of distributed solar PV: subsidies, feed-in tariffs, manufacturing and installation cost, and manufacturing scale-up.

- **Cost.** The 2009 IEPR states that solar PV technology has shown dramatic cost reductions since 2007, and is expected to show the most improvement of all the technologies evaluated in the 2009 IEPR model, bringing its capital cost within range of that of natural gas–fired combined cycle units. However, the CPUC *33% Renewables Portfolio Standard Implementation Analysis Preliminary Results* considered a number of cases to achieve a 33 percent RPS standard. The results of this study state that the cost of a high distributed generation case is significantly higher than the other 33 percent RPS alternative cases. The study explains that this is due to the heavy reliance on solar PV resources which are more expensive than wind and central station solar.
- **Tariffs.** Additionally, the IEPR discusses the need to adjust feed-in tariffs to keep downward pressure on costs. Feed-in tariffs should be developed based on the size and type of renewable resources, given that the cost of generating energy from a 100 MW wind farm is less than the cost of generating to ensure a good mix of new renewable energy projects. According to the report, differentiating feed-in tariffs by type and size can ensure a good mix of new renewable energy projects and avoid paying too much for some technologies and too little for others.
- **Limited Installations**. Examples of large scale distributed solar projects are still limited. In the spring of 2008, SCE proposed 250 to 500 MW of rooftop solar PV to be installed in five years. As of January 2010, SCE had installed only 3 MW. As the 2009 IEPR points out, the potential for distributed resources remains largely untapped and integrating large amounts of distributed renewable generation on distribution systems throughout the State presents challenges.
- **Electric Distribution System**. The State's electric distribution systems are not designed to easily accommodate large quantities of randomly installed distributed generation resources at customer sites. Accomplishing this objective efficiently and cost-effectively will require the development of a new transparent distribution planning framework. (Ex. 300, pp. B.2-66 to B.2-69.)

Conservation and Demand-Side Management. Conservation and demand-side management consists of a variety of approaches to reduction of electricity use, including energy efficiency and conservation, building and appliance standards, and load management and fuel substitution. Energy efficiency helped flatten the state's per capita electricity use and saved consumers more than $56 billion between 1978 and 2005. However, with population growth, increasing demand for energy, and the need to reduce greenhouse gases, there is a greater need for energy efficiency.

Conservation and demand-side management is important for California's energy future and cost effective energy efficiency is considered as the resource of first choice for meeting California's energy needs. However, with population growth and increasing demand for energy, conservation and demand-management alone is not sufficient to address all of California's energy needs. Additionally, it will not provide the renewable energy required to meet the California Renewable Portfolio Standard requirements. (Ex. 300, p. B.2-84.)

FINDINGS OF FACT

Based upon the evidence, we find and conclude as follows:

1. The record contains an acceptable analysis of a reasonable range of site location and generation alternatives to the project as proposed.
2. The Reduced Acreage Alternative would reduce many of the impacts of the proposed project, but in doing so it would also reduce the project's benefits of replacing fossil fuel fired generation and reducing associated criteria pollutant and greenhouse gas emissions.
3. The Private Lands alternative, while reducing the biological, cultural, and visual impacts of the proposed project, would have greater land use and noise impacts and be difficult to implement in the time desired due to the need to assemble upwards of 100 separate parcels with nearly 50 separate owners.
4. The "No Project" alternative is the environmentally superior alternative. It fails, however, to achieve the project objectives.
5. None of the site location or other alternatives to the project offer a superior alternative in terms of feasibly meeting project objectives and reducing its significant environmental impacts.

CONCLUSION OF LAW

1. The record contains a sufficient analysis of Alternatives and complies with the requirements of the California Environmental Quality Act, the Warren-Alquist Act, and their respective regulations.

No Conditions of Certification are required for this topic.

III. COMPLIANCE AND CLOSURE

Public Resources Code section 25532 requires the Commission to establish a post-certification monitoring system. The purpose of this requirement is to assure that certified facilities are constructed and operated in compliance with applicable laws, ordinances, regulations, standards, as well as the specific Conditions of Certification adopted as part of this Decision.

SUMMARY OF THE EVIDENCE

The record contains a full explanation of the purposes and intent of the Compliance Plan (Plan). The Plan is the administrative mechanism used to ensure that the Calico Solar Project is constructed and operated according to the Conditions of Certification. It essentially describes the respective duties and expectations of the Project Owner and the Staff Compliance Project Manager (CPM) in implementing the design, construction, and operation criteria set forth in this Decision.

Compliance with the Conditions of Certification contained in this Decision is verified through mechanisms such as periodic reports and site visits. The Plan also contains requirements governing the planned closure, as well as the unexpected temporary and unexpected permanent closure, of the Project. The Compliance Plan will be integrated with a U.S. Bureau of Land Management (BLM) Compliance Monitoring Plan (hereafter referred to as the Compliance Plan) to assure compliance with the terms and conditions of any approved Right-of-Way (ROW) grant including the approved Plan of Development (POD)

The Compliance Plan is composed of two broad elements. The first element establishes the "General Conditions," which:

- set forth the duties and responsibilities of the Compliance Project Manager (CPM), the project owner, delegate agencies, and others;
- set forth the requirements for handling confidential records and maintaining the compliance record;
- set forth procedures for settling disputes and making post-certification changes;
- set forth the requirements for periodic compliance reports and other administrative procedures necessary to verify the compliance status of all Commission imposed Conditions; and
- set forth requirements for facility closure.

The second general element of the Plan contains the specific "Conditions of Certification." These are found following the summary and discussion of each individual topic area in this Decision. The individual Conditions contain the measures required to mitigate potentially adverse Project impacts associated with construction, operation, and closure to levels of insignificance. Each Condition also includes a verification provision describing the method of assuring that the Condition has been satisfied.

The contents of the Compliance Plan are intended to be implemented in conjunction with any additional requirements contained in the individual Conditions of Certification.

FINDINGS OF FACT

The record establishes:

1. Requirements contained in the Compliance Plan and in the specific Conditions of Certification are intended to be implemented in conjunction with one another.

2. We adopt the following Compliance Plan as part of this Decision.

CONCLUSIONS OF LAW

1. The compliance and monitoring provisions incorporated as a part of this Decision satisfy the requirements of Public Resources Code section 25532.

2. The Compliance Plan and the specific Conditions of Certification contained in this Decision assure that the Calico Solar Project will be designed, constructed, operated, and closed in conformity with applicable law.

3. Conditions of Certification referred to herein serve the purpose of both the Energy Commission's Conditions of Certification for purposes of the California Environmental Quality Act (CEQA) and BLM's Mitigation Measures for purposes of the National Environmental Policy Act (NEPA).

GENERAL CONDITIONS OF CERTIFICATION

DEFINITIONS

The following terms and definitions are used to establish when Conditions of Certification are implemented.

BLM AUTHORIZED OFFICER

The BLM Authorized Officer for the Project is the BLM Needles Field Manager or his designated Compliance Inspector that is responsible for oversight and inspection of all construction and operational related activities on public land.

PRE-CONSTRUCTION SITE MOBILIZATION

Pre-Construction Site Mobilization, sometimes also called “site mobilization” in this Decision, is limited preconstruction activities at the site to allow for the installation of fencing, construction trailers, construction trailer utilities, and construction trailer parking at the site. Limited ground disturbance, grading, and trenching associated with the above mentioned pre-construction activities is considered part of site mobilization. Walking, driving or parking a passenger vehicle, pickup truck and light vehicles is allowable during site mobilization.

CONSTRUCTION

Onsite work to install permanent equipment or structures for any facility.

Ground Disturbance

Construction-related ground disturbance refers to activities that result in the removal of top soil or vegetation at the site beyond site mobilization needs, and for access roads and linear facilities.

Grading, Boring, and Trenching

Construction-related grading, boring, and trenching refers to activities that result in subsurface soil work at the site and for access roads and linear facilities, e.g., alteration of the topographical features such as leveling, removal of hills or high spots, moving of soil from one area to another, and removal of soil.

Notwithstanding the definitions of ground disturbance, grading, boring and trenching above, construction does not include the following:

1. the installation of environmental monitoring equipment;
2. a soil or geological investigation;
3. a topographical survey;
4. any other study or investigation to determine the environmental acceptability or feasibility of the use of the site for any particular facility; and

5. any work to provide access to the site for any of the purposes specified in "Construction" 1, 2, 3, or 4 above.

START OF COMMERCIAL OPERATION

For compliance monitoring purposes, "commercial operation" begins after the completion of start-up and commissioning, when each of the power plants has reached reliable steady-state production of electricity at the rated capacity. At the start of commercial operation, plant control is usually transferred from the construction manager to the plant operations manager.

BLM'S AUTHORIZED OFFICER AND COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

BLM's Authorized Officer (AO) and the Compliance Project Manager (CPM) shall oversee the compliance monitoring and is responsible for:

1. Ensuring that the design, construction, operation, and closure of the project facilities are in compliance with the terms and conditions of BLM's ROW Grant and the Energy Commission Decision
2. Resolving complaints
3. Processing post-certification changes to the conditions of certification, project description (petition to amend), and ownership or operational control (petition for change of ownership) (See instructions for filing petitions)
4. Documenting and tracking compliance filings
5. Ensuring that compliance files are maintained and accessible

BLM's AO is the contact person for BLM and will consult with appropriate responsible agencies, Energy Commission, and Energy Commission staff when handling disputes, complaints, and amendments. The CPM is the contact person for the Energy Commission and will consult with appropriate responsible agencies, BLM, Energy Commission, and Energy Commission staff when handling disputes, complaints, and amendments.

All project compliance submittals are submitted to BLM's AO and the CPM for processing. Where a submittal required by a condition of certification requires BLM's AO and/or CPM approval, the approval will involve all appropriate BLM personnel, Energy Commission staff and management. All submittals must include searchable electronic versions (pdf or word files).

CHIEF BUILDING OFFICIAL RESPONSIBILITIES

The Chief Building Official (CBO) shall serve as BLM's and the Energy Commission's delegate to assure the project is designed and constructed in accordance with BLM's Right-of-Way Grant, the Energy Commission's Decision including Conditions of Certification, California Building Standards Code, local building codes and applicable laws, ordinances, regulations and standards to ensure health and safety. The CBO is

typically made-up of a team of specialists covering civil, structural, mechanical and electrical disciplines whose duties include the following:

1. Performing design review and plan checks of all drawings, specifications and procedures;
2. Conducting construction inspection;
3. Functioning as BLM's and the Energy Commission's delegate including reporting noncompliance issues or violations to the BLM Authorized Officer for action and taking any action allowed under the California Code of Regulations, including issuing a Stop Work Order, to ensure compliance;
4. Exercising access as needed to all project owner construction records, construction and inspection procedures, test equipment and test results; and
5. Providing weekly reports on the status of construction to BLM's Authorized Officer and the CPM.

PRE-CONSTRUCTION AND PRE-OPERATION COMPLIANCE MEETING

BLM's AO and the CPM shall schedule pre-construction and pre-operation compliance meetings prior to the projected start-dates of construction, plant operation, or both. The purpose of these meetings is to assemble BLM's, the Energy Commission's and project owner's technical staff and construction contractor to review the status of all pre-construction or pre-operation requirements, contained in BLM's and the Energy Commission's conditions of certification. This is to confirm that all applicable conditions of certification have been met, or if they have not been met, to ensure that the proper action is taken. In addition, these meetings ensure, to the extent possible, that BLM and Energy Commission conditions will not delay the construction and operation of the plant due to oversight and to preclude any last minute, unforeseen issues from arising. Pre-construction meetings held during the certification process must be publicly noticed unless they are confined to administrative issues and processes.

BLM AND ENERGY COMMISSION RECORD

BLM and the Energy Commission shall maintain the following documents and information as a public record, in either the Energy Commission's Compliance file or Dockets file, for the life of the project (or other period as required):

- All documents demonstrating compliance with any legal requirements relating to the construction and operation of the facility;
- All monthly and annual compliance reports filed by the project owner;
- All complaints of noncompliance filed with BLM and the Energy Commission; and
- All petitions/requests for project or condition of certification changes and the resulting BLM, Energy Commission staff or Energy Commission action.

PROJECT OWNER RESPONSIBILITIES

The project owner is responsible for ensuring that the compliance conditions of certification and all other conditions of certification that appear in BLM's ROW Grant and

the Energy Commission Decision are satisfied. The compliance conditions regarding post-certification changes specify measures that the project owner must take when requesting changes in the project design, conditions of certification, or ownership. Failure to comply with any of the conditions of certification or the compliance conditions may result in reopening of the case and revocation of the Energy Commission certification; an administrative fine; or other action as appropriate. A summary of the Compliance Conditions of Certification is included as Compliance Table 1 at the conclusion of this section. The BLM ROW grant holder will comply with the terms, conditions, and special stipulations of the ROW grant. Failure to comply with applicable laws or regulations or any of the terms and conditions of a BLM ROW grant may result in the suspension or termination of the ROW grant (43 CFR 2807.17). Prior to suspending or terminating a ROW grant, BLM will provide written notice to the holder stating it intends to suspend or terminate and will provide reasonable opportunity to correct any noncompliance.

COMPLIANCE MITIGATION MEASURES/CONDITIONS OF CERTIFICATION

UNRESTRICTED ACCESS (COMPLIANCE-1)

BLM's AO, responsible BLM staff, the CPM, responsible Energy Commission staff, and delegated agencies or consultants shall be guaranteed and granted unrestricted access to the power plant site, related facilities, project-related staff, and the records maintained on-site, for the purpose of conducting audits, surveys, inspections, or general site visits. Although BLM's AO and the CPM will normally schedule site visits on dates and times agreeable to the project owner, BLM's AO and the CPM reserve the right to make unannounced visits at any time.

COMPLIANCE RECORD (COMPLIANCE-2)

The project owner shall maintain project files on-site or at an alternative site approved by BLM's AO and the CPM for the life of the project, unless a lesser period of time is specified by the conditions of certification. The files shall contain copies of all "as-built" drawings, documents submitted as verification for conditions, and other project-related documents. As-built drawings of all facilities including linear facilities shall be provided to the BLM AO for inclusion in the BLM administrative record within 90-days of completion of that portion of the facility or project.

BLM and Energy Commission staff and delegate agencies shall, upon request to the project owner, be given unrestricted access to the files maintained pursuant to this condition.

COMPLIANCE VERIFICATION SUBMITTALS (COMPLIANCE-3)

Each condition of certification is followed by a means of verification. The verification describes the Energy Commission's procedure(s) to ensure post-certification compliance with adopted conditions. The verification procedures, unlike the conditions, may be modified as necessary by BLM's AO and the CPM.

Verification of compliance with the conditions of certification can be accomplished by the following:

1. Monthly and/or annual compliance reports, filed by the project owner or authorized agent, reporting on work done and providing pertinent documentation, as required by the specific conditions of certification;
2. Appropriate letters from delegate agencies verifying compliance;
3. BLM and Energy Commission staff audits of project records; and/or
4. BLM and Energy Commission staff inspections of work, or other evidence that the requirements are satisfied.

Verification lead times associated with start of construction may require the project owner to file submittals during the certification process, particularly if construction is planned to commence shortly after certification.

A cover letter from the project owner or authorized agent is required for all compliance submittals and correspondence pertaining to compliance matters. The cover letter subject line shall identify the project by AFC number, the appropriate condition(s) of certification by condition number(s), and a brief description of the subject of the submittal. The project owner shall also identify those submittals not required by a condition of certification with a statement such as: “This submittal is for information only and is not required by a specific condition of certification.” When submitting supplementary or corrected information, the project owner shall reference the date of the previous submittal and BLM/CEC submittal number.

The project owner is responsible for the delivery and content of all verification submittals to the BLM’s AO and CPM, whether such condition was satisfied by work performed by the project owner or an agent of the project owner.

All hardcopy submittals shall be addressed to each of the following:

BLM’s Authorized Officer	**Mary Dyas**
(CACA-049537 and CACA-049539)	**(08-AFC-13C)**
U.S. Bureau of Land Management	**California Energy Commission**
2601 Barstow Road	**1516 Ninth Street, MS-2000**
Barstow, CA 92311	**Sacramento, CA 95814**

Those submittals shall be accompanied by a searchable electronic copy, on a CD or by e-mail, as agreed upon by BLM’s AO and the CPM.

If the project owner desires BLM and/or Energy Commission staff action by a specific date, that request shall be made in the submittal cover letter and shall include a detailed explanation of the effects on the project if that date is not met.

PRE-CONSTRUCTION MATRIX AND TASKS PRIOR TO START OF CONSTRUCTION (COMPLIANCE-4)

Prior to commencing construction, a compliance matrix addressing only those conditions that must be fulfilled before the start of construction shall be submitted by the project owner to BLM’s AO and the CPM. This matrix will be included with the project

owner's first compliance submittal or prior to the first pre-construction meeting, whichever comes first. It will be submitted in the same format as the compliance matrix described below. In order to begin any on-site mobilization or surface disturbing activities on public land, the BLM AO must approve a written Notice to Proceed (NTP). NTPs will be phased as appropriate to facilitate timely implementation of construction.

Construction shall not commence until the pre-construction matrix is submitted, all pre-construction conditions have been complied with, and BLM's AO and the CPM has issued a letter and BLM has issues a NTP to the project owner authorizing construction. Various lead times for submittal of compliance verification documents to BLM's AO and the CPM for conditions of certification are established to allow sufficient BLM and Energy Commission staff time to review and comment and, if necessary, allow the project owner to revise the submittal in a timely manner. This will ensure that project construction may proceed according to schedule.

Failure to submit compliance documents within the specified lead-time may result in delays in authorization to commence various stages of project development.

If the project owner anticipates commencing project construction as soon as the project is certified, it may be necessary for the project owner to file compliance submittals prior to project certification. Compliance submittals should be completed in advance where the necessary lead time for a required compliance event extends beyond the date anticipated for start of construction. The project owner must understand that the submittal of compliance documents prior to project certification is at the owner's own risk. Any approval by Energy Commission staff is subject to change, based upon BLM's ROW Grant and the Energy Commission Decision.

Compliance Reporting

There are two different compliance reports that the project owner must submit to assist BLM's AO and the CPM in tracking activities and monitoring compliance with the terms and conditions of BLM's ROW Grant and the Energy Commission Decision. During construction, the project owner or authorized agent will submit Monthly Compliance Reports. During operation, an Annual Compliance Report must be submitted. These reports, and the requirement for an accompanying compliance matrix, are described below. The majority of the conditions of certification require that compliance submittals be submitted to BLM's AO and the CPM in the monthly or annual compliance reports.

POSTING OF A SURETY BOND (COMPLIANCE-5)

Prior to site disturbance and each increment of construction, the project owner shall post a surety bond adequate to cover the cost of decommissioning and restoration, including the removal of the project features that have been constructed for that that portion of the site and restoring the native topography and vegetation. An "increment of construction" shall mean a significant feature of construction, such as site grading, a building, a fluid storage tank, a water treatment facility, a hydrogen production facility, a switchyard, or a group of solar collectors connected to an electrical transformer (including that transformer). This Surety bond will apply to all site disturbance features.

The project owner shall provide the surety bond to the BLM AO for approval and to the CPM for review with written evidence indicating that the surety bond is adequate to cover the cost of decommissioning and removing the project features constructed, allowing for site restoration. The written evidence shall include a valid estimate showing that the amount of the bond is adequate to accomplish such work. The timing for the submittal of the surety bond and approval of this document shall be coordinated with the BLM AO and CPM. Over the life of the project, the surety bond will be updated as necessary to account for any changes to the project description and/or decommissioning costs.

COMPLIANCE MATRIX (COMPLIANCE-6)

A compliance matrix shall be submitted by the project owner to BLM's AO and the CPM along with each monthly and annual compliance report. The compliance matrix is intended to provide BLM's AO and the CPM with the current status of all conditions of certification in a spreadsheet format. The compliance matrix must identify:

1. the technical area;
2. the condition number;
3. a brief description of the verification action or submittal required by the condition;
4. the date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.);
5. the expected or actual submittal date;
6. the date a submittal or action was approved by the Chief Building Official (CBO), BLM's AO, CPM, or delegate agency, if applicable; and
7. the compliance status of each condition, e.g., "not started," "in progress" or "completed" (include the date).
8. if the condition was amended, the date of the amendment.

Satisfied conditions shall be placed at the end of the matrix.

MONTHLY COMPLIANCE REPORT (COMPLIANCE-7)

The first Monthly Compliance Report is due one month following the Energy Commission business meeting date upon which the project was approved, unless otherwise agreed to by BLM's AO and the CPM. The first Monthly Compliance Report shall include the AFC number and an initial list of dates for each of the events identified on the Key Events List. The Key Events List Form is found at the end of this section.

During pre-construction and construction of each power plant, the project owner or authorized agent shall submit an original and an electronic searchable version of the Monthly Compliance Report within 10 working days after the end of each reporting month. Monthly Compliance Reports shall be clearly identified for the month being reported. The reports shall contain, at a minimum:

1. A summary of the current project construction status, a revised/updated schedule if there are significant delays, and an explanation of any significant changes to the schedule;

2. Documents required by specific conditions to be submitted along with the Monthly Compliance Report. Each of these items must be identified in the transmittal letter, as well as the conditions they satisfy and submitted as attachments to the Monthly Compliance Report;
3. An initial, and thereafter updated, compliance matrix showing the status of all conditions of certification (fully satisfied conditions do not need to be included in the matrix after they have been reported as completed);
4. A list of conditions that have been satisfied during the reporting period, and a description or reference to the actions that satisfied the condition;
5. A list of any submittal deadlines that were missed, accompanied by an explanation and an estimate of when the information will be provided;
6. A cumulative listing of any approved changes to conditions of certification;
7. A listing of any filings submitted to, or permits issued by, other governmental agencies during the month;
8. A projection of project compliance activities scheduled during the next two months. The project owner shall notify BLM's AO and the CPM as soon as any changes are made to the project construction schedule that would affect compliance with conditions of certification;
9. A listing of the month's additions to the on-site compliance file; and
10. A listing of complaints, notices of violation, official warnings, and citations received during the month, a description of the resolution of the resolved actions, and the status of any unresolved actions.

All sections, exhibits, or addendums shall be separated by tabbed dividers or as acceptable by BLM's AO and the CPM.

ANNUAL COMPLIANCE REPORT (COMPLIANCE-8)

After construction of each power plant is complete or when a power plant goes into commercial operations, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports. The reports are for each year of commercial operation and are due to BLM's AO and the CPM each year at a date agreed to by BLM's AO and the CPM. Annual Compliance Reports shall be submitted over the life of the project unless otherwise specified by BLM's AO and the CPM. Each Annual Compliance Report shall include the AFC number, identify the reporting period and shall contain the following:

1. An updated compliance matrix showing the status of all conditions of certification (fully satisfied conditions do not need to be included in the matrix after they have been reported as completed);
2. A summary of the current project operating status and an explanation of any significant changes to facility operations during the year;
3. Documents required by specific conditions to be submitted along with the Annual Compliance Report. Each of these items must be identified in the transmittal letter,

with the condition it satisfies, and submitted as attachments to the Annual Compliance Report;

4. A cumulative listing of all post-certification changes by the Energy Commission or changes to the BLM ROW grant or approved POD by BLM , or cleared by BLM's AO and the CPM;
5. An explanation for any submittal deadlines that were missed, accompanied by an estimate of when the information will be provided;
6. A listing of filings submitted to, or permits issued by, other governmental agencies during the year;
7. A projection of project compliance activities scheduled during the next year;
8. A listing of the year's additions to the on-site compliance file;
9. An evaluation of the on-site contingency plan for unplanned facility closure, including any suggestions necessary for bringing the plan up to date [see Compliance Conditions for Facility Closure addressed later in this section]; and
10. A listing of complaints, notices of violation, official warnings, and citations received during the year, a description of the resolution of any resolved matters, and the status of any unresolved matters.

CONFIDENTIAL INFORMATION (COMPLIANCE-9)

Any information that the project owner deems confidential shall be submitted to the Energy Commission's Executive Director with an application for confidentiality pursuant to Title 20, California Code of Regulations, section 2505(a). Any information that is determined to be confidential shall be kept confidential as provided for in Title 20, California Code of Regulations, section 2501 et. seq.

Any information the ROW holder deems confidential shall be submitted to the BLM AO with a written request for said confidentiality along with a justification for the request. All confidential submissions to BLM should be clearly stamped "proprietary information" by the holder when submitted.

ANNUAL ENERGY FACILITY COMPLIANCE FEE (COMPLIANCE-10)

Pursuant to the provisions of Section 25806(b) of the Public Resources Code, the project owner is required to pay an annual compliance fee, which is adjusted annually. Current Compliance fee information is available on the Energy Commission's website http://www.energy.ca.gov/siting/filing_fees.html. You may also contact the CPM for the current fee information. The initial payment is due on the date the Energy Commission adopts the final decision. All subsequent payments are due by July 1 of each year in which the facility retains its certification. The payment instrument shall be made payable to the California Energy Commission and mailed to: Accounting Office MS-02, California Energy Commission, 1516 9th St., Sacramento, CA 95814.

REPORTING OF COMPLAINTS, NOTICES, AND CITATIONS (COMPLIANCE-11)

Prior to the start of construction, the project owner must send a letter to property owners living within one mile of the project notifying them of a telephone number to contact

project representatives with questions, complaints or concerns. If the telephone is not staffed 24 hours per day, it shall include automatic answering with date and time stamp recording. All recorded complaints shall be responded to within 24 hours. The telephone number shall be posted at the project site and made easily visible to passersby during construction and operation. The telephone number shall be provided to BLM's AO and the CPM who will post it on the Energy Commission's web page at:

http://www.energy.ca.gov/sitingcases/power_plants_contacts.html.

Any changes to the telephone number shall be submitted immediately to BLM's AO and the CPM, who will update the web page.

In addition to the monthly and annual compliance reporting requirements described above, the project owner shall report and provide copies to BLM's AO and the CPM of all complaint forms, including noise and lighting complaints, notices of violation, notices of fines, official warnings, and citations, within 10 days of receipt. Complaints shall be logged and numbered. Noise complaints shall be recorded on the form provided in the **NOISE** conditions of certification. All other complaints shall be recorded on the complaint form (Attachment A).

FACILITY CLOSURE

At some point in the future, the project will cease operation and close down. At that time, it will be necessary to implement the Closure, Revegetation and Restoration Plan to ensure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts. Although the project setting for this project does not appear, at this time, to present any special or unusual closure problems, it is impossible to foresee what the situation will be in 30 years or more when the project ceases operation. Therefore, provisions must be made that provide the flexibility to deal with the specific situation and project setting that exist at the time of closure. Laws, Ordinances, Regulations and Standards (LORS) pertaining to facility closure are identified in the sections dealing with each technical area. Facility closure will be consistent with LORS in effect at the time of closure. Closure would be conducted in accordance with Condition of Certification **BIO-14** that requires the project owner to develop and implement a Closure, Revegetation and Rehabilitation Plan.

There are at least three circumstances in which a facility closure can take place: planned closure, unplanned temporary closure and unplanned permanent closure.

CLOSURE DEFINITIONS

Planned Closure

A planned closure occurs when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence.

Unplanned Temporary Closure

An unplanned temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a

natural disaster or an emergency. Short-term is defined as cessation of construction activities or operations of a power plant for a period less than 6-months long. Cessation of construction of operations for a period longer than 6 months in considered a permanent closure.

Unplanned Permanent Closure

An unplanned permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unplanned closure where the owner implements the on-site contingency plan. It can also include unplanned closure where the project owner fails to implement the contingency plan, and the project is essentially abandoned.

COMPLIANCE CONDITIONS FOR FACILITY CLOSURE

PLANNED CLOSURE (COMPLIANCE-11)

In order to ensure that a planned facility closure does not create adverse impacts, a closure process that provides for careful consideration of available options and applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of closure, will be undertaken. To ensure adequate review of a planned project closure, the project owner shall submit a revision or update to the approved Closure, Revegetation and Rehabilitation Plan to BLM and the Energy Commission for review and approval at least 12 months (or other period of time agreed to by BLM's AO and the CPM) prior to commencement of closure activities. The project owner shall file 50 copies and 50 CDs with the Energy Commission and 10 copies and 10 CDs with BLM (or other number of copies agreed upon by BLM's AO and the CPM) of a proposed facility closure plan/Closure, Revegetation and Rehabilitation Plan.

The plan shall:

1. identify and discuss any impacts and mitigation to address significant adverse impacts associated with proposed closure activities and to address facilities, equipment, or other project related materials that must be removed from the site;
2. identify a schedule of activities for closure of the power plant site, transmission line corridor, and all other appurtenant facilities constructed as part of the project;
3. address conformance of the plan with all applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of facility closure, and applicable conditions of certification; and.
4. Address any changes to the site revegetation, rehabilitation, monitoring and long-term maintenance specified in the existing plan that are needed for site revegetation and rehabilitation to be successful.

Prior to submittal of an amended or revised Closure, Revegetation and Restoration Plan, a meeting shall be held between the project owner, BLM's AO and the Energy Commission CPM for the purpose of discussing the specific contents of the plan.

In the event that there are significant issues associated with the proposed facility Closure, Revegetation and Restoration plan's approval, or the desires of local officials

or interested parties are inconsistent with the plan, BLM's AO the CPM shall hold one or more workshops and/or BLM and the Energy Commission may hold public hearings as part of its approval procedure.

As necessary, prior to or during the closure plan process, the project owner shall take appropriate steps to eliminate any immediate threats to public health and safety and the environment, but shall not commence any other closure activities until BLM and the Energy Commission approves the facility Closure, Revegetation and Restoration plan.

UNPLANNED TEMPORARY CLOSURE/ON-SITE CONTINGENCY PLAN (COMPLIANCE-12)

In order to ensure that public health and safety and the environment are protected in the event of an unplanned temporary facility closure, it is essential to have an On-Site Contingency Plan in place. The On-Site Contingency Plan will help to ensure that all necessary steps to mitigate public health and safety impacts and environmental impacts are taken in a timely manner.

The project owner shall submit an On-Site Contingency Plan for BLM's AO and CPM review and approval. The plan shall be submitted no less than 60 days (or other time agreed to by BLM's AO and the CPM) after approval of any NTP or letter granting approval to commence construction for each phase of construction. A copy of the approved plan must be in place during commercial operation of the facility and shall be kept at the site at all times.

The project owner, in consultation with BLM's AO and the CPM, will update the On-Site Contingency Plan as necessary. BLM's AO and the CPM may require revisions to the On-Site Contingency Plan over the life of the project. In the annual compliance reports submitted to the Energy Commission, the project owner will review the On-Site Contingency Plan, and recommend changes to bring the plan up to date. Any changes to the plan must be approved by BLM's AO and the CPM.

The On-Site Contingency Plan shall provide for taking immediate steps to secure the facility from trespassing or encroachment. In addition, for closures of more than 90 days, unless other arrangements are agreed to by BLM's AO and the CPM, the plan shall provide for removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment, and the safe shutdown of all equipment. (Also see specific conditions of certification for the technical areas of Hazardous Materials Management and Waste Management.)

In addition, consistent with requirements under unplanned permanent closure addressed below, the nature and extent of insurance coverage, and major equipment warranties must also be included in the On-Site Contingency Plan. In addition, the status of the insurance coverage and major equipment warranties must be updated in the annual compliance reports.

In the event of an unplanned temporary closure, the project owner shall notify BLM's AO and the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the On-Site Contingency Plan.

The project owner shall keep BLM's AO and the CPM informed of the circumstances and expected duration of the closure.

If BLM's AO and the CPM determine that an unplanned temporary closure is likely to be permanent, or for a duration of more than 6 months, a Closure Plan consistent with the requirements for a planned closure shall be developed and submitted to BLM's AO and the CPM within 90 days of BLM's AO and the CPM's determination (or other period of time agreed to by BLM's AO and the CPM).

UNPLANNED PERMANENT CLOSURE/ON-SITE CONTINGENCY PLAN (COMPLIANCE-13)

The On-Site Contingency Plan required for unplanned temporary closure shall also cover unplanned permanent facility closure. All of the requirements specified for unplanned temporary closure shall also apply to unplanned permanent closure.

In addition, the On-Site Contingency Plan shall address how the project owner will ensure that all required closure steps will be successfully undertaken in the event of abandonment.

In the event of an unplanned permanent closure, the project owner shall notify BLM's AO and the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the On-Site Contingency Plan. The project owner shall keep BLM's AO and the CPM informed of the status of all closure activities.

To ensure that public health and safety and the environment are protected in the event of an unplanned permanent closure, the project owner shall submit an On-Site Contingency Plan no less than 60 days after a NTP is issued for each phase of development.

POST CERTIFICATION CHANGES TO BLM'S ROW GRANT AND/OR THE ENERGY COMMISSION DECISION: AMENDMENTS, OWNERSHIP CHANGES, STAFF APPROVED PROJECT MODIFICATIONS AND VERIFICATION CHANGES (COMPLIANCE-14)

The project owner must petition the Energy Commission pursuant to Title 20, California Code of Regulations, section 1769, in order to modify the project (including linear facilities) design, operation or performance requirements, and to transfer ownership or operational control of the facility. The BLM ROW holder must file a written request in the form of an application to the BLM AO in order to change the terms and conditions of their ROW grant or POD. Written requests will be in a manner prescribed by the BLM AO.

It is the responsibility of the project owner to contact BLM's AO and the CPM to determine if a proposed project change should be considered a project modification pursuant to section 1769. Implementation of a project modification without first securing BLM and either Energy Commission or Energy Commission staff approval, may result in enforcement action that could result in civil penalties in accordance with section 25534 of the Public Resources Code.

A petition is required for amendments and for staff approved project modifications as specified below. Both shall be filed as a “Petition to Amend.” Staff will determine if the change is significant or insignificant. For verification changes, a letter from the project owner is sufficient. In all cases, the petition or letter requesting a change should be submitted to BLM’s AO and the CPM, who will file it with the Energy Commission’s Dockets Unit in accordance with Title 20, California Code of Regulations, section 1209.

The criteria that determine which type of approval and the process that applies are explained below. They reflect the provisions of Section 1769 at the time this condition was drafted. If the Commission’s rules regarding amendments are amended, the rules in effect at the time an amendment is requested shall apply.

Amendment

The project owner shall petition the Energy Commission, pursuant to Title 20, California Code of Regulations, Section 1769(a), when proposing modifications to the project (including linear facilities) design, operation, or performance requirements. If a proposed modification results in deletion or change of a condition of certification, or makes changes that would cause the project not to comply with any applicable laws, ordinances, regulations or standards, the petition will be processed as a formal amendment to the Energy Commission’s final decision, which requires public notice and review of the BLM-Energy Commission staff analysis, and approval by the full Energy Commission. The petition shall be in the form of a legal brief and fulfill the requirements of Section 1769(a). Upon request, the CPM will provide you with a sample petition to use as a template.

The ROW holder shall file an application to amend the BLM ROW grant for any substantial deviation or change in use. The requirements to amend a ROW grant are the same as when filing a new application including paying processing and monitoring fees and rent.

Staff Approved Project Modification

Modifications that do not result in deletions or changes to conditions of certification, and that are compliant with laws, ordinances, regulations and standards may be authorized by BLM’s AO and the CPM as a staff approved project modification (SAPM) pursuant to section 1769(a) (2). Once staff files an intention to approve the proposed project modifications, any person may file an objection to staff’s determination within 14 days of service on the grounds that the modification does not meet the criteria of section 1769 (a)(2). If a person objects to staff’s determination, the petition must be processed as a formal amendment to the decision and must be approved by the full commission at a noticed business meeting or hearing. BLM and the Energy Commission intend to integrate a process to jointly approve SAPMs to avoid duplication of approval processes and ensure appropriate documentation for the public record.

Change of Ownership

Change of ownership or operational control also requires that the project owner file a petition pursuant to section 1769(b). This process requires public notice and approval by the full Commission and BLM. The petition shall be in the form of a legal brief and

fulfill the requirements of Section 1769(b). Upon request, the CPM will provide you with a sample petition to use as a template. The transfer of ownership of a BLM ROW grant must be through the filing of an application for assignment of the grant.

Verification Change

A verification may be modified by BLM's AO and the CPM without requesting an amendment to the ROW Grant or Energy Commission decision if the change does not conflict with the conditions of certification and provides an effective alternate means of verification.

CBO DELEGATION AND AGENCY COOPERATION

In performing construction and operation monitoring of the project, BLM and Energy Commission staff act as, and have the authority of, the Chief Building Official (CBO). BLM and Energy Commission staff may delegate CBO responsibility to either an independent third party contractor or the local building official. BLM and the Energy Commission intend to avoid duplication by integrating the responsibilities of the CBO with those of a BLM compliance inspector and will work jointly in the selection of a CBO. BLM and Energy Commission staff retain CBO authority when selecting a delegate CBO, including enforcing and interpreting federal, state and local codes, and use of discretion, as necessary, in implementing the various codes and standards.

BLM and Energy Commission staff may also seek the cooperation of state, regional and local agencies that have an interest in environmental protection when conducting project monitoring.

ENFORCEMENT

BLM's legal authority to enforce the terms and conditions of its ROW Grant is specified in 43 CFR 2807.16 to 2807.19. BLM may issue an immediate temporary suspension of activities it they determine a holder has violated one or more of the terms, conditions, or stipulation of the grant. BLM may also suspend or terminate a ROW grant if a holder does not comply with applicable laws and regulation or any terns, conditions, or special stipulations contained in the grant. Prior to suspending or terminating a ROW grant, BLM will provide written notice to the holder stating it intends to suspend or terminate and will provide reasonable opportunity to correct any noncompliance.

The Energy Commission's legal authority to enforce the terms and conditions of its Decision is specified in Public Resources Code sections 25534 and 25900. The Energy Commission may amend or revoke the certification for any facility, and may impose a civil penalty for any significant failure to comply with the terms or conditions of the Energy Commission Decision. The specific action and amount of any fines the Energy Commission may impose would take into account the specific circumstances of the incident(s). This would include such factors as the previous compliance history, whether the cause of the incident involves willful disregard of LORS, oversight, unforeseeable events, and other factors the Energy Commission may consider.

ENERGY COMMISSION NONCOMPLIANCE COMPLAINT PROCEDURES

Any person or agency may file a complaint alleging noncompliance with the conditions of certification. Such a complaint will be subject to review by the Energy Commission pursuant to Title 20, California Code of Regulations, section 1237, but in many instances the noncompliance can be resolved by using the informal dispute resolution process. Both the informal and formal complaint procedure, as described in current State law and regulations, are described below. They shall be followed unless superseded by future law or regulations.

The Energy Commission has established a toll free compliance telephone number of 1-800-858-0784 for the public to contact the Energy Commission about power plant construction or operation-related questions, complaints or concerns.

Informal Dispute Resolution Process

The following procedure is designed to informally resolve disputes concerning the interpretation of compliance with the requirements of this compliance plan. The project owner, the Energy Commission, or any other party, including members of the public, may initiate an informal dispute resolution process. Disputes may pertain to actions or decisions made by any party, including the Energy Commission's delegate agents.

This process may precede the more formal complaint and investigation procedure specified in Title 20, California Code of Regulations, section 1237, but is not intended to be a substitute for, or prerequisite to it. This informal procedure may not be used to change the terms and conditions of certification as approved by the Energy Commission, although the agreed upon resolution may result in a project owner, or in some cases the Energy Commission staff, proposing an amendment.

The process encourages all parties involved in a dispute to discuss the matter and to reach an agreement resolving the dispute. If a dispute cannot be resolved, then the matter must be brought before the full Energy Commission for consideration via the complaint and investigation procedure.

Request for Informal Investigation

Any individual, group, or agency may request the Energy Commission to conduct an informal investigation of alleged noncompliance with the Energy Commission's terms and conditions of certification. All requests for informal investigations shall be made to the designated CPM.

Upon receipt of a request for informal investigation, the CPM shall promptly notify the project owner of the allegation by telephone and letter. All known and relevant information of the alleged noncompliance shall be provided to the project owner, BLM and to the Energy Commission staff. The CPM will evaluate the request and the information to determine if further investigation is necessary. If the CPM find that further investigation is necessary, the project owner will be asked to promptly investigate the matter. Within seven working days of the CPM's request, provide a written report to the CPM of the results of the investigation, including corrective measures proposed or undertaken. Depending on the urgency of the noncompliance matter, the CPM may

conduct a site visit and/or request the project owner to also provide an initial verbal report, within 48 hours.

Request for Informal Meeting

In the event that either the party requesting an investigation or the Energy Commission staff is not satisfied with the project owner's report, investigation of the event, or corrective measures proposed or undertaken, either party may submit a written request to the CPM for a meeting with the project owner. Such request shall be made within 14 days of the project owner's filing of its written report. Upon receipt of such a request, the CPM shall:

1. immediately schedule a meeting with the requesting party and the project owner, to be held at a mutually convenient time and place;
2. secure the attendance of appropriate Energy Commission staff and staff of any other agencies with expertise in the subject area of concern, as necessary;
3. conduct such meeting in an informal and objective manner so as to encourage the voluntary settlement of the dispute in a fair and equitable manner;
4. After the conclusion of such a meeting, promptly prepare and distribute copies to all in attendance and to the project file, a summary memorandum that fairly and accurately identifies the positions of all parties and any understandings reached. If an agreement has not been reached, the CPM shall inform the complainant of the formal complaint process and requirements provided under Title 20, California Code of Regulations, section 1230 et seq.

Formal Dispute Resolution Procedure-Complaints and Investigations

Any person may file a complaint with the Energy Commission's Dockets Unit alleging noncompliance with a Commission decision adopted pursuant to Public Resources Code section 25500. Requirements for complaint filings and a description of how complaints are processed are in Title 20, California Code of Regulations, section 1237.

PROJECT:

DOCKET #:

COMPLIANCE PROJECT MANAGER:

BLM AUTHORIZED OFFICER:

EVENT DESCRIPTION	DATE
Certification Date	
Obtain Site Control	
Online Date	
POWER PLANT SITE ACTIVITIES	
Start Site Mobilization	
Start Ground Disturbance	
Start Grading	
Start Construction	
Begin Pouring Major Foundation Concrete	
Begin Installation of Major Equipment	
Completion of Installation of Major Equipment	
First Combustion of Gas Turbine	
Obtain Building Occupation Permit	
Start Commercial Operation	
Complete All Construction	
TRANSMISSION LINE ACTIVITIES	
Start T/L Construction	
Synchronization with Grid and Interconnection	
Complete T/L Construction	
FUEL SUPPLY LINE ACTIVITIES	
Start Gas Pipeline Construction and Interconnection	
Complete Gas Pipeline Construction	
WATER SUPPLY LINE ACTIVITIES	
Start Water Supply Line Construction	
Complete Water Supply Line Construction	

COMPLIANCE TABLE 1
SUMMARY of COMPLIANCE CONDITIONS OF CERTIFICATION

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-1	**Unrestricted Access**	The project owner shall grant BLM and Energy Commission staff and delegate agencies or consultants unrestricted access to the power plant site.
COMPLIANCE-2	**Compliance Record**	The project owner shall maintain project files on-site. BLM and Energy Commission staff and delegate agencies shall be given unrestricted access to the files.
COMPLIANCE-3	**Compliance Verification Submittals**	The project owner is responsible for the delivery and content of all verification submittals to BLM's Authorized Officer and the CPM, whether such condition was satisfied by work performed or the project owner or his agent.
COMPLIANCE-4	**Pre-construction Matrix and Tasks Prior to Start of Construction**	• Construction shall not commence until the all of the following activities/submittals have been completed: property owners living within one mile of the project have been notified of a telephone number to contact for questions, complaints or concerns, a pre-construction matrix has been submitted identifying only those conditions that must be fulfilled before the start of construction, all pre-construction conditions have been complied with, BLM's Authorized Officer and the CPM have issued a letter to the project owner authorizing construction.
COMPLIANCE-5	**Posting of A Surety Bond**	The project owner shall post a surety bond adequate to cover the cost of decommissioning and restoration including the removal of the project features that have been constructed for that that portion of the site and restoring the native topography and vegetation.

COMPLIANCE TABLE 1
SUMMARY of COMPLIANCE CONDITIONS OF CERTIFICATION

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-6	**Compliance Matrix**	The project owner shall submit a compliance matrix (in a spreadsheet format) with each monthly and annual compliance report which includes the status of all compliance conditions of certification.
COMPLIANCE-7	**Monthly Compliance Report including a Key Events List**	During construction, the project owner shall submit Monthly Compliance Reports (MCRs) which include specific information. The first MCR is due the month following the Energy Commission business meeting date on which the project was approved and shall include an initial list of dates for each of the events identified on the Key Events List.
COMPLIANCE-8	**Annual Compliance Reports**	After construction ends and throughout the life of the project, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports.
COMPLIANCE-9	**Confidential Information**	Any information the project owner deems confidential shall be submitted to BLM and the Energy Commission's Dockets Unit with a request for confidentiality.
COMPLIANCE-10	**Annual Fees**	Payment of Annual Energy Facility Compliance Fee to the Energy Commission;
COMPLIANCE-11	**Reporting of Complaints, Notices and Citations**	Within 10 days of receipt, the project owner shall report to BLM's Authorized Officer and the CPM, all notices, complaints, and citations.
COMPLIANCE-12	**Planned Facility Closure**	The project owner shall submit any revisions or changes to the Closure, Revegetation and Restoration Plan to BLM's Authorized Officer and the CPM at least 12 months prior to commencement of a planned closure.

COMPLIANCE TABLE 1
SUMMARY of COMPLIANCE CONDITIONS OF CERTIFICATION

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-13	**Unplanned Temporary Facility Closure**	To ensure that public health and safety and the environment are protected in the event of an unplanned temporary closure, the project owner shall submit an On-Site Contingency Plan no less than 60 days after a NTP is issued for each power plant.
COMPLIANCE-14	**Unplanned Permanent Facility Closure**	To ensure that public health and safety and the environment are protected in the event of an unplanned temporary closure, the project owner shall submit an On-Site Contingency Plan no less than 60 days after a NTP is issued for each power plant.
COMPLIANCE-15	**Post-certification changes to the ROW Grant and/or Decision**	The project owner must petition the Energy Commission and file an application to amend the ROW grant to delete or change a condition of certification, modify the project design or operational requirements and/or transfer ownership of operational control of the facility.

Complaint Log Number:_____ Docket Number:_____

Project Name:_____

COMPLAINANT INFORMATION

Name:_____ Phone Number:_____

Address:_____

COMPLAINT

DATE COMPLAINT RECEIVED:_____ TIME COMPLAINT RECEIVED:_____

COMPLAINT RECEIVED BY: ☐ TELEPHONE ☐ IN WRITING (COPY ATTACHED)

DATE OF FIRST OCCURRENCE:_____

DESCRIPTION OF COMPLAINT (INCLUDING DATES, FREQUENCY, AND DURATION):_____

FINDINGS OF INVESTIGATION BY PLANT PERSONNEL:_____

DOES COMPLAINT RELATE TO VIOLATION OF BLM ROW GRANT? ☐ YES ☐ NO

DOES COMPLAINT RELATE TO VIOLATION OF A CEC REQUIREMENT? ☐ YES ☐ NO

DATE COMPLAINANT CONTACTED TO DISCUSS FINDINGS:_____

DESCRIPTION OF CORRECTIVE MEASURES TAKEN OR OTHER COMPLAINT RESOLUTION:_____

DOES COMPLAINANT AGREE WITH PROPOSED RESOLUTION?☐ YES ☐ NO

IF NOT, EXPLAIN:_____

_____

CORRECTIVE ACTION

IF CORRECTIVE ACTION NECESSARY, DATE COMPLETED:_____

DATE FIRST LETTER SENT TO COMPLAINANT (COPY ATTACHED):_____

DATE FINAL LETTER SENT TO COMPLAINANT (COPY ATTACHED):_____

OTHER RELEVANT INFORMATION:_____

_____

"This information is certified to be correct."

PLANT MANAGER SIGNATURE:_____ DATE:

(ATTACH ADDITIONAL PAGES AND ALL SUPPORTING DOCUMENTATION, AS REQUIRED)

IV. ENGINEERING ASSESSMENT

The broad engineering assessment of the Calico Solar Project consists of separate analyses that examine its facility design, engineering, efficiency, and reliability aspects. These analyses include the on-site power generating equipment and the project-related linear facilities.

A. FACILITY DESIGN

This review covers several technical disciplines including the civil, electrical, mechanical, and structural engineering elements related to project design and construction. It addresses consistency with applicable LORS, and does not extend to the project's environmental impacts under the California Environmental Quality Act (CEQA).

SUMMARY AND DISCUSSION OF THE EVIDENCE

The Application for Certification (AFC) describes the preliminary facility design. In considering the adequacy of the plans, the Commission reviews whether the power plant and linear facilities are described with sufficient detail to assure the project can be designed and constructed in accordance with applicable engineering laws, ordinances, regulations, and standards (LORS). The review also includes, as appropriate, the identification of special design features that are necessary to deal with unique site conditions which could impact public health and safety or the operational reliability of the project. (Ex. 300, p. D.1-1.)

Staff considered potential geological hazards and reviewed the preliminary project design with respect to grading, flood protection, erosion control, site drainage, and site access in addition to the criteria for designing and constructing related linear facilities such as the transmission interconnection facilities. (Ex. 300, pp. D.1-2 to D.1-3; see also, the **Geology and Paleontology** section of this Decision.) The evidence establishes that the project will incorporate accepted industry standards. This includes design practices and construction methods for preparing and developing the site. Conditions **CIVIL-1** through **CIVIL-4** ensures that these activities will be conducted in compliance with applicable LORS.

Major structures, systems, and equipment are structures and their associated components or equipment that are necessary for power production, costly or time

consuming to repair or replace, are used for the storage, containment, or handling of hazardous or toxic materials, or could become potential health and safety hazards if not constructed according to applicable engineering LORS. (Ex. 300, p. D.1-3.) **Table 2**, contained in Condition **GEN-2,** lists the major structures and equipment included in the initial engineering design for the project.[1] Conditions **GEN-3** through **GEN-8** require that qualified individuals oversee and inspect construction of the facility. Similarly, Conditions **MECH-1** through **MECH-3** address compliance of the project's mechanical systems with appropriate standards, and a quality assurance/quality control program assures that the project will be designed, procured, fabricated, and installed as described. Condition **ELEC-1** provides assurance that design and construction of major electrical features will comply with applicable LORS. Compliance with design requirements will be verified through specific inspections and audits. (Ex. 300, p. D.1-4.)

Certain structures in a power plant may be required, under the building codes, to undergo dynamic lateral force (structural) analysis; others may be designed using the simpler static analysis procedure. In order to ensure that structures are analyzed according to their appropriate lateral force procedure, Condition of Certification **STRUC-1** requires the project CBO's review and approval of the owner's proposed lateral force procedures before construction begins. (Ex. 300, p. D.1-3.)

The Conditions of Certification establish a design review and construction inspection process to verify compliance with applicable standards and special requirements. The project will be designed and constructed in conformance with the latest edition of the California Building Standards Code (currently the 2007 CBSC) and other applicable codes and standards in effect at the time design approval and construction actually begin. Condition of Certification **GEN-1** incorporates this requirement. (Ex. 300, pp. D.1-3 to D.1-4.)

Overall, the evidentiary record conclusively establishes that the project will be designed and constructed in compliance with all applicable LORS, and that these activities will not negatively impact public health and safety.

[1] The master drawing and master specifications lists described in Condition **GEN-2** include documents based on the project's *detailed* design and may include supplemental materials for structures and equipment not currently identified in Table 1.

FINDINGS OF FACT

Based on the uncontroverted evidence, the Commission makes the following findings:

1. The Calico Solar Project is currently in the preliminary design stage.
2. The evidence summarized in this topic area addresses consistency with applicable LORS, and does not extend to an evaluation of the project's environmental impacts.
3. The facility can be designed and constructed in conformity with the applicable laws, ordinances, regulations, and standards (LORS) set forth in the appropriate portion of **Appendix A** of this Decision.
4. The Conditions of Certification set forth below provide, in part, that qualified personnel will perform design review, plan checking, and field inspections of the project.
5. The Conditions of Certification set forth below are necessary to ensure that the project is designed and constructed in accordance with applicable law and in a manner that protects public health and safety.
6. The **General Conditions,** included in the **Compliance and Closure** section of this Decision, establish requirements to be followed in the event of facility closure.

CONCLUSION OF LAW

1. We therefore conclude that implementation of the Conditions of Certification listed below ensure that the Calico Solar Project will be designed and constructed in conformance with the applicable LORS pertinent to the engineering aspects summarized in this section of the Decision.

CONDITIONS OF CERTIFICATION

GEN-1 The project owner shall design, construct, and inspect the project in accordance with the 2007 California Building Standards Code (CBSC), also known as Title 24, California Code of Regulations, which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and all other applicable

engineering LORS in effect at the time initial design plans are submitted to the CBO for review and approval (the CBSC in effect is the edition that has been adopted by the California Building Standards Commission and published at least 180 days previously). The project owner shall ensure that all the provisions of the above applicable codes are enforced during the construction, addition, alteration, moving, demolition, repair, or maintenance of the completed facility. All transmission facilities (lines, switchyards, switching stations and substations) are covered in the Conditions of Certification in the **Transmission System Engineering** section of this document.

In the event that the initial engineering designs are submitted to the CBO when the successor to the 2007 CBSC is in effect, the 2007 CBSC provisions shall be replaced with the applicable successor provisions. Where, in any specific case, different sections of the code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

The project owner shall ensure that all contracts with contractors, subcontractors, and suppliers clearly specify that all work performed and materials supplied comply with the codes listed above.

Verification: Within 30 days following receipt of the certificate of occupancy, the project owner shall submit to the CPM a statement of verification, signed by the responsible design engineer, attesting that all designs, construction, installation, and inspection requirements of the applicable LORS and the Energy Commission's decision have been met in the area of facility design. The project owner shall provide the CPM a copy of the certificate of occupancy within 30 days of receipt from the CBO.

Once the certificate of occupancy has been issued, the project owner shall inform the CPM at least 30 days prior to any construction, addition, alteration, moving, demolition, repair, or maintenance to be performed on any portion(s) of the completed facility that requires CBO approval for compliance with the above codes. The CPM will then determine if the CBO needs to approve the work.

GEN-2 Before submitting the initial engineering designs for CBO review, the project owner shall furnish the CPM and the CBO with a schedule of facility design submittals, and master drawing and master specifications lists. The schedule shall contain a list of proposed submittal packages of designs, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide specific packages to the CPM upon request.

Verification: At least 30 days (or a project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall

submit to the CBO and to the CPM the schedule, the master drawing and master specifications lists of documents to be submitted to the CBO for review and approval. These documents shall be the pertinent design documents for the major structures and equipment listed in **Facility Design Table 2**, below. Major structures and equipment shall be added to or deleted from the table only with CPM approval. The project owner shall provide schedule updates in the monthly compliance report.

Facility Design Table 2
Major Structures and Equipment List

Equipment/System	Quantity (Plant)
SunCatcher Power Generating Unit (CT) Foundation and Connections	1 Lot
Administration Building Structure, Foundation and Connections	1
Maintenance Building Structure, Foundation and Connections	1
Assembly Building Structure, Foundation and Connections	3
Collector Group Generator Step-up Unit Transformer Foundation and Connections	1 Lot
Generator Collection Power Center	1 Lot
Generator Collection Sub-panel	1 Lot
Power Factor Capacitor	1 Lot
Open Bus Switch Rack	6
Shunt Capacitor Bank	6
Dynamic VAR Compression System	6
Disconnect Switch	15
Power Transformer Foundation and Connections	6
Coupling Capacitor Voltage Transformer Foundation and Connections	6
Diesel Power Generator Set Foundation and Connections	1
Fire Water Pump Foundation and Connections	1
Water Treatment System Foundation and Connections	1
Potable/Fire Water Tank Structure, Foundation and Connections	1
Well Water Storage Tank Structure, Foundation and Connections	1
Demineralized Water Storage Tank Structure, Foundation and Connections	2
Hydrogen Bottles Storage Area	1 Lot
Chemical Storage Area	1 Lot
Drainage Systems (including sanitary drain and waste)	1 Lot
High Pressure and Large Diameter Piping and Pipe Racks	1 Lot
HVAC and Refrigeration Systems	1 Lot
Temperature Control and Ventilation Systems (including water and sewer connections)	1 Lot
Building Energy Conservation Systems	1 Lot

Equipment/System	Quantity (Plant)
Substation, Switchboards, Transformers, Buses and Towers	1 Lot
Electrical Breakers, Cables/Duct Banks	1 Lot
Prefabricated Assemblies	1 Lot

GEN-3 The project owner shall make payments to the CBO for design review, plan checks, and construction inspections, based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. These fees may be consistent with the fees listed in the 2007 CBC, adjusted for inflation and other appropriate adjustments; may be based on the value of the facilities reviewed; may be based on hourly rates; or may be otherwise agreed upon by the project owner and the CBO.

Verification: The project owner shall make the required payments to the CBO in accordance with the agreement between the project owner and the CBO. The project owner shall send a copy of the CBO's receipt of payment to the CPM in the next monthly compliance report indicating that applicable fees have been paid.

GEN-4 Prior to the start of rough grading, the project owner shall assign a California- registered architect, or a structural or civil engineer, as the resident engineer (RE) in charge of the project. All transmission facilities (lines, switchyards, switching stations, and substations) are addressed in the Conditions of Certification in the **Transmission System Engineering** section of this Decision.

The RE may delegate responsibility for portions of the project to other registered engineers. Registered mechanical and electrical engineers may be delegated responsibility for mechanical and electrical portions of the project, respectively. A project may be divided into parts, provided that each part is clearly defined as a distinct unit. Separate assignments of general responsibility may be made for each designated part.

The RE shall:

1. Monitor progress of construction work requiring CBO design review and inspection to ensure compliance with LORS;
2. Ensure that construction of all facilities subject to CBO design review and inspection conforms in every material respect to applicable LORS, these Conditions of Certification, approved plans, and specifications;
3. Prepare documents to initiate changes in approved drawings and specifications when either directed by the project owner or as required by the Conditions of the project;

4. Be responsible for providing project inspectors and testing agencies with complete and up-to-date sets of stamped drawings, plans, specifications, and any other required documents;
5. Be responsible for the timely submittal of construction progress reports to the CBO from the project inspectors, the contractor, and other engineers who have been delegated responsibility for portions of the project; and
6. Be responsible for notifying the CBO of corrective action or the disposition of items noted on laboratory reports or other tests when they do not conform to approved plans and specifications.

The resident engineer (or his delegate) must be located at the project site, or be available at the project site within a reasonable period of time, during any hours in which construction takes place.

The RE shall have the authority to halt construction and to require changes or remedial work if the work does not meet requirements.

If the RE or the delegated engineers are reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the resume and registration number of the RE and any other delegated engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the RE and other delegated engineer(s) within five days of the approval.

If the RE or the delegated engineer(s) is subsequently reassigned or replaced, the project owner has five days to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-5 Prior to the start of rough grading, the project owner shall assign at least one of each of the following California registered engineers to the project: a civil engineer; a soils, geotechnical, or civil engineer experienced and knowledgeable in the practice of soils engineering; and an engineering geologist. Prior to the start of construction, the project owner shall assign at least one of each of the following California registered engineers to the project: a design engineer who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; a mechanical engineer; and an electrical engineer.

(California Business and Professions Code section 6704 et seq., and sections 6730, 6731 and 6736 require state registration to practice as a civil engineer or structural engineer in California). All transmission facilities (lines, switchyards, switching stations, and substations) are handled in the Conditions of Certification in the **Transmission System Engineering** section of this Decision.

The tasks performed by the civil, mechanical, electrical, or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (for example, proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer.

The project owner shall submit, to the CBO for review and approval, the names, qualifications, and registration numbers of all responsible engineers assigned to the project.

If any one of the designated responsible engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned responsible engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

A. The civil engineer shall:

   1. Review the foundation investigations, geotechnical, or soils reports prepared by the soils engineer, the geotechnical engineer, or by a civil engineer experienced and knowledgeable in the practice of soils engineering;

   2. Design (or be responsible for the design of), stamp, and sign all plans, calculations, and specifications for proposed site work, civil works, and related facilities requiring design review and inspection by the CBO. At a minimum, these include: grading, site preparation, excavation, compaction, construction of secondary containment, foundations, erosion and sedimentation control structures, drainage facilities, underground utilities, culverts, site access roads and sanitary sewer systems; and

   3. Provide consultation to the RE during the construction phase of the project and recommend changes in the design of the civil works facilities and changes to the construction procedures.

B. The soils engineer, geotechnical engineer, or civil engineer experienced and knowledgeable in the practice of soils engineering, shall:

   1. Review all the engineering geology reports;

2. Prepare the foundation investigations, geotechnical, or soils reports containing field exploration reports, laboratory tests, and engineering analysis detailing the nature and extent of the soils that could be susceptible to liquefaction, rapid settlement or collapse when saturated under load;
3. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with requirements set forth in the 2007 CBC (depending on the site conditions, this may be the responsibility of either the soils engineer, the engineering geologist, or both); and
4. Recommend field changes to the civil engineer and RE.

This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform to the predicted conditions used as the basis for design of earthwork or foundations.

C. The engineering geologist shall:
   1. Review all the engineering geology reports and prepare a final soils grading report; and
   2. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 2007 CBC (depending on the site conditions, this may be the responsibility of either the soils engineer, the engineering geologist, or both).

D. The design engineer shall:
   1. Be directly responsible for the design of the proposed structures and equipment supports;
   2. Provide consultation to the RE during design and construction of the project;
   3. Monitor construction progress to ensure compliance with engineering LORS;
   4. Evaluate and recommend necessary changes in design; and
   5. Prepare and sign all major building plans, specifications, and calculations.

E. The mechanical engineer shall be responsible for, and sign and stamp a statement with, each mechanical submittal to the CBO, stating that the proposed final design plans, specifications, and calculations conform to all of the mechanical engineering design requirements set forth in the Energy Commission's Decision.

F. The electrical engineer shall:

1. Be responsible for the electrical design of the project; and
2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: At least 30 days (or project owner and CBO approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible civil engineer, soils (geotechnical) engineer and engineering geologist assigned to the project.

At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of construction, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible design engineer, mechanical engineer, and electrical engineer assigned to the project.

The project owner shall notify the CPM of the CBO's approvals of the responsible engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-6 Prior to the start of an activity requiring special inspection, including prefabricated assemblies, the project owner shall assign to the project, qualified and certified special inspector(s) who shall be responsible for the special inspections required by the 2007 CBC. All transmission facilities (lines, switchyards, switching stations, and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this Decision.

A certified weld inspector, certified by the American Welding Society (AWS), and/or American Society of Mechanical Engineers (ASME) as applicable, shall inspect welding performed on-site requiring special inspection (including structural, piping, tanks and pressure vessels).

The special inspector shall:

1. Be a qualified person who shall demonstrate competence, to the satisfaction of the CBO, for inspection of the particular type of construction requiring special or continuous inspection;
2. Inspect the work assigned for conformance with the approved design drawings and specifications;

3. Furnish inspection reports to the CBO and RE. All discrepancies shall be brought to the immediate attention of the RE for correction, then, if uncorrected, to the CBO and the CPM for corrective action; and
4. Submit a final signed report to the RE, CBO, and CPM, stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans, specifications, and other provisions of the applicable edition of the CBC.

Verification: At least 15 days (or project owner- and CBO-approved alternative time frame) prior to the start of an activity requiring special inspection, the project owner shall submit to the CBO for review and approval, with a copy to the CPM, the name(s) and qualifications of the certified weld inspector(s), or other certified special inspector(s) assigned to the project to perform one or more of the duties set forth above. The project owner shall also submit to the CPM a copy of the CBO's approval of the qualifications of all special inspectors in the next monthly compliance report.

If the special inspector is subsequently reassigned or replaced, the project owner has five days in which to submit the name and qualifications of the newly assigned special inspector to the CBO for approval. The project owner shall notify the CPM of the CBO's approval of the newly assigned inspector within 5 days of the approval.

GEN-7 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend required corrective actions. The discrepancy documentation shall be submitted to the CBO for review and approval. The discrepancy documentation shall reference this Condition of Certification and, if appropriate, applicable sections of the CBC and/or other LORS.

Verification: The project owner shall transmit a copy of the CBO's approval of any corrective action taken to resolve a discrepancy to the CPM in the next monthly compliance report. If any corrective action is disapproved, the project owner shall advise the CPM, within five days, of the reason for disapproval and the revised corrective action to obtain CBO's approval.

GEN-8 The project owner shall obtain the CBO's final approval of all completed work that has undergone CBO design review and approval. The project owner shall request the CBO to inspect the completed structure and review the submitted documents. The project owner shall notify the CPM after obtaining the CBO's final approval. The project owner shall retain one set of approved engineering plans,

specifications, and calculations (including all approved changes) at the project site or at another accessible location during the operating life of the project. Electronic copies of the approved plans, specifications, calculations, and marked-up as-builts shall be provided to the CBO for retention by the CPM.

Verification: Within 15 days of the completion of any work, the project owner shall submit to the CBO, with a copy to the CPM, in the next monthly compliance report, (a) a written notice that the completed work is ready for final inspection, and (b) a signed statement that the work conforms to the final approved plans. After storing the final approved engineering plans, specifications, and calculations described above, the project owner shall submit to the CPM a letter stating both that the above documents have been stored and the storage location of those documents.

Within 90 days of the completion of construction, the project owner shall provide to the CBO three sets of electronic copies of the above documents at the project owner's expense. These are to be provided in the form of "read only" (Adobe .pdf 6.0) files, with restricted (password-protected) printing privileges, on archive quality compact discs.

CIVIL-1 The project owner shall submit to the CBO for review and approval the following:

1. Design of the proposed drainage structures and the grading plan;
2. An erosion and sedimentation control plan;
3. Related calculations and specifications, signed and stamped by the responsible civil engineer; and
4. Soils, geotechnical, or foundation investigations reports required by the 2007 CBC.

Verification: At least 15 days (or project owner- and CBO-approved alternative time frame) prior to the start of site grading the project owner shall submit the documents described above to the CBO for design review and approval. In the next monthly compliance report following the CBO's approval, the project owner shall submit a written statement certifying that the documents have been approved by the CBO.

CIVIL-2 The resident engineer shall, if appropriate, stop all earthwork and construction in the affected areas when the responsible soils engineer, geotechnical engineer, or the civil engineer experienced and knowledgeable in the practice of soils engineering identifies unforeseen adverse soil or geologic conditions. The project owner shall submit modified plans, specifications, and calculations to the CBO based on these new conditions. The project owner shall obtain approval from the CBO before resuming earthwork and construction in the affected area.

Verification: The project owner shall notify the CPM within 24 hours, when earthwork and construction is stopped as a result of unforeseen adverse geologic/soil conditions. Within 24 hours of the CBO's approval to resume earthwork and construction in the affected areas, the project owner shall provide to the CPM a copy of the CBO's approval.

CIVIL-3 The project owner shall perform inspections in accordance with the 2007 CBC. All plant site-grading operations, for which a grading permit is required, shall be subject to inspection by the CBO.

If, in the course of inspection, it is discovered that the work is not being performed in accordance with the approved plans, the discrepancies shall be reported immediately to the resident engineer, the CBO, and the CPM. The project owner shall prepare a written report, with copies to the CBO and the CPM, detailing all discrepancies, non-compliance items, and the proposed corrective action.

Verification: Within five days of the discovery of any discrepancies, the resident engineer shall transmit to the CBO and the CPM a non-conformance report (NCR), and the proposed corrective action for review and approval. Within five days of resolution of the NCR, the project owner shall submit the details of the corrective action to the CBO and the CPM. A list of NCRs, for the reporting month, shall also be included in the following monthly compliance report.

CIVIL-4 After completion of finished grading and erosion and sedimentation control and drainage work, the project owner shall obtain the CBO's approval of the final grading plans (including final changes) for the erosion and sedimentation control work. The civil engineer shall state that the work within his/her area of responsibility was done in accordance with the final approved plans.

Verification: Within 30 days (or project owner- and CBO-approved alternative time frame) of the completion of the erosion and sediment control mitigation and drainage work, the project owner shall submit to the CBO, for review and approval, the final grading plans (including final changes) and the responsible civil engineer's signed statement that the installation of the facilities and all erosion control measures were completed in accordance with the final approved combined grading plans, and that the facilities are adequate for their intended purposes, along with a copy of the transmittal letter to the CPM. The project owner shall submit a copy of the CBO's approval to the CPM in the next monthly compliance report.

STRUC-1 Prior to the start of any increment of construction of any major structure or component listed in **Facility Design Table 2** of Condition of Certification **GEN-2**, above, the project owner shall submit to the CBO for design review and approval the proposed lateral force procedures for project structures and the applicable designs, plans and

drawings for project structures. Proposed lateral force procedures, designs, plans and drawings shall be those for the following items (from **Table 2**, above):

1. Major project structures;
2. Major foundations, equipment supports, and anchorage; and
3. Large field-fabricated tanks.

Construction of any structure or component shall not begin until the CBO has approved the lateral force procedures to be employed in designing that structure or component.

The project owner shall:

1. Obtain approval from the CBO of lateral force procedures proposed for project structures;
2. Obtain approval from the CBO for the final design plans, specifications, calculations, soils reports, and applicable quality control procedures. If there are conflicting requirements, the more stringent shall govern (for example, highest loads, or lowest allowable stresses shall govern). All plans, calculations, and specifications for foundations that support structures shall be filed concurrently with the structure plans, calculations, and specifications;
3. Submit to the CBO the required number of copies of the structural plans, specifications, calculations, and other required documents of the designated major structures prior to the start of on-site fabrication and installation of each structure, equipment support, or foundation;
4. Ensure that the final plans, calculations, and specifications clearly reflect the inclusion of approved criteria, assumptions, and methods used to develop the design. The final designs, plans, calculations, and specifications shall be signed and stamped by the responsible design engineer; and
5. Submit to the CBO the responsible design engineer's signed statement that the final design plans conform to applicable LORS.

Verification: At least 60 days (or project owner and CBO approved alternative time frame) prior to the start of any increment of construction of any structure or component listed in **Facility Design Table 2** of Condition of Certification **GEN-2**, above, the project owner shall submit to the CBO the above final design plans, specifications and calculations, with a copy of the transmittal letter to the CPM.

The project owner shall submit to the CPM, in the next monthly compliance report, a copy of a statement from the CBO that the proposed structural plans,

specifications, and calculations have been approved and comply with the requirements set forth in applicable engineering LORS.

STRUC-2 The project owner shall submit to the CBO the required number of sets of the following documents related to work that has undergone CBO design review and approval:

1. Concrete cylinder strength test reports (including date of testing, date sample taken, design concrete strength, tested cylinder strength, age of test, type and size of sample, location and quantity of concrete placement from which sample was taken, and mix design designation and parameters);
2. Concrete pour sign-off sheets;
3. Bolt torque inspection reports (including location of test, date, bolt size, and recorded torques);
4. Field weld inspection reports (including type of weld, location of weld, inspection of non-destructive testing (NDT) procedure and results, welder qualifications, certifications, qualified procedure description or number (ref: AWS); and
5. Reports covering other structural activities requiring special inspections shall be in accordance with the 2007 CBC.

Verification: If a discrepancy is discovered in any of the above data, the project owner shall, within 5 days, prepare and submit an NCR describing the nature of the discrepancies and the proposed corrective action to the CBO, with a copy of the transmittal letter to the CPM. The NCR shall reference the Condition(s) of Certification and the applicable CBC chapter and section. Within five days of resolution of the NCR, the project owner shall submit a copy of the corrective action to the CBO and the CPM.

The project owner shall transmit a copy of the CBO's approval or disapproval of the corrective action to the CPM within 15 days. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action to obtain CBO's approval.

STRUC-3 The project owner shall submit to the CBO design changes to the final plans required by the 2007 CBC, including the revised drawings, specifications, calculations, and a complete description of, and supporting rationale for, the proposed changes, and shall give to the CBO prior notice of the intended filing.

Verification: On a schedule suitable to the CBO, the project owner shall notify the CBO of the intended filing of design changes, and shall submit the required number of sets of revised drawings and the required number of copies of the other above-mentioned documents to the CBO, with a copy of the

transmittal letter to the CPM. The project owner shall notify the CPM, via the monthly compliance report, when the CBO has approved the revised plans.

STRUC-4 Tanks and vessels containing quantities of toxic or hazardous materials exceeding amounts specified in the 2007 CBC shall, at a minimum, be designed to comply with the requirements of that chapter.

Verification: At least 30 days (or project owner- and CBO-approved alternate time frame) prior to the start of installation of the tanks or vessels containing the above specified quantities of toxic or hazardous materials, the project owner shall submit to the CBO for design review and approval final design plans, specifications, and calculations, including a copy of the signed and stamped engineer's certification.

The project owner shall send copies of the CBO approvals of plan checks to the CPM in the following monthly compliance report. The project owner shall also transmit a copy of the CBO's inspection approvals to the CPM in the monthly compliance report following completion of any inspection.

MECH-1 The project owner shall submit, for CBO design review and approval, the proposed final design, specifications and calculations for each plant major piping and plumbing system listed in **Facility Design Table 2**, Condition of Certification **GEN-2**, above. Physical layout drawings and drawings not related to code compliance and life safety need not be submitted. The submittal shall also include the applicable QA/QC procedures. Upon completion of construction of any such major piping or plumbing system, the project owner shall request the CBO's inspection approval of that construction.

The responsible mechanical engineer shall stamp and sign all plans, drawings, and calculations for the major piping and plumbing systems, subject to CBO design review and approval, and submit a signed statement to the CBO when the proposed piping and plumbing systems have been designed, fabricated, and installed in accordance with all of the applicable laws, ordinances, regulations and industry standards, which may include, but are not limited to:

- American National Standards Institute (ANSI) B31.1 (Power Piping Code);
- ANSI B31.2 (Fuel Gas Piping Code);
- ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping Code);
- ANSI B31.8 (Gas Transmission and Distribution Piping Code);
- Title 24, California Code of Regulations, Part 5 (California Plumbing Code);

- Title 24, California Code of Regulations, Part 6 (California Energy Code, for building energy conservation systems and temperature control and ventilation systems);
- Title 24, California Code of Regulations, Part 2 (California Building Code); and
- San Bernardino County codes.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of any increment of major piping or plumbing construction listed in **Facility Design Table 2**, Condition of Certification **GEN-2,** above, the project owner shall submit to the CBO for design review and approval the final plans, specifications, and calculations, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with applicable LORS, and shall send the CPM a copy of the transmittal letter in the next monthly compliance report.

The project owner shall transmit to the CPM, in the monthly compliance report following completion of any inspection, a copy of the transmittal letter conveying the CBO's inspection approvals.

MECH-2 For all pressure vessels installed in the plant, the project owner shall submit to the CBO and California Occupational Safety and Health Administration (Cal-OSHA), prior to operation, the code certification papers and other documents required by applicable LORS. Upon completion of the installation of any pressure vessel, the project owner shall request the appropriate CBO and/or Cal-OSHA inspection of that installation.

The project owner shall:

1. Ensure that all boilers and fired and unfired pressure vessels are designed, fabricated, and installed in accordance with the appropriate section of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, or other applicable code. Vendor certification, with identification of applicable code, shall be submitted for prefabricated vessels and tanks; and
2. Have the responsible design engineer submit a statement to the CBO that the proposed final design plans, specifications, and calculations conform to all of the requirements set forth in the appropriate ASME Boiler and Pressure Vessel Code or other applicable codes.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of on-site fabrication or installation of any pressure vessel, the project owner shall submit to the CBO for design review and approval, the above listed documents, including a copy of the signed and stamped engineer's certification, with a copy of the transmittal letter to the CPM.

The project owner shall transmit to the CPM, in the monthly compliance report following completion of any inspection, a copy of the transmittal letter conveying the CBO's and/or Cal-OSHA inspection approvals.

MECH-3 The project owner shall submit to the CBO for design review and approval the design plans, specifications, calculations, and quality control procedures for any heating, ventilating, air conditioning (HVAC) or refrigeration system. Packaged HVAC systems, where used, shall be identified with the appropriate manufacturer's data sheets.

The project owner shall design and install all HVAC and refrigeration systems within buildings and related structures in accordance with the CBC and other applicable codes. Upon completion of any increment of construction, the project owner shall request the CBO's inspection and approval of that construction. The final plans, specifications and calculations shall include approved criteria, assumptions, and methods used to develop the design. In addition, the responsible mechanical engineer shall sign and stamp all plans, drawings and calculations and submit a signed statement to the CBO that the proposed final design plans, specifications and calculations conform with the applicable LORS.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of construction of any HVAC or refrigeration system, the project owner shall submit to the CBO the required HVAC and refrigeration calculations, plans, and specifications, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the CBC and other applicable codes, with a copy of the transmittal letter to the CPM.

ELEC-1 Prior to the start of any increment of electrical construction for all electrical equipment and systems 480 Volts or higher (see a representative list, below), with the exception of underground duct work and any physical layout drawings and drawings not related to code compliance and life safety, the project owner shall submit, for CBO design review and approval, the proposed final design, specifications, and calculations. Upon approval, the above listed plans, together with design changes and design change notices, shall remain on the site or at another accessible location for the operating life of the project. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS. All transmission facilities (lines, switchyards, switching stations,

and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this Decision.

A. Final plant design plans shall include:

   1. one-line diagrams for the 13.8-kV, 4.16-kV and 480 V systems; and
   2. system grounding drawings.

B. Final plant calculations must establish:

   1. short-circuit ratings of plant equipment;
   2. ampacity of feeder cables;
   3. voltage drop in feeder cables;
   4. system grounding requirements;
   5. coordination study calculations for fuses, circuit breakers and protective relay settings for the 13.8-kV, 4.16-kV and 480 V systems;
   6. system grounding requirements; and
   7. lighting energy calculations.

C. The following activities shall be reported to the CPM in the monthly compliance report:

   1. Receipt or delay of major electrical equipment;
   2. Testing or energization of major electrical equipment; and
   3. A signed statement by the registered electrical engineer certifying that the proposed final design plans and specifications conform to requirements set forth in the Energy Commission decision.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of each increment of electrical construction, the project owner shall submit to the CBO for design review and approval the above listed documents. The project owner shall include in this submittal a copy of the signed and stamped statement from the responsible electrical engineer attesting compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next monthly compliance report.

B. POWER PLANT EFFICIENCY

Pursuant to the California Environmental Quality Act (CEQA), the Commission must determine whether the consumption of fossil fuel (a non-renewable form of energy) will result in substantial impacts upon energy resources. (Cal. Code Regs., tit. 14 § 15126.4(a)(1), App. F.). The Calico Solar Project will not use natural gas (fossil fuel) for power generation. The project would decrease reliance on fossil fuel, and would increase reliance on renewable energy resources. The undisputed evidence establishes that the project would not create significant adverse effects on fossil fuel energy supplies or resources, would not require additional sources of energy supply, and would not consume fossil fuel energy in a wasteful or inefficient manner. (Ex. 300, p. D.3-1; 8/4/10 RT 183: 8-9.)

The evidence examines the efficiency of the Calico Solar project design and compares project efficiency to that of other solar projects. (Ex. 300, pp. D.3-1 and D.3-7.) There are no LORS that establish solar power plant efficiency criteria. (Ex. 300, p. D.3-12.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

The Calico Solar Project is a solar thermal power plant that will produce a total of 663.5 MW (nominal net output) and will employ the Stirling Energy Systems SunCatcher technology. The project would occupy approximately 4,613 acres of land and would consist of 26,540 SunCatchers (Ex. 1 AFC §§ 1.1, 1.3, 2.2, 3.1, 3.3; Ex. 300, p. D.3-4; Ex. 317, p. B.1-2.).

Each SunCatcher is composed of a pedestal, a mirrored dish that tracks the sun, and a power conversion unit (PCU) consisting of a solar receiver, a closed-cycle Stirling engine, and a generator that captures the solar energy and converts it to electricity. Each SunCatcher is capable of generating 25 kW of power. Power would be routed from the SunCatchers to electrical transformers, then to a switchyard located near the center of the project. (Ex.1, AFC §§ 3.1, 3.1.1, 3.4.1, 3.4.3, 3.4.4.1, 3.4.4.2; Ex. 300, p. D.3-4.).

The project will not use fossil fuel to generate electricity. Each of the 26,540 Stirling engines is filled with hydrogen gas, which acts as a working fluid that allows the engine to operate. During operation, hydrogen leaks from the engines and must be continuously replenished from a centralized hydrogen system connected to each SunCatcher., Some electricity consumption will result due to the necessity of replacing hydrogen gas that leaks from the Stirling engines. The

project will produce hydrogen gas onsite through electrolysis of water, which will consume 215 MW-hours of electrical energy per year. (Ex. 300, pp. D.3-4 to D.3-5.)

The Stirling engine that is the heart of the SunCatcher technology is cooled by an automotive-style cooling system. Waste engine heat is conducted via an enclosed cooling loop to a radiator that dumps the waste heat to the atmosphere. This is a dry cooling system; its only water consumption is that required to make up any unintended leakage from the system. Thus, we concur with Staff's determination that the cooling technology selected for this project appears optimum. (Ex. 300, p. D.3-8.)

Applicant and Staff evaluated alternative generating technologies to the proposed project. Staff independently concluded that from an energy efficiency prospective, given the project objectives, location, air pollution control requirements, and the commercial availability of various alternative technologies, that the selected solar thermal technology is a reasonable selection. This is evaluated in the **Alternatives** section of this Decision. (Ex. 300, p. D.3-6.)

1. Fossil Fuel Use - Impacts

The Calico Solar Project, if constructed and operated as proposed, will use solar energy to generate all of its capacity, consuming no natural gas for power production. The project will decrease reliance on fossil fuel, and will increase reliance on renewable energy resources. The evidence establishes that the project will not create significant adverse effects on energy supplies or resources, will not require additional sources of energy supply, and will not consume energy in a wasteful or inefficient manner. (Ex. 300, p. D.3-1.) Therefore, we find that this project will present no significant adverse impacts on energy resources.

2. Solar Land Use Impacts

The evaluation of solar power plant efficiency includes land use efficiency because of the large expanses of land covered by these facilities. To address land use efficiency, solar efficiency must be determined by evaluating the effectiveness of the specific technology used and the product of three key steps: capture sun's rays, convert energy to heat, and convert heat to electricity. The greater the project's solar efficiency, the less land the plant must occupy to produce a given power output. Therefore, land use efficiency is expressed in terms of power produced, or MW per acre. (Ex. 300, pp. D.3-2, D.3-7..)

The evidence includes a comparison of MWs per acre for the Calico Solar Project and other solar projects currently under review by the Commission. **Efficiency Table 1** provides the power and energy output and the extent of the land occupied for the Calico Solar Project and other solar projects under review. For comparison purposes, the table also includes the solar land use efficiency for a typical fossil fuel-fired (natural gas-fired) combined cycle power plant. (Ex. 300, pp. D.3-2 and D.3-7.)

According to the Staff analysis, the Calico Solar project, as proposed prior to its downsizing, would produce power at the rate of 850 MW net, and will generate energy at the rate of 1,840,000 MW-hours net per year, while occupying approximately 6,215 acres (Ex. 1. AFC §§ 1.1, 1.3, 2.2, 3.1, 3.11.1.)[1] Staff calculations for the Calico project establish:

Power-based efficiency: 850 MW ÷ 6,125 acres = **0.14 MW/acre** or **7.3 acres/MW**

Staff calculates energy-based land use efficiency thus:

Energy-based efficiency (the first equation removes energy consumed in hydrogen replenishment):

1,840,000 MWh/year -215 MWh/year = 1,839,785 MWh/year

1,839,785 MWh/year ÷ 6,215 acres = **296 MWh/acre-year**

As seen in **Efficiency Table 1** below, the Calico Solar Project, employing the Stirling Energy Systems SunCatcher technology, will be less efficient in use of land than the Beacon Solar, Ridgecrest Solar, Palen Solar, and Blythe Solar projects, which will employ linear parabolic trough technology. Calico Solar is more efficient in use of land than the Ivanpah Solar Electric Generating System project, which will employ BrightSource power tower technology. (Ex. 300, p. D.3-7.)

[1] These results are also representative of the performance of the Scenario 5.5 that is certified in this Decision due to a proportionate reduction in land used and project output. (Ex 317, p. D.3-1.)

Efficiency Table 1 — Solar Land Use Efficiency

Project	Generating Capacity (MW net)	Annual Energy Production (MWh net)	Annual Fuel Consumption (MMBtu LHV)	Footprint (Acres)	Land Use Efficiency (Power-Based) (MW/acre)	Land Use Efficiency (Energy – Based) (MWh/acre-year)	
						Total	Solar Only[1]
Calico Solar (09-AFC-13)	**850**	**1,840,000**	**0**	**6,215**	**0.14**	**296**	**296**
Beacon Solar (08-AFC-2)	250	600,000	36,000	1,240	0.20	484	480
Ivanpah SEGS (07-AFC-5)	400	960,000	432,432	3,744	0.11	256	238
Abengoa Solar (09-AFC-5)	250	630,000	94,280	1,420	0.18	444	434
Blythe Solar (09-AFC-6)	1,000	2,100,000	207,839	5,950	0.17	353	348
Palen Solar (09-AFC-7)	500	1,000,000	103,919	2,970	0.17	337	332
Genesis Solar (09-AFC-8)	250	600,000	60,000	1,800	0.14	333	329
Ridgecrest Solar (09-AFC-9)	250	500,000	51,960	1,440	0.17	347	342
San Joaquin Solar Hybrid (08-AFC-12)	106	774,000	5,899,500	640	0.17	1,209	415
Avenal Energy (08-AFC-1)[2]	600	3,023,388	24,792,786	25	24.0	120,936	N/A

[1]Net energy output is reduced by natural gas-fired combined cycle proxy energy output; see **Efficiency Appendix A**.
[2]Example natural gas-fired combined cycle plant.
Source: Ex. 300, p. D.3-7

Based on the uncontroverted evidence, we make the following findings and reach the following conclusions:

FINDINGS OF FACT

1. The Calico Solar Project will provide approximately 663.5 MW of electrical power and employ Stirling Energy Systems SunCatcher technology, which does not use fossil fuel to generate electricity.

2. The project will use hydrogen gas in the Stirling engines. Hydrogen gas will be produced onsite by electrolysis of water, which will consume 215 MW-hours per year of the electricity generated by the facility.

3. The evidence establishes that the project's fuel consumption will be negligible and therefore no alternative fuel sources were evaluated.

4. The impact of the project's fuel consumption on energy supplies and energy efficiency will be insignificant.

5. The project will decrease reliance on fossil fuel and will increase reliance on renewable energy resources. Consequently, the project will help in reducing California's dependence on fossil fuel-fired power plants.

6. The evidentiary record contains an analysis of the project's land use efficiency and energy output in comparison to other solar projects currently under review by the Commission.

7. The project will occupy approximately 7.3 acres per MW of power output, a figure higher than many other solar power technologies.

8. The Calico Solar Project represents one of the least land use-efficient solar technologies proposed among the projects currently in the Energy Commission's licensing process.

9. No Federal, State, or local laws, ordinances, regulations, or standards apply to the efficiency of this project.

CONCLUSIONS OF LAW

1. The Calico Solar Project will not create adverse effects upon energy supplies or resources, require additional sources of energy supply, or consume energy in a wasteful or inefficient manner.

2. No Conditions of Certification are required for this topic area.

C. POWER PLANT RELIABILITY

In order to ensure safe and reliable operation of the Calico Solar Project, the Commission must determine whether the project will be appropriately designed and sited. [Pub. Res. Code, § 25520(b); Cal. Code Regs., tit. 20, § 1752(c)(2).] However, there are no LORS that establish either power plant reliability criteria or procedures for attaining reliable operation. (Ex. 300, pp. D.4-1 and D.4-8.)

For the purposes of this section, the Commission considers a project is acceptable if it does not degrade the reliability of the utility system to which it is connected. This is likely the case if a project is at least as reliable as other power plants on that system.

The responsibility for maintaining system reliability falls largely to control area operators such as the California Independent System Operator (CAISO) that purchase, dispatch, and sell electric power throughout the State. (Ex. 300, p. D.4-2.) Protocols to ensure sufficient electrical system reliability have been established. For example, "must run" power purchase agreements and "participating generator" agreements are two mechanisms that contribute to an adequate supply of reliable power. (Ex. 300, p. D.4-2.) The California ISO's mechanisms to ensure adequate power plant reliability are based on the assumption that the individual power plants that compete to sell power into the system will each exhibit a level of reliability similar to that of power plants of past decades. (Ex. 300, p. D.4-2.)

The "availability factor" of a power plant is the percentage of time it is available to generate power; both planned and unplanned outages subtract from this availability. Measures of power plant reliability are based upon two factors: (1) the plant's actual ability to generate power when it is considered to be available and, (2) failures at startup and unplanned (or forced) outages. For practical purposes, reliability can be considered a combination of these two industry measures, making a reliable power plant one that is available when called upon to operate. Power plant systems must be able to operate for extended periods without shutting down for maintenance or repairs. Achieving this reliability requires adequate levels of equipment availability, plant maintainability with scheduled maintenance outages, fuel and water availability, and resistance to natural hazards. This section examines these factors for the project and compares them to industry norms. (Ex. 300, p. D.4-2.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

The Applicant proposes to operate the 663.5 megawatt (MW) (net power output) Calico Solar Project, a solar thermal power plant facility employing advanced solar power technology. The Applicant intends to provide dependable power to the grid, generally during the hours of peak power consumption by Southern California Edison (SCE), the interconnecting utility. This project would help serve the need for renewable energy in California, as all its generated electricity will be produced by a reliable source of energy that is available during hot summer afternoons, when power is needed most. In the AFC, the Applicant indicated that it expects the project to achieve an availability factor of 99%. The project is anticipated to operate at an annual capacity factor of approximately 25% (Ex. 1, AFC §§ 1.3, 3.1, 3.9.14, 3.11.1; Ex. 300, p. D.4-3.) However, as discussed below in Plant Maintainability additional information has been provided on this issue. (Ex. 300, p. D.4-4.)

1. Equipment Availability

Equipment availability will be ensured by use of appropriate quality assurance/quality control (QA/QC) programs during design, procurement, construction, and operation of the plant and by providing adequate maintenance and repair of the equipment and systems. The project owner will use a QA/QC program typical in the power industry. Equipment will be purchased from qualified suppliers and the project owner will perform receipt inspections, test components, and administer independent testing contracts. To ensure these measures are taken, we have incorporated appropriate Conditions of Certification in the **Facility Design** section of this Decision. (Ex. 300, p. D.4-3.) Applicant's witness testified to the equipment manufacturer's warranty obligations and fulfillment program, which obligates the manufacturer to have sufficient spare parts on hand to maintain a 98 percent availability factor. (8/4/10 RT 167,174.)

2. Plant Maintainability

The Calico Solar Project will operate only when the sun is shining. Redundant pieces of the equipment most likely to require service or repair will be kept on site in order to allow repairs to be made at night when the plant is shut down or during the day, when the plant is in operation. (Ex. 300, p.D.4-3.) The power conversion unit (PCU), which contains the Stirling engine, is the component that has required the most maintenance interventions at the Applicant's Maricopa test facility. The PCU on a SunCatcher will, when in need of maintenance or repair,

simply be changed out and the removed PCU serviced in the shop. Change-out is considered a normal part of plant operation and typically takes as little as 28 minutes. (8/4/10 RT 170.) During change-out, the affected SunCatcher will not generate electricity, but this will not affect the other SunCatchers, which will continue to operate. This modularity is expected to be beneficial to project reliability. (Id.) The project owner will establish a maintenance program based on the equipment manufacturers recommendations. Maintenance outages will likely be planned for periods of low electricity demand. (Ex. 300, p. D.4-4.)

The Applicant predicts that each machine will leak its entire inventory of hydrogen once a year, thus requiring constant replenishment of hydrogen. The Applicant proposes a hydrogen electrolyzer and piping system that uses electricity from the grid to convert water into hydrogen and oxygen, then compresses the hydrogen and pipes it to each of the 26,540 SunCatchers. (Ex. 300, p. D.4-4.) Experience at the Applicant's 1.5 MW Maricopa Plant (a pilot plant using the Stirling Energy Systems SunCatcher units) has shown that Applicant's hydrogen leakage predictions are correct and its replenishment procedure is functioning as expected. (8/4/10 RT 152, 160, 178.)

Staff expressed reluctance to predict the long-term availability factor for the project. (Ex. 300, p. D.4-5.) However, all the evidence points to an ongoing upward trend at the Maricopa facility. (8/4/10 RT 153.) The current 96.1 percent is already within the range of typical power plant availability factors. Although some individuals have expressed concern due to the fact that this will be the first installation of SunCatchers on so large a scale (Exs. 300, p. D.4-1.), these opinions do not take into account the performance of SunCatchers at the Maricopa test facility. There is no evidence in the record that would tend to show that the availability factor will decrease.

The Applicant submitted a confidential report claiming an overall availability factor[1] of 95.1 percent for the Maricopa Plant during the period of March 16 to June 5, 2010. The proposed Calico Solar Project would be a much larger project than the 60-unit Maricopa Plant, but with a similar configuration. The Maricopa Plant has generated 833,738 kWh, representing a capacity factor of 26.7 percent. This represents several hundred hours of plant operation. The applicant claims that it has used, and will continue to use, lessons learned from the Maricopa Plant to incorporate engineering and maintenance improvements into the Calico Solar Project. (8/4/10 RT 180.)

[1] The availability factor of a power plant is the percentage of time it is available to generate power; both planned and unplanned outages subtract from this availability.

The Applicant's revised data from the Maricopa Plant demonstrates an availability factor based on a limited number of operational hours. The long-term availability factor will be determined only with more operational experience of this technology. Staff proposed, and the Applicant has not contested, a condition requiring periodic reports of the reliability and maintenance data from the Maricopa plant, which we adopt as Condition of Certification REL-1, below.

3. Fuel and Water Availability

For any power plant the long-term availability of fuel, and water for cooling or process use, is necessary to ensure reliability. The Calico Solar Project will not use natural gas or other fossil fuel. Therefore, there is no likelihood that availability of natural gas will cause concern. (Ex. 300, p. D.4-4.)

The Calico Solar Project will use water from a groundwater well on private land adjacent to the project site for mirror washing, for potable and fire protection water, and in an electrolysis process to produce hydrogen gas to replenish the hydrogen that leaks from the Stirling engines. (Ex. 1, AFC §§ 1.3, 1.4, 3.1.2, 3.5.6, 3.5.10, 3.7.) At the project site, the water will be pumped from the well, conveyed in an underground pipe to a storage tank, treated and dispersed for onsite use. Since the Stirling engines are air-cooled, no water will be required for power plant cooling. (Ex. 300, p. D.4-4.)

To ensure the well can provide an adequate water supply, we adopt Condition of Certification **Soil & Water-9**, which requires a Water Conservation and Alternative Water Supply Plan, should groundwater monitoring indicate long-term downward trends in water levels and storage. With the implementation of this condition of certification, we find that the water supply will be adequate for the project. For further discussion of water supply, see the **Soil and Water Resources** section of this Decision.

4. Natural Hazards

The site lies within a seismically active region; see the "Faulting and Seismicity" portion of the **Geology and Paleontology** section of this document. The project will be designed and constructed to the latest applicable LORS. (Ex,1, AFC § 3.10.1.1.) Compliance with current seismic design LORS represents an upgrading of performance during seismic shaking compared to older facilities since these LORS have been continually upgraded. Because the solar project will be built to the latest seismic design LORS, this project will likely perform at

least as well as, and perhaps better than, existing plants in the electric power system. We adopted conditions of certification to ensure this; see the **Facility Design** section. The evidence provides no special concerns with the power plant's functional reliability during earthquakes. (Ex. 300, p. D.4-5.)

Portions of the site lie within the 100-year flood plain. (Ex. 1, AFC §§ 3.10.1.4.) Project features will be designed and built to provide adequate levels of flood resistance. Thus, the evidence provides no special concerns with power plant functional reliability due to flooding. For further discussion, see the **Soil and Water Resources** and **Geology and Paleontology** sections. (Ex. 300, p. D.4-5.)

High winds are common in this region of the site; project features will be built to withstand winds over 90 miles per hour. However, at winds greater than 35 miles per hour the SunCatchers will move to a stowed position. (8/4/10 RT 189.) Design would be in accordance with applicable LORS, including the 2007 California Building Code (Ex. 1, AFC § 3.10.1.2). The evidence provides no special concerns with power plant functional reliability due to wind. (Ex. 300, p. D.4-5.)

5. Comparison to Industry Norms

The North American Electric Reliability Corporation (NERC) maintains industry statistics for availability factors (as well as other related reliability data). The NERC regularly polls North American utility companies on their project reliability through its Generating Availability Data System and periodically summarizes and publishes those statistics on the Internet at <http://www.nerc.com>. Energy Commission staff typically compares the applicant's claims for reliability to the statistical reliability of similar power plants. Because solar technology is relatively new and the technologies employed so varied, no NERC statistics are available for solar power plants. Thus our typical comparison with other existing facilities cannot be accomplished. (Ex. 300, p. D.4-5.)

Nevertheless, typical availability factors for gas-fired power plants range from 94 to 98 percent. *See* North American Electric Reliability Council *2005–2009 Generating Availability Report,* available at <www.nerc.com/elibrary>. Given that the evidence of limited performance history shows the Calico project will likely achieve an availability factor within this range, we find that the project compares favorably with industry norms for utility-scale electrical generation facilities.

FINDINGS OF FACT

Based on the uncontested evidence, we make the following findings:

1. No federal, state, or local/county LORS apply to the reliability of the Calico Solar Project.

2. A project's reliability is acceptable if it does not degrade the reliability of the utility system to which it is connected.

3. No NERC statistics for solar power plants are currently available. Therefore, the evidence contains a comparison of the project's predicted availability factor to the average availability factor of fossil-fueled plants.

4. The technology used by the Calico Solar Project has certain potential reliability advantages compared to other generating technologies including its modularity and the ability to maintain and repair individual units without materially affecting overall output, and certain disadvantages including a relative lack of historical field data on commercial-scale installations.

5. The Calico Solar Project is anticipated to operate at an annual capacity factor of approximately 25

6. Implementation of QA/QC programs during design, procurement, construction, and operation of the plant, as well as adequate maintenance and repair of the equipment and systems, will ensure the project is adequately reliable.

7. Appropriate Conditions of Certification included in the **FACILITY DESIGN** portion of this Decision ensure implementation of the QA/QC programs and conformance with seismic design criteria.

8. The Applicant will use the water from a private well adjacent to the project site to supply water for the project. The evidence includes additional information regarding the Lavic Groundwater Basin, and with the implementation of Condition of Certification **SOIL&WATER-9**, the water supply will be adequate for the project.

9. The project will meet or exceed reliability during seismic events, flooding and high winds.

10. The project will incorporate an appropriate redundancy of function for its equipment.

11. The project will provide renewable energy on hot summer days, when it is most needed.

CONCLUSIONS OF LAW

1. We therefore conclude that the Calico Solar Project will meet or exceed industry norms and not degrade the overall reliability of the electrical system.

2. There are no LORS that establish either power plant reliability criteria or procedures for attaining reliable operation.

CONDITIONS OF CERTIFICATION

REL-1 From the time of the Energy Commission's adoption of this condition of certification to the start of commercial operation of the Calico Solar Project, or to the closure of the Maricopa Plant, whichever occurs earlier, the project owner shall obtain and provide to the CPM quarterly data sets of reliability and maintenance data from the Maricopa Plant, including the following:

a) logs of equipment failure data and operational data for all major equipment, including power conversion units, drive mechanisms, and controls. These logs shall include major equipment and plant availability factors, and major equipment and plant forced outage rates, including their causes and durations

b) plant operating logs showing dates and times of dispatch, and power level of dispatch

During the first two years of the commercial operation of the Calico Solar Project, the project owner shall maintain quarterly data sets of reliability and maintenance data, including the information specified in paragraphs a) and b) above, for the Calico Solar Project and make the information available to the CPM upon request.

Verification: On a quarterly basis, the project owner shall submit the Maricopa project data described in paragraphs a) and b) above, to the CPM, and shall make the Calico Solar Project data available to the CPM upon request.

D. TRANSMISSION SYSTEM ENGINEERING

The transmission system engineering analysis examines whether the Calico Solar Project's proposed interconnection conforms to all laws, ordinances, regulations, and standards (LORS) required for safe and reliable electric power transmission. The Commission's jurisdiction includes "…any electric power line carrying electric power from a thermal power plant… to a point of junction with an interconnected transmission system." (Pub. Res. Code § 25107.) Additionally, under CEQA, the Energy Commission must conduct an environmental review of the "whole of the action," which may include facilities not licensed by the Energy Commission. (Title 14, California Code of Regulations section 15378.)

The Energy Commission must, therefore, identify the system impacts and necessary new or modified transmission facilities downstream of the proposed interconnection that are required for interconnection and that, when included with the other project features, represent the whole of the action. (Ex. 300, p. D.5-1.)

Commission staff relies on the responsible interconnecting authority for analysis of impacts on the transmission grid, as well as for the identification and approval of new or modified facilities required downstream from a proposed interconnection for mitigation purposes. The proposed Calico Solar Project will connect to Southern California Edison's (SCE's) existing 230 kV transmission network and will require both analysis by SCE and the approval of the California Independent System Operator (CAISO). (Ex. 300, p. D.5-1.)

The CAISO is responsible for ensuring electric system reliability for all participating transmission owners and for developing the standards to achieve system reliability. The power generated by the proposed Calico Solar Project will be dispatched to the CAISO grid via SCE's existing Pisgah 230 kV Substation. Therefore, the CAISO will review the studies of the SCE system to ensure adequacy of the proposed transmission interconnection. The California ISO determines the reliability impacts of proposed transmission modifications on the SCE transmission system in accordance with all applicable reliability criteria. According to the California ISO tariffs, the California ISO will determine the need for transmission additions or upgrades downstream from the interconnection point to insure reliability of the transmission grid. (Ex. 300, p. D.5-2.)

The CAISO reviewed the System Impact Study prepared by SCE for the proposed project and issued a preliminary approval to SCE. On completion of the

SCE Facility Study, the CAISO will review the study results and provide its conclusions and recommendations. (Ex. 300, p. D.5-2.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

1. Transmission Facilities Description

The applicant proposes to interconnect the proposed 663.5 megawatt (MW) Calico Solar Project to SCE's existing Pisgah 230 kV Substation, which is located in San Bernardino County approximately 35 miles east of Barstow, California. The proposed project will be developed in two phases, one 275 MW phase (Calico Solar Project Phase 1), and one 388.5 MW phase (Calico Solar Project Phase 2). (Ex. 300, p. D.5-4.)

The Calico Solar Project is a solar concentrating thermal power plant, based on the proprietary SunCatcher technology of Sterling Energy System, Inc. Each SunCatcher consists of a 25-kilowatt (kW) solar power generating system. The project will consist of approximately 34,000 SunCatchers total for the two phases. Each complete solar group will consist of 60 SunCatchers, which correlates to a 1.5 MW power block with a corresponding GSU (collector group step-up unit) transformer. The 1.5 MW solar groups will be connected by underground electrical cables to create the 3, 6, and 9 MW solar groups. MW groups will be coupled through underground electrical cables and will ascend through a pole riser to either a 48 MW or 51 MW overhead distribution collector line. The overhead collector groups will deliver the solar electric generated power to a new 850 MW substation constructed on site as part of the project. (Ex. 1, Section 3.4, pages 3-27 to 3-32 and Figure 3-1 to 3-45, Ex. 300, p. D.5-4.)

The substation will consist of six open-air bus segments with each segment consisting of five 1,200A, 35 kV collection feeder circuit breakers. One 48 MW and two 51 MW overhead collection lines will be connected to each of the six 34.5 kV bus segments via circuit breakers. Additionally, two 35 kV circuit breakers in each segment will connect to capacitor banks in the substation yard. For Phase 1 of the project, the first interconnection substation will consist of six power transformers rated at 100/133/167 MVA each to convert the generation collection voltage from 34.5 kV to the transmission tie voltage of 230kV. Each power transformer will serve 3 of the 15 overhead collection lines. The high side of each step up transformer will be connected to the 230kV bus segments via 2000A, 230kV circuit breakers. One common bus for each phase will be formed

by connecting the 230 kV bus segments through 2000A disconnect switches. (Ex. 300, pp. D.5-4 to D.5-5.)

An approximately two-mile long 230-kV single circuit will be used to interconnect the new Calico Solar Project substation to the existing Pisgah Substation. Each circuit of the overhead line begins at a dead-end structure in the Calico Solar Project substation, continues east and parallel to the Burlington Northern Santa Fe (BNSF) railroad ROW, and south crossing the BNSF railroad to a point where the line turns east leaving the site and undercrossing three SCE transmission lines before it finally enters the SCE Pisgah substation from the south. The transmission lines will start within the project site boundary but a 0.14 mile long segment from the project site to the Pisgah Substation will be outside the project site boundary. The off-site portion of the 230kV interconnect transmission line will be routed under existing SCE transmission lines. Construction of that line will include dead-end structures in the substation and 12 to 15 230 kV lattice steel towers and/or tubular steel poles and new 1,590 kcmil ACSR conductors for each phase of the circuit. (Ex. 300, p. D.5-5.)

Furthermore, SCE has proposed expanding and upgrading the existing 230kV SCE Pisgah substation to a 230/500kV substation, increasing the voltage to 500kV, looping the Eldorado-Lugo 500kV line into the SCE Pisgah substation and upgrading 65 miles of the existing Lugo-Pisgah number two 230kV transmission line to 500kV. (Ex. 300, p. D.5-5.)

Pre-Project Upgrade Requirements. The upgrades included below are those facilities that are required to mitigate reliability violations caused by higher-queued projects, placed ahead of the project in the generator interconnection queue, and are expected to be implemented by those higher-queued projects. In the event that any of these higher-queued projects withdraw their application, the Calico Solar Project may become responsible for these additional facilities.

- Upgrade of the Inyo 115kV Phase-Shift transformer;
- Inyokern substation conversion to 230kV;
- New Lugo-Kramer Transmission Line project;
- Construction of a third Lugo 500/230kV transformer Bank;
- Mountain Pass-El Dorado 115kV line reconductor;
- Replacing El Dorado 230/115kV transformer Bank with a larger size. (Ex. 300, p.D.5-7.)

2. Transmission System Impacts Analysis

SCE prepared the System Impact Studies (SIS) at the request of the Applicant to identify the potential impacts of the proposed Calico Solar Project on SCE's transmission system. The SIS included power flow, sensitivity, and short circuit studies, and transient and post-transient analyses. The SIS modeled the proposed project for a net output of 850 MW. The base cases included all CAISO approved major SCE transmission projects, and major path flow limits of Southern California Import Transmission (SCIT), East-Of-River, West-of-River and upgraded 115kV phase shifting transformer at Inyo substation. The SIS considered light load conditions with generation patterns and SCIT imports maximized to identify the extent of potential congestion and to fully stress the SCE system in the area where the project phases of the proposed Calico Solar Project will be interconnected. (Ex. 300, pp. D.5-5 to D.5-6.)

The power flow studies were conducted with and without Calico Solar connected to SCE's grid at the existing Pisgah Substation, using 2009 heavy summer and 2009 light spring base cases. The power flow study assessed the potential impacts of the proposed Calico Solar Project on thermal loading of the transmission lines and equipment. Transient and post-transient studies were conducted for Phases 1 and 2 of the proposed Calico Solar Project using the 2009 heavy summer base case to determine whether the project will create instability in the system following certain selected outages. Short circuit studies were conducted to determine if Phases 1 and 2 of the proposed Calico Solar Project will overstress existing substation facilities. (Ex. 300, pp. D.5-5 to D.5-6.)

Based on the results of the SIS and the implementation of **Conditions of Certification TSE-1 through TSE-7**, we find that the outlet lines and termination of Phases 1 and 2 of the proposed Calico Solar Project are acceptable and will comply with all applicable LORS. This determination is based on Commission staff evaluation of the project transmission lines and equipment, both from the power plant up to the point of interconnection with the existing transmission network as well as upgrades beyond that interconnection that are attributable to the project. (Ex. 300, p.D.5-23.) In addition, the staff analysis included recommended measures (required facilities) that must be met by the project owner as part of the project. These required facilities include:

- Expand the existing Pisgah 230kV interconnection facility;
- Loop the existing Eldorado-Lugo 500kV transmission line into the expanded Pisgah substation;
- Install a new Lugo-Pisgah Number 2 500kV transmission line;

- Require a Special Protection System (SPS) to mitigate thermal overloads;
- Design and construct the project with adequate reactive power resources. (Ex. 300, pp.D.5-1 and D.5-23.)

BNSF and CURE argue in their PMPD comments that further analysis of the various transmission system improvements necessary to connect CSP to the electric grid is necessary prior to approving CSP. The potential system improvements are beyond the point of first interconnection to the electric grid and not under the Energy Commission's jurisdiction. They are a combination of equipment upgrades in existing switchyards and reconductoring of existing or new transmission lines. The equipment upgrades in existing facilities do not require further environmental analysis. The transmission line construction and reconductoring is commonly understood and mitigation strategies for any potential impact likely to occur are widely known and understood. That work will be reviewed and approved by other agencies who can and should require the appropriate mitigation. (8/4,/10 RT 248 – 250, 258-261.)

3. Cumulative Impacts

The cumulative analysis considers whether the interconnection of the Calico Solar Project to SCE's transmission system along with other existing and foreseeable generation projects will conform to all LORS. The geographic scope for cumulative impacts on the electric system includes the Southern California Edison (SCE) grid. The SCE grid includes many natural gas-fired power plants, several hydroelectric power plants, and a growing number of solar and wind power plants. The existing transmission system in the project area lacks additional capacity and will require upgrades for any projects not currently interconnected to the grid. (Ex. 300, p. D.5-16.)

The impacts identified in the SIS will be mitigated with the identified recommended measures and conditions of certification, which will minimize the project's contribution to cumulative impacts. The evidence also supports positive impacts because the Calico Solar Project will supplement local solar generation and import of power to the SCE system, and will meet the increasing load demand in the San Bernardino County and Riverside County. (Ex. 300, p. D.5-16.)

4. Public and Agency Comments

No public or agency comments were received for transmission system engineering.

FINDINGS OF FACT

Based on the uncontroverted evidence of record, the Commission makes the following finding:

1. The proposed interconnection of the 663.5 MW Calico Solar Project to SCE's existing Pisgah 230 kV substation, the new 230 kV Calico substation, two-mile long transmission line, GSU transformer, and other associated facilities will be in accordance with NERC/WECC planning standards and CAISO reliability criteria. We find that with implementation of the required facilities and the conditions of certification, the requirements and standards of all applicable engineering LORS contained in **Appendix A** will be met.

2. The record includes a System Impact Study, which analyzed potential reliability and congestion impacts that could occur when the Calico Solar Project interconnects to the grid.

3. The System Impact Study considered power flow with implementation of pre-project upgrades that will be made by projects in a higher-queue than the Calico Solar Project and also considered power flow with pre-project and project-initiated upgrades.

4. The System Impact Study performed by SCE demonstrates that the addition of the Calico Solar Project will cause new normal (N-0) and single contingency (N-1) overloads on the Lugo No. 1 & No. 2 500/230 kV transformer banks and the Lugo-Pisgah 230 kV lines during heavy summer peak and light spring conditions. However, with all pre-project upgrades and project-related upgrades, the base overloads were eliminated.

5. The System Impact Study also evaluated transient and post transient scenarios. The study determined the system remained stable with the implementation of pre-project and proposed project-related system upgrades.

6. The record contains analysis of required facilities the Applicant will need to implement to mitigate project-related thermal overloads.

7. The Calico Solar Project will meet the requirements and standards of all applicable LORS upon compliance with the recommended Conditions of Certification.

8. The Calico Solar Project is a solar generation facility, which will provide clean renewable energy that will help meet state mandates and goals.

CONCLUSIONS OF LAW

1. With the implementation of the conditions of certification specified in this Decision, and the conditions of certification which follow, the proposed transmission interconnection for the Calico Solar Project will not contribute to significant adverse direct, indirect, or cumulative impacts.

2. The conditions of certification identified below ensure that the transmission-related aspects of the Calico Solar project will be designed, constructed, and operated in conformance with the applicable laws, ordinances, regulations, and standards identified in the appropriate portion of **Appendix A** of this Decision.

CONDITIONS OF CERTIFICATION

TSE-1 The project owner shall furnish to the Compliance Project Manager (CPM) and to the Chief Building Official (CBO) a schedule of transmission facility design submittals, a Master Drawing List, a Master Specifications List, and a Major Equipment and Structure List. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide designated packages to the CPM when requested.

Verification: At least 60 days prior to the start of construction (or a lesser number of days mutually agreed to by the project owner and the CBO), the project owner shall submit the schedule, a Master Drawing List, and a Master Specifications List to the CBO and to the CPM. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a list of major equipment in **Transmission System Engineering Table 1**, Major Equipment List below). Additions and deletions shall be made to the table only with CPM and CBO approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

Transmission System Engineering Table 1
Major Equipment List

Breakers Step-Up Transformer Switchyard Busses Surge Arrestors Disconnects	Take Off Facilities Electrical Control Building Switchyard Control Building Transmission Pole/Tower Grounding System

TSE-2 Prior to the start of construction, the project owner shall assign an electrical engineer and at least one of each of the following to the project: A) a civil engineer; B) a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; C) a design engineer who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; or D) a mechanical engineer. (Business and Professions Code Sections 6704 et seq. require state registration to practice as a civil engineer or structural engineer in California.)

The tasks performed by the civil, mechanical, electrical, or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California-registered electrical engineer. The civil, geotechnical or civil, and design engineer assigned in conformance with Facility Design Condition **GEN-5**, may be responsible for design and review of the TSE facilities.

The project owner shall submit to the CBO for review and approval, the names, qualifications, and registration numbers of all engineers assigned to the project. If any one of the designated engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval.

The project owner shall notify the CPM of the CBO's approval of the new engineer. This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform to predicted conditions used as a basis for design of earthwork or foundations.

The electrical engineer shall:

1. Be responsible for the electrical design of the power plant switchyard, outlet and termination facilities; and
2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: At least 30 days prior to the start of rough grading (or a lesser number of days mutually agreed to by the project owner and the CBO), the project owner shall submit to the CBO for review and approval, the names, qualifications, and registration numbers of all the responsible engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner shall have five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of that approval.

TSE-3 If any discrepancy in design and/or construction is discovered in any engineering work that has previously undergone CBO design review and approval, the project owner shall document the discrepancy and recommend corrective action, (California Building Code, 1998, Chapter 1, Section 108.4, Approval Required; Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector; Appendix Chapter 33, Section 3317.7, Notification of Noncompliance). The discrepancy documentation shall become a controlled document and shall be submitted to the CBO for review and approval and shall reference this condition of certification.

Verification: The project owner shall submit a copy of the CBO's approval or disapproval of any corrective action taken to resolve a discrepancy to the CPM within 15 days of receipt. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action required obtaining the CBO's approval**.**

TSE-4 For the power plant switchyard, outlet line, and termination, the project owner shall not begin any increment of construction until plans for that increment have been approved by the CBO. These plans, together with design changes and design change notices, shall remain on the site for one year after completion of construction. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS. The following activities shall be reported in the Monthly Compliance Report:

- Receipt or delay of major electrical equipment;
- Testing or energization of major electrical equipment; and

- The number of electrical drawings approved, submitted for approval, and still to be submitted**.**

Verification: At least 30 days prior to the start of each increment of construction (or a lesser number of days mutually agreed to by the project owner and the CBO), the project owner shall submit to the CBO for review and approval the final design plans, specifications, and calculations for equipment and systems of the power plant switchyard, outlet line, and termination, including a copy of the signed and stamped statement from the responsible electrical engineer attesting to compliance with the applicable LORS, and shall include a copy of the transmittal letter in the next Monthly Compliance Report**.**

TSE-5 The project owner shall ensure that the design, construction, and operation of the proposed transmission facilities conform to all applicable LORS, including the requirements listed below. The project owner shall submit the required number of copies of the design drawings and calculations as determined by the CBO.

1. The Calico Solar Project shall be interconnected to the SCE grid via a segment of 230kV, 1590 kcmil-ACSR, approximately 2 mile long single circuit extending from the new substation on the project site to the Pisgah SCE Substation.

2. The Calico Solar Project substation on the project site shall use 34.5kV, 1200A, 25 breakers and six, three phase, 100/133/167.7 MVA, 34.5kV/230 kV transformers.

3. The power plant outlet line shall meet or exceed the electrical, mechanical, civil, and structural requirements of CPUC General Order 95 and General Order 98 or National Electric Safety Code (NESC), Title 8 of the California Code and Regulations (Title 8), Articles 35, 36, and 37 of the “High Voltage Electric Safety Orders”, California ISO standards, National Electric Code (NEC), and related industry standards.

4. Breakers and busses in the power plant switchyard and other switchyards, where applicable, shall be sized to comply with a short-circuit analysis.

5. Outlet line crossings and line parallels with transmission and distribution facilities shall be coordinated with the transmission line owner and comply with that owner’s standards.

6. The project conductors shall be sized to accommodate the full output from the project.

7. Termination facilities shall comply with applicable SCE interconnection standards.

8. The generating facility shall provide sufficient reactive power resources on the project site as specified by the power factor design criteria requirements in Large Generator Interconnection Agreement.

Verification: At least 30 days prior to the start of construction of transmission facilities (or a lesser number of days mutually agreed to by the project owner and CBO), the project owner shall submit to the CBO for approval:

1. Design drawings, specifications, and calculations conforming with CPUC General Order 95 and General Order 98 or NESC; Title 8, California Code of Regulations, Articles 35, 36, and 37 of the "High Voltage Electric Safety Orders"; NEC; applicable interconnection standards, and related industry standards for the poles/towers, foundations, anchor bolts, conductors, grounding systems, and major switchyard equipment.
2. For each element of the transmission facilities identified above, the submittal package to the CBO shall contain the design criteria, a discussion of the calculation method(s), a sample calculation based on worst-case conditions,[1] and a statement signed and sealed by the registered engineer in responsible charge**,** or other acceptable alternative verification, that the transmission element(s) will conform with CPUC General Order 95 or NESC; Title 8, California Code of Regulations, Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders"; NEC; applicable interconnection standards, and related industry standards.
3. Electrical one-line diagrams signed and sealed by the registered professional electrical engineer in responsible charge, a route map, and an engineering description of equipment and the configurations covered by requirements **TSE-1 through 5** above.

TSE-6 The project owner shall provide the following Notice to the California Independent System Operator (California ISO) prior to synchronizing the facility with the California transmission system:

1. At least one week prior to synchronizing the facility with the grid for testing, provide the California ISO a letter stating the proposed date of synchronization; and

2. At least one business day prior to synchronizing the facility with the grid for testing, provide telephone notification to the California ISO Outage Coordination Department.

Verification: The project owner shall provide copies of the California ISO letter to the CPM when it is sent to the California ISO one week prior to initial synchronization with the grid. A report of the conversation with the California ISO shall be provided electronically to the CPM one day before synchronizing the facility with the California transmission system for the first time.

[1] Worst-case conditions for the foundations would include for instance, a dead-end or angle pole.

TSE-7 The project owner shall be responsible for the inspection of the transmission facilities during and after project construction, and any subsequent CPM and CBO approved changes thereto, to ensure conformance with CPUC GO-95 or NESC; Title 8, CCR, Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders"; applicable interconnection standards; NEC; and related industry standards. In case of non-conformance, the project owner shall inform the CPM and CBO in writing, within 10 days of discovering such non-conformance and describe the corrective actions to be taken.

Verification: Within 60 days after first synchronization of the project, the project owner shall transmit to the CPM and CBO:

1. As-built engineering description(s) and one-line drawings of the electrical portion of the facilities signed and sealed by the registered electrical engineer in responsible charge. A statement attesting to conformance with CPUC GO-95 or NESC; Title 8, California Code of Regulations, Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders"; applicable interconnection standards; NEC; and related industry standards, and these conditions shall be provided concurrently with the submittal of the as-built plans.
2. An as-built engineering description of the mechanical, structural, and civil portions of the transmission facilities signed and sealed by the registered engineer in responsible charge or acceptable alternative verification. As-built drawings of the electrical, mechanical, structural, and civil portions of the transmission facilities shall be maintained at the power plant and made available, if requested, for CPM audit as set forth in the "Compliance Monitoring Plan."
3. A summary of inspections of the completed transmission facilities, and identification of any nonconforming work and corrective actions taken, signed and sealed by the registered engineer in charge.

E. TRANSMISSION LINE SAFETY AND NUISANCE

The Calico Solar, LLC, project's transmission line must be constructed and operated in a manner that protects environmental quality, assures public health and safety, and complies with applicable law. This portion of the Decision assesses the potential for the generation tie line to create the various impacts mentioned below, as well as to determine whether mitigation measures are required to reduce any significant adverse effects to insignificant levels. The analysis of record takes into account both the physical presence of the line and the physical interactions of its electric and magnetic fields. Evidence was submitted by Applicant, Staff, and Intervenor BNSF. (8/25/2010 RT 8, 318-319; Exs. 1; 300, C.12; 1200-1210.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

The proposed tie-in line system for the two project phases would consist of the following individual segments:

- A new, single-circuit 230-kV overhead transmission line extending two miles from the on-site project switchyard to SCE's Pisgah Substation; and
- The project's on-site 230-kV switchyard from which the conductors would extend to the SCE Pisgah Substation.

The on-site segment of the proposed project line would be located within its own unshared right-of-way as it extends from the on-site substation, crossing over three SCE transmission lines of 230-kV and 500-kV as it extends to the connection point within the Pisgah Substation. The proposed routing scheme was chosen to minimize the length of the required line and to locate the line within existing line corridors to the extent possible. To accommodate the power from Phase 1 and later Phase 2, SCE has proposed expanding and upgrading the 230-kV Pisgah Substation to 500-kV, looping the Eldorado-Lugo 500-kV line into the Pisgah Substation and upgrading 65 miles of the existing Lugo-Pisgah No.2 230 line to 500-kV. Modifications within SCE's El Dorado and Lugo Substations would also be necessary. These project-related line modifications would be under CPUC and BLM jurisdiction and would thus be made according to CPUC guidelines ensuring compliance with existing health and safety LORS. (Exs. 1, pp. 3-27 to 3-36; 300, pp. C.12-1, C.12-4.)

Potential impacts involve aircraft collisions, interference with radio frequency communication, audible noise, fire danger, hazardous shocks, nuisance shocks,

and electric and magnetic field (EMF) exposure. (Ex. 300, pp. C.12-5 to C.12-8.) The evidence conclusively establishes the following:

1. Aviation Safety

Any potential hazard to area aircraft would relate to the potential for collision in the navigable airspace. The LORS listed in the Supplemental Staff Assessment, **TLSN Table 1** (Ex. 300, p.C.12-2), require FAA notification in cases of structures over 200 feet from the ground, or if the structure is less than 200 feet in height but would be located within the restricted airspace in the approaches to public or military airports. For airports with runways longer than 3,200 feet, the restricted space is defined by the FAA as an area extending 20,000 feet from the runway. For airports with runways of 3,200 feet or less, the restricted airspace would be an area that extends 10,000 feet from this runway. For heliports, the restricted space is an area that extends 5,000 feet.

The closest area airports are too far from the proposed project and related facilities to pose a collision hazard to aircraft according to FAA criteria. Furthermore, the maximum height of 110 feet for the proposed line support structures would be much less than the 200-foot height that triggers the concern over aviation hazard according to FAA requirements. (Exs. 1; p. 3-31 and Figure 3.4-39; 300, p. C.12-5.)

2. Interference with Radio-Frequency Communication

This potential impact is one of the indirect effects of line operation and is produced by the physical interactions of the electric fields. It arises from corona discharge and is primarily a concern for lines larger than 345-kV. When generated, it is perceived as interference with radio or television signal reception or interference with other forms of radio communication. The project's 230-kV line will be built and maintained according to standard SCE practices aimed at minimizing any interference. Moreover, there are no nearby residential receptors. Thus, no radio frequency interference or related complaints are likely. (Ex. 300, pp. C.12-5 to C.12-6.)

3. Audible Noise

This is typically perceived as a characteristic crackling, hissing, or frying sound or hum, especially in wet weather.[1] The noise level depends upon the strength of the line's electric field, and is a concern mainly from lines of 345-kV or higher. It can be limited through design, construction, and maintenance practices. The project's line (230-kV) will embody a low corona design to minimize field strengths. The evidence shows that the line is not expected to add significantly to the current background noise levels.[2] (Ex. 300, p. C.12-6.)

4. Fire Hazards

Fire can be caused by sparks from the line's conductors or by direct contact between the line and nearby trees or other combustible objects. SCE's standard fire prevention and suppression measures, and compliance with the clearance-related aspects of GO-95 as required in Condition of Certification **TLSN-3**, ensure that appropriate fire prevention measures are implemented. (Ex. 300, pp. C.12-6.)

5. Hazardous Shocks

These could result from direct or indirect contact between an individual and the energized line. Adherence to minimum national safe operating clearances in areas where the line might be accessible to the public assures safety. Compliance with the CPUC's GO-95, as required in Condition of Certification **TLSN-1**, will ensure that adequate measures are implemented to minimize this potential impact. (Ex. 300, p. C.12-6.)

6. Nuisance Shocks

Nuisance shocks are typically caused by direct contact with metal objects electrically charged by fields from an energized line. They are effectively minimized through grounding procedures for all metallic objects within the right-of-way as specified by the National Electrical Safety Code (NESC) as well as the joint guidelines of the American National Standards Institute (ANSI) and the

[1] In fair weather, audible noise from modern transmission lines is generally indistinguishable from background noise at the edge of a right-of-way 100 or more feet wide. (Ex. 300, p. C.12-6.)

[2] Overall project noise levels are discussed in the **Noise** section of this Decision.

Institute of Electrical and Electronics Engineers (IEEE). This is required in Condition of Certification **TLSN-4**. (*Id.*)

The railway line of Intervenor Burlington Northern Santa Fe (BNSF) bisects the project site. To avoid the risk of inductive shocks related to the Calico transmission lines, BNSF requested that Condition of Certification **TLSN-4** be modified to require a minimum clearance of 300 feet between the proposed transmission lines and the edge of the right-of-way for the BNSF tracks. In addition, in the location where the transmission line is proposed to cross the tracks, BNSF argues that the transmission line should do so at a 90-degree angle, and should travel 300 feet from the far side of the right of way before returning to a parallel configuration. Applicant and Staff supported BNSF's proposed change. We have modified Condition of Certification **TLSN-4** and added a new **TLSN-5** to incorporate the BNSF requests. (Exs. 300, pp. C.12-6 and C.12-8; 1200; 1209; 8/25/10 RT pp. 8, 318, 319.)

7. Exposure to Electric and Magnetic Fields

Electric and magnetic fields (EMF) occur whenever electricity flows. The possibility of deleterious health effects from exposure to EMF has raised public health concerns about living and working near high-voltage lines. Due to the present scientific uncertainty regarding these potential health effects, CPUC policy requires reduction of EMF fields in the design, construction, and maintenance of new or modified lines, if feasible, without affecting the safety, efficiency, reliability, and maintainability of the transmission grid. (Ex. 300, pp. C.12-7 to C.12-8.)

The CPUC requires each new or modified transmission line in California to be designed according to the EMF-reducing guidelines of the electric utility in the service area involved. EMF fields produced by new lines must be similar to the fields of comparable lines in that service area. To comply with CPUC requirements for EMF management, SCE's specific field strength-reducing measures will be incorporated into the project line's design and include:

- Increasing the distance between the conductors and the ground to an optimal level;
- Reducing the spacing between the conductors to an optimal level;
- Minimizing the current in the line; and
- Arranging current flow to maximize the cancellation effects from the interaction of conductor fields. (Ex. 300, pp. C.12-9 to C.12-10.)

Applicant calculated the maximum electric and magnetic field intensities expected along the Phase I line route.[3] Condition of Certification **TLSN-2** requires that actual field strengths be measured, according to accepted procedures, to insure that the field intensities are similar to those of other SC&E lines. These measurements will reflect both the effectiveness of the field reduction techniques used and the project's potential contribution to area EMF levels. (Ex. 300, p. C.12-10.)

Since there are no residences in the vicinity of the project's line, there will not be the long-term human residential EMF exposures primarily responsible for the health concern of recent years. The only project-related EMF exposures of potential significance are the short-term exposures of plant workers, regulatory inspectors, maintenance personnel, visitors, or individuals in the immediate vicinity of the lines. The evidence shows that these types of exposures are not significantly related to an adverse health effect. (Ex. 300, p. C.12-16, C.12-19.)

Overall, the evidence shows that the tie line will be designed, constructed, operated, and maintained in compliance with applicable LORS. Implementation of the Conditions of Certification will ensure that any impacts are reduced to less than significant levels. (Ex. 300, pp. C.12-16 to C.12-17.)

Finally, the evidence addresses the impacts of a 275 MW Reduced Acreage Alternative and various No Project Alternatives in regard to this topic area. The Calico Solar Project does not create significant adverse impacts in this topic area. Therefore, it is not necessary to consider any of the project's alternatives as a means of reducing impacts to below a level of significance. (Ex. 300, pp. C.11-10 to C.12-13.)

FINDINGS OF FACT

Based on the evidence, we make the following findings:

1. The Calico Solar, LLC, transmission facilities consist of an on-site 230-kV switchyard and a two-mile long, 230-kV single-circuit overhead transmission tie line extending from the switchyard to SCE's Pisgah Substation.

[3] Estimates are specified for a height of one meter above the ground, in units of kilovolts per meter (kV/m) for the electric field and milligauss (mG) for the companion magnetic field. The maximum electric field strength (0.2 kV/m) and the maximum magnetic field intensity (20 mG) calculated at the edge of the right-of-way are similar to those of other SCE 230-kV lines. (Ex. 300, p. C.12-9.)

2. The evidentiary record includes analyses of potential impacts from the project's generation tie line involving aircraft collisions, interference with radio frequency communication, audible noise, hazardous shocks, nuisance shocks, fire danger, and EMF exposure.

3. Specific measures have been adopted to minimize the risk of inductive shocks along the railroad right-of-way adjacent to the project.

4. There are no residences along the route of the project's new generation tie line.

5. The available scientific evidence does not establish that EMF fields pose a significant health hazard to humans.

6. The electric and magnetic fields generated by the project's generation tie line will be managed to the extent the CPUC considers appropriate, based on available health effects information.

7. The project's generation tie line will comply with existing LORS for public health and safety.

8. The project's generation tie line will incorporate standard EMF-reducing measures established by the CPUC and used by SCE.

9. The project owner will provide field intensity measurements before and after line energization to assess EMF contributions from the project-related current flow.

10. The new generation tie line will not result in significant adverse environmental impacts to public health and safety or cause significant direct, indirect, or cumulative impacts as a result of aviation collisions, radio frequency communication interference, fire danger, nuisance or hazardous shocks, or electric and magnetic field exposure.

11. The record addresses the impacts of a reduced acreage and various No Project Alternatives in regard to this topic area.

12. Implementation of any of the Alternatives mentioned above is not necessary or preferable as a means of reducing project related impacts to below a level of significance.

CONCLUSIONS OF LAW

1. Implementation of the Conditions of Certification, below, will ensure that the Calico Solar, LLC project's line complies with all applicable laws, ordinances, regulations, and standards relating to **Transmission Line Safety and Nuisance** as identified in the pertinent portion of **Appendix A** of this Decision.

2. The Calico Solar, LLC project's transmission line will not create a significant impact due to tie line safety and nuisance factors.

CONDITIONS OF CERTIFICATION

TLSN-1 The project owner shall construct the proposed transmission line (anywhere along the area identified by the Applicant as available for its routing) according to the requirements of California Public Utility Commission's GO-95, GO-52, GO-131-D, Title 8, and Group 2, High Voltage Electrical Safety Orders, sections 2700 through 2974 of the California Code of Regulations, and Southern California Edison's EMF reduction guidelines.

Verification: At least 30 days before starting the transmission line or related structures and facilities, the project owner shall submit to the Compliance Project Manager (CPM) a letter signed by a California registered electrical engineer affirming that the lines will be constructed according to the requirements stated in the Condition.

TLSN-2 The project owner shall use a qualified individual to measure the strengths of the electric and magnetic fields from the line at the points of maximum intensity along the route for which the Applicant provided specific estimates. The measurements shall be made before and after energization according to the American National Standard Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) standard procedures. These measurements shall be completed no later than 6 months after the start of operations.

Verification: The project owner shall file copies of the pre-and post-energization measurements with the CPM within 60 days after completion of the measurements.

TLSN-3 The project owner shall ensure that the rights-of-way of the proposed transmission line are kept free of combustible material, as required under the provisions of section 4292 of the Public Resources Code and section 1250 of Title 14 of the California Code of Regulations.

Verification: During the first five years of plant operation, the project owner shall provide a summary of inspection results and any fire prevention activities

carried out along the right-of-way and provide such summaries in the Annual Compliance Report on transmission line safety and nuisance-related requirements.

TLSN-4 The project owner shall ensure that all permanent metallic objects within the right-of-way of the project-related lines are grounded according to industry standards regardless of ownership. A minimum clearance of 300 feet shall be maintained between the proposed transmission line and the edge of the right-of-way for BNSF Railroad Company's railroad tracks.

Verification: At least 30 days before the lines are energized, the project owner shall transmit to the CPM a letter confirming compliance with this condition.

TLSN-5 Project owner's transmission lines shall make any crossing of the BNSF mainline at a 90-degree angle.

Verification: At least 30 days before the lines are energized, the project owner shall transmit to the CPM a letter confirming compliance with this condition.

V. PUBLIC HEALTH AND SAFETY

A. GREENHOUSE GAS (GHG) EMISSIONS

INTRODUCTION AND SUMMARY

There is wide scientific consensus that climate change is occurring and that human activity contribute to that change. Man-made emissions of greenhouse gases, if not sufficiently curtailed, are likely to contribute further to continued increases in global temperatures. Indeed, the California Legislature has found that "[g]lobal warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California" (Cal. Health & Safety Code, sec. 38500, division 25.5, part 1). (Ex. 300, p. C.1-64.)

The California Air Resources Board (ARB) has promulgated regulations for mandatory GHG emission reporting to comply with the California Global Warming Solutions Act of 2006 (AB 32 Núñez, Statutes of 2006, Chapter 488, Health and Safety Code sections 38500 et seq.) (ARB 2008a). The Calico Solar Project, which will solely generate electricity from solar power, is exempt from the mandatory GHG emission reporting requirements for electricity generating facilities [CCR Title 17 §95101(c)(1)]. However, the project may be subject to future reporting requirements and GHG reductions or trading requirements as these regulations become more fully developed and implemented. (Ex. 300, p. C.1-63.)

The evidence includes consideration of SB 1368, which addresses the Greenhouse Gas Emission Performance Standard. The Calico Solar Project, as a renewable energy generation facility, is determined by rule to comply with the requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]). (Ex. 300, pp. C.1-62 and C.1-68.)

The generation of electricity using fossil fuels, even in a back-up generator at a thermal solar plant, produces gaseous emissions known as greenhouse gases in addition to the criteria air pollutants that have been traditionally regulated under the federal and state Clean Air Acts. California is actively pursuing policies to reduce GHG emissions that include adding non-GHG emitting renewable generation resources to the system. (Ex. 300, pp. C.1-66 to C.1-67.)

The greenhouse gases are carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFC), and perflurocarbons (PFC). CO_2 emissions are far and away the most common of these emissions; as a result, even though the other GHGs have a greater impact on climate change on a per-unit basis, GHG emissions are often expressed in terms of "metric tons of CO_2-equivalent" ($MTCO_2e$) for simplicity. (Ex. 300, p. C.1-63.)

The state has demonstrated a clear willingness to address global climate change through research, adaptation, and inventory reductions. In that context, this part of the Decision evaluates the GHG emissions from the proposed project, presents information on GHG emissions related to electricity generation, and describes the applicable GHG standards and requirements. (*Id.*)

1. Policy and Regulatory Framework

The Legislature stated 35 years ago, "it is the responsibility of state government to ensure that a reliable supply of electrical energy is maintained at a level consistent with the need for such energy for protection of public health and safety, for promotion of the general welfare, and for environmental quality protection." (Pub. Res. Code, § 25001.) Today, as a result of compelling science showing a clear link between greenhouse gas emissions and negative environmental impacts, the most recent addition to "environmental quality protection" is the reduction of GHG emissions. Several laws and statements of policy are applicable.

a. <u>AB 32</u>

The foundation of California's GHG policy is the California Global Warming Solutions Act of 2006. [Assembly Bill 32, codified in Health & Saf. Code, § 38560 et seq. (hereinafter AB 32).] AB 32 requires the California Air Resources Board ("CARB") to adopt regulations that will reduce statewide GHG emissions, by the year 2020, to the level of statewide GHG emissions that existed in 1990. Gubernatorial Executive Order S-3-05 (June 1, 2005) requires a further reduction, to a level 80 percent below the 1990 GHG emissions, by the year 2050.

Along with all other regulatory agencies in California, the Energy Commission recognizes that meeting the AB 32 goals is vital to the state's economic and environmental health. The scoping plan adopted by ARB relies heavily on cost-effective energy efficiency and demand response, renewable energy, and

prioritization of generation resources to achieve significant reductions of emissions in the electricity sector by 2020. Even more dramatic reductions in electricity sector emissions would likely be required to meet California's 2050 greenhouse gas reduction goal. Facilities under our jurisdiction, such as Calico Solar Project, must be consistent with these policies.[1]

b. Renewable Portfolio Standard

California statutory law requires the state's utilities to be obtaining at least 20 percent of their electricity supplies from renewable sources by the year 2020. (Pub. Util. Code, § 399.11 et seq.) Gubernatorial Executive Orders increase the requirement to 33 percent and require CARB to adopt regulations to achieve the goal. [Governor's Exec. Orders Nos. S-21-09 (Sept. 15, 2009), S-14-08 (Nov. 17, 2008).]

c. Emissions Performance Standard

Senate Bill (SB) 1368 of 2006, and regulations adopted by the Energy Commission and the Public Utilities Commission pursuant to the bill, prohibit utilities from entering into long-term commitments with any base load facilities that exceed an Emission Performance Standard (EPS) of 0.500 metric tonnes of CO_2 per megawatt-hour (this is the equivalent of 1100 pounds CO_2/MWh). (Pub. Util. Code, § 8340 et seq.; Cal. Code Regs., tit. 20, § 2900 et seq.; CPUC D0701039.) The Calico Solar Project, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]). However, even if it were not determined by rule to comply, the project would operate at or below a 60 percent capacity factor.

d. Loading Order

In 2003, the Energy Commission and the CPUC agreed on a "loading order" for meeting electricity needs. The first energy resources that should be utilized are energy efficiency and demand response (at the maximum level that is feasible and cost-effective), followed by renewables and distributed generation, combined

[1] Of course, the Calico Solar Project and all other stationary sources will need to comply with any applicable GHG LORS that take effect in the future.

heat and power (also known as cogeneration), and finally the most efficient available fossil fuel resources and infrastructure development.[2] CARB's AB 32 Scoping Plan reflects these policy preferences. (California Air Resources Board, Climate Change Scoping Plan, December 2008.)

2. GHG Emissions During Construction of the Facility

Construction of industrial facilities such as power plants requires coordination of numerous equipment and personnel. The concentrated on-site activities result in short-term, unavoidable increases in vehicle and equipment emissions that include greenhouse gases. Construction of the proposed project has two phases. There will be approximately 12 month-overlapping period between each phase, which would result in four years of continuous construction. The Applicant provided a construction emissions estimate that Staff used to calculate greenhouse gas emissions for the entirety of the construction activities. The greenhouse gas emissions estimate is presented below in **Greenhouse Gas Table 1**, where the GHG emissions were converted by staff into MTCO2E and totaled. (Ex. 300, p. C.1-67.)

Greenhouse Gas Table 1
Estimated Calico Solar Potential Construction Greenhouse Gas Emissions

Construction Element	CO_2-Equivalent (MTCO2E) [a,b]
On-Site Construction Equipment	4,988.20
On-Site Construction/Delivery Trucks	1,678.36
On-Site Construction/Worker/Security Vehicles	1,805.69
Off-Site Worker/Security Vehicles	13,954.82
Off-Site Delivery Trucks	17,028.23
On-site/Off-Site Train for Water Delivery	2,115.71
Construction Total	41,571.01

Source: Ex. 300, p. C.1-67, **Greenhouse Gas Table 2**

[a] One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.

[b] The vast majority of the CO2E emissions, over 99 percent, are CO_2 from these combustion sources.

The Applicant did not update the GHG emissions to reflect the changes to the project. However, based on the evidence, we find that the GHG emissions are expected to minimally decrease due to the proposed project modifications for the same reasons as identified in the **Air Quality** section of this Decision. (Ex. 300, p. C.1-67.)

[2] California Energy Commission 2008, *2008 Integrated Energy Policy Report Update*, (IEPR) (CEC-100-2008-008-CMF.)

There is no adopted, enforceable federal or state LORS applicable to Calico construction emissions of GHG. Nevertheless, there is guidance from regulatory agencies on how the significance of such emissions should be assessed. For example, the most recent guidance from CARB staff recommends a "best practices" threshold for construction emissions. [CARB, Preliminary Draft Staff Proposal, Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act (Oct. 24, 2008), p. 9]. Such an approach is also recommended on an interim basis, or proposed, by major local air districts.

Staff concluded that the GHG emission increases from construction activities would not be significant environmental impacts for several reasons. First, the period of construction would be short-term and the emissions intermittent during that period, not ongoing during the life of the proposed project. Second, "best practices" control measures, such as limiting idling times and requiring, as appropriate, equipment that meet the latest emissions standards, will further minimize greenhouse gas emissions. The use of newer equipment will increase efficiency and reduce GHG emissions and be compatible with low-carbon fuel (e.g., bio-diesel and ethanol) mandates that will likely be part of the ARB regulations to reduce GHG from construction vehicles and equipment. Lastly, this renewable energy source will provide power with very low GHG emissions, and the construction emissions will be offset by the reduction in fossil fuel fired generation that would be enabled by the proposed project. If the proposed project construction emissions were distributed over the 40 year life of the project they would only increase the project life time annual facility GHG emissions rate by 0.00056 MT CO2 eq per MW. (Ex. 300, pp. C.1-67 to C.1-70.)

Therefore, we find that the measures described above to directly and indirectly limit the emission of GHGs during construction of the Calico Solar Project are in accordance with current best practices. We also find the evidence shows that the GHG emissions from construction activities will not be significant.

3. Direct/Indirect Operation Impacts and Mitigation

a. <u>Anticipated Emissions</u>

Operation of the proposed Calico Solar Project will cause GHG emissions from the facility maintenance fleet and employee trips, emergency fire pump engine, and sulfur hexafluoride emissions from new electrical component equipment. (Ex.

300, p. Air-1, C.1-67.) **Greenhouse Gas Table 2** shows what the proposed project could potentially emit in greenhouse gases on an annual basis.

Greenhouse Gas Table 2
Estimated Calico Solar Potential Operating Greenhouse Gas Emissions

Operating Element	Annual CO_2-Equivalent (MTCO2E)[a]
Onsite Stationary Equipment Combustion [b]	0.82
Onsite Vehicle Combustion [b]	1,635.51
Onsite Train for Water Delivery [b]	153.75
Offsite Vehicle Combustion [b]	1,174.54
Offsite Train for Water Delivery [b]	140.19
Equipment Leakage (SF_6)	384.42
Total Project GHG Emissions – MTCO2E [b]	**3,488.22**
Facility MWh per year [c]	1,840,000
Facility GHG Performance (MTCO2E/MWh)	0.00190

Source: Ex. 300, p. C.1-68, **Greenhouse Gas Table 3**
[a] One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.
[b] The vast majority of the CO2E emissions, over 99 percent, are CO_2 from these two emission sources.
[c] Approximately a 25 percent capacity factor.

The proposed project is estimated to emit, directly from primary and secondary emission sources on an annual basis, nearly 3,500 metric tonnes of CO_2-equivalent GHG emissions per year. The Calico Solar Project, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]). Regardless, the Calico Solar Project has an estimated GHG emission rate of 0.00190 MTCO2E/MWh, well below the Greenhouse Gas Emission Performance Standard of 0.500 MTCO2/MWh.

The Applicant did not update the GHG emissions to reflect the changes to the project. However, based on the evidence, we find that the GHG emissions are expected to minimally decrease due to the proposed project modifications for the same reasons as identified in the **Air Quality** section this Decision. (Ex. 300, p. C.1-68.)

b. <u>Assessment of Operational Impacts</u>

GHG emissions contribute to global impacts. While it may be true that in general, when an agency conducts a CEQA analysis of a proposed project, it does not need to analyze how the operation of the proposed project is going to affect the entire system of projects in a large multistate region, analysis of the

impacts of GHG emissions from power plants requires consideration of the project's impacts on the entire electricity system.

California's electricity system – which is actually part of a system serving the entire western region of the U.S., Canada, and Mexico – is large and complex. Hundreds of power plants, thousands of miles of transmission and distribution lines, and millions of points of electricity demand operate in an interconnected, integrated, and simultaneous fashion. Because the system is integrated, and because electricity is produced and consumed instantaneously, and will continue to be until large-scale electricity storage technologies are available, any change in demand and, most important for this analysis, any change in output from any generation source, is likely to affect the output from all generators (*Committee Guidance on Fulfilling California Environmental Quality Act Responsibilities for Greenhouse Gas Impacts in Power Plant Siting Applications,* CEC-700-2009-004, pp. 20 to 22.) [3] (Hereinafter referred to as "Committee CEQA Guidance")

The California Independent System Operator (CAISO) is responsible for operating the system so that it provides power reliably and at the lowest cost. Thus the CAISO dispatches generating facilities generally in order of cheapest to operate (i.e., typically the most efficient) to most expensive (i.e., typically the least efficient). (*Id*., p. 20.) Because operating cost is correlated with heat rate (the amount of fuel that it takes to generate a unit of electricity), and, in turn, heat rate is directly correlated with emissions (including GHG emissions), when a power plant runs, it usually will take the place of another facility with higher emissions that otherwise would have operated. Due to the integrated nature of the electrical grid, the operational plant and the displaced plant may be hundreds of miles apart (Committee CEQA Guidance, p. 20.) Because one plant's operation could affect GHG emissions hundreds of miles away, the necessity of assessing their operational GHG emissions on a system-wide basis becomes clear.

As California moves towards an increased reliance on renewable energy, non-renewable energy resources will be displaced. These reductions in non-renewable energy, shown in **Greenhouse Gas Table 3**, could be as much as 36,500 GWh. These assumptions are conservative in that the forecasted growth in electricity retail sales assumes that the impacts of planned increases in expenditures on (uncommitted) energy efficiency are already included in the current retail sales forecast. Energy Commission staff estimates that as much as

[3] The report was issued in March 2009 and is found on the Commission website at: **http://www.energy.ca.gov/2009publications/CEC-700-2009-004-CEC-700-2009-004.PDF**

18,000 GWh of additional savings due to uncommitted energy efficiency programs may be forthcoming. This would reduce non-renewable energy needs by a further 12,000 GWh given a 33 percent RPS.

Greenhouse Gas Table 3
Estimated Changes in Non-Renewable Energy Potentially Needed to Meet California Loads, 2008-2020

California Electricity Supply	**Annual GWh**	
Statewide Retail Sales, 2008, estimated [a]	264,794	
Statewide Retail Sales, 2020, forecast [a]	298,697	
Growth in Retail Sales, 2008-20	24,903	
Growth in Net Energy for Load [b]	29,840	
California Renewable Electricity	**GWh @ 20% RPS**	**GWh @ 33% RPS**
Renewable Energy Requirements, 2020 [c]	57,939	95,600
Current Renewable Energy, 2008	29,174	
Change in Renewable Energy-2008 to 2020 [c]	28,765	66,426
Resulting Change in Non-Renewable Energy	176	(36,586)

Source: Ex. 300, p. C.1-71, **Greenhouse Gas Table 4**
Notes:
a. 2009 IPER Demand Forecast, Form 1.1c. Excludes pumping loads for entities that do not have an RPS.
b. 2009 IEPR Demand Forecast, Form 1.5a.
c. RPS requirements are a percentage of retail sales.

High GHG -emitting resources, such as coal, are effectively prohibited from entering into new contracts for California electricity deliveries as a result of the Emissions Performance Standard adopted in 2007 pursuant to SB 1368. Between now and 2020, more than 18,000 GWh of energy procured by California utilities under these contracts will have to reduce GHG emissions or be replaced; these contracts are presented in **Greenhouse Gas Table 4**. (Ex. 300, C.1-71.)

Greenhouse Gas Table 4
Expiring Long-term Contracts with Coal-fired Generation 2009 – 2020

Utility	Facility [a]	Contract Expiration	Annual GWh Delivered to CA
PG&E, SCE	Misc In-state Qual.Facilities [a]	2009-2019	4,086
LADWP	Intermountain	2009-2013	3,163 [b]
City of Riverside	Bonanza, Hunter	2010	385
Department of Water Resources	Reid Gardner	2013 [c]	1,211
SDG&E	Boardman	2013	555
SCE	Four Corners	2016	4,920
Turlock Irrigation District	Boardman	2018	370
LADWP	Navajo	2019	3,832
		TOTAL	**18,522**

Source: Ex. 300, p. C.1-72, **Greenhouse Gas Table 5**
Notes:
a. All facilities are located out-of-state except for the Miscellaneous In-state Qualifying Facilities.
b. Estimated annual reduction in energy provided to LADWP by Utah utilities from their entitlement by 2013.
c. Contract not subject to Emission Performance Standard, but the Department of Water Resources has stated its intention not to renew or extend.

This represents almost half of the energy associated with California utility contracts with coal-fired resources that will expire by 2030. If the State enacts a carbon adder[4], all the coal contracts (including those in **Greenhouse Gas Table 4**, which expire by 2020, and other contracts that expire beyond 2020 and are not shown in **Table 4**) may be retired at an accelerated rate as coal-fired energy becomes economically uncompetitive. Also shown are the approximate 500 MW of in-state coal and petroleum coke-fired capacity that may be unlikely to contract with California utilities for baseload energy due to SB1368 Emission Performance Standard. As these contracts expire, new and existing generation resources will replace the lost energy and capacity. Some will come from renewable generation; some will come from new and existing natural gas fired generation. All of these new facilities will emit substantially less GHG than the coal and petroleum coke-fired generation, which average about 1.0 $MTCO_2$/MWh without

[4] A carbon adder or carbon tax is a specific value added to the cost of a project for per ton of associated carbon or carbon dioxide emissions. Because it is based on, but not limited to, actual operations and emission and can be trued up at year end, it is considered a simple mechanism to assign environmental costs to a project.

carbon capture and sequestration, resulting in a net reduction in GHG emissions from the California electricity sector. (Ex. 300, p. C.1-72.)

The SWRCB has proposed substantial changes to once-through cooling (OTC) units, shown in **Greenhouse Gas Table 5**, which would likely require retrofit, retirement, or substantial curtailment of dozens of generating units. In 2008, these units collectively produced about 58,000 GWh. While the more recently built OTC facilities may well install dry or wet cooling towers, it is unlikely that the aging, merchant plants will do so. Most of these units already operate at low capacity factors, reflecting their limited ability to compete in the current electricity market. New resources would continue to out-compete aging plants, displacing the energy provided by OTC facilities and accelerating their retirement. (Ex. 300, p. C.1-72 to C.1.73.)

It must be noted, however, that a project like Calico Solar, located far from coastal load pockets such as the Greater Los Angeles Local Capacity Area, would more likely provide energy support to facilitate the retirement of some aging and/or OTC power plants, but would not likely provide any local capacity support at or near the coastal OTC units. We expect that local capacity and voltage support will increasingly be provided by newer, more-efficient natural gas and other forms of generation, including, to the extent practical, distributed generation resources such as rooftop solar. These resources will also help displace older, less-efficient generation and accelerate retirement of those units. Regardless, due to its low greenhouse gas emissions, Calico Solar will serve to reduce GHG emissions from the electricity sector. (Ex. 300, p. C.1-73.)

Greenhouse Gas Table 5
Units Utilizing Once-Through Cooling: 2008 Capacity and Energy Output [a]

Plant, Unit Name	Owner	Local Reliability Area	Aging Plant?	Capacity (MW)	2008 Energy Output (GWh)	GHG Performance (MTCO2/MWh)
Diablo Canyon 1, 2	Utility	None	No	2,232	17,091	Nuclear
San Onofre 2, 3	Utility	L.A. Basin	No	2,246	15,392	Nuclear
Broadway 3 [b]	Utility	L.A. Basin	Yes	75	90	0.648
El Centro 3, 4 [b]	Utility	None	Yes	132	238	0.814
Grayson 3-5 [b]	Utility	LADWP	Yes	108	150	0.799
Grayson CC [b]	Utility	LADWP	Yes	130	27	0.896
Harbor CC	Utility	LADWP	No	227	203	0.509
Haynes 1, 2, 5, 6	Utility	LADWP	Yes	1,046	1,529	0.578
Haynes CC [c]	Utility	LADWP	No	560	3,423	0.376
Humboldt Bay 1, 2 [a]	Utility	Humboldt	Yes	107	507	0.683
Olive 1, 2 [b]	Utility	LADWP	Yes	110	11	1.008
Scattergood 1-3	Utility	LADWP	Yes	803	1,327	0.618
Utility-Owned				**7,776**	**39,988**	**0.693**
Alamitos 1-6	Merchant	L.A. Basin	Yes	1,970	2,533	0.661
Contra Costa 6, 7	Merchant	S.F. Bay	Yes	680	160	0.615
Coolwater 1-4 [b]	Merchant	None	Yes	727	576	0.633
El Segundo 3, 4	Merchant	L.A. Basin	Yes	670	508	0.576
Encina 1-5	Merchant	San Diego	Yes	951	997	0.674
Etiwanda 3, 4 [b]	Merchant	L.A. Basin	Yes	666	848	0.631
Huntington Beach 1, 2	Merchant	L.A. Basin	Yes	430	916	0.591
Huntington Beach 3, 4	Merchant	L.A. Basin	No	450	620	0.563
Mandalay 1, 2	Merchant	Ventura	Yes	436	597	0.528
Morro Bay 3, 4	Merchant	None	Yes	600	83	0.524
Moss Landing 6, 7	Merchant	None	Yes	1,404	1,375	0.661
Moss Landing 1, 2	Merchant	None	No	1,080	5,791	0.378
Ormond Beach 1, 2	Merchant	Ventura	Yes	1,612	783	0.573
Pittsburg 5-7	Merchant	S.F. Bay	Yes	1,332	180	0.673
Potrero 3	Merchant	S.F. Bay	Yes	207	530	0.587
Redondo Beach 5-8	Merchant	L.A. Basin	Yes	1,343	317	0.810
South Bay 1-4	Merchant	San Diego	Yes	696	1,015	0.611
Merchant-Owned				**15,254**	**17,828**	**0.605**
Total In-State OTC				**23,030**	**57,817**	

Source: Ex. 300, p. Air-1-13, **Greenhouse Gas Table 6**

a. OTC Humboldt Bay Units 1 and 2 are included in this list. They must retire in 2010 when the new Humboldt Bay Generating Station (not ocean-cooled), currently under construction, enters commercial operation.

b. Units are aging but are not OTC.

The proposed Calico Solar Project promotes the state's efforts to move towards a high-renewable, low-GHG electricity system, and, therefore, reduce the amount of natural gas used by electricity generation and greenhouse gas emissions. Its use of solar power, resultant limited GHG emissions, and likely replacement of older existing plant capacity, furthers the state's strategy to promote generation system efficiency and reduce fossil fuel use and GHG emissions.

Net GHG emissions for the integrated electric system will decline when new renewable power plants are added to: 1) move renewable generation towards the 33 percent target; 2) improve the overall efficiency, or GHG emission rate, of the electric system; or 3) serve load growth or capacity needs more efficiently, or with fewer GHG emissions. We find that the Calico Solar Project furthers the state's progress toward achieving these important goals and is consistent with the state policies we discussed in Section 1 of this chapter.

5. Cumulative Impacts on Greenhouse Gases

Cumulative impacts are defined as "two or more individual effects which, when considered together, are considerable or . . . compound or increase other environmental impacts." (CEQA Guidelines § 15355.) "A cumulative impact consists of an impact that is created as a result of a combination of the project evaluated in the EIR together with other projects causing related impacts." (CEQA Guidelines § 15130[a][1].) Such impacts may be relatively minor and incremental, yet still be significant because of the existing environmental background, particularly when one considers other closely related past, present, and reasonably foreseeable future projects.

GHG assessment is by its very nature a cumulative impact assessment. The Calico Solar Project will emit a limited amount of greenhouse gases and, therefore, this assessment presents the potential cumulative impact in the context of the project's effect on the electricity system, resulting GHG emissions from the system, and existing GHG regulatory requirements and GHG energy policies. The evidence supports our finding that the Calico Solar Project will not cause or contribute to a significant adverse cumulative impact due to GHG emissions, and will in fact result in a net reduction in GHG emissions across the electricity system providing energy and capacity to California. (Ex. 300, p. C.1-62.)

6. Closure and Decommissioning

Eventually the facility will close, either at the end of its useful life or due to some unexpected situation such as a natural disaster or catastrophic facility breakdown. When the facility closes, all sources of air emissions would cease to operate and thus impacts associated with those greenhouse gas emissions would no longer occur. The only other expected GHG emissions would be temporary equipment exhaust (off-road and on-road) from the dismantling activities. These activities would be of much a shorter duration than construction of the project, equipment is assumed to have lower comparative GHG emissions due to technology advancement, and would be required to be controlled in a manner at least equivalent to that required during construction. Therefore, we find that while there will be a temporary CEQA impact on GHG during decommissioning, it will be less than significant. (Ex. 300, p. C.1-73.)

7. Mitigation Measures/Proposed Conditions of Certification

No Conditions of Certification related to Greenhouse Gas emissions are proposed. The project owner will comply with any future applicable GHG regulations formulated by the ARB, such as GHG reporting or emissions cap and trade markets.

FINDINGS OF FACT

1. The GHG emissions from the Calico Solar Project construction are likely to be less than 41,571.01 $MTCO_2$ equivalent ("$MTCO_2E$") during the entire construction period.

2. The project owner will use best practices to control its construction-related GHG emissions.

3. Construction-related GHG emissions are less than significant if they are controlled with best practices.

4. State government has a responsibility to ensure a reliable electricity supply, consistent with environmental, economic, and health and safety goals.

5. California utilities are obligated to meet whatever demand exists from any and all customers.

6. Under SB 1368 and implementing regulations, California's electric utilities may not enter into long-term commitments with base load power plants with CO_2 emissions that exceed the Emissions Performance Standard ("EPS") of 0.500 $MTCO_2$ / MWh.

7. The maximum annual CO2 emissions from Calico Solar operation will be less than 3,488.22 MTCO2e, which constitutes an emissions performance factor of approximately 0.00190 MTCO2e / MWh.

8. The Calico Solar Project, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368.

9. AB 32 requires CARB to adopt regulations that will reduce statewide GHG emissions, by the year 2020, to the 1990 level. Executive Order S-3-05 requires a further reduction, by the year 2050, to 80 percent below the 1990 level.

10. The California Renewable Portfolio Standard (RPS) requires the state's electric utilities obtain at least 33 percent of the power supplies from renewable sources, by the year 2020.

11. California's power supply loading order requires California utilities to obtain their power first from the implementation of all feasible and cost-effective energy efficiency and demand response, then from renewables and distributed generation, and finally from the most efficient available fossil-fired generation and infrastructure improvement.

12. There is no evidence in the record that construction or operation of the Calico Solar Project will be inconsistent with the loading order.

13. When it operates, the Calico Solar Project will displace generation from less-efficient (i.e., higher-heat-rate and therefore higher-GHG-emitting) power plants.

14. The Calico Solar Project will replace power from coal-fired power plants that will be unable to contract with California utilities under the SB 1368 EPS, and from once-through cooling power plants that must be retired.

15. Calico Solar Project operation will reduce overall GHG emissions from the electricity system.

16. The role of fossil fuel-fired generation will diminish as technology advances, coupled with efficiency and conservation measures, make round-the-clock availability of renewables generation feasible.

CONCLUSIONS OF LAW

1. Calico Solar construction-related GHG emissions will not cause a significant adverse environmental impact.

2. The GHG emissions from a power plant's operation should be assessed in the context of the operation of the entire electricity system of which the plant is an integrated part.

3. Calico Solar operational GHG emissions will not cause a significant environmental impact.

4. The SB 1368 EPS applies to the Calico Solar Project. Calico Solar has an estimated GHG emission rate of 0.00190 MTCO2E/MWh, well below the Greenhouse Gas Emission Performance Standard of 0.500 MTCO2/MWh.

5. Calico Solar operation will help California utilities meet their RPS obligations.

6. Calico Solar operation will be consistent with California's loading order for power supplies.

7. Calico Solar operation will foster the achievement of the GHG goals of AB 32 and Executive Order S-3-05.

8. The GHG emissions of any power plant must be assessed within the system on a case-by-case basis to ensure that the project will be consistent with the goals and policies enunciated above.

9. The Calico Solar Project will:
    a) not increase the overall system heat rate;
    b) not interfere with generation from existing renewables or with the integration of new renewable generation; and
    c) have the ability to reduce system-wide GHG emissions.

B. AIR QUALITY

This analysis evaluates the expected air quality impacts from the emissions of criteria air pollutants from both the construction and operation of the Calico Solar Project. Criteria air pollutants are air contaminants for which the state and/or federal governments, per the California Clean Air Act and the federal Clean Air Act, have established an ambient air quality standard to protect public health. (Ex. 300, p. C.1-2.)

The criteria pollutants analyzed within this section are nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), and particulate matter (PM). Lead is not analyzed as a criteria pollutant, but lead and other toxic air pollutant emissions impacts are analyzed in the **Public Health** section of this Decision. Two subsets of particulate matter are inhalable particulate matter (less than 10 microns in diameter - PM10) and fine particulate matter (less than 2.5 microns in diameter - PM2.5). Nitrogen oxides (NO_X, consisting primarily of nitric oxide [NO] and NO_2) and volatile organic compound (VOC) emissions readily react in the atmosphere as precursors to ozone and, to a lesser extent, particulate matter. Sulfur oxides (SO_X) readily react in the atmosphere to form particulate matter and are major contributors to acid rain. (*Id.*)

The evidence includes an evaluation of the following four major issues:

- whether the Calico Solar Project is likely to conform with applicable federal, state, and Mojave Desert Air Quality Management District (MDAQMD or District) air quality laws, ordinances, regulations and standards (Title 20, California Code of Regulations, section 1744 (b));
- whether the project is likely to cause new violations of ambient air quality standards or contribute substantially to existing violations of those standards (Title 20, California Code of Regulations, section 1743);
- whether recommended mitigation measures are adequate to lessen potential impacts under CEQA to a level of insignificance (Title 20, California Code of Regulations, section 1742 (b)); and
- whether the project would exceed regulatory benchmarks identified and used by Staff to analyze NEPA air quality impacts, before or after implementation of recommended mitigation measures. (*Id.*)

The evidence establishes that with the adoption and implementation of the recommended Conditions of Certification the Calico Solar Project will meet the

provisions of all applicable air quality laws and will not result in any significant adverse air quality impacts. (Ex. 300, pp. C.1.1 to C-48.)

The Applicant modified the project boundary and significantly reduced the project footprint from 8,230 acres to 6,215 acres. The revisions to the project do not substantially change the worst-case onsite construction emissions and would reduce onsite operation emissions due to the reduction in the project footprint and vehicle travel requirements. Therefore, the modeling assessment conducted for the project continues to be valid. However, the Applicant did provide additional modeling analysis to show compliance with the new federal 1-hour NO_2 standard, which is included in the analysis. (Ex. 300, p. C.1-23.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

The federal Clean Air Act and the California Clean Air Act both require the establishment of standards for ambient concentrations of air pollutants, called ambient air quality standards (AAQS). The state AAQS, established by the California Air Resources Board (CARB), are typically more protective than the federal AAQS, which are established by the U.S. Environmental Protection Agency (EPA). The standards consist of two parts: an allowable concentration of a pollutant, and an averaging time over which the concentration is to be measured. The averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposures to a high concentration for a short time (one hour, for instance), or to a relatively lower average concentration over a longer period (8 hours, 24 hours, or 1 month). **Air Quality Table 1** lists the state and federal AAQS**.** (Ex. 300, p. C.1-7.)

As shown in **Table 1**, the averaging times for the various air quality standards and the times over which they are measured, range from one-hour to annual averages. The standards are read as a concentration in parts per million (ppm), or as a weighted mass of material per a volume of air in milligrams or micrograms of pollutant in a cubic meter of air (mg/m^3 or $\mu g/m^3$, respectively.) (*Id.*)

In general, an area is designated as “attainment” if the concentration of a particular air contaminant does not exceed the standard. Likewise, an area is designated as “nonattainment” if the concentration of a particular contaminant standard is violated. Where there is insufficient data to support designation as either attainment or nonattainment, the area can be designated as unclassified. An area could be attainment for one air contaminant while nonattainment for

another, or attainment under the federal standard and nonattainment under the state standard for the same air contaminant. (Ex. 300, p. C.1-8.)

Air Quality Table 1
Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Standard	California Standard
Ozone (O_3)	8 Hour	0.075 ppm [a] (147 μg/m^3)	0.070 ppm (137 μg/m^3)
	1 Hour	—	0.09 ppm (180 μg/m^3)
Carbon Monoxide (CO)	8 Hour	9 ppm (10 mg/m^3)	9.0 ppm (10 mg/m^3)
	1 Hour	35 ppm (40 mg/m^3)	20 ppm (23 mg/m^3)
Nitrogen Dioxide (NO_2)	Annual	0.053 ppm (100 μg/m^3)	0.03 ppm (57 μg/m^3)
	1 Hour	0.100 ppm [b]	0.18 ppm (339 μg/m^3)
Sulfur Dioxide (SO_2)	Annual	0.030 ppm (80 μg/m^3)	—
	24 Hour	0.14 ppm (365 μg/m^3)	0.04 ppm (105 μg/m^3)
	3 Hour	0.5 ppm (1300 μg/m^3)	—
	1 Hour	—	0.25 ppm (655 μg/m^3)
Particulate Matter (PM10)	Annual	—	20 μg/m^3
	24 Hour	150 μg/m^3	50 μg/m^3
Fine Particulate Matter (PM2.5)	Annual	15 μg/m^3	12 μg/m^3
	24 Hour	35 μg/m^3	—
Sulfates (SO_4)	24 Hour	—	25 μg/m^3
Lead	30 Day Average	—	1.5 μg/m^3
	Calendar Quarter	1.5 μg/m^3	—
Hydrogen Sulfide (H_2S)	1 Hour	—	0.03 ppm (42 μg/m^3)
Vinyl Chloride (chloroethene)	24 Hour	—	0.01 ppm (26 μg/m^3)
Visibility Reducing Particulates	8 Hour	—	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70%.

Source: Ex. 300, p. C.1-8.

Note:
[a] – The 2008 standard is shown above, but as of September 16, 2009 this standard is being reconsidered. The 1997 8-hour standard is 0.08 ppm.
[b] – The U.S. EPA is in the process of implementing this new standard, which became effective April 12, 2010. This standard is based on the 3-year average of the 98th percentile of the yearly distribution of 1-hour daily maximum concentrations.

1. Existing Air Quality

The project site is located in the Mojave Desert Air Basin (MDAB) under the jurisdiction of the MDAQMD. The San Bernardino County portion of the MDAB surrounding the project site is designated as non-attainment for the federal and state ozone and PM10 standards, and the state PM2.5 standard. This area is designated as attainment or unclassified for the state and federal CO, NO_X, SO_X, and the federal PM2.5 standards. **Air Quality Table 2** summarizes the area's attainment status for various applicable state and federal standards. (Ex. 300, p. C.1-9.)

Air Quality Table 2
Federal and State Attainment Status
San Bernardino County

Pollutant	Attainment Status [a]	
	Federal	State
Ozone	Moderate Nonattainment	Moderate Nonattainment
CO	Attainment	Attainment
NO_2	Attainment[b]	Attainment
SO_2	Attainment	Attainment
PM10	Moderate Nonattainment	Nonattainment
PM2.5	Attainment	Nonattainment

Source: Ex. 300, p. C1-10

[a] Attainment = Attainment or Unclassified.
[b] Nitrogen dioxide attainment status for the new federal 1-hour NO_2 standard is scheduled to be determined by January 2012.

2. Construction Impacts and Mitigation

The proposed project will be located on approximately 4,613 acres, and will include the installation of 26,540 SunCatchers, operation of Solar Stirling Engine Power Conversion Units (PCUs), administration building, the maintenance building, and the substation building. The proposed project also includes the construction of a project substation, water treatment infrastructure, and onsite road construction. The project owner will use well water from the Lavic Groundwater Basin for construction and operation of the project. Water will be transported by a 0.51 mile long underground pipeline. (Ex. 300, pp. C.1-14 and C.1-16.)

Construction generally consists of site preparation, and construction and installation of major equipment and structures. Thus, there are two types of construction emissions fugitive emissions and combustion emissions. Fugitive dust comes from moving, disturbing, and traveling over the work site and roads, including grading/excavation and installation of linear facilities. Fuel combustion

emissions come from construction equipment exhausts, such as vehicles and heavy equipment/internal combustion engines. (Exs. 1, p. 5.10-16; 300, p. C.1-14.)

Air Quality Table 3 presents the Applicant's maximum annual construction-emission estimates. The **Table** shows that the maximum annual emissions are below the General Conformity Rule applicability thresholds for Ozone Precursors: NO_X (100 tons), VOC (100 tons) and PM10 (100 tons). (Ex. 300, p. C.1-17.)

Air Quality Table 3
Calico Solar Construction - Maximum Annual (12-Month) Emissions (tons/yr)

	NOx	SOx	CO	VOC	PM10	PM2.5
Onsite Construction Emissions						
Onsite Combustion Emissions	37.73	0.05	36.69	6.89	2.38	2.18
Onsite Fugitive Dust Emissions	---	---	---	---	71.72	10.39
Subtotal of Onsite Emissions	**37.73**	**0.05**	**36.69**	**6.89**	**74.10**	**12.57**
Offsite Emissions						
Offsite Combustion Emissions	57.83	0.12	64.48	13.97	3.80	3.33
Offsite Fugitive Dust Emissions	---	---	---	---	12.67	1.66
Subtotal of Offsite Emissions	**57.83**	**0.12**	**64.48**	**13.97**	**16.47**	**4.99**
Total Maximum Annual Emissions	**95.55**	**0.16**	**101.17**	**20.86**	**90.57**	**17.56**

Source: Ex. 300, p. C.1-17

Using estimated peak hourly, daily, and annual construction equipment exhaust emissions, the Applicant modeled Calico Solar Project's construction emissions to determine impacts. The Applicant's modeling analysis includes onsite fugitive dust and vehicle tailpipe emissions sources and control measures proposed by the Applicant. The modeling results are shown in **Air Quality Table 4**.[1] (Ex. 300, pp. C.1-21 to C.1-24.)

[1] Staff evaluated construction impacts by adding the modeled impacts to the available highest ambient background concentrations recorded during the previous three years from nearby monitoring stations. (Ex. 300, p. C.1-27.)

Air Quality Table 4
Calico Solar Maximum Project Construction Impacts

Pollutants	Avg. Period	Impacts ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	Standard ($\mu g/m^3$)	Percent of Standard
NO_2	1-hr.	68.1	154.4	222.5	339	66%
	Annual	3.9	41.8	45.7	57	80%
PM10	24-hr	26.5	80	106.5	50	213%
	Annual	3.2	29.8	33.0	20	165%
PM2.5	24-hr	4.1	28	32.1	35	92%
	Annual	0.6	10.3	10.9	12	91%
CO	1-hr	61	4,025	4,086	23,000	18%
	8-hr	32	1,367	1,399	10,000	14%
SO_2	1-hr	0.07	47.2	47.3	665	7%
	3-hr	0.05	42.4	42.5	1300	3%
	24-hr	0.02	13.1	13.1	105	12%
	Annual	0.004	2.7	2.7	80	3%

Source: Exs.1. **Table 5.2-19** Revised; 300, p. C.1-24

As shown, with the exception of 24-hour and annual PM10 impacts, the Calico Solar Project will not create new exceedances. The modeling analysis also shows that with the exception of PM10 impacts, the project will not contribute to exceedances for any of the modeled air pollutants. (Ex. 300, p. C.1-22.)

However, in light of the existing PM10 and ozone-nonattainment status for the project area, Staff determined that the construction emissions of nonattainment pollutants and their precursors (NO_X, VOC, and PM emissions) are CEQA significant and therefore, the off-road equipment and fugitive dust emissions require mitigation. (*Id.*)

The modeling analysis also shows that with implementation of mitigation measures, project construction is not predicted to cause new exceedances of the NAAQS for attainment pollutants. (Ex. 300, p. C.1-25.)

3. Operation Impacts and Mitigation

The Calico Solar Project will be a nominal 663.5 MW solar electrical generating facility. While the direct air pollutant emissions from power solar generation are negligible, there are required auxiliary equipment and maintenance activities necessary to operate and maintain the facility. (Ex. 300, p. C.1-17.)

The Applicant's maximum annual operation emissions estimates are well below the General Conformity Rule applicability thresholds for PM10 (100) and ozone

precursors (NO_X [100 tons] and VOC [100 tons]). **Air Quality Table 5** presents these estimates. (Ex. 300, p. C.1-20.)

Air Quality Table 5
Calico Solar Operations - Maximum Annual Emissions (tons/yr)

	NOx	SOx	CO	VOC	PM10	PM2.5
Onsite Operation Emissions						
Onsite Combustion Emissions	2.89	0.02	27.71	3.55	0.10	0.08
Onsite Gasoline Tank Emissions	---	---	---	0.09	---	---
Onsite Fugitive Dust Emissions	---	---	---	---	35.11	5.14
Subtotal of Onsite Emissions	2.89	0.02	27.71	3.64	35.21	5.23
Offsite Emissions						
Offsite Combustion Emissions	1.14	0.01	6.20	0.21	0.14	0.08
Offsite Fugitive Dust	---	---	---	---	5.37	0.30
Subtotal of Offsite Emissions	1.14	0.01	6.20	0.21	5.51	0.38
Total Maximum Annual Emissions	4.03	0.03	33.91	3.85	40.72	5.61

Source: TS 2010q and Staff estimates for the gasoline tank. Ex. 300, p. C.1-19

The Applicant also performed a modeling analysis using the EPA-approved AERMOD model to estimate the impacts of the project's NO_X, PM10, CO, and SO_X maintenance and stationary emissions resulting from project operation. **Air Quality Table 6** presents the results of the Applicant's modeling analysis.[2]

Air Quality Table 6
Calico Solar Operation Emission Impacts

Pollutants	Avg. Period	Impacts ($\mu g/m^3$)	Background [1] ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	Standard ($\mu g/m^3$)	Percent of Standard
NO_2	1-hr.	51.8	154.4	206.2	339	61%
	1-hr Fed	51.8	129.6	181.3	188	96%
	Annual	0.3	41.8	42.1	57	74%
PM10	24-hr	2.8	80	82.8	50	166%
	Annual	0.6	29.8	30.4	20	152%
PM2.5	24-hr	0.4	28	28.4	35	81%
	Annual	0.1	10.3	10.4	12	87%
CO	1-hr	166	4,025	4,191	23,000	18%
	8-hr	72	1,367	1,439	10,000	14%
SO_2	1-hr	0.62	47.2	47.8	665	7%
	3-hr	0.22	42.4	42.6	1300	3%
	24-hr	0.07	13.1	13.2	105	13%
	Annual	0.001	2.7	2.7	80	3%

Source: Exs. 1, **Table 5.2-20** Revised; 300, p. C.1-27.

[2] Staff evaluated the operation impacts by adding the modeled impacts to the available highest ambient background concentrations recorded during the previous three years from nearby monitoring stations. (Ex. 300, p. C.1-27.)

As shown, with the exception of PM10 impacts, that the proposed project would not create new exceedances. The table further shows that with the exception of PM10 impacts, the proposed project will not contribute to existing exceedances for any of the modeled air pollutants. (Ex. 300, p. C.1-25.)

In light of the existing PM10 and ozone non-attainment status for the project area, Staff determined that the operating emissions of NO_X, VOC, and PM emissions are potentially CEQA significant and mitigation is required for the off-road equipment and fugitive dust emissions. (Ex. 300, p. C.1-25.)

The record further shows that based on the modeling analysis and with implementation of recommended mitigation measures, as adopted in the Conditions of Certification below, project operations will not cause new exceedances of NAAQS.

The record shows that the project's operating emissions are well below the General Conformity applicability thresholds for the federal PM10 and ozone nonattainment pollutants. (Ex. 300, pp. C.1-24 and C.1-45.)

4. Construction and Operation Overlap Impacts and Mitigation

For a period of time, the construction and operation of the facilities will overlap due to the staged construction and operation of the two phases. As discussed above, the record discloses Applicant's performance of various emission analyses for worst-case emissions. These analyses include estimation of the worst-case onsite emissions associated with overlap between operation of Phase I and construction of Phase II. **Air Quality Table 7** presents the maximum annual construction/operation overlapping emissions. (Ex. 300, p. C.1-18.)

As shown, the maximum annual overlapping construction/operation emissions are below the General Conformity Rule applicability thresholds for PM10 [70 tons] and ozone precursors (NO_X [100 tons] and VOC [100 tons].). (Ex. 300, pp. C.1-21 to C.1-22.)

Furthermore, the Applicant's emissions analysis indicates that the mitigated construction/operation overlapping emissions would be no higher than those determined for the worst-case project construction period. (Ex. 300, pp. C.1-25 and C.1-26.) Staff therefore determined that no significant CEQA or adverse NEPA impacts would occur after implementation of the mitigation measures included in the Conditions of Certification adopted herein. (*Id*.)

Air Quality Table 7
Maximum Annual Construction/Operation Overlap Emissions (tons/year)

Construction						
	NOx	**SOx**	**CO**	**VOC**	**PM10**	**PM2.5**
Onsite Emissions						
Onsite Combustion Emissions	31.74	0.04	36.78	6.39	2.11	1.92
Onsite Fugitive Dust Emissions	--	--	--	--	65.55	9.72
Subtotal of Onsite Emissions	**31.74**	**0.04**	**36.78**	**6.39**	**67.65**	**11.64**
Offsite Emissions						
Offsite Combustion Emissions	53.36	0.12	65.33	13.17	3.56	3.11
Offsite Fugitive Dust	--	--	--	--	11.77	1.55
Subtotal of Offsite Emissions	**53.36**	**0.12**	**65.33**	**13.17**	**15.33**	**4.65**
Total Maximum Hourly Emissions	**85.11**	**0.16**	**102.11**	**19.56**	**82.98**	**16.30**
Operation						
	NOx	**SOx**	**CO**	**VOC**	**PM10**	**PM2.5**
Onsite Emissions						
Onsite Combustion Emissions	0.42	0.00	3.96	0.51	0.01	0.01
Onsite Gasoline Tank Emissions	--	--	--	0.09	--	--
Onsite Fugitive Dust Emissions	--	--	--	--	5.02	0.74
Subtotal of Onsite Emissions	**0.42**	**0.00**	**3.96**	**0.60**	**5.03**	**0.75**
Offsite Emissions						
Offsite Combustion Emissions	0.16	0.00	0.89	0.03	0.02	0.01
Offsite Fugitive Dust	--	--	--	--	0.77	0.04
Subtotal of Offsite Emissions	**0.16**	**0.00**	**0.89**	**0.03**	**0.79**	**0.05**
Total Maximum Hourly Emissions	**0.58**	**0.00**	**4.85**	**0.63**	**5.82**	**0.80**
Construction/Operation Overlap Totals						
	NOx	**SOx**	**CO**	**VOC**	**PM10**	**PM2.5**
Construction/Operation Overlap Total	**85.69**	**0.16**	**106.96**	**20.19**	**88.80**	**17.10**

Source: TS 2010e, **Table 2.2-6a**, and Staff estimates for the gasoline tank. Ex. 300, p. C.1-21.

5. Cumulative Impacts

Cumulative impacts result from the proposed project's incremental effect, together with other closely related past, present and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project. (Pub. Res. Code § 21083; Cal. Code Regs., tit. 14, §§ 15064(h), 15130, 15355.)

This analysis is concerned with criteria air pollutants. Such pollutants have impacts that are usually (though not always) cumulative by nature. Rarely would a project by itself cause a violation of a federal or state criteria pollutant standard. However, a new source of pollution may contribute to violations of criteria pollutant standards because of the existing background sources or foreseeable future projects. (Ex. 300, C.1-41.)

The record includes extensive analysis of cumulative impacts to air quality. The "Existing Ambient Air Quality" subsection describes the air quality background in San Bernardino County, including a discussion of historical ambient levels for

each of the significant criteria pollutants. The construction and operation subsections discuss the proposed project's contribution to the local existing background caused by project construction and operation. (*Id.*)

The record also contains a summary of projections for criteria pollutants by the MDAQMD's programmatic efforts to abate such pollution, an analysis of the project's localized cumulative impacts, and the project's direct operating emissions combined with other local major emission sources. (Ex. 300, pp. C.1-41 to C.1-43.)

As a solar power generation facility, the direct air pollutant emissions from power generation are negligible and the emission source would be limited to auxiliary equipment and maintenance activities. The emissions from the proposed project would be minimal compared to the other power generation facilities, and it is unlikely that the proposed project would have significant impact on particulate matter emissions. (Ex. 300, p. C.1-42.)

The applicable air quality plans do not outline any new control measures applicable to the proposed project's operating emission sources. Therefore, compliance with existing District rules and regulations would ensure compliance with air quality plans. (*Id.*)

The Applicant, in consultation with MDAQMD and San Bernardino County Land Use Service Department, confirmed that there are no projects within a six-mile radius from the Calico Solar Project site that are under construction or have received permits to be built or operate in the foreseeable future. Therefore, we find that no stationary sources requiring a cumulative modeling analysis exist within a six-mile radius of the proposed project site. (Ex. 300, C.1-44.)

In addition to the projects determined through consultation with the District, there are several pending solar and wind projects in the Newberry Springs/Ludlow Area that would be located within a few miles of the Calico Solar Project site, and there are dozens of other wind and solar projects that have applications pending with BLM in the California Desert District. This potential for significant additional development within the air basin and corresponding increase in air basin emissions is a major part of Staff's rationale for recommending Conditions of Certification **AQ-SC6** and **AQ-SC7** that are designed to mitigate the proposed project's cumulative impacts by reducing the dedicated on-site vehicle emissions and fugitive dust emissions during site operation. (*Id.*)

In addition, we find that because the project's cumulative air quality impacts have been mitigated to less than significant, there is no environmental justice impact for air quality. (*Id.*)

6. Compliance with LORS

The MDAQMD issued a Preliminary Determination of Compliance (PDOC) for the Calico Solar Project on June 4, 2009, and a Final Determination of Compliance on January 27, 2010, (MDAQMD 2010a). Compliance with all District rules and regulations was demonstrated to the District's satisfaction in the FDOC. The District's FDOC conditions are presented in the Conditions of Certification (**AQ-1 to AQ-15**). (Ex. 300, p. C.1-45.)

MDAQMD Rules 403 and 403.2 limit fugitive dust emissions in the project area. Implementation of Staff-recommended mitigation measures **AQ-SC3, AQ-SC4,** and **AQ-SC7,** which we hereby adopt, will reduce the project's contributions to fugitive dust emissions to below the level of significance. (Ex. 300, p. C.1-46.)

In addition, Staff recommended several other Conditions of Certification designed to reduce the project's air quality impacts to below the level of significance. We hereby adopt all of Staff's recommended Conditions of Certification, **AQ-SC1** through **AQ-SC9**. (*Id.*)

FINDINGS OF FACT

Based on the persuasive weight of the evidence of record, we find as follows:

1. The proposed Calico Solar Project in the Mojave Desert Air Basin and is under the jurisdiction of the Mojave Desert Air Quality Management District.

2. The San Bernardino County portion of the Mojave Desert Air Basin area is designated as nonattainment for federal and state ozone and PM10 standards, and the state PM 2.5 standard.

3. The project will not cause new violations of any NO_2, SO_2, PM2.5, or CO ambient air quality standards. Therefore, the NO_X, SO_X, PM2.5, and CO emission impacts are not significant.

4. The project's NO_X and VOC emissions can contribute to the existing violations of the ozone standards. However, the required mitigation will reduce the project's impact to a level that is less than significant.

5. The project's PM10 emissions can contribute to the existing violations of the PM10 air quality standards. However, the required mitigation will mitigate the project's impacts to a level that is less than significant.

6. The Mojave Desert Air Quality Management District issued a Final Determination of Compliance imposing conditions of compliance on project construction and operation to ensure compliance with District Rules and Regulations. These Rules and Regulations are incorporated into the Conditions of Certification below.

7. The project's construction-related impacts are temporary and short-term in nature. They are mitigated to below a level of significance by measures identified in the Conditions of Certification.

8. The record contains an adequate analysis of the project's contributions to cumulative air quality impacts.

9. Projects, which have been constructed, undergoing construction, or otherwise reasonably foreseeable have been considered in the cumulative impact analyses of record. Impacts arguably attributable to such projects do not alter conclusions reached concerning the Calico Solar Project's contribution to cumulative air quality impacts.

10. Implementation of the Conditions of Certification listed below ensures that Calico Solar Project will not result in any significant direct, indirect, or cumulative adverse impacts to air quality.

CONCLUSION OF LAW

1. The Commission therefore concludes that the implementation of the Conditions of Certification will ensure that Calico Solar Project will conform with all applicable laws, ordinances, regulations, and standards relating to air quality as set forth in the pertinent portion of **Appendix A** of this Decision.

CONDITIONS OF CERTIFICATION

Note that the term "CPM" refers to the Energy Commission's Compliance Project Manager.

AQ-SC1 Air Quality Construction Mitigation Manager (AQCMM): The project owner shall designate and retain an on-site AQCMM who shall be responsible for directing and documenting compliance with Conditions of Certification **AQ-SC3**, **AQ-SC4** and **AQ-SC5** for the entire project site and linear facility construction. The on-site AQCMM may delegate responsibilities to one or more AQCMM Delegates. The AQCMM and

AQCMM Delegates shall have full access to all areas of construction on the project site and linear facilities, and shall have the authority to stop any or all construction activities as warranted by applicable construction mitigation conditions. The AQCMM and AQCMM Delegates may have other responsibilities in addition to those described in this Condition. The AQCMM shall not be terminated without written consent of the Compliance Project Manager (CPM).

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit to the CPM for approval, the name, resume, qualifications, and contact information for the on-site AQCMM and all AQCMM Delegates.

AQ-SC2 Air Quality Construction Mitigation Plan (AQCMP): The project owner shall provide an AQCMP, for approval, which details the steps that will be taken and the reporting requirements necessary to ensure compliance with Conditions of Certification **AQ-SC3**, **AQ-SC4,** and **AQ-SC5**.

Verification: At least 30 days prior to the start of any ground disturbance, the project owner shall submit the AQCMP to the CPM for approval. The AQCMP shall include effectiveness and environmental data for the proposed soil stabilizer. The CPM will notify the project owner of any necessary modifications to the plan within 15 days from the date of receipt.

AQ-SC3 Construction Fugitive Dust Control: The AQCMM shall submit documentation to the CPM in each Monthly Compliance Report that demonstrates compliance with the Air Quality Construction Mitigation Plan (AQCMP) mitigation measures for the purposes of minimizing fugitive dust emission creation from construction activities and preventing all fugitive dust plumes that would not comply with the performance standards identified in Condition **AQ-SC4** from leaving the project site. The following fugitive dust mitigation measures shall be included in the Air Quality Construction Mitigation Plan (AQCMP) required by **AQ-SC2**, and any deviation from the AQCMP mitigation measures shall require prior CPM notification and approval.

A. The main access roads through the facility to the power block areas will be either paved or stabilized using soil binders, or equivalent methods, to provide a stabilized surface that is similar for the purposes of dust control to paving, that may or may not include a crushed rock (gravel or similar material with fines removed) top layer, prior to initiating construction in the main power block area, and delivery areas for operations materials (chemicals, replacement parts, etc.) will be paved or treated prior to taking initial deliveries.

B. All unpaved construction roads and unpaved operation and maintenance site roads, as they are being constructed, shall be

stabilized with a non-toxic soil stabilizer or soil weighting agent that can be determined to be both as efficient or more efficient for fugitive dust control as ARB approved soil stabilizers, and shall not increase any other environmental impacts including loss of vegetation to areas beyond where the soil stabilizers are being applied for dust control. All other disturbed areas in the project and linear construction sites shall be watered as frequently as necessary during grading (consistent with Biology Conditions of Certification that address the minimization of standing water); and after active construction activities shall be stabilized with a non-toxic soil stabilizer or soil weighting agent, or alternative approved soil stabilizing methods, in order to comply with the dust mitigation objectives of Condition of Certification **AQ-SC4**. The frequency of watering can be reduced or eliminated during periods of precipitation.

C. No vehicle shall exceed 10 miles per hour on unpaved areas within the construction site, with the exception that vehicles may travel up to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions.

D. Visible speed limit signs shall be posted at the construction site entrances.

E. All construction equipment vehicle tires shall be inspected and washed as necessary to be cleaned free of dirt prior to entering paved roadways.

F. Gravel ramps of at least 20 feet in length must be provided at the tire washing/cleaning station.

G. All unpaved exits from the construction site shall be graveled or treated to prevent track-out to public roadways.

H. All construction vehicles shall enter the construction site through the treated entrance roadways, unless an alternative route has been submitted to and approved by the CPM.

I. Construction areas adjacent to any paved roadway below the grade of the surrounding construction area or otherwise directly impacted by sediment from site drainage shall be provided with sandbags or other equivalently effective measures to prevent run-off to roadways, or other similar run-off control measures as specified in the Storm Water Pollution Prevention Plan (SWPPP), only when such SWPPP measures are necessary so that this condition does not conflict with the requirements of the SWPPP.

J. All paved roads within the construction site shall be swept daily or as needed (less during periods of precipitation) on days when construction activity occurs to prevent the accumulation of dirt and debris.

K. At least the first 500 feet of any paved public roadway exiting the construction site or exiting other unpaved roads en route from the construction site or construction staging areas shall be swept as needed (less during periods of precipitation) on days when construction activity occurs or on any other day when dirt or runoff resulting from the construction site activities is visible on the public paved roadways.

L. All soil storage piles and disturbed areas that remain inactive for longer than 10 days shall be covered, or shall be treated with appropriate dust suppressant compounds.

M. All vehicles that are used to transport solid bulk material on public roadways and that have potential to cause visible emissions shall be provided with a cover, or the materials shall be sufficiently wetted and loaded onto the trucks in a manner to provide at least 2 feet of freeboard.

N. Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) shall be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this Condition shall remain in place until the soil is stabilized or permanently covered with vegetation.

Verification: The AQCMM shall provide the CPM a Monthly Compliance Report to include the following to demonstrate control of fugitive dust emissions:

A. A summary of all actions taken to maintain compliance with this Condition;

B. Copies of any complaints filed with the District in relation to project construction; and

C. Any other documentation deemed necessary by the, CPM or AQCMM to verify compliance with this Condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC4 Dust Plume Response Requirement: The AQCMM or an AQCMM Delegate shall monitor all construction activities for visible dust plumes. Observations of visible dust plumes that have the potential to be transported (A) off the project site and within 400 feet upwind of any regularly occupied structures not owned by the project owner or (B) 200 feet beyond the centerline of the construction of linear facilities indicate that existing mitigation measures are not resulting in effective mitigation. The AQCMP shall include a section detailing how the additional mitigation measures will be accomplished within the time limits specified. The AQCMM or Delegate shall implement the following procedures for additional mitigation measures in the event that such visible dust plumes are observed:

Step 1: The AQCMM or Delegate shall direct more intensive application of the existing mitigation methods within 15 minutes of making such a determination.

Step 2: The AQCMM or Delegate shall direct implementation of additional methods of dust suppression if Step 1, specified above, fails to result in adequate mitigation within 30 minutes of the original determination.

Step 3: The AQCMM or Delegate shall direct a temporary shutdown of the activity causing the emissions if Step 2, specified above, fails to result in effective mitigation within one hour of the original determination. The activity shall not restart until the AQCMM or Delegate is satisfied that appropriate additional mitigation or other site conditions have changed so that visual dust plumes will not result upon restarting the shutdown source. The owner/operator may appeal to the CPM any directive from the AQCMM or Delegate to shut down an activity, if the shutdown shall go into effect within one hour of the original determination, unless overruled by the CPM before that time.

Verification: The AQCMM shall provide the CPM a Monthly Compliance Report to include:

A. a summary of all actions taken to maintain compliance with this Condition;

B. copies of any complaints filed with the District in relation to project construction; and

C. any other documentation deemed necessary by the CPM or AQCMM to verify compliance with this Condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC5 Diesel-Fueled Engine Control: The AQCMM shall submit to the CPM, in the Monthly Compliance Report, a construction mitigation report that demonstrates compliance with the AQCMP mitigation measures for purposes of controlling diesel construction-related emissions. The following off-road diesel construction equipment mitigation measures shall be included in the Air Quality Construction Mitigation Plan (AQCMP) required by **AQ-SC2,** and any deviation from the AQCMP mitigation measures shall require prior CPM notification and approval.

a. All diesel-fueled engines used in the construction of the facility shall have clearly visible tags issued by the on-site AQCMM showing that the engine meets the conditions set forth herein.

b. All construction diesel engines with a rating of 50 hp or higher shall meet, at a minimum, the Tier 3 California Emission Standards for Off-Road Compression-Ignition Engines, as specified in California Code of Regulations, Title 13, section 2423(b)(1), unless a good

faith effort to the satisfaction of the CPM that is certified by the on-site AQCMM demonstrates that such engine is not available for a particular item of equipment. In the event that a Tier 3 engine is not available for any off-road equipment larger than 50 hp, that equipment shall be equipped with a Tier 2 engine, or an engine that is equipped with retrofit controls to reduce exhaust emissions of nitrogen oxides (NO_X) and diesel particulate matter (DPM) to no more than Tier 2 levels unless certified by engine manufacturers or the on-site AQCMM that the use of such devices is not practical for specific engine types. For purposes of this Condition, the use of such devices is "not practical" for the following, as well as other, reasons.

1. There is no available retrofit control device that has been verified by either the California Air Resources Board or U.S. Environmental Protection Agency to control the engine in question to Tier 2 equivalent emission levels and the highest level of available control using retrofit or Tier 1 engines is being used for the engine in question; or
2. The construction equipment is intended to be on site for 10 days or less.
3. The CPM may grant relief from this requirement if the AQCMM can demonstrate a good faith effort to comply with this requirement and that compliance is not practical.

c. The use of a retrofit control device may be terminated immediately, provided that the CPM is informed within 10 working days of the termination and that a replacement for the equipment item in question meeting the controls required in item "b" occurs within 10 days of termination of the use, if the equipment would be needed to continue working at this site for more than 15 days after the use of the retrofit control device is terminated, if one of the following conditions exists :

1. The use of the retrofit control device is excessively reducing the normal availability of the construction equipment due to increased down time for maintenance, and/or reduced power output due to an excessive increase in back pressure.
2. The retrofit control device is causing or is reasonably expected to cause engine damage.
3. The retrofit control device is causing or is reasonably expected to cause a substantial risk to workers or the public.
4. Any other seriously detrimental cause which has the approval of the CPM prior to implementation of the termination.

d. All heavy earth-moving equipment and heavy-duty construction-related trucks with engines meeting the requirements of (b) above

e. All diesel heavy construction equipment shall not idle for more than five minutes. Vehicles that need to idle as part of their normal operation (such as concrete trucks) are exempted from this requirement.

f. Construction equipment will employ electric motors when feasible.

Verification: The AQCMM shall include in the Monthly Compliance Report the following to demonstrate control of diesel construction-related emissions:

A. A summary of all actions taken to control diesel construction related emissions;

B. A list of all heavy equipment used on site during that month, including the owner of that equipment and a letter from each owner indicating that equipment has been properly maintained; and

C. Any other documentation deemed necessary by the CPM, or the AQCMM to verify compliance with this Condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC6 The project owner, when obtaining dedicated on-road or off-road vehicles for mirror washing activities and other facility maintenance activities, shall only obtain vehicles that meet California on-road vehicle emission standards or appropriate U.S.EPA/California off-road engine emission standards for the latest model year available when obtained.

Verification: At least 30 days prior to the start commercial operation, the project owner shall submit to the CPM a copy of the plan that identifies the size and type of the on-site vehicle and equipment fleet and the vehicle and equipment purchase orders and contracts and/or purchase schedule. The plan shall be updated every other year and submitted in the Annual Compliance Report.

AQ-SC7 The project owner shall provide a site Operations Dust Control Plan, including all applicable fugitive dust control measures identified in the verification of **AQ-SC3** that would be applicable to minimizing fugitive dust emission creation from operation and maintenance activities and preventing all fugitive dust plumes that would not comply with the performance standards identified in **AQ-SC4** from leaving the project site; that:

A. describes the active operations and wind erosion control techniques such as windbreaks and chemical dust suppressants, including their ongoing maintenance procedures, that shall be used on areas that could be disturbed by vehicles or wind anywhere within the project boundaries; and

B. identifies the location of signs throughout the facility that will limit traveling on unpaved portion of roadways to solar equipment maintenance vehicles only. In addition, vehicle speed shall be limited to no more than 10 miles per hour on these unpaved roadways, with the exception that vehicles may travel up to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions.

The site operations fugitive dust control plan shall include the use of durable non-toxic soil stabilizers on all regularly used unpaved roads and disturbed off-road areas, or alternative methods for stabilizing disturbed off-road areas, within the project boundaries, and shall include the inspection and maintenance procedures that will be undertaken to ensure that the unpaved roads remain stabilized. The soil stabilizer used shall be a non-toxic soil stabilizer or soil weighting agent that can be determined to be either as efficient or more efficient for fugitive dust control as ARB approved soil stabilizers, and shall not increase any other environmental impacts including loss of vegetation to areas beyond where the soil stabilizers are being applied for dust control.

The performance and application of the fugitive dust controls shall also be measured against and meet the performance requirements of condition **AQ-SC4**. The measures and performance requirements of **AQ-SC4** shall also be included in the operations dust control plan.

Verification: At least 30 days prior to start of commercial operation, the project owner shall submit to the CPM for review and approval a copy of the site Operations Dust Control Plan that identifies the dust and erosion control procedures, including effectiveness and environmental data for the proposed soil stabilizer, that will be used during operation of the project and that identifies all locations of the speed limit signs.

Within 60 days after commercial operation, the project owner shall provide to the CPM a report identifying the locations of all speed limit signs, and a copy of the project employee and contractor training manual that clearly identifies that project employees and contractors are required to comply with the dust and erosion control procedures and on-site speed limits.

AQ-SC8 The project owner shall provide the CPM copies of all District issued Authority-to-Construct (ATC) and Permit-to-Operate (PTO) documents for the facility.

The project owner shall submit to the CPM for review and approval any modification proposed by the project owner to any project federal air permit. The project owner shall submit to the CPM any modification to any permit proposed by the District or U.S. Environmental Protection Agency (U.S. EPA), and any revised federal permit issued by the District or U.S. EPA, for the project.

Verification: The project owner shall submit any ATC, PTO, and proposed federal air permit modifications to the CPM within five working days of its submittal either by 1) the project owner to an agency, or 2) receipt of proposed modifications from an agency. The project owner shall submit all modified ATC/PTO documents and all federal air permits to the CPM within 15 days of receipt.

AQ-SC9 The project owner shall only use Tier 3 or higher certified engine generators, totaling no more than 900 horsepower, to provide project site power prior to the installation of utility construction or permanent electric power lines to the project site. These engines shall be in the range of 50 to 750 hp each and will have NOx emissions that are certified under full load to be no more than 3.5 grams per brake horsepower for engines between 50 and 100 horsepower and no more than 3.0 grams per brake horsepower for engines between 100 and 750 horsepower. This requirement does not include small engine generators that are solely dedicated to specific pieces of equipment, such as engine generators necessary for welders.

Verification: The project owner shall submit data on the site power generators at least 15 days prior to their use that demonstrates compliance with this condition.

DISTRICT CONDITIONS

DISTRICT FINAL DETERMINATION OF COMPLIANCE CONDITIONS (MDAQMD 2010a)

District conditions **AQ-1** through **AQ-15** are CEQA-only required Conditions.

Application No. 00010423 (Emergency Generator)

EQUIPMENT DESCRIPTION:

ARB Certified Tier III engine, 399 bhp, fueled on ARB diesel, powering an electrical generator.

AQ-1 Engine may operate in response to notification of impending rotating outage if the area utility has ordered rotating outages in the area where the engine is located or expects to order such outages at a particular time, the engine is located in the area subject to the rotating outage, the engine is operated no more than 30 minutes prior to the forecasted outage, and the engine is shut down immediately after the utility advises that the outage is no longer imminent or in effect.

Verification: The project owner shall maintain engine operating records as required in **AQ-6** and shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-2 This unit shall only be fired on ultra-low sulfur diesel fuel, whose sulfur concentration is less than or equal to 0.0015 percent (15 ppm) on a weight per weight basis per ARB Diesel or equivalent requirements.

Verification: The project owner shall maintain the fuel sulfur content records for diesel fuel deliveries on site as required in **AQ-6** and shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-3 This equipment shall be installed, operated and maintained in strict accord with those recommendations of the manufacturer/supplier and/or sound engineering principles which produce the minimum emissions of contaminants. Unless otherwise noted, this equipment shall also be operated in accordance with all data and specifications submitted with the application for this permit.

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-4 A non-resettable four-digit (9,999) hour timer shall be installed and maintained on this unit to indicate elapsed engine operating time.

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Energy Commission.

AQ-5 This unit shall be limited to use for emergency power, defined as in response to a fire or when commercially available power has been interrupted. In addition, this unit shall be operated no more than 50 hours per year, and no more than 0.5 hours per day for testing and maintenance, excluding compliance source testing. Time required for source testing will not be counted toward the 50 hour per year limit.

Verification: The project owner shall maintain engine use records on site as required in **AQ-6** and shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-6 The project owner shall maintain an operations log for this unit current and on-site (or at a central location) for a minimum of five years, and this log shall be provided to District, State and Federal personnel upon request. The log shall include, at a minimum, the information specified below:

a. Date of each use and duration of each use (in hours);

b. Reason for use (testing & maintenance, emergency, required emission testing);

c. Calendar year operation in terms of fuel consumption (in gallons) and total hours; and,

d. Fuel sulfur concentration (the project owner may use the supplier's certification of sulfur content if it is maintained as part of this log).

Verification: The project owner shall submit records required by this Condition that demonstrating compliance with the sulfur content and engine use limitations of Conditions **AQ-2** and **AQ-5** in the Annual Compliance Report (**COMPLIANCE-8**), including a photograph showing the annual reading of engine hours. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-7 This gen-set is subject to the requirements of the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines (Title 17 CCR 93115). In the event of conflict between these Conditions and the ATCM, the more stringent requirements shall govern.

Verification: The project owner shall submit the engine specifications at least 30 days prior to purchasing the engines for review and approval demonstrating that the engines meet both ATCM and New Source Performance Standard (NSPS) subpart IIII emission limit requirements at the time of engine purchase. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-8 This unit shall not be used to provide power during a voluntary agreed to power outage and/or power reduction initiated under an Interruptible Service Contract (ISC); Demand Response Program (DRP); Load Reduction Program (LRP) and/or similar arrangement(s) with the electrical power supplier.

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

Application No. 00010422 (5,000 gallon Above Ground Non-Retail Gasoline Dispensing Facility)

EQUIPMENT DESCRIPTION:

5,000 gallon capacity gasoline tank with Phase I and Phase II vapor recovery.

AQ-9 The toll-free telephone number that must be posted is 1-800-635-4617.

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-10 The project owner shall maintain a log of all inspections, repairs, and maintenance on equipment subject to Rule 461. Such logs or records

shall be maintained at the facility for at least two years and shall be available to the District upon request.

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-11 Any modifications or changes to the piping or control fitting of the vapor recovery system require prior approval from the District.

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-12 The vapor vent pipes are to be equipped with pressure relief valves.

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-13 The project owner shall perform the following tests within 60 days of construction completion and annually thereafter in accord with the following test procedures:

a. Static Pressure Decay Test per ARB test method TP-201.3B (2-inch test);

b. Dynamic Back Pressure test per TP-201.4;

c. Liquid Removal Test (if applicable) per TP-201.6;

d. Fuel dispensing rate not to exceed 10 gpm, verified per EO G-70-200-C Exhibit 4, and;

e. Emergency vents and manways shall be leak free when tested at the operating pressure of the tank in accordance with ARB test methods, as specified in Title 17, California Code of Regulations.

The District shall be notified a minimum of 10 days prior to performing the required tests with the final results submitted to the District within 30 days of completion of the tests.

The District shall receive passing test reports no later than six weeks prior to the expiration date of this permit.

Verification: The project owner shall notify the District at least 10 days prior to performing the required tests. The test results shall be submitted to the District within 30 days of completion of the tests and shall be made available to the CPM if requested.

AQ-14 The annual throughput of gasoline shall not exceed 500,000 gallons per year. Throughput Records shall be kept on site and available to District personnel upon request. Before this annual throughput can be increased the facility may be required to submit to the District a site specific Health Risk Assessment in accord with a District approved plan. In addition public notice and/or comment period may be required.

Verification: The project owner shall submit to the CPM gasoline throughput records demonstrating compliance with this Condition as part of the Annual Compliance Report .The project owner shall maintain on site the annual gasoline throughput records and shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-15 The project owner shall; install, maintain, and operate this equipment in compliance with ARB Executive Order G-70-200-C or Enhanced Vapor Recovery (EVR) Phase I and EVR Phase II, and Standing Loss requirements in affect at the time of construction.

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

C. PUBLIC HEALTH

The public health analysis supplements the previous discussion on air quality and considers the potential public health effects from project emissions of toxic air contaminants. In this analysis, we review the evidence concerning whether such emissions will result in significant public health impacts or violate standards for public health protection.[1]

SUMMARY AND DISCUSSION OF THE EVIDENCE

Project construction and operation will result in routine emissions of toxic air contaminants for which no ambient air quality standards have been established. These substances are categorized as noncriteria pollutants. In the absence of standards, state and federal regulatory agencies have developed health risk assessment procedures to evaluate potential health effects due to these toxic air contaminants.

The risk assessment consists of the following steps:

- Identify the types and amounts of hazardous substances that the Calico Solar Project could emit into the environment;
- Estimate worst-case concentrations of project emissions in the environment using dispersion modeling;
- Estimate amounts of pollutants to which people could be exposed through inhalation, ingestion, and dermal contact;[2] and
- Characterize potential health risks by comparing worst-case exposure from the project with the scientific safety standards based on known health effects. (Ex. 300, p. C.6-3.)

Typically, the initial health risk analysis is performed at a "screening level," which is designed to estimate potential health risks. The risks for screening purposes are based on examining conditions that would lead to the highest, or worst-case,

[1] This Decision discusses other potential public health concerns under various topics. For instance, the accidental release of hazardous materials is discussed in **Hazardous Materials Management** and **Worker Safety and Fire Protection**. Electromagnetic fields are discussed in **Transmission Line Safety and Nuisance**. Potential impacts to soils and surface water sources are discussed in the **Soil and Water Resources** section of this Decision. Potential exposure to contaminated soils and hazardous wastes is described in **Waste Management** section of this Decision.

[2] Exposure pathways, or ways in which people might come into contact with toxic substances, include inhalation, dermal (through the skin) absorption, soil ingestion, consumption of locally grown plant foods, and mother's milk.

risks and then modeling those conditions to analyze results. Such conditions include:

- Using the highest levels of pollutants that could be emitted from the power plant;
- Assuming weather conditions that would lead to the maximum ambient concentration of pollutants;
- Using the type of air quality computer model which predicts the greatest plausible impacts;
- Calculating health risks at the location where the pollutant concentrations are estimated to be the highest;
- Assuming that an individual's exposure to cancer-causing agents occurs continuously for 70 years; and
- Using health-based standards designed to protect the most sensitive members of the population (i.e., the young, elderly, and those with respiratory illnesses). (Ex. 300, pp. C.6-3 to C.6-4.)

The risk assessment for the Calico Project addresses two categories of potential health impacts: chronic (long-term) non-cancer effects and cancer risk (also long-term). Chronic non-cancer health effects occur as a result of long-term exposure (8 to 70 years) to lower concentrations of pollutants. For carcinogenic substances, the health assessment considers the total risk of developing cancer and assumes that continuous exposure to the cancer-causing substance occurs over a 70-year lifetime. (Ex. 300, pp. C.6-4 – C.6-5.)

The analysis for chronic health effects compares the maximum project contaminant levels to safe levels called Reference Exposure Levels or RELs. These exposure levels are designed to protect the most sensitive individuals in the population such as infants, the elderly, and people suffering from illness or disease, which make them more susceptible to the effects of toxic substance exposure. The RELs are based on the most sensitive adverse health effects reported in medical and toxicological literature, and include margins of safety.

The assessment considers risk from all cancer-causing chemicals from the source of emissions. The calculated risk is not meant to predict the actual expected incidence of cancer, but is rather a theoretical estimate based on worst-case assumptions.

Cancer risk is expressed in chances per million and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer, and the length of the exposure period. Cancer risks for each

carcinogen are added to yield total cancer risk. The conservative nature of the screening assumptions means that actual cancer risks due to project emissions are likely to be considerably lower than those estimated. (Ex. 300, p. C.6-5.)

If the screening analysis predicts no significant risks, then no further analysis is required. However, if the predicted risk is significant, then further analysis using more realistic, site-specific assumptions is performed to obtain a more accurate assessment of potential health risks. If the site-specific analysis confirms that the risk exceeds the significance level, then appropriate mitigation measures are necessary to reduce the risk to less than significant. If a refined analysis identifies a cancer risk that exceeds the significance level after all risk reduction measures have been considered, then Staff would not recommend approval of the project. (Ex. 300, p. C.6-6.)

The evidence shows that both the Applicant and Staff independently performed screening risk assessments and concluded that no adverse health effects are expected from project construction or operation.

1. Construction Impacts and Mitigation

Construction of the Calico Solar Project is anticipated to take place over a period of 48 months. Potential construction-phase health impacts could occur from exposure to toxic substances in contaminated soil disturbed during site preparation and to diesel exhaust from heavy equipment. Excavation, grading, and earth moving activities also have potential to affect public health through mechanisms such as windblown dust, soil erosion, and the uncovering of hazardous substances. (Exs. 1, p. 5.16-1; 300, pp. C.6-10 – C.6-11.)

A Phase I Environmental Site Assessment identified no “Recognized Environmental Conditions” (i.e., found no evidence or record of any use, spillage, or disposal of hazardous substances on the site). If, however, any unexpected contamination is encountered during construction, then compliance with Conditions of Certification **Waste-1** and **Waste-2** will ensure that contaminated soil does not affect the public. These Conditions require a registered professional engineer or geologist to be available during soil excavation and grading to ensure proper handling and disposal of contaminated soil. (Ex. 302, p. C.6-10.)

With respect to the air emissions from diesel-fueled engines, the Applicant estimated worst-case emissions of 23.5 pounds per day of particulate matter less

than 10 microns in diameter (PM10) and 21.8 pounds of per day of fine particulate matter less than 2.5 microns in diameter (PM2.5) during construction. (Exs. 1, § 5.2, Table 5.2-2-0 Revised; 10, § 5.2; 96) Because assessment of chronic (long-term) health effects assumes continuous exposure to toxic substances over a period from eight to 70 years, the Applicant did not estimate the health risks resulting from the short duration of the construction activities. Similarly, Staff did not conduct a quantitative assessment of construction impacts on public health given the distance from the site to the sparsely populated area surrounding the site and based on its prior experience using quantitative risk assessment tools showing that construction vehicle emissions impacts are generally less than significant. (Exs. 1, p. 5.16-4; 300, p. C.6-11.)

Even though the Applicant and Staff independently determined that the construction impacts would be less than significant, they both proposed mitigation measures to reduce the maximum calculated PM10 and PM2.5 emissions and further reduce any potential impacts. (Ex. 1, § 5.2; 300, p. C.6-11.) We have adopted the recommended mitigation measures the **Air Quality** section of this Decision. Included in these measures are requirements for use of aggressive fugitive dust and diesel exhaust control measures. For instance, these Conditions will reduce exposure to diesel emissions from construction equipment by requiring the use of ultra-low sulfur diesel fuel and Tier 2 or Tier 1 California Emission Standards for Off-Road Compression-Ignition Engine or the installation of an oxidation catalyst and soot filters on diesel equipment.

2. Operation Impacts and Mitigation

The record shows that the only stationary source of toxic air contaminants (TAC) that would be emitted from the Calico Solar Project would be diesel particulate matter from the emergency generator which will be operated once a month for about 20 minutes. (Ex. 300, pp. C.6-11-C.6-14.) Mobile sources of TAC emissions during operations would include gasoline-fueled and diesel-fueled maintenance and delivery vehicles as well as visitor and staff traffic

The record includes the methodology used in identifying and quantifying the emission rates of the toxic noncriteria pollutants that could adversely affect public health. As shown in **Public Health Table 1** below, both the chronic hazard index and the cancer risk are below the level of significance indicating that no long-term adverse health effects are expected.

PUBLIC HEALTH Table 1
Operation Hazard/Risk at Point of Maximum Impact: Applicant Assessment

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
Acute Noncancer	0.062	1.0	No
Chronic Noncancer	0.00000042	1.0	No
Individual Cancer	0.000667 in 1 million	10.0 in 1 million	No

Source: Ex. 302, p. C.6-13.

The record shows that Staff performed an independent qualitative analysis of the risk assessment results using the Applicant's emission factors and considering several specified aspects of facility operations. Staff's results for acute hazard index are lower than the results reported by the Applicant due to a change in the acute REL for acrolein from the value used in the Applicant's August 2009 report (0.19 ug/m^3) to the value published by OEHHA in their December 2008 guidance, 2.5 ug/m^3. (Ex. 300, p. C.6-13.)

The point of maximum impact, PMI, was determined under the 70 year residential scenario. Three nearby residences, the only residential receptors located near the facility, were also modeled. Cumulative impacts were not evaluated as there are no existing or proposed projects within sic miles of the facility.

Public Health Table 2
Operation Phase Emission Rates Listed in Response to Data Requests

Substance	Diesel Generator	Washing Vehicle (running & idling)	LRU Maintenance Truck (running & Idling)	Staff & visitor cars, van pool, security truck	Diesel Delivery Trucks	Total Emissions
Peak Hourly Emissions from all vehicles of each type (lb/hr)						
DPM	0.015				0.027	0.042
Benzene		0.024	0.014	0.036		0.074
1,3-Butadiene		0.002	0.001	0.002		0.005
Formaldehyde		0.010	0.006	0.005		0.022
Acetaldehyde		0.005	0.003	0.004		0.012
Acrolein		0.001	0.000	0.000		0.002

Substance	Diesel Generator	Washing Vehicle (running & idling)	LRU Maintenance Truck (running & Idling)	Staff & visitor cars, van pool, security truck	Diesel Delivery Trucks	Total Emissions
Annual Emissions from all vehicles of each type (lb/yr)						
DPM	0.18				13.40	13.58
Benzene		69.78	39.08	36.28		145.14
1,3-Butadiene		5.17	2.90	2.51		10.58
Formaldehyde		29.80	16.69	5.43		51.92
Acetaldehyde		13.45	7.53	4.27		25.25
Acrolein		2.29	1.28	0.30		3.87

Source: Ex. 302, p. C.6-15.
Note: Values listed are for emissions from all vehicles of each type
DPM = diesel particulate matter

The Applicant's screening health risk assessment for the project resulted in an acute Hazard Index (HI) of 0.062 and a chronic HI of 0.00000042 at the point of maximum impact (PMI). The worst-case individual cancer risk was calculated to be 0.000667 in 1 million at the PMI. As **Public Health Table 1** shows, both the acute and chronic hazard indices and the maximum cancer risk are below the level of significance, indicating that no long-term or short-term cancer or non-cancer health effects are expected. (Ex. 300, p. C.6-12.)

Nonetheless, in order to reduce public health impacts, several administrative changes were made from the original proposal. During construction, unpaved roads would be sealed, vehicle trip lengths would be reduced and the option of using alternatively fueled vehicles would be investigated. In order to reduce public health impacts during operations, the diesel fire water pump would be changed to an electric unit, gasoline-powered vehicles for mirror wash and other maintenance vehicles would be used instead of diesels, and gasoline, electric and/or hybrid, vehicles would be used on-site. The remaining stationary emitting unit is the diesel-fueled emergency generator, for which the Applicant is continuing to investigate the possibility of using gasoline or other alternative fuels. The emergency generator will be used four hours/year for testing purposes. (Ex. 300, p. C.6-13.)

For the operations phase, atmospheric dispersion modeling of facility emissions was conducted by the Applicant using AERMOD and the risk assessment was conducted using the CARB/OEHHA Hotspots Analysis and Reporting Program

(HARP), Version 1.4a. The HARP On-Ramp program was used to load the AERMOD results into HARP. Local meteorological data were used and building downwash effects were included for five buildings. Potential risks to 5,211 grid receptors and 3 sensitive receptors were modeled. Exposure pathways assessed include inhalation, ingestion of home-grown produce, dermal absorption, soil ingestion and mother's milk. (Ex. 300, p. C.6-13.)

Staff conducted additional HARP modeling in which the one-hour emissions reported in the HARP files for each mobile source were multiplied by a factor of 2,880 hours/year, which assumes operation of vehicles for eight hours/day, 30 days/month for 12 months/year which is the rate at which the washing and LRU vehicles are expected to operate. For some vehicles this may be an underestimation (security vehicles are expected to run 24 hrs/day) or an overestimation (staff and vanpool vehicles are expected to run two hrs/day). Cancer risk and chronic hazard index modeled by Staff in this analysis are less than the significance levels of 10 in 1 million for cancer risk and 1.0 for hazard index. (Ex. 300, p. C.6-14.)

3. Cumulative Impacts

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (Cal. Code Regs., tit.14, § 15130). NEPA states that cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. (40 CFR §1508.7.)

Cumulative impacts can occur if implementation of the Calico Solar Project could combine with those of other local or regional projects. Cumulative impacts would occur locally if Calico Solar Project impacts combined with impacts of projects located within the same air basin. Cumulative impacts could also occur as a result of development of some of the many proposed solar and wind development projects that have been or are expected to be under consideration by the BLM and the Energy Commission in the near future. Many of these projects are located within the California Desert Conservation Area, as well as on BLM land in Nevada and Arizona. The geographic extent for the analysis of local cumulative impacts associated with the Calico Solar Project includes the Mojave Desert Air

Basin (MDAB), which contains most of San Bernardino County and parts of Riverside County and Kern County. (Ex. 300, p. C.6-22.)

Cumulative impacts of the proposed project and other projects within a six-mile radius were not evaluated by the Applicant. However, there is a potential for substantial future development in the project area and throughout the southern California desert region, including several energy projects employing solar or wind technologies. (Ex. 300, p. C.6-22.)

The maximum cancer risk for emissions from the Calico Solar Project is 2.7 in one million at the point of maximum impact located at the project fenceline. The maximum impact location occurs where pollutant concentrations from the Calico Solar Project would theoretically be the highest. Even at this location, we do not expect any significant change in lifetime risk to any person, and the increase does not represent any real contribution to the average lifetime cancer incidence rate due to all causes. Modeled facility-related residential risks are lower at more distant locations, and actual risks are expected to be much lower since worst-case estimates are based on conservative assumptions and thus overstate the true magnitude of the risk expected. Therefore, we do not consider the incremental impact of the additional risk posed by the Calico Solar Project to be either individually or cumulatively significant. (Ex. 300, p. C.6-23.)

Any emissions from construction of these projects would be dispersed over southeastern California, southern Nevada, and western Arizona and would not result in chronic health problems to sensitive receptors. Operation of the future solar and wind energy projects would result in negligible emissions, mostly related to worker vehicles and maintenance trucks, therefore, operation of these future projects would not result in negative regional health effects. (*Id*.)

Public health impacts of the Calico Solar Project would not combine with impacts of any past, present, or reasonably foreseeable projects to result in cumulatively considerable local or regional impacts.

4. Public Benefits

The evidence shows that a solar electric generating facility such as the proposed Calico Solar project would emit significantly fewer TACs than other energy sources available in California such as natural gas or biomass, thereby reducing the health risks that would otherwise occur with these non-renewable energy sources. At the same time, the proposed Calico Solar Project would provide

much needed electrical power to California residences and businesses at the time of greatest load (hot afternoons). It is documented that during heat waves in which elevated air-conditioning use has caused an electrical blackout, hospitalizations and deaths due to heat stroke increased. (Ex. 302, p. C.6-24.)

5. Compliance with Laws, Ordinances, Regulations and Standards (LORS)

The evidence reflects that the project will comply with all applicable LORS with implementation of the Conditions of Certification we adopt in this Decision.

FINDINGS OF FACT

Based on the evidence, we make the following findings and conclusions:

1. Construction and operation of the project will result in the routine release of criteria and noncriteria pollutants that have the potential to adversely impact public health.

2. Exposure to diesel particulate emissions from construction equipment is short-term and will not result in long-term carcinogenic or non-cancer effects.

3. Exposure to construction-related diesel particulates will be mitigated to the extent feasible by implementing measures to reduce equipment emissions.

4. Exposure to fugitive dust due to excavation and construction activities will be mitigated to insignificant levels by implementing measures to reduce dust production and dispersal.

5. Emissions of criteria pollutants, as discussed in the **Air Quality** section of this Decision, will be mitigated to levels consistent with applicable state and federal standards.

6. Emissions of noncriteria pollutants or toxic air contaminants are assessed according to procedures developed by state and federal regulatory agencies to evaluate potential health effects.

7. Emissions of toxic air contaminants from the project will not cause acute or chronic non-cancer adverse public health effects or long-term carcinogenic effects at the points of maximum impact.

8. The maximum cancer and non-cancer health risks associated with the project are below the significance thresholds commonly accepted for risk analysis purposes.

9. Since the project's contributions to health risks are well below the significance level, the project is not expected to contribute significantly to a cumulative health impact.

CONCLUSIONS OF LAW

1. Project emissions of toxic air contaminants do not pose a significant direct, indirect, or cumulative adverse public health risk.

2. With the implementation of the Conditions of Certification listed in the **Air Quality** and **Waste Management** and sections of this Decision, the project will not result in significant public health impacts during construction or operation.

3. The project will comply with the applicable laws, ordinances, regulations, and standards specified in the appropriate portion of **Appendix A** of this Decision.

CONDITIONS OF CERTIFICATION

No conditions of certification or mitigation measures are proposed.

D. WORKER SAFETY AND FIRE PROTECTION

Worker safety and fire protection measures are mandated by federal, state, and local laws, ordinances, regulations, and standards (LORS). Workers at industrial facilities, such as this project site, routinely operate equipment and handle hazardous materials. Such workers face hazards, including serious physical injury, resulting from on-site accidents. Protection measures are employed to eliminate these hazards or minimize their risk of harm through special training, protective equipment, and procedural controls. The purpose of this section is to determine whether the Applicant's proposed health and safety plans are in accordance with all applicable LORS and thus legally adequate for the protection of industrial workers. This section addresses the availability and adequacy of fire protection and emergency response services, as well as threats from wildland fires. As required by CEQA, this section also addresses the project's impacts on local fire protection services. Under the CEQA Guidelines, a project may have a significant impact if it would adversely impact acceptable levels of service for fire protection [Guidelines Appendix G]. (8/6/10 RT 122-219, Exs. 1, §5.17, Appendix B; 300, §§ B.3, C.15; 113, 300; 310; 1100 – 1105.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

1. Worker Safety

Industrial environments are dangerous during both construction and operation. The Calico Solar Project will expose workers to loud noise, moving equipment, trenches, and confined space ingress and egress. Workers may fall and trip, and suffer burns, lacerations, and other injuries. The project also exposes workers to the possibility of falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks or electrocution. It is necessary for the Calico Solar Project to have well-defined policies and procedures, training, and hazard recognition and controls to minimize the risks posed by these hazards and to protect workers. If the facility complies with all applicable LORS, workers will be afforded legally adequate protection from these health and safety hazards. (Ex. 300, p. C.15-5.)

The Calico Solar Project will present construction and operational risks to workers typical of other solar power projects. In addition, the facility will pose risks associated with use of 34,000 pounds of hydrogen as a working gas. The risk to workers is minimized through onsite generation (which reduces storage of

hydrogen) and through rigorous safety management practices required by applicable LORS. (8/6/10 RT 162; Ex. 300, pp. C.15-5 - C.15-6.)

The project owner will prepare a Safety and Health Program to minimize worker hazards during construction and operation of the project. (Exs. 1, pp. 5.17-2–5.17-7, 5.17-7–5.17-12; 300, pp. C.15-5 – C.15-11.) The construction safety and health program (Title 8 of the California Code of Regulations, section 1502 et seq) will incorporate the orders promulgated by Cal/OSHA and over 20 additional state programs or requirements that address worker safety. The Applicant has included outlines of these required programs in the AFC. (Exs.1, Appen. B; 300, p. C.15-7.) Safety training will be an integral part of this worker safety program. We adopt Condition of Certification **WORKER SAFETY-1** to ensure that the project owner implements these programs and plans prior to the start of construction. (Ex. 300, pp. C.15-5 - C.15-7.)

The safety and health program for plant operation will include an injury and illness prevention program, an emergency action plan, a fire prevention program, and a personal protective equipment program. As with the construction program, worker safety-training will be an essential element of the operation program. To ensure that the programs will be in place before construction and operation begin, we have adopted Conditions of Certification **WORKER SAFETY-1 and -2**. (Ex. 300, pp. C.15-7 to C.15-11.)

This solar power plant will present a unique work environment that includes a solar field located in the high desert. The area under the SunCatchers must be kept free from weeds and thus herbicides will be applied as necessary. Worker exposure to these herbicides by inhalation and ingestion of dusts containing the herbicides poses a health risk. Workers will regularly inspect the SunCatchers for broken or non-functioning mirrors, and will clean and service the mirrors on a regular schedule. All these activities will take place year-round, including the summer months of peak solar power generation, when outside ambient temperatures routinely reach 115°F and above. (Ex. 300, p. C.15-10.) While the Applicant has indicated that workers will be adequately trained and protected, the Applicant has not included specific precautions to prevent heat stress and exposure to herbicides. Therefore, to protect workers from these risks and minimize their effects to less than significant levels, we have incorporated into Conditions of Certification **WORKER SAFETY-1** and **WORKER SAFETY-2** requirements for heat illness prevention and management of herbicides. (Ex. 300, pp. C.15-10 – C.15-11.)

Protecting construction workers from injury and disease is one of today's greatest challenges in occupational safety and health. (Ex. 300, pp. C.15-11 – C.15-13.) These hazards increase in complexity in multi-employer worksites typical of large, complex industrial projects like gas-fired power plants. There are no OSHA or Cal-OSHA requirements that an employer hire or provide for a construction safety officer, but doing so has become standard industry practice in view of OSHA and Cal-OSHA regulations requiring an employer to provide safety. To satisfy the intent of the Cal-OSHA regulations to provide for a safe workplace during power plant construction, we adopt Condition of Certification **WORKER SAFETY-3**, which requires the project owner to designate and provide for a project site construction safety supervisor.

Accidents, fires, and a worker death have occurred at Energy Commission-certified power plants in the recent past because of both the failure to recognize and control safety hazards and the inability to monitor compliance with occupational safety and health regulations. (Ex. 300, pp. C.15-11 – C.15-12.) In order to reduce and/or eliminate these hazards, we find that a professional Safety Monitor must be on-site to track compliance with Cal-OSHA regulations and periodically audit safety compliance during construction, commissioning, and the hand-over to the operations staff. Therefore, we adopt Condition of Certification **WORKER SAFETY-4,** which requires the project owner to hire a Safety Monitor. The Safety Monitor will be hired by the project owner but required to report to the Chief Building Official (CBO) and the Compliance Project Manager (CPM).

2. Valley Fever

Coccidioidomycosis or "Valley Fever" (VF) is primarily encountered in southwestern states, particularly Arizona and California. It is caused by inhaling the spores of the fungus *Coccidioides immitis*, which are released from the soil during soil disturbance (e.g., during construction activities) or wind erosion. The disease usually affects the lungs and can have potentially severe consequences, including hospitalization and death. The eastern side of San Bernardino County, including the Mojave Desert where the plant will be sited, experiences high rates of Valley Fever. (Ex. 300, p. C.15-13.)

The available scientific and medical literature on Valley Fever shows that there is some potential for Valley Fever to impact workers during construction and operation of the proposed project. However, the high number of cases reported in Kern County indicates that the project site may have an elevated risk for exposure. (Ex. 300, pp. C.15-13 - C.15-19.) To minimize exposure of workers

and the public to VF during soil excavation and grading, the project owner must employ extensive wetting of the soil prior to and during construction activities and require the use of dust masks at certain times during these activities. The dust (PM10) control measures set forth in the **Air Quality** section of this Decision must be strictly adhered to in order to adequately reduce the risk of contracting VF. Therefore, we adopt Condition of Certification **WORKER SAFETY-9,** which supplements the dust control measures found in Conditions **AQ-SC3** and **AQ-SC4** with additional requirements for development and implementation of a dust control plan.

3. Fire Protection and Emergency Response

a. Fire Protection

Electrical sparks, combustion of fuel oil, natural gas, hydraulic fluid, mineral oil, insulating fluid at the project power plant switchyard or flammable liquids, explosions, and overheated equipment, are all potential sources of small fires on the project site. (Ex. 300, p. C.15-18.) However, major structural fires, and fires and explosions of natural gas or other flammable gasses or liquids, are rare at most power plants. Indeed, according to the evidence, compliance with all LORS is usually adequate to ensure protection from all fire hazards associated with the project. (*Id*.)

Similarly, wildland fires that would use local vegetation as fuel are not likely to be caused by this project, as the Applicant will remove all vegetation in the vicinity of the solar power towers, substation and administration areas, and to cut and maintain vegetation in the solar field. Also, the access road along the perimeter fence lines of the project site will serve as a fire break. (Ex. 300, p. C.15-19.)

During construction and operation, the project will rely on both on-site fire protection systems and local fire protection services. The on-site fire protection system will provide the first line of defense for small fires. A major fire will require support services from the San Bernardino County Fire Department (SBCFD), including trained firefighters and equipment for a sustained response. (Ex. 300, p. C.15-19.) If warranted, mutual aid might be sought from and provided by other entities, including the Newberry Springs Fire Department. (8/6/10 RT 193, 211-213, Ex. 300, p 15-22.)

During construction, portable fire extinguishers will be located and maintained throughout the site and safety procedures and training will be implemented. (Ex.

300, p. C.15-19.) During operation, the project owner shall meet the fire protection and suppression requirements of the California Fire Code, all applicable recommended National Fire Protection Association (NFPA) standards, and all Cal-OSHA requirements. (Ex. 300, p. C.15-19.) The fire protection system will be designed to protect personnel and limit property loss and plant downtime in the event of a fire. The primary source of fire protection water will be 175,000 gallons stored in the demineralized water tank. A diesel firewater pump will increase the water pressure to the level required to serve all fire fighting systems. In addition, the Applicant is expected to implement a number of Applicant-proposed protective measures that would reduce the potential for harm to plant personnel and damage to facilities, including removal of all vegetation in the vicinity of the substation and administration areas. These measures are detailed in the record. (Exs. 1, pp. 5.17-14 to 5.17-7; 300, p. C.15-19.)

In addition to the fixed fire protection system, smoke detectors, flame detectors, high-temperature detectors, appropriate class of service portable extinguishers, and fire hydrants must be located throughout the facility at NFPA-approved intervals. These systems are standard requirements of the fire code and NFPA. Implementation of these systems will ensure adequate fire protection and Conditions of Certification **WORKER SAFETY-1** and **WORKER SAFETY-2** will ensure adequate on-site fire protection. (Ex. 300, pp. C.15-19 to C.15-20.)

With respect to off-site emergency access to the project by SBCFD or any other responder, the evidence establishes that two access gates and roads are necessary. The Applicant identified only one access gate and one access road coming from I-40. (Ex. 300, p. C.15-20.) But, based on the evidence, a secondary access road is required to ensure access to both the northern and southern solar fields, should the main access road with the above-grade crossing be blocked or otherwise unavailable. With implementation of Condition of Certification **WORKER SAFETY-6**, the project owner will provide secondary access gates and roads and means of access that are deemed acceptable by the SBCFD.

b. Emergency Response.

Staff produced evidence of SBCFD's emergency response over the past 12 years to the only three active solar power plants in the state: Solar Electric Generating Station (SEGS) 1 & 2 in Dagget, SEGS 3 – 7 at Kramer Junction, and SEGS 8 & 9 at Harper Dry Lake. In Staff's view, regardless of where a solar plant is located, the local fire department having jurisdiction will need to provide

some level of service in response areas that include fire response, hazmat spill response, rescue, and emergency medical services. (Ex. 300, pp. C.15-20 to C.15-22.) This data shows, however, that, excluding a major fire that occurred at SEGS 8 in 1990, SBCFD responded to about 30 incidents and emergences at the three solar facilities combined. Stated otherwise, the incident rate for all three power plants would be 30 in 12 years or 2.5 emergency calls per year or 0.83 emergencies per solar plant per year. (*Id*.)

Staff nonetheless concluded that the Calico Solar Project poses unique risks for fire response because it differs from the industrial, commercial, and residential development in the San Bernardino County desert region and from the existing solar plants located in the county. More particularly, the Calico plant will be larger in scale than the existing power plants and will produce, use, and store a large amount (34,000 pounds) of hydrogen gas. Staff opined that the use and storage of this amount of gas, combined with the remote location of the site and the potential for escalation of a small fire into a large conflagration enveloping the entire site and perhaps beyond, presents an emergency response challenge for SBCFD. Thus, according to Staff, the Calico Solar plant's unique needs and characteristics would pose significant added demands on local fire protection services and cause significant direct impacts on SBCFD. (Ex. 300, pp. C.15 -20 to C.15-24.)

We are not persuaded that the Calico Project will result in direct significant impacts to the physical environment or SBCFD's provision of a variety of emergency response services. Specifically with respect to EMS responses, the evidence shows that incidents at power plants requiring such response are infrequent and represent an insignificant impact on the local fire departments. (Ex. 300, p. C.15-22.) Yet there may be rare instances where a rural fire department with mostly volunteer fire-fighting staff may be insufficient to provide the required response. While the potential for both work-related and non-work related heart attacks exists at power plants, the evidence shows that many of the responses for cardiac emergencies involved non-work related incidences. (Ex. 300, pp. C.15-25 to C.15-26.) The evidence also shows that the quickest medical intervention would be achieved with the use of an on-site defibrillator often called an Automatic External Defibrillator or AED because the response from an off-site provider will take longer regardless of the provider location. Given the availability of modern, cost-effective AED devices, we adopt Staff-recommended Condition of Certification **WORKER SAFETY-5**, which requires the project owner to maintain a portable AED on site, and train workers in its proper use.

And, as further shown by the evidence discussed above, it is an event such as a major fire, and not routine plant operations, that cause concern for SBCFD. As is also shown by the evidence, the likelihood of such an occurrence is low. However, as discussed in the Cumulative Impacts section below, we find that that the project has potential to result in adverse cumulative impacts and that mitigation is required. (8/6/10 RT 193, 211-213, Ex. 300, p. C.15-22.)

4. Cumulative Impacts

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects. (Cal. Code Regs., tit. 14, § 15130.)

Under CEQA, there are two acceptable and commonly used methodologies for establishing the cumulative impact setting or scenario: the “list approach” and the “projections approach”. The first approach would use a “list of past, present, and probable future projects producing related or cumulative impacts.” [14 Cal Code Regs §15130(b)(1)(A).] The second approach is to use a “summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact” [14 Cal Code Regs., § 15130(b)(1)(B)].

This evaluation uses the “list approach” for purposes of state law to provide a tangible understanding and context for analyzing the potential cumulative effects of a project. (Ex. 300, pp. B.3-2 to B.3-3.) Reasonably foreseeable future projects in the Newberry Springs/Ludlow area of San Bernardino County, including proposed nearby solar and wind projects are shown below in **Worker Safety and Fire Table 1**. (See also Ex. 300, § B.3.) These are reasonably foreseeable projects that may contribute to the cumulative effect because they are in the immediate vicinity of the Calico Solar Project site (i.e., within a 15-20 mile radius). (Ex. 300, pp. B.3-2 to B.3-2.)

Worker Safety and Fire Table 1
Future Foreseeable Projects in the Newberry Springs/Ludlow Area

ID	Project Name	Location	Agency/ Owner	Status	Project Description
A	SES Solar Three (CACA 47702)	T's. 8, 9N., R5E (Immediately west of project site)	SES Solar Three, LLC	BLM received completed amended application June 2007. SES withdrew the application for Solar Three in December 2009. As there was a second-in-line application, this application becomes the project proposed at this location. .	914 MW Stirling solar plant on 6,779-acre site.
B	Broadwell BrightSource (CACA 48875)	Broadwell Valley (T'8N and 9N; R7E) – in northeast direction of project site	Bright-Source Energy, Inc.	Application filed with BLM. Potential conflict with proposed National Monument. Plans withdrawn/put on hold in September 2009.	5,130-acre solar thermal facility using power tower technology.
C	SCE Pisgah Substation expansion	Immediately southeast of project site	Southern California Edison		Substation upgrade from 220-kV to 500-kV

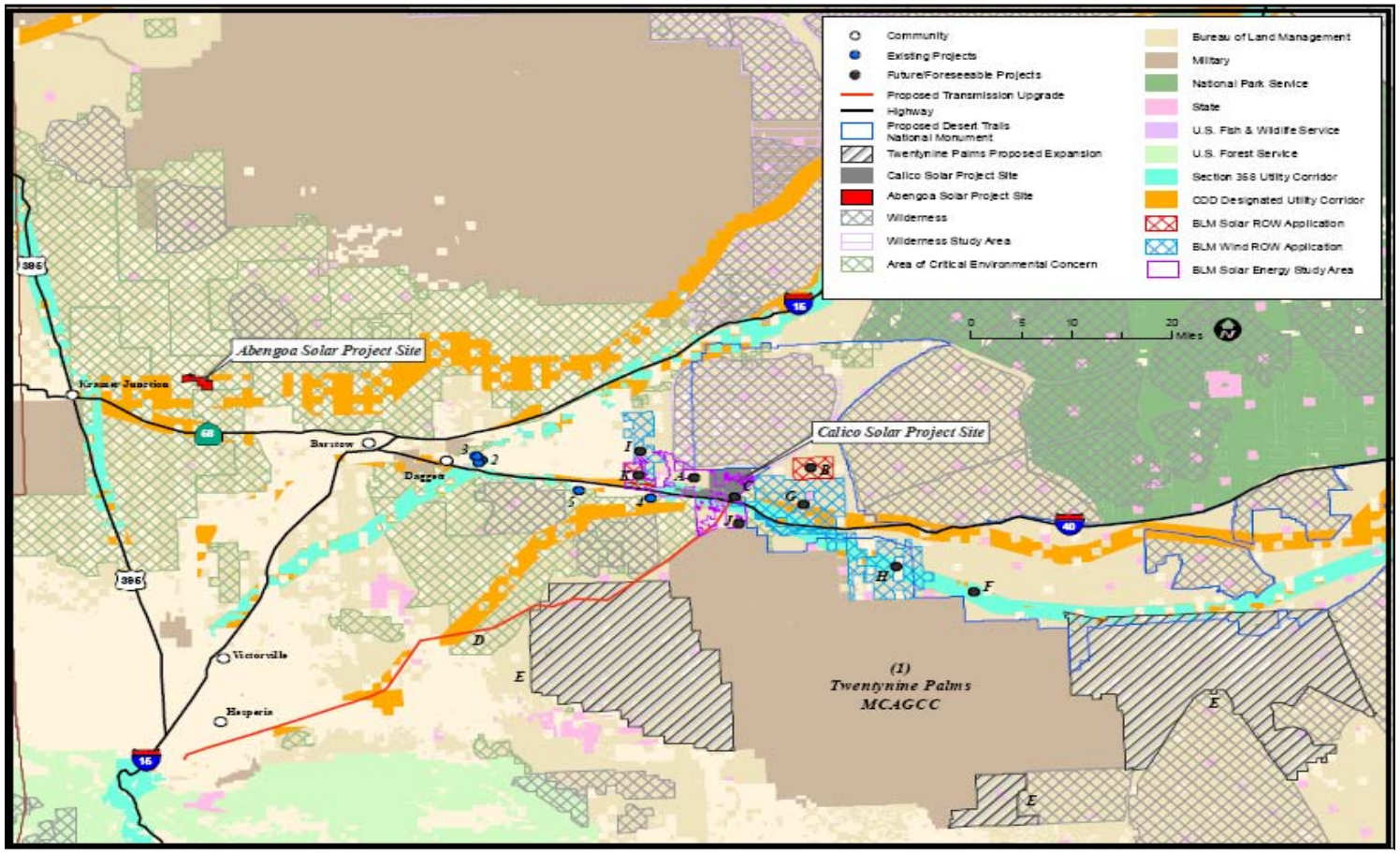
ID	Project Name	Location	Agency/ Owner	Status	Project Description
D	Pisgah-Lugo transmission upgrade	Pisgah Substation (SE side of project site) to Lugo Substation (near Hesperia)	Southern California Edison		The proposed 850 MW Calico Solar Project would require removal of 65 miles of existing 220-kV transmission line and reinstallation with a 500-kV line. The Reduced Acreage Alternative (275 MW) would require an upgrade of the telecommunication facilities serving the existing 200-kV Pisgah-Lugo transmission line. Specifically, it would require: • Replacement of a portion of existing Eldorado-Lugo 500-kV overhead ground wire with new optical ground wire between the Lugo and Pisgah Substations • Installation of a new fiber-optic line between the Pisgah Substation and Cool Water Substation (new fiber to be installed on approximately 20 miles of existing electric distribution poles).
E	Twentynine Palms Expansion	Morongo Basin (south of project site)	U.S. Marine Corps	NOI to prepare EIS to study alternatives published in Oct. 2009. Draft EIS expected September 2010.	400,000-acre expansion on the east, west, and south of the existing 596,000-acre Twentynine Palms Marine Corps base. In June 2009, approximately 60,000 acres in all study areas were removed from further study, leaving 360,000 acres under study (USMC 2009).

ID	Project Name	Location	Agency/ Owner	Status	Project Description
F	Solel, Inc. (CACA 049424)	Southwest of proposed site, immediately north of Twentynine Palms MCAGCC	Solel, Inc.	BLM received application in July 2007, POD is under review.	600 MW solar thermal plant proposed on 7,453 acres.
G	Wind project (CACA 48629)	Black Lava T2N, R5E, T1N, R5E	Oak Creek Energy	BLM received application December 2006. Issues with partial location in ACEC.	Wind project on 17,920 acres
H	Wind Project (CACA 48667)	South Ludlow T6N/R6E, T7N/R6E, T6N/R7E, T7N/R7E, T6N/R8E, T7N/R8E (In southeast direction of project site)	Oak Creek Energy	Pending	Wind project on 25,600 acres
I	Wind project (CACA 48472)	Troy Lake T9N&10N, R4E (In west direction of project site)	Power Partners SW (enXco)	Pending review of EA.	Wind project on 10,240 acres
J	Twin Mountain Rock Venture	10 miles west of Ludlow and 1 mile south of I-40; APN 0552-011-10-0 000	Rinker Materials	Permit granted to extend permit to 2018	Plan to re-permit a cinder quarry on approximately 72 acres of leased land. No development activity has occurred on project site.
K	Solar thermal (CACA 49429)	Stedman (in southeast direction of project site)	Solel, Inc.	Application filed with BLM.	600 MW solar project on 14,080 acres. POD under review.

ID	Project Name	Location	Agency/ Owner	Status	Project Description
L	Proposed National Monument (former Catellus Lands)	Between Joshua Tree National Park and Mojave National Preserve		In December 2009, Sen. Feinstein introduced bill S.2921 that would designate 2 new national monuments including the Mojave Trails National Monument.	The proposed Mojave Trails National Monument would protect approximately 941,000 acres of federal land, including approximately 266,000 acres of the former railroad lands along historic Route 66. The BLM would be given the authority to conserve the monument lands and also to maintain existing recreational uses, including hunting, vehicular travel on open roads and trails, camping, horseback riding and rockhounding.
M	BLM Renewable Energy Study Areas	Along the I-10 corridor between Desert Center and Blythe	BLM	Proposed, under environmental review	The DOE and BLM identified 24 tracts of land as Solar Energy Study Areas in the BLM and DOE Solar PEIS. These areas have been identified for in-depth study of solar development and may be found appropriate for designation as solar energy zones in the future.

Source: Projects were identified through a variety of sources including the project AFC (Section 5.18) and Applicant's Submittal of CAISO Reports, SES 2010e and websites of the San Bernardino County Land Use Services Department, BLM, CEC and individual projects.

Worker Safety and Fire Figure 1
Cumulative Scenario



Source: Ex. 300, §B.3.

We find that the Calico Project differs from the existing industrial, commercial and residential development in the San Bernardino County desert region and existing solar plants, given its size and proposed production, use and storage of hydrogen. (Ex. 300, pp. C.15-22 to C.15-23.) The evidence further establishes that the Calico Project may exacerbate existing fire station drawdown and, in the event of a major detonation, may cause adverse physical and nonphysical impacts to SBCFD's ability to provide timely and adequate fire protection and emergency services. (8/6/10 RT 198; Ex. 300, pp. C.15-19 to C.15-24.)

Specifically with respect to the project's use of hydrogen, Asst. Chief Brierty indicated that this facility will use an innovative system with several tanks and pipes. (8/6/10 RT 176-177.) Even so, Asst Chief Brierty asserted that he did not believe that there is any real plausible potential of an explosion with hydrogen. Staff witness Alvin Greenberg also testified that the chances of a hydrogen explosion are remote. (8/6/10 RT 179.) But SBCFD is nonetheless concerned about the risk of fires, and the fires being close enough to the rail line or to some other combustible material, such as grass or other off-the site materials, that could cause a fire to escalate throughout the facility. (8/6/10 RT 177.)

Thus, based on the evidence, we find that the incremental impact of the Calico Project, together with the environmental changes anticipated from past, present and probable future projects, is cumulatively considerable with respect to fire and emergency services. We are persuaded by Staff's evidence (developed in consultation with SBCFD) that these impacts can be fully mitigated to less than significant levels if the Calico Project funds its proportionate share of SBCFD mitigation activities. At some future time there may be need for SBCFD to construct additional fire infrastructure or improve existing fire stations, related fire equipment and staff, or related alternative mitigation measures. (Exs. 300, pp. C.15-24 to C.15-25; 302.)

Staff specifically concludes that impacts attributable to the Calico Project will be mitigated with the project's payment to SBCFD of $1,187,000 for capital improvements and annual payments of $1,095,000 for the life of the project. (Exs. 300, p. C.15-25; 302.) In contrast, the Applicant maintains that any payment for impacts should not exceed $62,000 per year. (8/6/10 RT 143.) While both parties provided documentary evidence and testimony to support their positions, neither party provided clear evidence that the assumptions and methodologies underlying the respective funding recommendations adequately focused on the Calico Project's reasonable and proportionate contribution to the identified cumulatively considerable impacts.

Staff's methodologies and conclusions may require mitigation from the project in excess of its impacts, while the Applicant's methodology and conclusions may result in the project not providing its share of mitigation. For instance, the risk matrix relied on by Staff and SBCFD appears to give little or no weight to Staff's evidence establishing that the combined incident rate for the SEGS VIII, IX, and Kramer Junction solar facilities was 30 over a period of 12 years, which was merely 2.5 emergency calls per year or 0.83 emergencies per solar plant per year. (Ex. 300, pp. C.15-20 to C.15-22.) This evidence suggests that the analysis proposed by Staff and SBCFD for the Calico Project's cost allocation did not properly consider the historical risks posed by solar facilities in San Bernardino County.

The Applicant's evidence suggests that under a worst case and unlikely scenario a hydrogen-related conflagration would have an impact radius that does not exceed 0.3 miles from the center of the explosion. (8/6/10 RT 135-136, 144.) Moreover, because the 850 MW project would operate in 9 MW units, with each SunCatcher connected to valves that would shut off with pressure changes, the project's potential impacts to fire and emergency services should result in the project being viewed as a 9 MW project and not an 850 MW project. (8/6/10 RT 142-143, 166- 167.) However, this approach is overly simplistic and does not adequately represent the potential for fire risk of the entire project.

The evidence submitted by intervenor Newberry Community Service District underscores the need for further risk analysis and consideration of the project's appropriate mitigation funding. According to District Chief Springer, no consideration was given to impacts on the outlying areas working in cooperation with San Bernardino County to meet their response and mitigation factors. If there is a major event at the Calico site, Chief Springer anticipates receiving a request to provide and providing support to SBCFD. The Chief stated this would put a significant drain on resources in the District's area for coverage, but, according to Chief Springer, is not addressed by the analyses presented. (8/6/10 RT 212-214.)

Based on the significant and irreconcilable disparities in the assumptions underlying the proffered methodologies and mitigation funding amounts, we find that further study is required to more precisely quantify the project's impacts and set the corresponding funding level with the identified mitigation activities to be undertaken by SBCFD. As a result, we have adopted Condition of Certification **WORKER SAFETY-7**, which requires the project owner and SBCFD to agree upon a funding amount and payment terms to ensure that the identified mitigation

can provide adequate fire protection and emergency response as discussed above. If agreement cannot be reached, the Condition requires preparation of a study by an independent consultant subject to the specified protocols and requirements. Plant operation shall not occur until the requirements of **WORKER SAFETY-7** are satisfied.

If the requirements of Condition of Certification **WORKER SAFETY-7** are not satisfied by the time the project owner, in consultation with the CPM, determines that construction must commence, Condition of Certification **WORKER SAFETY-8** allows the project owner to engage in construction activities upon making pre-construction mitigation payments to SBCFD based on the project's proposed two-phase development. Phase 1 comprises approximately 1,876 acres and Phase 2 comprises 2,737 acres. Phase 1 will be further broken down into Phase 1a and Phase 1b. Phase 1a includes 250 acres of the project site and linear elements, and involves (i) construction of the main access road, the waterline, the Main Services Area, the substation area, (ii) installation of 60 SunCatcher pedestals, and (iii) the temporary at-grade crossing and the permanent bridge spanning the Burlington Northern Santa Fe (BNSF) railroad tracks. All other aspects of Phase 1 will be completed in Phase 1b.

The mitigation payments set forth in **WORKER SAFETY-8** shall be made as follows: (a) $91,750 (250 acres x $367 per acre) prior to the start of construction for Phase 1a; (b) $596,742 (1,626 acres x $367 per acre) prior to the start of construction for Phase 1b; and (c) $1,004,479 (2,737 acres x $367 per acre) prior to the start of construction for Phase 2. These payment amounts were negotiated and agreed upon by and among the Applicant, Staff, and SBCFD as adequate pre-construction mitigation. (8/25/10 RT 294-297.) We have adjusted them for the reduced footprint of Scenario 5.5 and invite the parties to comment. This funding shall off-set any initial funding required by **WORKER SAFETY-7** above until the funds are exhausted.

5. Public and Agency Comment

Staff received comments from the Applicant and Intervenor Patrick Jackson. Staff's responses to and our consideration of these comments are reflected in the record (Ex. 300, p. C.15-35) and as, appropriate, incorporated into the discussion above and elsewhere within this Decision (See, e.g., Conditions of Certification **HAZ-7** and **WORKER SAFETY-2**, **WORKER SAFETY-7**, and **WORKER SAFETY-8**).

Neither the public nor public agencies submitted comments.

FINDINGS OF FACT

Based on the evidence, the Commission makes the following findings:

1. Industrial workers are exposed to health and safety hazards on a daily basis.

2. To protect workers from job-related injuries and illnesses, the project owner will implement comprehensive Safety and Health Programs for both the construction and the operation phases of the project.

3. The project will employ an on-site professional Safety Monitor during construction and operation.

4. The Conditions of Certification ensure that workers are properly protected from work-related hazards at the site.

5. The Calico Solar Project will include on-site fire protection and suppression systems as the first line of defense in the event of a fire.

6. If required, the San Bernardino County Fire Department will provide fire protection and emergency response services to the project.

7. The project will not have a significant direct or indirect impact on fire protection and emergency services; however, it may result in significant cumulative impacts. Implementation of the Conditions of Certification below will reduce any potential project impacts to fire protection and emergency service to less than significant levels.

8. With implementation of the Conditions of Certification, below, the Calico Solar Project will comply with all applicable LORS.

CONCLUSION OF LAW

1. We therefore conclude that with implementation of the Conditions of Certification, the Calico Solar project will not create significant health and safety impacts to workers, and will comply with all applicable laws, ordinances, regulations, and standards listed in the appropriate portion of **Appendix A** of this Decision.

CONDITIONS OF CERTIFICATION

WORKER SAFETY-1 The project owner shall submit to the Compliance Project Manager (CPM) a copy of the Project Construction Safety and Health Program containing the following:

- A Construction Personal Protective Equipment Program;
- A Construction Exposure Monitoring Program;
- A Construction Injury and Illness Prevention Program;
- A Construction heat stress protection plan that implements and expands on existing Cal OSHA regulations as found in 8 CCR 3395;
- A Construction Emergency Action Plan; and
- A Construction Fire Prevention Plan.

The Personal Protective Equipment Program, the Exposure Monitoring, the Personal Protective Equipment Program, the Exposure Monitoring Program, the Heat Stress Protection Plan, and the Injury and Illness Prevention Program shall be submitted to the CPM for review and approval of compliance of the program with all applicable safety orders. These plans shall include programs to prevent exposure of workers to the unusual hazard of high intensity reflected light from the solar parabolic mirrors. The Construction Emergency Action Plan and the Fire Prevention Plan shall be submitted to the San Bernardino County Fire Department for review and comment prior to submittal to the CPM for approval.

Verification: At least 30 days prior to the start of construction, the project owner shall submit to the CPM for review and approval a copy of the Project Construction Safety and Health Program. The project owner shall provide a copy of a letter to the CPM from the San Bernardino County Fire Department with the fire department's comments on the Construction Fire Prevention Plan and Emergency Action Plan.

WORKER SAFETY-2 The project owner shall submit to the CPM a copy of the Project Operations and Maintenance Safety and Health Program containing the following:

- An Operation Injury and Illness Prevention Plan;
- An Operation heat stress protection plan that implements and expands on existing Cal OSHA regulations (8 CCR 3395);
- A Best Management Practices (BMP) for the storage and application of herbicides;
- An Emergency Action Plan;

- Hazardous Materials Management Program;
- Fire Prevention Program (8 CCR § 3221); and;
- Personal Protective Equipment Program (8 CCR §§ 3401-3411).

The Operation Injury and Illness Prevention Plan, Emergency Action Plan, the Heat Stress Protection Plan, BMP for Herbicides, and Personal Protective Equipment Program shall be submitted to the CPM for review and approval concerning compliance of the programs with all applicable safety orders. These plans shall include programs to prevent exposure of workers to the unusual hazard of high intensity reflected light from the solar parabolic mirrors. The Fire Prevention Plan and the Emergency Action Plan shall address special precautions and responses to implement when a fire involves a SunCatcher or hydrogen piping located within 200 feet of a fence line where a public access road exists directly on the other side of the fence. The Fire Prevention Plan and Emergency Action Plan shall also be submitted to the San Bernardino County Fire Department and the BNSF railroad for review and comment.

Verification: At least 30 days prior to the start of operations, the project owner shall submit to the CPM for approval a copy of the Project Operations and Maintenance Safety and Health Program.

WORKER SAFETY-3 The project owner shall provide a site Construction Safety Supervisor (CSS) who, by way of training and/or experience, is knowledgeable of power plant construction activities and relevant laws, ordinances, regulations, and standards, is capable of identifying workplace hazards relating to the construction activities, and has authority to take appropriate action to assure compliance and mitigate hazards. The CSS shall:

- Have overall authority for coordination and implementation of all occupational safety and health practices, policies, and programs;
- Assure that the safety program for the project complies with Cal/OSHA and federal regulations related to power plant projects;
- Assure that all construction and commissioning workers and supervisors receive adequate safety training;
- Complete accident and safety-related incident investigations, emergency response reports for injuries, and inform the CPM of safety-related incidents; and
- Assure that all the plans identified in **Worker Safety-1** and **2** are implemented.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit to the CPM the name and contact information for the CSS. The contact information of any replacement CSS shall be submitted to the CPM within one business day.

The CSS shall submit in the Annual Compliance Report documentation of monthly safety inspection reports to include:

- Record of all employees trained for that month (all records shall be kept on site for the duration of the project);
- Summary report of safety management actions and safety-related incidents that occurred during the month;
- Report of any continuing or unresolved situations and incidents that may pose danger to life or health; and
- Report of accidents and injuries that occurred during the month.

WORKER SAFETY-4 The project owner shall make payments to the Chief Building Official (CBO) for the services of a Safety Monitor based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. Those services shall be in addition to other work performed by the CBO. The Safety Monitor shall be selected by and report directly to the CBO, and will be responsible for verifying that the Construction Safety Supervisor, as required in **Worker Safety-3**, implements all appropriate Cal/OSHA and Commission safety requirements. The Safety Monitor shall conduct on-site (including linear facilities) safety inspections at intervals necessary to fulfill those responsibilities.

Verification: At least 30 days prior to the start of construction, the project owner shall provide proof of its agreement to fund the Safety Monitor services to the CPM for review and approval.

WORKER SAFETY-5 The project owner shall ensure that two or more portable automatic external defibrillators (AEDs) are located on site during construction and operations and shall implement a program to ensure that workers are properly trained in its use and that the equipment is properly maintained and functioning at all times. During construction and commissioning, the following persons shall be trained in its use and shall be on-site whenever the workers that they supervise are on-site: the Construction Project Manager or delegate, the Construction Safety Supervisor or delegate, and all shift foremen. During operations, all power plant employees shall be trained in its use. The training program shall be submitted to BLM's authorized officer and the CPM for review and approval.

Verification: At least 30 days prior to the start of site mobilization the project owner shall submit to BLM's authorized officer and the CPM proof that a portable AED exists on site and a copy of the training and maintenance program for review and approval.

WORKER SAFETY-6 Prior to the start of site mobilization for Phase 1b, the project owner shall:

a. Provide secondary access gates for emergency personnel to enter the southern and northern portions of the site. These secondary access gates shall be at least one-quarter mile from the primary access points and may be restricted to emergency response personnel.

b. Provide a second access road or roads that serve both the northern portion of the site and the southern portion of the site. This road(s) shall be treated with Soiltac or its equivalent with 80 percent compaction, at least 20 feet wide. The secondary emergency access road may cross the BNSF tracks at an at-grade crossing.

c. Maintain the main access road and the secondary access roads and provide a plan for implementation.

d. Provide funding for a gate (with a lock allowing emergency response access), posting to direct emergency responders to notify BNSF operations before crossing, telephone box to allow BNSF notification at the at-grade crossing of the BNSF rail line on the secondary access road, and any road improvements required by the San Bernardino County Fire Department.

e. Provide an at-grade crossing of the BNSF tracks between the southern and northern portions of the site and provide funding for a gate (with a lock allowing emergency response access), posting to direct emergency responders to notify BNSF, a telephone box to allow for notification to BNSF by emergency responders when using the secondary access road, and any road improvements near the crossing recommended by the SBCFD.

Plans for the secondary access gates, the method of gate operation, secondary emergency access road(s), the above-grade crossing, and to maintain the roads shall be submitted to the San Bernardino County Fire Department for review and comment and to the CPM for review and approval.

Verification: At least 30 days prior to the start of site mobilization for Phase 1b, the project owner shall submit to the San Bernardino County Fire Department and the CPM preliminary plans showing the location and dimensions of the secondary access gates to both the southern and northern portions of the site, a description of how the gates will be opened by the fire department, and a description and map showing the location, dimensions, and composition of the main road, location of the secondary emergency access road(s) to the southern

and northern portions of the site, and the engineering drawings and precise location of the above-grade crossing structure.

At least 30 days prior to the start of site mobilization, the project owner shall submit final plans plus the road maintenance plan to the CPM review and approval. The final plan submittal shall also include a letter containing comments from the San Bernardino County Fire Department or a statement that no comments were received.

WORKER SAFETY-7 The project owner shall either:

(1) Reach an agreement with the San Bernardino County Fire Department (SBCFD) regarding funding of its project-related share of capital and operating costs to build and operate new fire protection/response infrastructure and provide appropriate equipment as mitigation of project-related impacts on fire protection services within the jurisdiction.

or

(2) The project owner shall fund a Fire Needs Assessment and Risk Assessment conducted by an independent contractor who shall be selected and approved by the CEC Compliance Project Manager (CPM) and fulfill all mitigation identified in the independent fire needs assessment and a risk assessment. The Fire Needs Assessment must address emergency response and equipment, staffing, and location needs while the Risk Assessment must be used to establish the risk (chances) of significant impacts occurring.

Should the Applicant pursue option (2), above, the Fire Needs Assessment and Risk Assessment shall evaluate the following:

(a) The risk of impact on the local population that could result from potential unmitigated impacts on local fire protection and emergency services (i.e. “drawdown” of emergency response resources);

(b) The extent that the project’s exemption from local taxes will impact local fire protection and emergency response services; and

(c) Recommend an amount of funding that should be provided to mitigate any identified significant impacts on local fire protection and emergency response services.

Compliance Protocols for the Fire Needs Assessment and Risk Assessment shall be as follows:

(a) The study shall be conducted by an independent consultant approved by the CPM. The project owner shall provide the CPM with the names of at least three consultants, whether entities or individuals, from which to make a selection, together with statements of qualifications. The CPM shall approve one of the three proffered consultants;

(b) The Fire Needs Assessment and Risk Assessment shall be fully funded by the project owner. The independent consultant(s) preparing the Fire Needs Assessment and Risk Assessment shall work directly for the Energy Commission;

(c) The project owner shall provide the protocols for conducting the independent fire needs assessment for review and comment by the SBCFD and review and approval by the CPM prior to the independent consultant's commencement of the fire needs assessment;

(d) The CPM shall be copied in any correspondence including emails or letters and included in any conversations between the project owner and consultant; and

(e) The CPM shall verify that the Fire Needs Assessment and Risk Assessment are prepared consistent with the approved fire needs assessment protocols and a risk assessment protocols.

Plant operation shall not occur until funding of mitigation occurs either (i) pursuant to an agreement reached between the project owner and the SBCFD, or (ii) pursuant to the independent Fire Needs and Risk Assessments conducted by an independent consultant approved by the CPM or (iii) as determined by the Energy Commission or its designee if the project owner and SBCFD do not agree to the recommendations of the independent consultant's study. The Energy Commission or its designee shall, based on the results of the study and comments from the project owner and SBCFD, make the final determination regarding the funding to be provided to the SBCFD to accomplish the above-identified mitigation.

Verification: If Option 1 of Condition of Certification **WORKER SAFETY-7** is fulfilled prior to plant operation, then the project owner shall provide to the CPM a copy of the individual agreement with the SBCFD. If option 2 of Condition of Certification **WORKER SAFETY-7** is selected, then prior to plant operation the project owner shall provide to the CPM a protocol, scope and schedule of work for the independent Fire Needs Assessment and Risk Assessment and the qualifications of proposed contractor(s) for review and approval by the CPM; a copy of the completed Fire Needs Assessment and Risk Assessment showing the precise amount the project owner shall pay for mitigation; and documentation

that the amount has been paid. If the Energy Commission or its designee establishes the payment amount, then prior to plant operation, the project owner shall provide the CPM with a copy of the order or decision and documentation establishing that the amount has been paid

Annually thereafter, the owner shall provide the CPM with verification of funding to the San Bernardino County Fire Department for required fire protection services mitigation pursuant to the agreement with the Fire Department or the CPM approved independent fire needs assessment.

WORKER SAFETY-8 In the event that the project owner has not satisfied the conditions set forth in **WORKER SAFETY-7** by the time the project owner, in consultation with the CPM, determines construction must commence, the project owner shall pay to SBCFD (a) $91,750 (250 acres x $367 per acre) prior to the start of construction for Phase 1a; (b) $762,259 (2,077 acres x $367 per acre) prior to the start of construction for Phase 1b; and (c) $1,426,896 (3,888 acres x $367 per acre) prior to the start of construction for Phase 2. This funding shall off-set any initial funding required by **WORKER SAFETY-7** above until the funds are exhausted. This offset will be based on a full accounting by the SBCFD regarding the use of these funds.

Verification: At least 10 days prior to the start of site mobilization for Phase 1a, 1b and Phase 2, respectively, the project owner shall provide to the CEC CPM either:

a. documentation that the payment described above has been made;

or

b. that payment has been made pursuant to a contractual agreement with the SBCFD.

The CEC CPM shall adjust any payments initially required by **WORKER SAFETY-7** based upon the accounting provided by the SBCFD.

WORKER SAFETY-9 The project owner shall develop and implement an enhanced Dust Control Plan that includes the requirements described in **AQ-SC3** and additionally requires:

i. site worker use of dust masks (NIOSH N-95 or better) whenever visible dust is present;

ii. implementation of methods equivalent to Rule 402 of the Kern County Air Pollution Control District (as amended Nov. 3, 2004); and

iii. implementation of enhanced dust control methods (increased frequency of watering, use of dust suppression chemicals, etc. consistent with **AQ-SC4** immediately whenever visible dust comes from or onto the site or when PM10 measurements obtained when implementing ii (above) exceed 50 $\mu g/m^3$.

Verification: At least 30 days prior to the commencement of site mobilization, the enhanced Dust control Plan shall be provided to the CPM for review and approval.

E. HAZARDOUS MATERIALS MANAGEMENT

This analysis considers whether the construction and operation of the Calico Solar Project will create significant impacts to public health and safety resulting from the use, handling, transportation, or storage of hazardous materials. This analysis does not address the potential exposure of workers to hazardous materials used at the project site; the **Worker Safety and Fire Protection** section of this Decision addresses this issue. Several site-specific factors affect the potential for project-related hazardous materials to cause adverse impacts. These include meteorological conditions, terrain characteristics, and the proximity of population centers and sensitive receptors relative to the project. In addition, sensitive subgroups such as the young, elderly, and those with existing conditions may be at greater risk from exposure to emitted pollutants. (Ex. 300, pp. C.5-1 to C.5-6.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

1. Potential Risks

The method used to assess risks posed by hazardous materials includes the following elements:

- A review of chemicals, the amounts proposed for on-site use, and a determination of the need and appropriateness of their use.

- Chemicals which will be used in small amounts, or whose physical state is such that there is virtually no chance that a spill will migrate off the site and impact the public, were removed from further consideration.

- Measures proposed to prevent spills were reviewed and evaluated. These included engineering controls such as automatic shut-off valves and different size transfer-hose couplings, as well as administrative controls such as worker training and safety management programs.

- Measures proposed to respond to accidents were reviewed and evaluated. These measures included engineering controls such as catchment basins and methods to keep vapors from spreading, as well as administrative controls such as training emergency response crews.

- An analysis of the theoretical impacts on the public of a worst-case spill of hazardous materials even with the mitigation measures in place. (Ex. 300, pp. C.5-6 to C.5-7.)

a. Small Quantity Hazardous Materials

Hazardous materials used during construction will include paint, cleaners, solvents, gasoline, diesel fuel, motor oil, welding gases, and lubricants. Any impact of spills or other releases of these materials would be limited to the site because of the small quantities involved, the infrequent use and hence reduced chances of release, and/or the temporary containment berms used by contractors. Petroleum hydrocarbon-based motor fuels, mineral oil, lube oil, and diesel fuel all have very low volatility and would represent limited off-site hazards, even in larger quantities. (Ex. 300, p. C.5-7.)

During operations, hazardous chemicals such as cleaning agents, lube oil, sodium hydroxide, diesel fuel, gasoline, ethylene glycol, and other various chemicals will be used and stored on-site and represent limited off-site hazard due to their small quantities, low volatility, and/or low toxicity. (Ex. 300, p. C.5-7.)

Hazardous Materials **Appendix A** (incorporated in Condition of Certification **HAZ-1** at the end of this section) lists the hazardous materials that will be used and stored on-site. Condition **HAZ-1** prohibits the project owner from using hazardous materials not listed in **Appendix A**, or storing them in greater quantities than specified, without prior approval of the Energy Commission's Compliance Project Manager

b. Large Quantity Hazardous Materials

Hydrogen is used as the working fluid in the Stirling cycle engines utilized by the project. Hydrogen will be produced onsite, and distributed through pipes or by truck in k-bottles to each SunCatcher engine. The Applicant is evaluating both methods for providing hydrogen to the SunCatchers.

From experience gained at other solar facilities, the Applicant has changed its original proposal for a hydrogen system and has increased the maximum amount of hydrogen stored at each SunCatcher from 3.4 to 11 standard cubic feet (scf), which would accommodate two full charges of the power conversion unit. For both systems, the hydrogen would be generated by electrolysis using two generators, each producing 1,820 scf per hour. Both systems would store up to 36,400 standard cubic feet in one tank. The currently proposed centralized hydrogen system would distribute hydrogen from the central storage tank to 95 compressor groups and from there to each SunCatcher using piping. Each compressor group would include a 29,333-scf high pressure supply tank and a

9,900-scf low pressure dump tank. Hydrogen refilling of each SunCatcher supply tank is expected to occur about three times per year. It would bring the on-site hydrogen to over 20,000,000 scf. (Ex. 300, p. C.5-8.)

Hazardous Materials Management Table 1, below, provides a comparison of the proposed hydrogen systems.

HAZARDOUS MATERIALS MANAGEMENT TABLE 1
COMPARISON OF PROPOSED HYDROGEN SYSTEMS

Feature	Centralized Hydrogen System	Distributed Hydrogen System
Storage - main service complex	36,400 x 1 tank	36,400 scf x 1 tank
High-pressure supply tank	29,333 x 95 compressor groups	82 scf x 34, 000 SunCatchers
Low-pressure supply tank	9,900 scf x 95 compressor groups	28 scf x 34,000 SunCatchers
Local storage tank	---	489 scf x 34, 000 SunCatchers
Single SunCatcher	11 scf	11 scf
Distribution method	pipeline	truck
Total amount onsite	4,140,00 scf (23, 000 lbs)	20,800,000 scf (116,000 lbs)

(Ex. 56, Supplement to AFC, p. 1-6, Table 1-1.)

The Applicant conducted an analysis assuming a worst-case release of all the hydrogen on site. It was assumed that a hydrogen release would form a vapor cloud and detonate causing an unconfined vapor cloud explosion. The distance to an over pressure of 1.0 psi was then determined. This is an over pressure that could cause some damage to structures and injury to exposed members of the general population. Four different scenarios were evaluated for the centralized system and three different scenarios for the distributed system. (Ex. 300, p. C.5-8.)

Phase II of the project would place SunCatchers and their stored hydrogen on land only a few hundred feet from traffic in I-40 and within one fourth-mile of the residence located to the south of I-40. This would result in traffic on I-40 and the residence being located within the 0.54 mile of the worst-case overpressure zone, thus indicating a potential for blast effects on traffic and the residence.

It is nearly impossible to detonate hydrogen in an unconfined vapor cloud because it disperses very rapidly due to its low density relative to air. The

evidence establishes that the Applicant's analysis was conservative and overestimated the magnitude of the potential risk of any actual explosion that could occur at the facility. The assessment assumed an instantaneous release of the entire volume of hydrogen instead of a more realistic release occurring over a period of time resulting in a significant dispersion of the hydrogen while the cloud was forming. Actual hydrogen releases have not resulted in unconfined cloud explosions. It is widely believed that unconfined hydrogen will not detonate without a high explosive initiating event. (Ex. 300, C.5-9.)

We conclude that an unconfined hydrogen vapor cloud detonation is not plausible and would not occur at the facility, and that the use of hydrogen posed some on-site explosion risk but no significant risk to the surrounding area. However, fires at the Calico Solar Project site could impact traffic on I-40 and the nearest residence from the extreme heat and the potential escalation of the fire beyond site boundaries, The BNSF railroad bisects the project site; a derailment could pose a risk to the site. Therefore, we adopt Conditions of Certification **HAZ-2, HAZ-7**, and **HAZ-8** to reduce potential impacts associated with the use of hydrogen for the Calico Solar Project. Condition of Certification **HAZ-2** will require Risk Management Plan that will include an Offsite Consequence Analysis. In addition, Conditions of Certification **HAZ-7** will require that the hydrogen system – whichever system the Applicant decides to use – is designed to applicable engineering safety codes and Condition of Certification **HAZ-8** requires a hazard analysis conducted by an independent third party.. We find that with implementation of these Conditions of Certification the project will not pose a significant risk to the public. (Ex. 300, pp. C.5.1, C.5-8, and C.5-9.)

2. Risk Mitigation

The evidence supports the implementation of specific mitigation measures to ensure that no significant risk will result from the use of hazardous materials. A Safety Management Program will reduce the potential for accidents resulting in the release of hazardous materials. This program would include both engineering and administrative controls to help prevent accidents and releases (spills) from moving off-site and impacting the community. Elements of the plan are summarized below.

- Engineering Controls. The Applicant has proposed use of secondary containment in storage areas and physical separation of stored chemicals to prevent accidental mixing of incompatible materials.

- Administrative Controls. The **Worker Safety** and **Fire Protection** section of this Decision requires a Worker Health and Safety Program that

> addresses administrative controls at the proposed project. This would include worker training on chemical hazards, personal protective equipment safety operating procedures; fire safety and prevention; and emergency response actions. (Ex. 300, p. C.5-11.)

We adopt Conditions of Certification **HAZ-1, HAZ-2,** and **HAZ-3** to address the management of hazardous materials for the Calico Solar Project. Condition of Certification **HAZ-1** requires that only approved hazardous materials be used at the facility as listed in the application. Condition of Certification **HAZ-2** requires the preparation and approval of a Hazardous Materials Business Plan, a Risk Management Plan, and a Spill Prevention, Control, and Countermeasures Plan that will incorporate state requirements for the handling of hazardous materials. Condition of Certification **HAZ-3** requires the preparation of a Safety Management Plan for project construction and operation. (Ex. 300, p. C.5-12.)

The evidence indicates that a San Bernardino County Fire Department (SBCFD) hazmat response team is located at Station #322 in Adelanto, about a one-hour drive from the project site. In the event of a large incident involving hazardous materials, this station would provide backup support. This hazmat response unit is capable of handling any incident at the proposed Calico Solar Project. (Ex. 300, p. C.5-12 and C.5-13.)

In order to address spill response, the project owner will prepare and implement an emergency response plan that includes information on hazardous materials contingency and emergency response procedures, spill containment and prevention systems, personnel training, spill notification, on-site spill containment, prevention equipment and capabilities, etc. Emergency procedures will be established which include evacuation, spill cleanup, hazard prevention, and emergency response. We find that, given the remote location, the hazardous material response time is acceptable, and that the SBCFD is adequately trained and equipped to respond to a hazardous materials spill emergency at Calico Solar in a timely manner. (Ex. 300, p. C.5-12.)

3. Transportation Risk Reduction

The evidence shows that containerized hazardous materials will be transported to the facility via truck. During construction and operation of the Calico Solar Project, the transport of minimal amounts and types of hazardous materials will not pose a significant risk of either spills or impacts along any transportation route. Therefore, we find that no specific transportation route needs to be identified for this project. (Ex. 300, p. C.5-13.)

Liquid hazardous materials can be released during a transportation accident, and the extent of their impact in the event of a release will depend on the location of the accident and the rate of vapor dispersion from the surface of the spilled pool. The evidence includes evaluation of the risk of accident and release during the transportation of hazardous materials. The evidence establishes, and we find, that the transport on I-40 and then for a short distance from I-40 on a dedicated road in a remote area, will present a less than significant risk of accident and release. (Ex. 300, p. C.5-13.)

4. Seismic Issues

The evidence presents the possibility of an earthquake causing the failure of a hazardous materials storage tank, secondary containment systems, and electrically controlled valves and pumps. The failure of all these preventive control measures might then result in the release of hazardous materials that could move offsite and impact the surrounding areas. (Ex. 300, p. C.5-13.)

The evidence indicates that after the January 1994 Northridge earthquake some damage was caused to several large and small storage tanks at the water treatment system of a cogeneration facility. The tanks with the greatest damage, including seam leakage, were older tanks, while newer tanks sustained less damage with displacements and attached line failures. Similar analysis of the February 2001 Nisqually earthquake near Olympia, Washington, showed no hazardous materials storage tanks were impacted by this quake. The assessment also considered the recent earthquakes in Haiti and Chile and found no evidence of impact on hazardous materials storage and pipelines. (Ex. 300, C.5-14.) The Calico Solar Project will be designed and constructed to the applicable standards of the 2007 California Building Code for Seismic Zone 4. On the basis of damage experienced from the Northridge quake to older tanks and the lack of failures during the Nisqually earthquake with newer tanks, the evidence discloses, and we find, that tank failures during seismic events are not likely and do not represent a significant risk to the public. (Ex. 300, pp. C.5-13 to C.5-14.)

5. Site Security

The Calico Solar Project proposes to use hazardous materials that necessitate special site security measures to prevent unauthorized access. The evidence indicates that the U.S. Department of Homeland Security (DHS) published an interim Final Rule to require facilities that use or store certain hazardous

materials to conduct vulnerability assessments and implement certain specified security measures. The rule lists hydrogen as a Chemical of Interest with a threshold level of 10,000 lbs. The Calico Solar Project will have a maximum of 37,243 lbs of hydrogen on-site and therefore the rule will apply. The project owner will need to submit a "Top Screen" assessment to the DHS consistent with the Chemical Facility Anti-Terrorism Standard (CFATS). (Ex. 300, pp. C.5-3 and C.5-14.)

In order to ensure that this facility (or a shipment of hazardous material) is not the target of unauthorized access, we adopt Conditions of Certification **HAZ-4** and **HAZ-5** to address both construction security and operations security plans. These plans would require the implementation of site security measures that are consistent with the North American Electric Reliability Corporation (NERC) *Security Guidelines for the Electricity Sector* in 2002 (NERC 2002), NERC Critical Infrastructure Protection standard for cyber security, the U.S. Department of Energy draft *Vulnerability Assessment Methodology for Electric Power Infrastructure* in 2002 (DOE 2002), and Energy Commission guidelines. (Ex. 300, p. C.5-14.)

Additional security measures include perimeter fencing and breach detectors, guards, alarms, site access procedures for employees and vendors, site personnel background checks, and law enforcement contact in the event of a security breach. Site access for vendors will be strictly controlled. Consistent with current state and federal regulations governing the transport of hazardous materials, hazardous materials vendors will have to maintain their transport vehicle fleets and employ only drivers who are properly licensed and trained. The project owner will be required, through its contractual language with vendors, to ensure that vendors supplying hazardous materials strictly adhere to the U.S. DOT requirements regarding security plans (49 CFR 172.802), and ensure that all hazardous materials drivers are in compliance with personnel background security checks (49 CFR Part 1572, Subparts A and B). (Ex. 300, pp. C.5-14 to C.5-15.)

6. Cumulative Risks

The geographic area considered for cumulative impacts from the use of Hazardous Materials is the area within one mile of the project boundary. The record contains analysis of the potential for impacts due to a simultaneous release of any of the hazardous chemicals from the Calico Solar Project with any other nearby facilities. The Calico Solar Project would not be expected to

contribute to the possible short-term, long-term, or decommissioning cumulative impacts related to hazardous materials. The project will not be located in close proximity to any other facility that might impact the same surrounding population in the event of an accidental release of hazardous materials. Based on the evidence that there are no nearby facilities using large amounts of hazardous chemicals, we find there is minimal possibility for cumulative hazardous materials impacts. (Ex. 300, pp. C.5-22 to C.5-23.)

7. Compliance with Laws, Ordinances, Regulations and Standards (LORS)

A listing of Federal, State and Local LORS applicable to the proposed project is set forth at Ex. 300, p. C.5-2. The evidence shows, and the Conditions of Certification we have adopted herein require, that the project owner comply with all applicable LORS.

8. Public and Agency Comments

Three comments were submitted regarding the Calico Solar Project's use of hazardous materials. Comments and responses are summarized below.

- Patrick C. Jackson, intervener, commented on the proposed project's impact on safety in the surrounding project area especially the use of hydrogen Staff evaluated the Applicant's Off-site Consequence Analysis and determined that there will be no significant risk to nearby populations as a result of the project.

- The Applicant commented that background checks for 700 construction personnel as required in **HAZ-5** would be onerous. The record indicates that the requirement applies only to operations personnel and not construction personnel.

- The BSNF Railway expressed concern that hydrogen gas in an underground piping system would be vulnerable to leaks and damage in the event of a train derailment. The record indicates that Staff included additional analysis of hydrogen use on the project site in the Supplemental Staff Assessment and identified Conditions of Certification **HAZ-7** and **HAZ-8** to address concerns from the BNSF railroad. **HAZ-7** requires that the hydrogen system be designed consistent with applicable design codes and **HAZ-8** requires an outside third party review of the system. Also, **HAZ-2** requires an Off-Site Consequence Analysis be included in the Risk Management Plan if hydrogen will be distributed by pipeline (Centralized Hydrogen System).

FINDINGS OF FACT

Based on the uncontroverted evidence of record, the Commission makes the following findings and conclusions:

1. The Calico Solar Project will use hazardous materials during construction and operation, including hydrogen.

2. The major public health and safety dangers associated with these hazardous materials include the accidental release, fire, and potential explosion from hydrogen gas.

3. The risk of explosion from hydrogen gas will be reduced to insignificant levels through adherence to applicable codes, and the implementation of effective safety management practices, and Conditions of Certification.

4. The project owner will submit an approved Safety Management Plan for handling all hazardous materials and an approved Hazardous Materials Business Plan prior to delivery of any hazardous materials to the site.

5. Hydrogen poses a fire risk but the evidence indicates that Conditions of Certification **HAZ-2**, **HAZ-7**, and **HAZ-8** will reduce the potential for fire to escalate beyond the site boundaries.

6. The record includes the evaluation of two options for distribution of hydrogen gas for the Calico Solar Project. Hydrogen gas will be produced on site and will be distributed either through a closed-cycle system (pipes) to the SunCatchers engines or by truck as determined by the Applicant.

7. The existing design of the Calico Solar Project is sufficient to safeguard against off-site migration of hazardous materials, including berms, secondary containment, and separate containment of hazardous materials.

8. Condition of Certification **HAZ-3** reduces the potential for accidents resulting in the release of hazardous materials by the implementation of a Safety Management Program.

9. The San Bernardino County HazMat Team is adequately trained and equipped to provide backup support if an emergency were to occur at the Calico Solar facility.

10. Other hazardous substances used on-site will be used in small quantities, have low volatility, and/or are of low toxicity.

11. Tank failures during seismic events are not likely and do not represent a significant risk to the public.

12. Conditions of Certification **HAZ-4** and **HAZ-5** require both construction and operational site security measures that include perimeter security, written procedures, monitoring, and other measures to control site access and prevent malicious mischief, vandalism, and terrorist attacks.

13. With implementation of the Conditions of Certification, below, the Calico Solar Project will comply with all applicable laws, ordinances, regulations, and standards related to hazardous materials management as identified in the evidentiary record and in the pertinent portion of **Appendix A** of this Decision.

CONCLUSION OF LAW

1. The Commission concludes, therefore, that the use of hazardous materials by the Calico Solar Project will not result in any significant adverse public health and safety impacts.

CONDITIONS OF CERTIFICATION

HAZ-1 The project owner shall not use any hazardous materials not listed in **Appendix A**, below, or in greater quantities than those identified by chemical name in **Appendix A,** unless approved in advance by the Compliance Project Manager (CPM).

Verification: The project owner shall provide to the CPM in the Annual Compliance Report, a list of hazardous materials contained at the facility.

HAZ-2 The project owner shall concurrently provide a Hazardous Materials Business Plan (HMBP), a Risk Management Plan (RMP) that includes the consequences of a train derailment resulting in a hydrogen pipeline leak and fire, and a Spill Prevention, Control, and Countermeasure Plan (SPCC) to the San Bernardino County Fire Department, and the CPM for review. After receiving comments from the San Bernardino County Fire Department, and the CPM, the project owner shall reflect all received recommendations in the final documents. If no comments are received from the county within 30 days of submittal, the project owner may proceed with preparation of final documents upon receiving comments from the CPM. Copies of the final HMBP, RMP, and SPCC Plan shall then be provided to the San Bernardino County Fire Department for their records and to the CPM for approval.

Verification: At least 60 days prior to receiving any hazardous material on the site for commissioning or operations, the project owner shall provide a copy of a final Hazardous Materials Business Plan (HMBP) and a Spill Prevention, Control, and Countermeasure Plan (SPCC) to the CPM for approval.

At least 60 days prior to existence of any hydrogen on the site for commissioning or operations, the project owner shall provide a copy of a final Risk Management Plan (RMP) to the CPM for approval,

HAZ-3 The project owner shall develop and implement a Safety Management Plan for delivery of liquid and gaseous hazardous materials. The plan shall include procedures, protective equipment requirements, training and a checklist. It shall also include a section describing all measures to be implemented to prevent mixing of incompatible hazardous materials. This plan shall be applicable during construction, commissioning, and operation of the power plant.

Verification: At least 60 days prior to the delivery of any liquid or gaseous hazardous material to the facility, the project owner shall provide a Safety Management Plan as described above to the CPM for review and approval.

HAZ-4 At least 30 days prior to commencing construction, a site-specific Construction Site Security Plan for the construction phase shall be prepared and made available to BLM's authorized officer and the CPM for review and approval. The Construction Security Plan shall include the following:

1. Perimeter security consisting of fencing enclosing the construction area;
2. Security guards;
3. Site access control consisting of a check-in procedure or tag system for construction personnel and visitors;
4. Written standard procedures for employees, contractors and vendors when encountering suspicious objects or packages on-site or off-site;
5. Protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency; and
6. Evacuation procedures.

Verification: At least 30 days prior to commencing construction, the project owner shall notify the CPM that a site-specific Construction Security Plan is available for review and approval.

HAZ-5 The project owner shall prepare a site-specific Security Plan for the operational phase and shall be made available to the CPM for review and approval. The project owner shall implement site security measures addressing physical site security and hazardous materials storage. The level of security to be implemented shall not be less than that described below (as per NERC 2002).

The Operation Security Plan shall include the following:

1. Permanent full perimeter fence, at least 8 feet high around the Solar Field;
2. Main entrance security gate, either hand operable or motorized;
3. Evacuation procedures;
4. Protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency;
5. Written standard procedures for employees, contractors and vendors when encountering suspicious objects or packages on-site or off-site;
6. a. A statement (refer to sample, attachment “A”) signed by the project owner certifying that background investigations have been conducted on all project personnel. Background investigations shall be restricted to ascertain the accuracy of employee identity and employment history, and shall be conducted in accordance with state and federal law regarding security and privacy;

   b. A statement(s) (refer to sample, attachment “B”) signed by the contractor or authorized representative(s) for any permanent contractors or other technical contractors (as determined by the CPM after consultation with the project owner) that are present at any time on the site to repair, maintain, investigate, or conduct any other technical duties involving critical components (as determined by the CPM after consultation with the project owner) certifying that background investigations have been conducted on contractor personnel that visit the project site.
7. Site access controls for employees, contractors, vendors, and visitors;
8. Closed circuit TV (CCTV) monitoring system, recordable, and viewable in the power plant control room and security station (if separate from the control room) with cameras able to pan, tilt, and zoom, have low-light capability, and are able to view the outside entrance to the control room, the two hydrogen generator locations the front gate and emergency access gate(s), and all security fence that directly abuts the public access road; and
9. Additional measures to ensure adequate perimeter security consisting of either:

   a. Security guard present 24 hours per day, 7 days per week, **OR**

   b. Power plant personnel on-site 24 hours per day, 7 days per week and **one** of the following:

      Perimeter breach detectors; **or**

CCTV able to view both site entrance gates and 100 percent of the power block area perimeter

The project owner shall fully implement the security plans and obtain CPM approval of any substantive modifications to the security plans. The CPM may authorize modifications to these measures, or may require additional measures, such as protective barriers for critical power plant components or cyber security depending on circumstances unique to the facility or in response to industry-related standards, security concerns, or additional guidance provided by the U.S. Department of Homeland Security, the U.S. Department of Energy, or the North American Electrical Reliability Council, after consultation with appropriate law enforcement agencies and the applicant.

Verification: At least 30 days prior to the initial receipt of hazardous materials on-site, the project owner shall notify the CPM that a site-specific Operations Site Security Plan is available for review and approval. In the Annual Compliance Report, the project owner shall include a statement that all current project employee and appropriate contractor background investigations have been performed, and updated certification statements are appended to the Operations Security Plan. In the Annual Compliance Report, the project owner shall include a statement that the Operations Security Plan includes all current hazardous materials transport vendor certifications for security plans and employee background investigations.

HAZ-6 The holder (project owner) shall comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, the holder(s) shall comply with the Toxic Substances Control Act of 1976, as amended (15 U.S.C. 2601, et seq.) with regard to any toxic substances that are used, generated by or stored on the right-of-way or on facilities authorized under this right-of-way grant. (See 40 CFR, Part 702-799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193.) Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR, Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation and Liability Act of 1980, Section 102b

Verification: A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances shall be furnished to the CPM concurrent with the filing of the reports to the involved Federal agency or State government.

HAZ-7 The project owner shall ensure that whichever of the two proposed hydrogen storage and handling systems is used in the project, the system is reviewed, evaluated by a Mechanical Engineer registered in California to ensure that it complies with all applicable ANSI, ASME,

and NFPA design codes, and that the system is approved by this person as shown by applying a professional "stamp" to the document review page. No hydrogen will be transported over or under the BNSF mainline or through the BNSF right-of-way.

Verification: At least 30 days prior to the existence of stored hydrogen on site, the project owner shall provide to the CPM for review and approval a copy of design drawings, documentation, and specifications of the hydrogen storage and handling system that has been reviewed, evaluated, approved, and stamped by a Mechanical Engineer registered in the state of California.

HAZ-8 The project owner shall:

a. Conduct a process hazard analysis and prepare a Process Safety Management Plan (PSM Plan) that contains a hazard analysis, including for rail operations using a Hazard and Operability Study (HAZOP) for the hydrogen system.

b. Retain an independent outside third party group of professionals to provide peer review and approval of the process hazard analysis and the PSM plan before they are submitted to the CPM. The outside third party shall have expertise in engineering and process operations, shall include at least one member who has experience and knowledge specific to the processes being evaluated, and shall also include one member knowledgeable in the specific process hazard analysis methodologies being used.

c. Ensure that the hydrogen compressor stations, piping connecting compressor stations and the piping between compressor stations and the hydrogen generator are at least 500 feet from the BNSF right-of-way.

d. Include in the hydrogen handling an automatic system for notification of BNSF operations of any loss of containment from the hydrogen system.

The final report containing the results of the hazard analysis, the final PSM Plan, and the review and approval of the outside third party shall be submitted to the San Bernardino County Fire Department for review and to the CPM for approval.

Verification: At least 30 days prior to receiving hydrogen gas on the site, the project owner shall provide a copy of a final hazard analysis, the final PSM Plan, and the review and approval of the outside third party to the CPM for approval.

Appendix A:
Hazardous Materials Proposed for Use at Calico Solar

Hazardous Materials Usage and Storage During Operations				
Chemical	**Use**	**Storage Location/Type**	**State**	**Storage Quantity**
Insulating oil	Electrical equipment	Electrical equipment (contained in transformers and electrical switches)	Liquid	60,000 gallons initial fill
Lubricating oil	Stirling Engine/dish drives PCU	Equipment 150-gallon recycle tank located in Maintenance Building	Liquid	40,000 gallons initial fill with usage of 21 gallons per month
Hydrogen	PCU working fluid	Generated on-site and stored in pressure vessel	Gas	Either 4,140,000 cubic feet or 20,800,000 cubic feet depending on hydrogen system selected
Acetylene	Welding	Cylinders stored in maintenance buildings	Gas	1,000 cubic feet
Oxygen	Welding	Cylinders stored in maintenance buildings	Gas	1,000 cubic feet
Ethylene glycol	PCU Radiator Coolant, antifreeze	PCU radiator Maintenance Buildings	Liquid	40,000 gal initial fill with usage of 21 gallons per month
Various solvents, detergents, paints, and other cleaners	Building maintenance and equipment cleaning	Three (3) 55-gallon drums and 1-gallon containers will be stored Maintenance Buildings	Liquid	Ten (10) 55-gallon drums Commercial 1-gallon containers
Gasoline	Maintenance vehicles	5,000 gallon AST at refueling station with containment	Liquid	5,000 gallons
Diesel fuel	Maintenance Vehicles	Firewater skid 5,000-gallon AST refueling station with containment	Liquid	100 gallons initial fill 5,000 gallons
Sodium hypochlorite 12.5% solution (bleach)	Disinfectant for potable water	Water treatment structure	Liquid	4 gallons

Notes:
AST = aboveground storage tank
PCU = power conversion unit
Source: Ex. 300, **Appendix A**

(Attachment A)
SAMPLE CERTIFICATION

Affidavit of Compliance for Project Owners

I, _____
(Name of person signing affidavit)(Title)

do hereby certify that background investigations to ascertain the accuracy of the identity and employment history of all employees of:

_____
(Company name)

for employment at:

_____
(Project name and location)

have been conducted as required by the California Energy Commission Decision for the above-named project.

_____
(Signature of Officer or Agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

(Attachment B)
SAMPLE CERTIFICATION

Affidavit of Compliance for Contractors

I, _____
(Name of person signing affidavit)(Title)

do hereby certify that background investigations to ascertain the accuracy of the identity and employment history of all employees of:

_____
(Company name)

for contract work at:

_____
(Project name and location)

have been conducted as required by the California Energy Commission Decision for the above-named project.

_____
(Signature of Officer or Agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

F. WASTE MANAGEMENT

The Calico Solar Project (formerly the Stirling Energy Systems Solar One Project) will generate nonhazardous and hazardous wastes during construction and operation. This section reviews the project's waste management plans for reducing the risks and environmental impacts associated with handling, storage, and disposal of project-related nonhazardous and hazardous wastes.

Nonhazardous wastes are degradable or inert materials, which do not contain concentrations of soluble pollutants that could degrade water quality and are therefore eligible for disposal at Class II or III disposal facilities. (Cal. Code Regs., tit. 14, § 17200 et seq.)

Hazardous waste consists of materials that exceed criteria for toxicity, corrosivity, ignitability, or reactivity as established by the California Department of Toxic Substances Control (DTSC). (See California Health and Safety Code, § 25100 et seq.; Hazardous Waste Control Act of 1972, as amended; and Cal. Code Regs., tit. 22, § 66261.1 et seq.) State law requires hazardous waste generators to obtain U.S. EPA identification numbers and contract with registered hazardous waste transporters to transfer hazardous waste to appropriate Class I disposal facilities. (Cal. Code Regs., tit. 22, § 66262.10 et seq.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

1. Phase I Site Assessment

The proposed Calico Solar Project site is approximately 4,613 acres of Bureau of Land Management (BLM) managed public lands located in San Bernardino County, California (Ex. 1, p. 3-3; 300, p. C.14-7.) The Burlington Northern Santa Fe (BNSF) railroad bisects the site from west to east. (Exs.1, p. 3-22; 300, p. C.14-7.)

The certification process requires a Phase I Environmental Site Assessment (ESA) to provide the history of how the site was used and a list of hazardous waste releases on or near the site to document the presence of any actual or potential soil or water contamination. If there is reasonable potential that the site contains hazardous substances, a Phase II ESA must be conducted to analyze the contamination and to establish a remediation plan. (Ex. 300, p. C.14-8.)

A Phase I ESA prepared for the project identified a former rock crusher/ore processing area in the northeastern corner of the site; the processing area was once a part of the Logan Mine (Ex. 1, Appendix T and Data Response 88). The Logan Mine produced primarily manganese and iron with trace production of phosphorus-phosphates, silica, and sulfur (Ex. 1, Appendix T and Data Response 89). The record indicates that Staff contacted the County of San Bernardino and verified that manganese and iron ore production and processing were not considered hazardous operations (Ex. 300, p. C.14-9). Therefore, the ESA did not identify any Recognized Environmental Conditions (RECs) in connection with historic or current site operations. A REC is the presence or likely presence of any hazardous substances or petroleum products on a property under the conditions that indicated an existing release, past release, or a material threat of a release of any hazardous substance or petroleum products into structures on the property or in the ground, groundwater, or surface water of the property. However, in the event that the project owner identifies contamination during any phase of construction, we adopt Conditions of Certification **WASTE-1** and **WASTE-2**. These measures require an experienced, qualified Professional Engineer or Professional Geologist be available if contaminated soil is encountered, a determination of the nature and extent of the contaminated soil, and a report that documents findings and recommended actions. (Ex. 300, pp. C-14-9 – C.14-10.)

2. Construction

Site preparation and construction of the proposed project will last approximately 44 months and generate both non-hazardous and hazardous wastes in solid and liquid forms. (Exs.1, p. 5.14-1; 300, p. C.14-10.) Before construction can begin, the project owner will be required to develop and implement a Construction Waste Management Plan per proposed Condition of Certification **WASTE-3**. This plan must describe all waste streams and methods of managing each waste. Implementation of this plan will ensure that the project owner manages wastes in accordance with appropriate LORS. (Ex. 300, pp. C.14-10 to C.14-12.)

a. Nonhazardous Wastes

Construction activities (including construction of the substation and portable SunCatcher assembly buildings) will generate an estimated 40 cubic yards per week of non-hazardous solid wastes, consisting of scrap wood, steel, glass, plastic, and paper. Of these items, the project owner will separate recyclable materials and remove as needed to recycling facilities. Non-recyclable materials

(insulation, other plastics, food waste, roofing materials, vinyl flooring and base, carpeting, paint containers, packing materials, etc.) will be disposed of at a Class III landfill. Decommissioning and removal of the buildings will generate approximately 80 cubic yards of waste consisting of surplus packing materials, lumber, cardboard, lighting, gaskets, and wiring. (Exs. 1, Data Response 172; 300, C.14-10.) We adopt Condition of Certification **WASTE-3** requires the project owner/operator to identity all waste streams and the management method used for each waste stream, which will ensure adequate treatment of these non-hazardous wastes. (Ex. 300, p. C.14-10.)

Project construction will generate non-hazardous liquid wastes, including storm water runoff and sanitary waste. Storm water runoff will be managed in accordance with appropriate LORS. Sanitary wastes will be pumped to tanker trucks by licensed contractors for transport to a sanitary water treatment plant. Please see the **Soil and Water Resources** section of this Decision for more information on the management of project wastewater. (Ex. 300, pp. C.14-10 to C.14-11.)

b. Hazardous Wastes

During construction, anticipated hazardous wastes include waste paint, spent construction solvents, waste cleaners, waste oil, oily rags, waste batteries, and spent welding materials. Estimated amounts are 1 cubic yard of empty containers (per week), 200 gallons of oils, solvents, and adhesives (every 90 days), and 20 batteries (per year). The project owner will return empty hazardous material containers to the vendor or dispose at a hazardous waste facility; solvents, used oils, paint, oily rags, and adhesives will be recycled or disposed at a hazardous waste facility; and spent batteries will be disposed at a recycling facility. (Exs. 1, **Table 5.14-2**; 300, p. C.14-11.)

Under state law, the project owner will be required to obtain a unique hazardous waste generator identification number for the site prior to starting construction, which will also be required for operation of the facility. Therefore, we adopt Condition of Certification **WASTE-4** to ensure compliance with California Code of Regulation Title 22, Division 4.5.

The project owner will collect hazardous waste in accumulation containers and store them in a lay down area, warehouse/shop area, or storage tank on equipment skids for less than 90 days. Licensed hazardous waste collection and disposal companies will manifest, transport, and dispose of accumulated wastes

at a permitted hazardous waste management facility. We find that wastes will be disposed of in accordance with applicable LORS. Should any construction waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner will notify the Compliance Project Manager (CPM) whenever the owner becomes aware of this action as required by the proposed Condition of Certification **WASTE-5**. (Ex. 300, p. C.14-11.)

In the event that construction activities identify potentially contaminated soils, specific waste handling, disposal, or other precautions may be necessary pursuant to hazardous waste management LORS. We adopt Conditions of Certification **WASTE-1** and **WASTE-2** to address any soil contamination that may be encountered during construction of the project and to support compliance with LORS. (Ex. 300, p. C-14-11.)

Further, the Integrated Waste Management Act of 1989 [Assembly Bill (AB) 939, Sher, Chapter 1095, Statutes of 1989] set landfill waste diversion goals of 50 percent (by 2000) for local jurisdictions. While the Calico Solar Project is not responsible to a local jurisdiction, we adopt Condition of Certification **WASTE-6** to ensure the project owner/operator meets waste diversion goals of the construction and decommissioning program, to ensure project wastes are managed properly, and to further reduce potential impacts to local landfills from project wastes. Therefore, we find that all construction wastes will be disposed of in accordance with all applicable LORS. (Ex. 300, p. C-14-11.)

3. Operation

The Calico Solar Project will generate both non-hazardous and hazardous wastes. To address waste generated during operation, we adopt Condition of Certification **WASTE-7**. This Condition requires the project owner/operator to maintain an accurate record of the project's waste storage, generation, and disposal, and requires compliance with waste regulations during operation. (Ex. 300, p. C-14-12.)

a. Nonhazardous Wastes

Non-hazardous solid wastes generated during project operations will consist of glass, paper, wood, plastic, cardboard, deactivated equipment and parts, defective or broken electrical materials, empty non-hazardous containers, and other miscellaneous solid wastes. The project will generate approximately 10 cubic yards of non-hazardous solid waste per week. (Exs. 1, **Table 5.14-3**; 300

p. C.14-12.) Such wastes will be recycled to the greatest extent possible, and the remainder will be removed on a regular basis for disposal in a Class III landfill. Non-hazardous oily rags (one 55-gallon drum per month) will be laundered at an authorized recycle facility. Sanitary wastewater solids will be treated with an onsite septic system, and sludge will be delivered to an off-site disposal facility. (Ex. 300, p. C.14-12.)

The project will generate non-hazardous liquid wastes during facility operation as discussed in the **Soil and Water Resources** section of this Decision. (Ex. 300, p. C.14-12.)

b. Hazardous Wastes

Hazardous wastes generated during routine project operation include motor oil and coolant from the Power Conversion Unit, batteries, oily absorbent and spent oil filters, and used hydraulic fluid. (Exs. 1, p. 5.14-11; 300, p. C.14-13.) In addition, spills and unauthorized releases of hazardous materials or hazardous wastes may generate contaminated soils or cleanup materials that may require management and disposal as hazardous waste. To ensure proper cleanup and management of hazardous materials spills, we adopt Condition of Certification **WASTE-8**. This measure requires the project owner/operator to document, clean up, and properly manage and dispose of wastes from any hazardous materials spills or releases in accordance with all applicable federal, state, and local requirements. The **Hazardous Materials Management** section of this Decision provides more information on hazardous materials management spill reporting, containment, and spill control and countermeasures plan provisions for the project. (Ex. 300, p. C-14-13.)

The amount of hazardous wastes generated during operation of Calico Solar will be temporarily stored on site, transported off site by licensed hazardous waste haulers, and recycled or disposed of at authorized disposal facilities in accordance with established standards (Title 22, CCR, §66262.10 et seq.). We adopt Condition of Certification **WASTE-5** that requires the project owner/operator to notify the CPM if an enforcement action is initiated by a regulatory agency. (Ex. 300, p. C-14-13.)

The Calico Solar Project will have more than 34,000 gallons of oil on site. A Hazardous Materials Business Plan, which outlines hazardous materials handling, storage, spill response, and reporting procedures, will be prepared before construction activities begin. The Lahontan Regional Water Quality

Control Board will require a Spill Prevention, Control, and Countermeasure Plan (SPCC) (Exs.1, Data Responses 170 & 17; 300, p. C.14-13)1) in accordance with Title 40 CFR, Section 112. Also, Federal Code of Regulations (40 CFR 112 Subpart B) requires owners/operators of non-transportation-related bulk petroleum storage facilities (depending on size) to prepare and maintain a site-specific SPCC Plan. Refer to the **Hazardous Materials Management** section of this Decision for more information. (Ex. 300, pp. C.14-13 to C.14-14.)

4. Potential Impacts on Waste Disposal Facilities

a. Non-Hazardous Solid Wastes

Construction will generate 41 cubic yards and operation will generate 10 cubic yards per week of nonhazardous solid waste (wood, paper/cardboard, glass, plastic, insulation, and concrete). The waste will be stored onsite for less than 30 days, and then recycled or disposed of in a Class III landfill. (Ex. 300, p. C.14-14.)

Four waste disposal facilities in San Bernardino County could take the non-hazardous construction and operation wastes generated by the Calico Solar Project. These facilities have over 93 million cubic yards of remaining combined capacity. (Exs.1, **Table 5.14-1**; 300, C.14-15.). The total amount of non-hazardous solid waste generated from project construction is estimated to be 7,872 cubic yards (41 cubic yards per week for 48 months), and the total amount from lifetime operations is estimated to be 20,800 cubic yards (10 cubic yards per week for 40 years). These quantities include both recyclable and non-recyclable wastes; Additional non-recyclable sanitary sludge (the non-liquid portion of 5,000 gallons of wastewater per month during operation) and saltcake (90,200 pounds per year of operation) will also be disposed off-site (Exs.1, **Table 5.14-3**;. 300, p. C.14-15.). The total non-recyclable solid waste will contribute much less than one percent of the available landfill capacity. We find that disposal of the solid wastes generated by the Calico Solar Project can occur without significantly impacting the capacity or remaining life of any of these facilities. (Ex. 300, pp. C.14-14 to C.14-15.)

b. Hazardous Wastes

Two hazardous waste (Class I) disposal facilities are currently accepting waste and could be used to manage Calico Solar Project wastes: the Clean Harbors Buttonwillow Landfill in Kern County and the Chemical Waste Management

Kettleman Hills Landfill in Kings County. The Kettleman Hills facility also accepts Class II and Class III wastes. In total, there is a combined excess of 16 million cubic yards of remaining hazardous waste disposal capacity at these landfills, with at least 30 years remaining in their operating lifetimes. In addition, the Kettleman Hills facility is in the process of obtaining approval for additional disposal capacity and the Buttonwillow facility has 40 years to reach its capacity at its current disposal rate. (Ex. 300, pp. C.14-14 to C.14-15.)

Hazardous wastes generated during construction and operation will be recycled to the extent possible and practical. The project owner/operator will transport off site those wastes that cannot be recycled to a permitted treatment, storage, or disposal facility. The project will generate approximately 225 cubic yards of recyclable and non-recyclable hazardous waste over the 48-month construction period. The project will generate approximately 50 cubic yards of hazardous non-recyclable waste over the 40-year operating lifetime. Thus, we find that hazardous wastes from the Calico Solar Project requiring off-site disposal will be significantly less than the remaining capacity of either Class 1 waste facility. (Ex. 300, p. C.14-14.)

The closure or decommissioning of the Calico Solar Project will produce both hazardous and non-hazardous solid and liquid waste. The project's General Compliance Conditions of Certification, including Compliance Monitoring and Closure Plan (Compliance Plan) have been established as required by Public Resources Code section 25532. While we expect that there will be adequate landfill capacity available to dispose of both non-hazardous and hazardous waste from the closure or decommissioning of the proposed project, Conditions of Certification **WASTE-3** through **WASTE-8** will continue to apply to the Calico Solar Project during closure or decommissioning of the project. (Ex. 300, p. C.14-14.)

5. Cumulative Impacts

Impacts of the Calico Solar Project will combine with impacts of past, present, and reasonably foreseeable projects to result in a contribution to local and regional cumulative impacts related to waste management. The amount of non-hazardous and hazardous wastes generated during construction and operation of the Calico Solar Project will add to the total quantity of hazardous and non-hazardous waste generated in San Bernardino County. However, the project will generate wastes in modest quantities, employ waste recycling wherever practical, and several treatment and disposal facilities have sufficient capacity

available to handle the volumes of wastes the project will generate. Therefore, we find that the waste generated by the project will not result in significant cumulative waste management impacts either locally or regionally. (Ex. 300, p. C.14-25.)

6. Public Comment

No public comment was received regarding **Waste Management**.

FINDINGS OF FACT

Based on the uncontroverted evidence, the Commission makes the following findings:

1. The project will generate nonhazardous and hazardous wastes during construction and operation.

2. Based on the preparation of a project-specific Phase I Environmental Site Assessment, no recognized environmental conditions (REC), or historical RECs were identified on the project site.

3. Conditions of Certification **WASTE-1**, **WASTE-2,** and **WASTE-3** adequately address any soil contamination that may be encountered during construction of the project, including preparation of a Construction Waste Management Plan.

4. The construction contractor and the project owner/operator is required to obtain a unique hazardous waste generator identification number for the site prior to starting construction, pursuant to Condition of Certification **WASTE-4**.

5. The project owner/operator has committed to dispose of all construction wastes in accordance with all applicable LORS.

6. Project compliance with LORS is sufficient to ensure that no significant impacts will occur as a result of project waste management activities during construction.

7. Condition of Certification **WASTE-5** requires the project owner to notify the CPM in writing of any impending enforcement action by any agency.

8. The project owner/operator has committed to recycle, as applicable, all non-hazardous wastes to the greatest extent possible and non-recyclable wastes will be collected by a licensed hauler and disposed of in a solid waste disposal facility (Class III landfill).

9. To reinforce this commitment, Condition of Certification **WASTE-6** requires a reuse/recycling plan that addresses at least 50 percent of the construction and demolition materials.

10. Condition **WASTE-7** requires the Project Owner to develop and implement an Operation Waste Management Plan to identify all waste streams and the methods of managing each waste.

11. Condition of Certification **WASTE-8** requires the project owner/operator to report, clean up, and remediate as necessary, any hazardous materials spills or releases in accordance with all applicable federal, state, and local requirements.

12. The disposal of the solid wastes generated by Calico Solar Project can occur without significantly impacting the capacity or remaining life of any of the facilities located in San Bernardino County, Kings County, or Kern County.

13. Liquid wastes will be classified for appropriate disposal and managed in accordance with the Conditions of Certification listed in the **Soil and Water Resources** section of this Decision.

14. Disposal of project wastes will not result in any significant direct, indirect, or cumulative impacts on existing waste disposal facilities.

CONCLUSIONS OF LAW

1. Implementation of the Conditions of Certification, below, and the waste management practices described in the evidentiary record will reduce potential impacts to insignificant levels and ensure that project wastes are handled in an environmentally safe manner.

2. The management of project wastes will comply with all applicable laws, ordinances, regulations, and standards related to waste management as identified in the pertinent portions of **Appendix A** of this Decision.

CONDITIONS OF CERTIFICATION

WASTE-1 The project owner shall provide the resume of an experienced and qualified professional engineer or professional geologist, who shall be available during site characterization (if needed), demolition, excavation, and grading activities, to the CPM for review and approval. The resume shall show experience in remedial investigation and feasibility studies.

The professional engineer or professional geologist shall be given authority by the project owner to oversee any earth moving

activities that have the potential to disturb contaminated soil and impact public health, safety and the environment.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit the resume to the CPM for review and approval.

WASTE-2 If potentially contaminated soil is identified during site characterization, demolition, excavation or grading at either the proposed site or linear facilities, as evidenced by discoloration, odor, detection by handheld instruments, or other signs, the professional engineer or professional geologist shall inspect the site, determine the need for sampling to confirm the nature and extent of contamination, and provide a written report to the project owner, representatives of Department of Toxic Substances Control or Regional Water Quality Control Board, and the CPM stating the recommended course of action.

Depending on the nature and extent of contamination, the professional engineer or professional geologist shall have the authority to temporarily suspend construction activity at that location for the protection of workers or the public. If in the opinion of the professional engineer or professional geologist, significant remediation may be required, the project owner shall contact the CPM and representatives of the Department of Toxic Substances Control or Regional Water Quality Control Board, for guidance and possible oversight.

Verification: The project owner shall submit any reports filed by the professional engineer or professional geologist to the CPM within five days of their receipt. The project owner shall notify the CPM within 24 hours of any orders issued to halt construction.

WASTE-3 The project owner shall prepare a Construction Waste Management Plan for all wastes generated during construction of the facility and shall submit the plan to the CPM for review and approval prior to the start of construction. The plan shall contain, at a minimum, the following:

- A description of all construction waste streams, including projections of frequency, amounts generated, and hazard classifications; and
- Management methods to be used for each waste stream, including temporary on-site storage, housekeeping and best management practices to be employed, treatment methods and companies providing treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans.

Verification: The project owner shall submit the Construction Waste Management Plan to the CPM for approval no less than 30 days prior to the initiation of construction activities at the site.

WASTE-4 The project owner shall obtain a hazardous waste generator identification number from the United States Environmental Protection Agency (USEPA) prior to generating any hazardous waste during project construction and operations.

Verification: The project owner shall keep a copy of the identification number on file at the project site and provide documentation of the hazardous waste generation and notification and receipt of the number to the CPM in the next scheduled Monthly Compliance Report after receipt of the number. Submittal of the notification and issued number documentation to the CPM is only needed once unless there is a change in ownership, operation, waste generation, or waste characteristics that requires a new notification to USEPA. Documentation of any new or revised hazardous waste generation notifications or changes in identification number shall be provided to the CPM in the next scheduled compliance report.

WASTE-5 Upon notification of any impending waste management-related enforcement action by any local, state, or federal authority, the project owner shall notify the CPM of any such action taken or proposed against the project itself, or against any waste hauler or disposal facility or treatment operator with which the owner contracts, and describe how the violation will be corrected.

Verification: The project owner shall notify the CPM in writing within 10 days of becoming aware of an impending enforcement action. The CPM shall notify the project owner of any changes that will be required in the way project-related wastes are managed.

WASTE-6 The project owner shall provide a reuse/recycling plan for at least 50 percent of construction and demolition materials prior to any building or demolition. The project owner shall ensure compliance and shall provide proof of compliance documentation to the CPM, including a recycling and reuse summary report, receipts, and records of measurement. Project mobilization and construction shall not proceed until the CPM issues an approval document.

Verification: At least 60 days prior to the start of any construction or demolition activities, the project owner shall submit a reuse recycling plan to the CPM for review and approval. The project owner shall ensure that project activities are consistent with the approved reuse/recycling plan and provide adequate documentation of the types and volumes of wastes generated, how the wastes were managed, and volumes of wastes diverted. Project mobilization and construction shall not proceed until CPM issues an approval document. Not later

than 60 days after completion of project construction, the project owner shall submit documentation of compliance with the diversion program requirements to the CPM. The required documentation shall include a recycling and reuse summary report along with all necessary receipts and records of measurement from entities receiving project wastes.

WASTE-7 The project owner shall prepare an Operation Waste Management Plan for all wastes generated during operation of the proposed project and shall submit the plan to the CPM for review and approval. The plan shall contain, at a minimum, the following:

- A detailed description of all operation and maintenance waste streams, including projections of amounts to be generated, frequency of generation, and waste hazard classifications;
- Management methods to be used for each waste stream, including temporary on-site storage, housekeeping and best management practices to be employed, treatment methods and companies providing treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans;
- Information and summary records of conversations with the local Certified Unified Program Agency and the Department of Toxic Substances Control regarding any waste management requirements necessary for project activities. Copies of all required waste management permits, notices, and/or authorizations shall be included in the plan and updated as necessary;
- A detailed description of how facility wastes will be managed, and any contingency plans to be employed, in the event of an unplanned closure or planned temporary facility closure; and
- A detailed description of how facility wastes will be managed and disposed of upon closure of the facility.

Verification: The project owner shall submit the Operation Waste Management Plan to the CPM for approval no less than 30 days prior to the start of project operation. The project owner shall submit any required revisions to the CPM within 20 days of notification from the CPM that revisions are necessary.

The project owner shall also document in each Annual Compliance Report the actual volume of wastes generated and the waste management methods used during the year; provide a comparison of the actual waste generation and management methods used to those proposed in the original Operation Waste Management Plan; and update the Operation Waste Management Plan as necessary to address current waste generation and management practices.

WASTE-8 The project owner shall ensure that all spills or releases of hazardous substances, hazardous materials, or hazardous waste are documented and cleaned up and that wastes generated from the release/spill are properly managed and disposed of, in accordance with all applicable federal, state, and local requirements.

Verification: The project owner shall document management of all unauthorized releases and spills of hazardous substances, hazardous materials, or hazardous wastes that occur on the project property or related linear facilities. The documentation shall include, at a minimum, the following information: location of release; date and time of release; reason for release; volume released; how release was managed and material cleaned up; amount of contaminated soil and/or cleanup wastes generated; if the release was reported; to whom the release was reported; release corrective action and cleanup requirements placed by regulating agencies; level of cleanup achieved and actions taken to prevent a similar release or spill; and disposition of any hazardous wastes and/or contaminated soils and materials that may have been generated by the release. A copy of the unauthorized release/spill documentation shall be provided to the CPM within 30 days of the date the release was discovered.

VI. ENVIRONMENTAL ASSESSMENT

A. BIOLOGICAL RESOURCES

The Commission must consider the potential impacts of project-related activities on biological resources, including state and federally listed species, species of special concern, wetlands, and other resources of critical biological interest such as unique habitats. The evidence describes the biological resources in the vicinity of the project site and linear alignments, assesses the potential for adverse impacts, proposes mitigation measures to reduce those impacts and assesses the project's compliance with applicable laws, ordinances, regulations, and standards (LORS).

SUMMARY AND DISCUSSION OF THE EVIDENCE

1. Project Description

The Calico Solar Project is located in Southern California's Mojave Desert, approximately 37 miles east of the city of Barstow. It is bordered on the south by Interstate 40 (I 40), on the east by the Southern California Edison transmission line corridor, and the Burlington Northern and Santa Fe rail corridor bisects the project site from east to west. The Cady Mountain Wilderness Study Area (WSA) is located north of the Calico Solar Project site. The Pisgah Crater, within the BLM-designated Pisgah Area of Critical Environmental Concern (ACEC), is located south and east of the project (south of I-40 by several miles). The ACEC designation is used by the BLM to identify areas with special management issues and priorities related to the conservation of important natural, cultural, and scenic resources, and to identify natural hazards. The Pisgah ACEC supports several sensitive species including Mojave fringe-toed lizard (Uma scoparia), desert tortoise (Gopherus agassizii), crucifixion thorn (Castela emoryi), white-margined beardtongue (Penstemon albomarginatus), and sand linanthus (Linanthus arenicola). Several underground and above ground utilities traverse the area.

The Cady Mountains north of the project site have been designated as a Wilderness Study Area by the BLM. Wilderness Study Areas meet the criteria to be considered Wilderness Areas, but have not been designated as such by Congress. BLM is required to maintain the wilderness characteristics of a Wilderness Study Area until a final decision is made by Congress as to whether or not to include the area as part of the National Wilderness Preservation System

(NWPS). A herd of Nelson's bighorn sheep inhabit the Cady Mountains Wilderness Study Area.

The Ord-Rodman Desert Wildlife Management Area (DWMA) is located adjacent to the southwest portion of the project site. This DWMA, which includes federally designated critical habitat for desert tortoise, was established by the West Mojave Plan for the conservation and recovery of the desert tortoise. Public lands within DWMAs are designated as ACECs. A recent study completed in cooperation between Caltrans and the CDFG has also identified the project area as an essential biological connectivity area between the Bristol (to the east of the project area) and Ord Mountains (to the south).

The Mojave Desert is located between the Great Basin Desert to the north and the Colorado Desert to the south, and lies in the rain shadow of the Sierra Nevada and Transverse Mountain ranges. It is generally a large alluvial-filled basin with many isolated mountain ranges. The Mojave receives most precipitation during winter months, although summer thunderstorms also occur. The average annual precipitation at Daggett Airport, approximately 23 miles east of the project site, is approximately 3.8 inches, and average monthly temperatures range between 36 and 104°F.

The Applicant originally proposed the project to generate 850-MW on 8,230 acres. To reduce impacts primarily to biological resources the Applicant reduced the project footprint to 6,215 acres of land within the original footprint. Again in an effort to address impacts associated with the proposed project, the Applicant proposed addition reduced acreage scenarios on September 10, 2010. The Applicant's preferred reduced acreage scenario, Scenario 5.5 is proposed to generate 663.5 MW on 4,613 acres of land within the originally proposed project footprint. (EX. 317, p. B.1-2) With the exception of the project's water well site, and the BNSF right of way over which the applicant will build a grade separation (bridge), the land is managed by the BLM. A detailed description of the CSP's equipment and structures and operational activities is provided in the **Project Description** section of this decision.

2. Biological Setting

The project location includes several linear development features including I-40, BNSF railway, and SCE transmission lines. Additionally, the area between the BNSF railroad and I-40 is isolated by the highway and railroad and portions of the site have been subject to repeated disturbance from pipeline development.

Besides these features, the project area is primarily open land ranging in elevation from approximately 1,925 to 3,050 feet (587 to 930 m) above mean sea level. The site lies within a broad alluvial floodplain that transports runoff from the Cady Mountains to the north. In addition, a collection of small to medium channels intersects the project from the south and east. All of these drainages generally collect and flow in a westerly direction.

Project site activities would impact two vegetation communities: desert saltbush scrub and Mojave creosote bush scrub. Under Scenario 5.5 areas mapped as desert microphyll woodland would be avoided. In addition, there are 28 acres of developed land uses (e.g., roads, railroads, transmission lines, and underground gas pipelines) on the site.

Mojave creosote bush scrub: The majority of the project site (approximately 4,372 acres) is Mojave creosote bush scrub. The dominant shrub species are creosote bush (Larrea tridentata) and white bursage (Ambrosia dumosa). Other common shrubs include desert senna (Senna armata), Nevada ephedra (Ephedra nevadensis), encelia (Encelia farinosa, E. actoni, E. frutescens), and range ratany (Krameria erecta, K. grayii. Shrubs are typically widely spaced and support a diverse assemblage of annual and perennial herbs in years of adequate seasonal precipitation.

Creosote bush is well known for forming “creosote rings,” which are very old plants growing from slowly-spreading root crowns. Creosote rings are protected under the San Bernardino County Plant Protection and Management Ordinance and were not evaluated in the Biological Resources Technical Report or the AFC In some cases, these rings are more than 10,000 years old and apparently develop on the surfaces of very old bajadas. Staff did not observe creosote rings at the project site and the project appears to be situated on younger alluvial surface than the sites where creosote rings have been recorded. Staff also reviewed aerial images of the proposed project site and did not observe any indication of creosote rings.

Catclaw acacia thorn scrub: (desert microphyll woodland): Within the mapped creosote bush scrub, dry desert washes in the northern portion of the proposed project site (i.e., foothills of the Cady Mountains and the upper bajada) support catclaw acacia (Acacia greggii) at various densities, sometimes in equal or greater cover and density than creosote bush. Scattered blue palo verde (Parkinsonia florida) and smoke tree (Psorothamnus spinosus) are also found in these washes.

Catclaw acacia is a large, deep-rooted shrub or small tree, characteristic of desert washes, occurring in habitats similar to other desert microphyllous wash woodland species. It resprouts rapidly following disturbance by floods, and seed dispersal and germination are apparently initiated by flooding. The seeds are apparently important to small mammals and, historically, to Native Americans. Catclaw acacia thorn scrub has no special conservation status ranking.

Lower elevation wash and sandfield vegetation: Areas mapped as creosote bush scrub in the southern part of the project area, generally from about 0.25 mile north of the BNSF railroad tracks and southward to the southern project area boundary, include scattered smoke trees. These areas are characterized by sandy soils, in deep sandy washes, open sandfields, and active windblown sandfields.

Sand transport from desert mountain ranges downslope to bajadas and, in some cases, dunelands, occurs throughout the deserts by fluvial and aeolian (i.e., water and wind) processes. Infrequent flooding transports sand downslope along desert washes. Prevailing winds sort sands according to grain size and further transport them downwind. Sediments from the Cady Mountains, upslope, are transported by fluvial processes toward the southern part of the project site, and redistributed by wind, particularly the southeastern part of the site, where fine windblown sands spread across the lower bajada and small hills in a small dune system, associated with active channels and partially stabilized sandfields.

Smoke tree is a shrub or small tree characteristic of desert washes and arroyos. In some areas it may be the dominant or co-dominant species, often occurring with other desert wash species (see catclaw acacia thorn scrub, above). Mixed stands, where smoke trees occur with smaller creosote bush or white bursage, may be classified as smoke tree woodland, even where smaller shrubs constitute as much as twice the overall cover. On the project site, a few small smoke trees occur in washes of the upper bajadas, and they are more common in lower washes where they are conspicuous, but do not make up a substantial proportion of total cover. Smoke tree is relatively short lived (to approximately 50 years), and is strongly tied to active washes. Its stands regenerate following floods, which abrade dormant seeds, permitting them to germinate. Smoke trees are protected under the San Bernardino County Plant Protection and Management Ordinance.

Big galleta shrub-steppe: (Pleuraphis rigida herbaceous alliance): On the proposed project site, big galleta (Pleuraphis rigid = Hilaria rigida) occurs in low

sandy areas and around the margins of dunes in the southeastern portion of the site. These areas are too small to map as separate units. In dune areas, it is often interspersed with small stands of the desert sand verbena (Abronia villosa) or desert panic grass (Panicum urvilleanum).

Desert saltbush scrub: The applicant mapped 242 acres of desert saltbush scrub on the project site. It is strongly dominated by desert saltbush (Atriplex polycarpa) with white burrobush (Hymenoclea salsola) and inkweed (Suadea moquinii) at lower cover; generally occurring on fine-textured, poorly drained saline or alkaline soils. On the project site, staff noted at least two Atriplex-dominated shrubland types in relictual wash or bajada surfaces in the southwestern part of the project site. None of the Mojave desert saltbush shrublands have special conservation status.

Jurisdictional Waters

The project site is located on a large alluvial fan that supports numerous drainages that flow from the Cady Mountains. This watershed consists of 43 square miles and is capable of producing substantial flood flows during the 100-year storm event. Because of the historic flow patterns, arid climate, and various levels of soil development desert washes can vary substantially in their characteristics.

Due to the arid conditions of the area, most of the surface waters that exist in the region are ephemeral streams, typically dry washes that only flow in response to precipitation. Regional storms, which generally occur in the winter months, are typically of low intensity, but can create short-lived ephemeral streams and cause significant flooding on the playa lakebeds. Alternatively, intense summer thunderstorms within the mountainous portions of the area can produce flooding in the low-lying valleys. During summer months, ephemeral streams may only last for a couple of hours. Conversely during the winter, flow within portions of these drainages has the potential to last up to several days. The West Mojave Plan (WMP) indicates the most important hydrologic features of these basins are the alluvial fans.

A total of 282.8 acres of State Jurisdictional Waters exist within the original Project Disturbance Area. Effected jurisdictional waters were reduced in the site revised filed by the Applicant on September 10, 2010. The proposed Scenario 5.5 site will impact an estimated 155.2 acres of Jurisdictional Waters. (Ex. 317, p. C.2-12) All of these drainages are ephemeral and are largely characterized by

sparse creosote bush scrub with small associations of microphyll woodland species such as catclaw acacia thorn scrub, smoke tree woodland, and big galleta shrub-steppe. In many locations the channels are largely devoid of vegetation or support scattered populations of annual wildflowers and grasses. The US Army Corps of Engineers has determined that the site does not support waters meeting the definition of Waters of the United States. No wetlands are present in the project footprint.

Wildlife

The project area supports a broad diversity of wildlife species. With the exception of the areas surrounding the BNSF railroad and existing roads the majority of the site consists of relatively undisturbed desert scrub communities. While the site primarily supports creosote bush scrub, a number of unique features occur throughout the site, including outcrops of black volcanic rock associated with lava flows from Pisgah Crater and wind-blown sand dune habitats. Numerous sandy washes also occur throughout the site. These features increase the biodiversity of the site, as some habitat specialists use these areas exclusively, while other generalist species are more wide-ranging in the region. For example, the Mojave fringe-toed lizard is closely associated with sand dunes, sand sheets, and sandy soils in the Mojave Desert. In addition, genetic variants of several reptile and small mammal species have been recorded in association with the dark substrates from the Pisgah lava flows, including melanistic (e.g., darker colored) forms of desert horned lizard (Phrynosoma platyrhinos), side-blotched lizard (Uta stansburiana), and long-nosed leopard lizard (Gambelia wislizenii). In addition, some mammal variation has been documented in this region including coat color variation in desert woodrats (Neotoma lepida).

Some of the species detected by the applicant during surveys conducted between 2007 and 2010 include desert tortoise (Gopherus agassizii), Mojave fringe-toed lizard (Uma scoparia), side-blotched lizard, desert iguana (Dipsosaurus dorsalis), western whiptail (Aspidoscelis tigris), zebra-tailed lizard (Callisaurus draconoides), desert horned lizard, western banded gecko (Coleonyx variegatus), long-nosed leopard lizard, and sidewinder (Crotalus cerastes). Mammals recorded during the surveys include black-tailed jackrabbit (Lepus californicus), desert cottontail (Sylvilagus audubonii), round-tailed ground squirrel (Spermophilus tereticaudus), coyote (Canis latrans), American badger (Taxidea taxus), bobcat (Lynx rufus), and desert kit fox (Vulpes macrotis).

Despite the moderate to low shrub density that occurs on the site, the project area provides forage, cover, roosting, and nesting habitat for a variety of bird species. In addition, many species, such as golden eagle (Aquila chrysaetos), are known to nest in the adjacent Cady Mountains and have been observed over the project area. Common resident and migratory birds detected in and near the Calico Solar Project site between 2007 and 2010 by the applicant include common nighthawk (Chordeiles minor), mourning dove (Zenaida macroura), white-crowned sparrow (Zonotrichia leucophrys), horned lark (Eremophila alpestris), black-throated sparrow (Amphispiza bilineata), and yellow-rumped warbler (Dendroica coronata). Common raven (Corvus corax), house finch (Carpodacus mexicanus), California quail (Callipepla californica), northern mockingbird (Mimus polyglottos), sage sparrow (A. belli), western kingbird (Tyrannus verticalis), western meadowlark (Sturnella neglecta), and violet-green swallow (Tachycineta thalassina) were also observed. Raptors and owls detected at or near the site include red-tailed hawk (Buteo jamaicensis), golden eagle, burrowing owl (Athene cunnicularia), Swainson's hawk (Buteo swainsoni), prairie falcon (Falco mexicanus), and turkey vulture (Cathartes aura).

3. Special-Status Species

Biological Resources Table 1, below, lists special-status species that are known to occur or which could potentially occur in the project vicinity. Many of these special-status plants and animals are unlikely to occur at the CSP site due to lack of suitable habitat. However, quite a few were detected during the 2007 through 2010 surveys or otherwise known to occur at or near the site; they are indicated by **bold-face type**.

Potential for occurrence is defined as follows:

Present: Species or sign of their presence observed on the site during surveys conducted for the proposed project (species that are present are noted in **bold text** in **Biological Resources Table 3**).

High: Species or sign not observed on the site, but reasonably certain to occur on the site based on conditions, species ranges, and recent records (within approximately 20 years and 10 miles of project site).

Moderate: Species or sign not observed on the site, but conditions suitable for occurrence and/or an historical record (greater than 20 years old) exists in the vicinity (within approximately 10 miles of project site).

Low: Species or sign not observed on the site, and conditions marginal for occurrence.

Not likely to occur: Species or sign not observed on the site, outside of the known range, and conditions unsuitable for occurrence.

Biological Resources Table 1
Special-Status Species, Their Status, and Potential Occurrence at the Calico Solar Project Site

Scientific Name	Common Name	Status	Potential For Occurrence On-Site
PLANTS			
Androstephium breviflorum	Pink funnel-lily, Small-flowered androstephium	CNPS 2.2	Present
Astragalus jaegerianus	Lane Mountain milk-vetch	FE, CNPS:1B.1	Not likely to occur
Astragalus lentiginosus var. *borreganus*	Borrego milk-vetch	CNPS: 4.3	Low
Blepharidachne kingii	King's eyelash grass	CNPS: 2.3	Low
Calochortus striatus	Alkali mariposa lily	BLM S, CNPS: 1B.2	Not likely to occur
Camissonia boothii var. *boothii*	Booth's evening primrose	CNPS: 2.3	Moderate
Cassia – see *Senna*			
Castela emoryi	Emory's crucifixion thorn	CNPS: 2.3	Low
Cleomella brevipes	Short-pedicelled cleomella	CNPS: 4.2	Low
Coryphantha alversonii [*Escobaria vivipara* var. *alversonii*]	Foxtail cactus	CNPS: 4.3	Present
Coryphantha chlorantha [*Escobaria vivipara* var. *deserti*]	Desert pincushion	CNPS: 2.1	Low
Coryphantha vivipara var. *rosea* [*Escobaria vivipara* var. *rosea*]	Viviparous foxtail cactus	CNPS: 2.2	Low
Cryptantha holoptera	Winged cryptantha	CNPS: 4.3	Present (unconfirmed)
Cymopterus deserticola	Desert cymopterus	BLM S, CNPS: 1B.2	Low
Cymopterus multinervatus	Purple-nerve cymopterus	CNPS: 2.2	Low
Cynanchum utahense	Utah vine milkweed	CNPS: 4.2	Present
Eriophyllum mohavense	Barstow woolly-sunflower	BLM S, CNPS: 1B.2	Low
Escobaria – see *Coryphantha*			
Gilia – see *Linanthus*			
Linanthus maculatus	Little San Bernardino Mountains linanthus	BLM S, CNPS: 1B.2	Not likely to occur
Loeflingia squarrosa var. *artemisiarum*	Sagebrush loeflingia	CNPS: 2.2	Not likely to occur
Lupinus sp.	Undescribed lupine	n/a	Low
Mentzelia eremophila	Solitary blazing-star	CNPS: 4.2	High
Mentzelia tridentata	Creamy blazing-star	BLM S, CNPS: 1B.3	Low
Mimulus mohavensis	Mojave monkeyflower	BLM S, CNPS: 1B.2	Low

Scientific Name	Common Name	Status	Potential For Occurrence On-Site
Muilla coronata	Crowned muilla	CNPS: 4.2	Present (unconfirmed)
Nemacaulis denudata var. *gracilis*	Slender woolly-heads	CNPS: 2.2	Low
Pediomelum castoreum	Beaver Dam breadroot	CNPS: 4.3	Low
Penstemon albomarginatus	White-margined beardtongue	BLM S, CNPS: 1B.1	Present
Phacelia coerulea	Sky-blue phacelia	CNPS: 2.3	Not likely to occur
Polygala acanthoclada	Thorny milkwort	CNPS: 2.3	Low
Senna covesii [*Cassia covesii*]	Coves' cassia	CNPS: 2.2	Present (unconfirmed)
Sphaeralcea rusbyi var. *eremicola*	Rusby's desert mallow	BLM S, CNPS: 1B.2	Low
Tripterocalyx micranthus	Small-flowered sand-verbena	CNPS: 2.3	Present (unconfirmed)
Wislizenia refracta ssp. *refracta*	Jackass-clover	CNPS: 2.2	Moderate
REPTILES			
Anniella pulchra pulchra	Silvery legless lizard	CSSC	Low
Gopherus agassizii	Desert tortoise	FT, ST	Present
Heloderma suspectum cinctum	Banded gila monster	BLM S, CSSC	Low
Lichanura trivirgata	Rosy boa	n/a	Moderate
Uma scoparia	Mojave fringe-toed lizard	BLM S, CSSC	Present
BIRDS			
Accipiter cooperii	Cooper's hawk	CDFG WL	Low
Aquila chrysaetos	Golden eagle	BLM S, SP, CDFG WL	Present
Asio otus	Long-eared owl	CSSC	High
Athene cunicularia	Western burrowing owl	BLM S, CSSC	Present
Buteo regalis	Ferruginous hawk	CDFG WL	High
Buteo swainsoni	Swainson's hawk	BLM S, ST	Present (not nesting)
Chaetura vauxi	Vaux's swift	CSSC	Low
Charadrius montanus	Mountain plover	BLM S, CSSC	Moderate
Circus cyaneus	Northern harrier	CSSC	Low
Eremophila alpestris actia	California horned lark	CDFG WL	Low
Falco columbarius	Merlin	CDFG WL	High
Falco mexicanus	Prairie falcon	CDFG WL	Present (not nesting)
Lanius ludovicianus	Loggerhead shrike	FBCC, CSSC	Present
Polioptila melanura	Black-tailed gnatcatcher	n/a	High
Toxostoma bendirei	Bendire's thrasher	BLM S, CSSC	Present
Toxostoma lecontei	LeConte's thrasher	BLM S, CDFG WL	Present
MAMMALS			
Antrozous pallidus	Pallid bat	BLM S, CSSC	Moderate
Corynorhinus townsendii	Townsend's big-eared bat	BLM S, CSSC	Present
Euderma maculatum	Spotted bat	BLM S, CSSC	Low

Scientific Name	Common Name	Status	Potential For Occurrence On-Site
Eumops perotis	Western mastiff bat	BLM S, CSSC	High
Ovis Canadensis nelsoni	Nelson's bighorn sheep	BLM S, SP	Present
Spermophilus mohavensis	Mohave ground squirrel	BLM S, ST	Not Likely to Occur
Taxidea taxus	American badger	CSSC	Present
Vulpes macrotis arsipus	Desert kit fox	n/a	Present

FE = Federally listed Endangered
FT = Federally listed Threatened
FD = Federally Delisted
FC = Federal Candidate
FBCC = Federal Bird of Conservation Concern
BLM S = BLM Sensitive
SE = State listed Endangered
ST = State listed Threatened (wildlife)
SR = State listed Rare (plants)
CSSC = California Species of Special Concern (wildlife)
SP = State Fully Protected Species
CDFG WL = California Department of Fish and Game Watch List species

CNPS (California Native Plant Society) Designations:

List 1A = Plants presumed extinct in California
List 1B = Plants considered by CNPS to be rare, threatened, or endangered in California, and throughout their range
List 2 = Plants rare, threatened, or endangered in California, but more common elsewhere in their range
List 3 = Plants about which we need more information – a review list.
List 4 = Plants of limited distribution – a watch list

CNPS Threat Rank:

.1 = Seriously endangered in California (over 80% of occurrences threatened/high degree and immediacy of threat)
.2 = Fairly endangered in California (20-80% occurrences threatened)
.3 = Not very endangered in California (20% of occurrences threatened or no current threats known)

(Ex. 300, pp. C.2-25 – C.2-27.)

a. Plants

<u>Small-Flowered Androstephium (Androstephium breviflorum)</u>

This species is ranked on CNPS List 2.2 (rare, threatened or endangered in California but more common elsewhere) and as S2.1 by CDFG (fewer than 1000 known individuals or fewer than 2000 acres of occupied habitat). Small-flowered androstephium is a bulb, generally occurring in sandy or rocky soil, in open desert shrublands of eastern California, through the Great Basin, to western Colorado. The documentation of many new occurrences indicates that small-flowered androstephium is more common in California than previously thought. However, a large percentage (85 percent) of the occurrences documented in the CDFG's California Natural Diversity Database (CNDDB) are threatened by development (solar energy projects and Fort Irwin expansion).

Small-flowered androstephium was reported from 52 locations on the project site and 14 additional occurrences within a 1000-foot buffer surrounding the site. Numerous additional occurrences were documented on public lands to the west and east, including many in the Pisgah ACEC. In 2010, more than 1,500

locations were documented on the site and it was reported as “ubiquitous” throughout the southern part of the project site. (Ex. 300, pp. C.2-27 – C.2-28.)

Lane Mountain Milk-Vetch (Astragalus jaegerianus)

This species is the only listed (endangered) plant species with potential to occur in the project area. It was not found in or near the project site. Lane Mountain milk-vetch is locally endemic in the central Mojave Desert, generally on and near Fort Irwin. All known occurrences are about 25 miles northwest of the proposed project site, and at higher elevations (3100, 4200 feet) than occur on the site.

The Calico Solar Project site is not within designated critical habitat or areas formerly proposed for designation as Lane Mountain milk-vetch critical habitat. In 2004, the USFWS proposed four Critical Habitat Units, all to the north of the proposed project site. In 2005, the USFWS finalized its critical habitat designation rule, designating 0 acres of critical habitat.

Lane Mountain milk-vetch is a perennial herb that climbs up through desert shrubs. It flowers during spring and dies back during summer. It almost always occurs on shallow soils on low ridges or hills of granitic outcrops rather than bajadas. It is unlikely to occur on the project site because of its distance from known occurrences and poorly suitable bajada habitat that occurs throughout most of the project site. (Ex. 300, p. C.2-28.)

Emory’s Crucifixion Thorn (Castela emoryi)

Crucifixion thorn is known from only a few widely scattered occurrences in the Sonoran Desert and southern Mojave Desert in eastern California, southwestern Arizona, northern Baja California, and western Sonora (Mexico). Most populations are fairly small, though one occurrence in Imperial County near the Mexican border includes about a thousand plants. Crucifixion thorn is a leafless, densely spiny shrub, about 6 to 20 ft. tall. It occurs along washes or other places where water may accumulate on plains and bajadas. Its fruits are held on the plant for several years, and the seeds are surrounded by a thick carpel wall which must be eroded before germination occurs. Seeds may have historically been dispersed by now-extinct Pleistocene grazing animals. The common name “crucifixion thorn” is also used for two unrelated plant species, Koeberlinia spinosa and Canotia holacantha.

Emory's crucifixion thorn was found at three locations on the formerly-proposed project site. All three locations are near the toe slopes of the Cady Mountains, outside of the amended project footprint. (Ex. 300, p. C.2-28.)

Foxtail Cactus (Coryphantha alversonii = Escobaria vivipara var. alversonii)

Foxtail cactus is typically found in sandy and rocky areas consisting of granitic soils within Mojavean desert scrub habitat from 245-5000 feet in elevation. It is recorded from the eastern Mojave and Colorado Deserts in Imperial, Riverside, and San Bernardino Counties, California. It is a stem succulent that is a CNPS List 4.3 species. It flowers from April through June (CNPS 2010). It was reported on the Calico Solar Project site at one location during the 2008 surveys for the proposed project, though the occurrence was not mapped in the applicant's Biological Resources Technical Report (SES 2009aa). It was not relocated on-site during the follow-up surveys (TS 2010i). Suitable desert shrubland habitat occurs throughout the site.

Winged Cryptantha (Cryptantha holoptera)

Winged cryptantha occurs on gravelly or rocky substrates in desert scrub communities at elevations of 328 to 5545 feet (CNPS 2010). It is known in California from the eastern Mojave Desert and Colorado Desert, and also occurs in Nevada, Arizona, Baja California, and Sonora (Mexico) (CNPS 2010). It is an annual herb with grayish foliage that blooms between March and April. It is on CNPS List 4.3. Winged cryptantha was reported in the applicant's list of plant species identified during surveys (SES 2009aa – Appendix D), though its locations were not mapped or quantified in the applicant's Biological Resources Technical Report (SES 2009aa). It was not relocated on-site during the follow-up surveys (TS 2010i). Suitable desert shrubland habitat occurs throughout much of the project site. (Ex. 300, p. C.2-29.)

Utah Vine Milkweed (Cynanchum utahense)

Utah vine milkweed is a perennial herb found in the Mojave Desert in San Bernardino County and in the Colorado Desert in Riverside, Imperial, and San Diego Counties. This species also occurs in Arizona, Nevada, and Utah (CDFG 2010a). In California its habitat is sandy and gravelly soils, often in washes, where it climbing up through shrubs. Utah vine milkweed is on CNPS List 4.2. It in present on the Calico Solar Project site, as the applicant reported one location onsite near I 40 (SES 2009aa). It was also reported in 2010 (TS 2010i) though its

locations were not mapped or quantified. Additional suitable habitat is found in washes throughout the project area. (Ex. 300, p. C.2-29.)

Undescribed Lupine (Lupinus spec. nov.)

Several lupine specimens collected near the base of the Cady Mountains, north of the present project boundary, do not appear to match any known species. They are similar to bajada lupine (Lupinus concinnus) though they do not match any of the several described varieties of that species. This is an annual species with blue flowers. They are apparently distinct in several characters, particularly the leaflet shape and width. James Andre has noted similar plants elsewhere in the central Mojave Desert. In Andre's experience, the plant appears to be sufficiently rare and geographically restricted to warrant inclusion in either CNPS List 1B or List 4, though he has not researched it enough to recommend such listing. During 2010 field surveys, locations of the undescribed lupine species were mapped throughout the larger project area originally proposed in the AFC. All of these locations are north of the revised project boundary and no occurrences were found within the revised project area. (Ex. 300, p. C.2-29.)

Crowned Muilla (Muilla coronata)

Crowned muilla is on CNPS List 4.2. It occurs in Inyo, Kern, Los Angeles, San Bernardino and Tulare Counties, and east into Nevada. It can be found in chenopod scrub, Joshua tree woodland, Mojavean desert scrub, and pinyon and juniper woodlands at elevations of about 2500 6400 feet. It is a bulbiferous herb that blooms between March and April. Crowned muilla was reported in the applicant's list of plant species identified during surveys, though it was not mapped or quantified in the applicant's Biological Resources Technical Report and was not relocated during 2010 field surveys. (Ex. 300, p. C.2-30.)

White-Margined Beardtongue (Penstemon albomarginatus)

White-margined beardtongue is the only CNPS List 1B species documented within the proposed project area. It is also managed by the BLM as a sensitive species. White-margined beardtongue occurs in the central Mojave Desert, in and around the Pisgah lava flow, in stabilized or drifting aeolian sand habitat. It is a perennial herb, flowering in spring (between March and May) and dying back to the ground in summer. White-margined beardtongue is a locally endemic species in three widely disjunct locations in California, Nevada, and Arizona. Most of its California geographic range is within the BLM Pisgah ACEC. In Nevada, it is

known only from several populations southeast of the I-15 Freeway, between Stateline and Las Vegas. These occurrences are threatened by a proposed new construction project. In Arizona, white-margined beardtongue occurs at Dutch Flat, east or southeast of Needles. In Arizona, as in California, it is regarded it is "a rare species throughout its range" by the Arizona Rare Plant Committee.

White-margined beardtongue is present at several locations on the CSP site and numerous other occurrences off-site to the southeast on lands managed by BLM in the Pisgah ACEC. It appears to require several years of above-average rainfall to become established from seed, and cross-sections of stem bases suggest that individual plants may survive for several decades. There is no known feasible horticultural method to propagate white-margined beardtongue. Due to varying habitat and rainfall, white-margined beardtongue may exist as "metapopulations," where local occurrences are extirpated by poor conditions but are replaced by new occurrences when seedlings become established at new sites during favorable conditions. In future years, white-margined beardtongue may have the potential to occur anywhere in the lower elevation wash and sandfield vegetation on the Calico Project site. (Ex. 300, pp. C.2-30 – C.2-31.)

Coves' Cassia (Senna covesii =Cassia covesii)

Coves' cassia, a CNPS List 2.2 species, occurs in scattered California locations along the desert margin of the Peninsular ranges, interior desert ranges in Riverside County, and in extreme southeastern San Bernardino County. It is more common and widespread in Arizona and Baja California, and also occurs in Nevada and mainland Mexico. It occurs in desert washes, below about 2000 ft. elevation. It is a low shrub with velvety leaves and stems which distinguish it from the more common Cassia armata. The flowers are yellow, appearing in spring in racemes of few flowers each. Though Coves' cassia was reported in 2009 surveys of the project site, the plant locations are not mapped and there is no indication of numbers of plants or the extent of distribution across the project site. If valid, that report would be the first record of Coves' cassia in the central Mojave Desert. It was not found during the 2010 survey. Staff concluded, and we therefore find, that the original report was due to misidentification. Coves' cassia is unlikely to occur on the project site. (Ex. 300, p. C.2-31.)

Small-Flowered Sand-Verbena (Tripterocalyx micranthus)

This CNPS List 2.3 species is a taprooted perennial herb of desert dunes and sandy sites. It occurs in the eastern California deserts (where it has been

reported from only two locations), eastward to the Rocky Mountain States. Its elevational range is approximately 1,800 to 2,800 feet. The only reliable prior reports in California are from the Kelso area and Eureka Valley in Inyo County. Small-flowered sand-verbena was reported in 2009 surveys of CSP site, though, as for Coves' cassia, above, the locations were not mapped, nor was there an indication of numbers of plants or extent of distribution across the project site. If valid, this report would be the first record of small-flowered sand-verbena in the central Mojave Desert. It was not found during the 2010 survey. We agree with Staff's assertion that small-flowered sand verbena is unlikely to occur on the project site. (Ex. 300, p. C.2-32.)

b. Birds

Western Burrowing Owl (Athene cunicularia)

The burrowing owl is a small, terrestrial owl of open country. Burrowing owls favor flat, open grassland or gentle slopes and sparse shrubland ecosystems. These owls prefer annual and perennial grasslands, typically with sparse, or nonexistent, tree or shrub canopies. In California, burrowing owls are found in close association with California ground squirrels. Owls use the burrows of ground squirrels and other rodents for shelter and nesting. Ground squirrels provide nesting and refuge burrows, and maintain areas of short vegetation height, which provide foraging habitat and allow for visual detection of avian predators by burrowing owls. Habitats lacking ground squirrel populations are usually unsuitable for occupancy by owls, although owls can also use man-made features as burrows (such as drain pipes, debris piles, etc). Burrowing owls are semi-colonial nesters, and group size is one of the most significant factors contributing to site constancy by breeding burrowing owls. The nesting season, as recognized by the California Burrowing Owl Consortium, runs from 1 February through 31 August.

In the Mojave Desert, burrowing owls generally occur at low densities in scattered populations, but they can be found in much higher densities near agricultural lands where rodent and insect prey tend to be more abundant (Gervais et al. 2008). The project area contains suitable foraging habitat and California ground squirrel burrows that could provide breeding habitat. This species is present on the project site, as one individual was observed in the north-central portion of the project site and another individual was observed in the Pisgah ACEC adjacent to the southeast of the project site during field surveys in 2008. Protocol surveys for this species were conducted in January

2010, and two burrowing owls and eleven burrows with sign were identified approximately 0.5 miles north of the project boundary near the toe of the Cady Mountains. (Ex. 300, pp. C.2-36 – C.2-37.)

Swainson's Hawk (Buteo swainsoni)

The Swainson's hawk was once one of the most common birds of prey in the grasslands of California and nested in the majority of the lowland areas of the state. Currently, the nesting range is primarily restricted to portions of the Sacramento and San Joaquin valleys, northeast California, and the Western Mojave, including the Antelope Valley. The Swainson's hawk requires large amounts of foraging habitat, preferably grassland or pasture habitats. Its preferred prey includes voles (Microtus spp.), gophers, birds, and insects such as grasshoppers. It has adapted to the use of some croplands, particularly alfalfa, as well as grain, tomatoes, and beets. Crops such as cotton, corn, rice, orchards, and vineyards are not suitable because they either lack suitable prey, or prey is unavailable to the hawks due to crop structure. Swainson's hawks often establish territories in riparian systems adjacent to suitable foraging habitats as well as utilizing lone trees or groves of trees in agricultural fields.

Within the West Mojave Plan area, the nearest documented nesting attempts have been recorded in Victorville, approximately 50 miles southwest of the project site; nesting is not known from east of this location within the planning area. Two Swainson's hawks were observed by the applicant during project surveys on March 30, 2008; thus the species is considered present within the project area, though it is not expected to nest there. (Ex. 300, p. C.2-37.)

Prairie Falcon (Falco mexicanus)

Prairie falcons breed throughout California, with the exception of the northwest corner and along the immediate coast. This species is an uncommon resident that ranges from the southeastern deserts northwest through the Central Valley and along the inner Coast Ranges and Sierra Nevada. It is primarily associated with perennial grasslands, savannahs, rangeland, some agricultural fields, and desert scrub areas. Prairie falcons were observed on the project site during surveys conducted in 2010 and in off-site areas during helicopter surveys for golden eagles. Nesting habitat for this species does not occur onsite; however, suitable foraging habitat for this species occurs within the project site. This species likely nests in the nearby Cady Mountains. Thus, the potential for

occurrence of this species within the project area has been determined to be high, though it is not expected to nest there. (Ex. 300, p. C.2-37.)

Golden Eagle (Aquila chrysaetos)

Golden eagles are typically year-round residents throughout most of their western United States range. They breed from late January through August with peak activity March through July. Migratory patterns are usually fairly local in California where adults are relatively sedentary, but dispersing juveniles sometimes migrate south in the fall. This species is generally considered to be more common in southern California than in the northern part of the state.
Habitats for this species typically include rolling foothills, mountain areas, and deserts. Golden eagles need open terrain for hunting and prefer grasslands, deserts, savanna, and early successional stages of forest and shrub habitats. Golden eagles primarily prey on lagomorphs and rodents but will also take other mammals, birds, reptiles, and some carrion. This species prefers to nest in rugged, open habitats with canyons and escarpments, with overhanging ledges and cliffs and large trees used as cover.

Absent interference from humans, breeding density is determined by either prey density or nest site availability, depending upon which is more limiting (USFWS 2009a). U.S. Fish and Wildlife Service recommendations include a 0.5 mile nest protection buffer and evaluating an area of 4 miles from nests as foraging habitat.

Golden eagles were observed flying over the project site during both the 2007 and 2008 surveys conducted by the applicant. Staff also observed a golden eagle above the project site during a reconnaissance survey conducted on May 25, 2010. This species is considered present within the project area and nesting was documented by the applicant in the vicinity of the project (within a 10 mile buffer area). Nesting habitat does not occur onsite, and the observed birds likely nest in the nearby Cady Mountains and forage over the project area. Information provided by the BLM and the applicant indicate that up to six potential nesting sites occur within a 10 mile radius of the site. To document potential nest sites for golden eagles, the applicant conducted helicopter surveys for this species on March 11th and 12th, 2010. This survey detected approximately 22 stick nests including eight inactive, but potential golden eagle nests, and one active nest that contained an incubating adult golden eagle. The active nest is located approximately 3.5 miles east of the proposed project area. (Ex. 300, pp. C.2-37 – C.2-38.)

Loggerhead Shrike (Lanius ludovicianus)

Loggerhead shrikes are uncommon residents throughout most of the southern portion of their range, including southern California. In southern California they are generally much more common in interior desert regions than along the coast. In the Mojave Desert this species appears to be most numerous in flat or gently sloping deserts and desert/scrub edges, especially along the eastern slopes of mountainous areas (Humple 2008). Loggerhead shrikes initiate their breeding season in February and may continue with raising a second brood as late as July; they often re-nest if their first nest fails or to raise a second brood.

This species can be found within lowland, open habitat types, including creosote scrub and other desert habitats, sage scrub, non-native grasslands, chaparral, riparian, croplands, and areas characterized by open scattered trees and shrubs. Fences, posts, or other potential perches are typically present. In general, loggerhead shrikes prey upon large insects, small birds, amphibians, reptiles, and small rodents over open ground within areas of short vegetation, usually impaling prey on thorns, wire barbs, or sharp twigs to cache for later feeding.

Suitable habitat for loggerhead shrike occurs throughout the scrub habitats within the project area and loggerhead shrikes were observed in the project area between the BNSF Railroad and the I-40 during the 2008 surveys and near the BNSF railroad during the 2010 surveys. Thus, this species is considered present, and it likely nests and forages onsite. (Ex. 300, pp. C.2-38 – C.2-39.)

Bendire's Thrasher (Toxostoma bendirei)

Bendire's thrashers are known in California from scattered locations in Kern, Inyo, San Bernardino, and Riverside Counties, and one documented outlier in San Diego County. This species is a summer resident in California from March to late August, breeds from late March through July, and departs by mid- to late August. In the Mojave Desert, this species favors Mojave Desert scrub, primarily in areas that contain large cholla, Joshua tree, Spanish bayonet, Mojave yucca, or other succulents. The status of populations of this species is poorly understood, but threats are believed to be loss of habitat due to urbanization and agricultural development, harvesting of yuccas and cholla cacti, and off-road vehicle activity.

Bendire's thrasher is present on the project site, as this species was observed during surveys in an area adjacent to the project site, and suitable nesting and foraging habitat occurs throughout the project area. (Ex. 300, p. C.2-39.)

Le Conte's Thrasher (Toxostoma lecontei)

This species inhabits some of the hottest and driest habitats in the arid southwest, including the deserts of southeastern California where they occur year-round. Preferred habitats include sparse desert scrub, alkali desert scrub, and desert succulent scrub habitats with open desert washes. They seek gentle to rolling slopes associated with dry desert washes, conditions found on alluvial fans that are found in the project area. Nests are typically placed in prickly vegetation such as cacti or thorny shrubs. The Le Conte's thrasher population densities are among the lowest of passerine (perching) birds, estimated at less than five birds per square kilometer in optimal habitats. This low population density decreases the probability of their detection during field surveys. The population decline is due in part to the conversion of habitat to agriculture and urbanization. Le Conte's thrashers are also affected by off-highway use during nesting season, which occurs on numerous unimproved roads throughout the project site. This species requires areas with an accumulated leaf litter under most plants as cover for its preferred arthropod prey; they also feed on seeds, insects, small lizards, and other small vertebrates.

Le Conte's thrasher is present on the project site. One individual was observed within the project boundary during the 2008 surveys, and three were observed in 2010. This species may nest and forage on the project site. (Ex. 300, p. C.2-39.)

c. Mammals

Nelson's Bighorn Sheep (Ovis canadensis nelsoni)

Bighorn sheep are typically found on open, rocky, steep areas used for escape cover and shelter, with available water and herbaceous vegetation for forage. Bighorn sheep are agile in steep, rocky terrain, allowing them to escape predators such as coyotes (Canis latrans), golden eagles (Aquila chrysaetos), and cougars (Felis concolor). Most of the bighorn sheep live between 300–4,000 feet in elevation where the annual precipitation is less than 4 inches and daily high temperatures average 104°F in the summer.

Bighorn sheep primarily browse shrubs and graze on native grasses throughout the year. The pulp and fruits of various cacti are eaten during the dry season. Bighorn sheep have a large rumen, relative to body size, which allows digestion of grasses, even in a dry state. This gives them flexibility to select diets that optimize nutrient content from available forage. Consequently, bighorn sheep feed on a large variety of plant species and diet composition varies seasonally and among locations. While diet quality varies greatly among years, it is most predictably high in late winter and spring, and this period coincides with the peak of lambing. The lambing season of Nelson's bighorn sheep in the Mojave Desert is typically between December and June.

Surface water is another element of desert bighorn habitat considered important to population health. Bighorn sheep congregate near dependable water sources from May through October. These population aggregations during this period are due to a combination of breeding activities and diminishing water sources. It is common for males and females to segregate and occupy different habitats outside the breeding season. Females tend to choose particularly steep, safe areas for bearing and initial rearing of lambs. Areas associated with ridge benches or canyon rims adjacent to steep slopes or escarpments are commonly preferred lambing areas if available. Males frequently occupy much less precipitous habitat during the lamb-rearing season. Alluvial fan areas are also used for breeding and feeding activities.

The population of bighorn sheep in the Cady Mountains just north of the project area is a native population (not reintroduced or augmented), and was estimated to contain approximately 25 to 50 individuals in 1995. By 2007, this population had grown to approximately 300 individuals. No Nelson's bighorn sheep were observed during the 2007 or 2008 Calico Solar Project surveys; however, surveys conducted by helicopter in March 2010 observed 62 bighorn sheep (12 rams, 38 ewes, and 12 lambs) within 10 miles of the project site. In addition, two bighorn sheep horns, two bighorn sheep skeletons and one occurrence of bighorn sheep scat were detected during surveys conducted for desert tortoises and botanical resources between April 5 and April 15, 2010. These occurrences were observed between the Cady Mountains and the proposed project. In addition, staff observed bighorn sheep scat on the top of one of the large volcanic rock outcroppings that occur adjacent to the formerly-proposed detention basin at the north of the project boundary. It is likely that bighorn sheep use portions of the site for foraging and possibly inter-mountain movement to some degree. (Ex. 300, p. C.2-40.)

Pallid Bat (Antrozous pallidus)

The pallid bat is a light brown or sandy colored, long-eared, moderate-sized bat that occurs throughout California with the exception of the northwest corner of the state and the high Sierra Nevada. Pallid bats are most commonly found in oak savannah and in open dry habitats with rocky areas, trees, buildings, or bridges for roosting. Coastal colonies commonly roost in deep crevices in rocky outcroppings, in buildings, under bridges, and in the crevices, hollows, and exfoliating bark of trees. Colonies can range from a few individuals to over a hundred. Usually this species occurs in groups larger than 20 individuals. Although crevices are important for day roosts, night roosts often include open buildings, porches, garages, highway bridges, and mines. Pallid bats may travel up to several miles for water or foraging sites if roosting sites are limited. This bat prefers foraging on terrestrial arthropods in open habitats and regional populations and individuals may show selective prey preferences. They may also occur in open coniferous forests. Pallid bat roosts are very susceptible to human disturbance, and urban development has been cited as the most significant factor contributing to their regional decline. Although roosting habitat does not appear to exist onsite, there is a moderate potential for pallid bats to forage over the entire project area. Roosting habitat occurs nearby in the Cady Mountains and lava tubes associated with the Pisgah Crater. (Ex. 300, p. C.2-41.)

Townsend's Big-Eared Bat (Corynorhinus townsendii)

The Townsend's big-eared bat is a colonial species that feeds primarily on moths and other soft-bodied insects. Females aggregate in the spring at nursery sites known as maternity colonies. Although the Townsend's big-eared bat is usually a cave-dwelling species, many colonies are found in anthropogenic structures such as the attics of buildings or old, abandoned mines. Roost sites in California include limestone caves, lava tubes, mine tunnels, buildings, and other structures. Radiotracking studies suggest that movement from a colonial roost during the maternity season is confined to within 9 miles of the nursery. Townsend's big-eared bats are very susceptible to human disturbance, and females are known to completely abandon their young when disturbed. The loss of maternity and hibernation roosts has been cited as the most significant factor contributing to their decline throughout their range. In Southern California, Townsend's big-eared bat was once common in the coastal plains of Southern California where mines or caves were prevalent. However, this species has declined substantially in the region and is now primarily limited to the foothill and mountain regions of Southern California. Townsend's big-eared bat was detected

onsite during surveys in 2008. Although roosting habitat does not appear to exist onsite, Townsend's big-eared bats are expected to forage over the entire project area. Roosting habitat occurs nearby in the Cady Mountains and lava tubes associated with the Pisgah Crater. (Ex. 300, p. C.2-41.)

American Badger (Taxidea taxus)

American badgers were once fairly widespread throughout open grassland habitats of California. They are now uncommon, permanent residents throughout most of the state, with the exception of the northern North Coast area. Known to occur in the Mojave Desert, they are most abundant in the drier open stages of most shrub, forest, and herbaceous habitats with friable soils. In the southwest, badgers are typically associated with Mojave creosote bush scrub and sagebrush. Mating occurs in late summer or early fall and two to three young are born in March or April. Badgers are fossorial, digging large burrows in dry, friable soils and will use multiple dens/cover burrows within their home range. They typically use a different den every day, although they can use a den for a few days at a time. Cover burrows are an average of 30 feet in length and are approximately 3 feet in depth. Natal dens are larger and more complex than cover dens. In undisturbed, high-quality habitat, badger dens can average 0.64 dens per acre, but are usually at much lower density in highly disturbed areas.

American badger is present within the project area, and three burrows were detected in 2010. Suitable foraging habitat and prey items for this species are broadly distributed across the project site. (Ex. 300, p. C.2-42.)

Desert Kit Fox (Vulpes macrotis arsipus)

The desert kit fox can be found in much of the same habitat as the badger in the Mojave Desert. While the desert kit fox is not listed as a special-status species by the State of California or the USFWS, it is protected under Title 14, California Code of Regulations (Title 14, Section 460) from trapping and hunting. Kit foxes are primarily nocturnal, and inhabit open level areas with patchy shrubs. Friable soils are necessary for the construction of dens, which are used throughout the year for cover, thermoregulation, water conservation, and rearing pups. Kit foxes typically produce one litter of about four pups per year, with most pups born February through April. Desert kit fox is present within the project site, as this species was detected onsite during surveys. Surveys conducted by the applicant for burrowing owls detected approximately 36 potential kit fox dens within the proposed project area. (Ex. 300, p. C.2-42.)

d. Reptiles

Desert Tortoise (Gopherus agassizii)

The desert tortoise is an herbivore that may attain a carapace (shell) length of 9 to 15 inches. The tortoise is able to live where ground temperature may exceed 140° F because of its ability to dig burrows and escape intense solar radiation. At least 95 percent of its life is spent in burrows. The tortoise enters brumation (the reptilian form of hibernation) during the period from September to November and leaves the burrow during the period from February to April. In the spring this species becomes most active above ground from March through May when foraging opportunities are optimal. Tortoises remain active — though to a lesser extent — between June and October. During the active period in the warmer months of the year, tortoises retreat to burrows during periods of intense heat, to rest at night, and to aestivate during extended periods of heat and dryness. Tortoises may also utilize shady areas underneath bushes or rocks during the hottest parts of the day. A single tortoise may have a dozen or more burrows within its home range, and different tortoises may use these burrows at different times.

Range wide, occupied habitats include desert alluvial fans, washes, canyon bottoms, rocky hillsides, and other steep terrain. Tortoises are most common in desert scrub, desert wash, and Joshua tree habitats, but occur in almost every desert habitat except on the most precipitous slopes. Friable soils, such as sand and fine gravel, are an important habitat component, particularly for burrow excavation and nesting. The presence of soil suitable for digging burrows is a limiting factor to desert tortoise distribution.

Plant species play a major role in defining desert tortoise habitat. Creosote bush, burrobush (Ambrosia dumosa), Mojave yucca (Yucca schidigera), and blackbrush (Coleogyne ramosissima) generally distinguish desert tortoise habitat. At higher elevations, Joshua tree and galleta grass are common plant indicators.

The desert tortoise's range includes the Mojave Desert region of Nevada, southern California, and the southwest corner of Utah and the Sonoran Desert region of Arizona and northern Mexico. The desert tortoise range is divided into Mojave and Sonoran populations. The desert tortoise in the vicinity of the Calico Solar Project is part of the Mojave population, which is primarily found in creosote bush-dominated valleys with adequate annual forbs for forage.

Desert tortoises occur in the project area and are broadly distributed across the proposed project site. Most of the desert tortoises detected during project surveys were noted north of the BNSF railroad, primarily in the bajada near the toe of the Cady Mountains. This area contains good quality habitat for desert tortoise and has less obstructed connectivity to adjacent natural lands. The area between the BNSF railroad and I-40 is isolated by the highway and railroad and portions of the site have been subject to repeated disturbance from pipeline development. Nonetheless, two tortoises were detected in this area and tortoise sign was observed in low density near the center of this area by staff and the applicant. While the railroad poses a substantial barrier to movement, access is available through the many railroad trestles that span the drainages that flow across the site.

The results of the 2010 protocol surveys conducted by the Applicant detected 104 tortoises (adult, subadult and juvenile) within the original 8,230-acre project footprint. In response to staff and agency feedback, the applicant reduced the project footprint to minimize impacts to desert tortoise linkages. The original redesigned 6,215-acre project footprint consisted of approximately fifty-seven (57) tortoises. Subsequent to the committee order, the project was reduced further to 4,613 acres in Scenario 5.5. The applicant detected 10 tortoises on this reduced acreage alternative. (Ex. 317, p. C.2-4.) **Biological Resources Figure 3** shows the locations of desert tortoises detected during the 2010 surveys.

The nearest designated critical habitat for this species is located approximately 0.5 mile south of the project site within the Ord-Rodman Desert Wildlife Management Area (DWMA). Interstate 40 and the BNSF Railroad pose barriers to movement between that critical habitat and the Calico Solar Project area. (Ex. 300, pp. C.2-32 – C.2-33.)

Banded Gila Monster (Heloderma suspectum cinctum)

The banded gila monster is considered rare in California with only 26 credible records of the species documented within the past 153 years. This large and distinct lizard is difficult to observe even in areas where they have been recently recorded. As a result, little is known about this species' distribution, population status, and life history in California. Most of the historical observations in California occurred in mountainous areas of moderate elevations with rocky, incised topography, in large and relatively high ranges as well as riparian areas. Despite the widespread distribution of potential habitat throughout the California

desert, the few documented observations suggest the California populations may be confined to the eastern portion of the California desert, and the current distribution is apparently a function of summer rainfall. All California gila monster observations except one (Mojave River) occurred east of the 116° longitude in areas that received at least 25 percent of their annual precipitation during the summer months. Throughout their range, gila monsters appear to be most active during or following summer rain events.

Banded gila monsters were not detected onsite during surveys and the project is avoiding many of the rocky outcrops and lava flows present onsite that could provide habitat. Although this species is not known from the area and the closest known sighting is an historic record from the Providence Mountains approximately 50 miles to the east of the project site, this species is difficult to detect due to its secretive nature and tendency to remain in underground burrows for extended periods of time. Therefore, there is a low potential for this species to inhabit the project area. (Ex. 300, pp. C.2-33 – C.2-34.)

Mojave Fringe-Toed Lizard (Uma scoparia)

Mojave fringe-toed lizards are known almost exclusively from California, primarily in San Bernardino and eastern Riverside Counties, but are also found to the north in southeastern Inyo County and historically to the west in eastern Los Angeles County.

The Mojave fringe-toed lizard is a BLM sensitive species that is found in arid, sandy, sparsely vegetated habitats, within the broader matrix of creosote bush scrub, throughout much of its range. It is restricted to habitats where fine, loose, aeolian sand is available. It burrows in the sand to avoid predators and to thermoregulate, though it will also seek shelter in rodent burrows. Sand dunes provide its primary habitat, although it can also be found in the margins of dry lakebeds, washes, and isolated sand habitat, such as scattered hummocks or wind-deposited “sand ramps” against hillsides.

The Mojave fringe-toed lizard is primarily insectivorous, but also eats plant food including leaves, seeds, and buds (Stebbins 1944). It normally hibernates from November to February, and emerges from hibernacula from March to April. The breeding season is April to July, and adult Mojave fringe-toed lizards reach sexual maturity two summers after hatching. Common predators include burrowing owls, leopard lizards, badgers, loggerhead shrikes, roadrunners, various snakes, and coyotes.

The Mojave fringe-toed lizard is widespread geographically across the Mojave and northern Colorado deserts, but its distribution is highly fragmented because it is restricted to habitats containing loose sand, which is patchily distributed. Many local populations occur on small or isolated patches of sand and are quite small. This fragmented pattern of distribution leaves the species vulnerable to local extirpations from additional habitat disturbance and fragmentation as well as random events. The loose wind-blown sand habitat, upon which the Mojave fringe-toed lizard is dependent, is a fragile ecosystem requiring the protection against both direct and indirect disturbances. Environmental changes that stabilize sand, affect sand sources, or block sand movement corridors will also affect this species. Aside from the direct loss of land, development can also affect Mojave fringe-toed lizards by increasing access by predators, such as the common raven and small raptors, to their habitat. Raven numbers tend to increase around developed facilities due to increased availability of water and trash; other predators may increase in numbers due to availability of new perch sites (e.g., fence posts, sign posts, structures) which allow them to hunt for lizards in areas where no perches were previously available. Potential indirect disturbances are associated with the disruption of the dune ecosystem source sand, wind transport, and sand transport corridors.

The applicant reported that the Mojave fringe-toed lizard is present on the Calico Solar Project site, and identified a partially stabilized dune complex located between the BNSF Railroad and I-40, approximately 16.9 acres, as Mojave fringe-toed lizard habitat. Staff conducted reconnaissance surveys of the site in January and May 2010, during which times staff inspected the dune complex and adjacent habitats. Four Mojave fringe-toed lizards were detected by Staff during the May surveys. These included one lizard within the dune area identified by the applicant; one in soft windblown sand along the large primary drainage west of the delineated habitat; and two in fine accumulated sands on the vegetated windrow that borders the north side of the BNSF railroad. Mojave fringe-toed lizard was also detected along a wash north of the BNSF railroad during the applicant’s 2010 desert tortoise surveys. Fine-grained friable sand occurs in many other areas adjacent to the identified dune complex, both within the numerous drainages that cross the project site and in small patches of windblown sand. Similarly, soft friable sands with small patches of micro dunes occur within the creosote bush scrub habitat across much of the lower project site. In Staff’s opinion, it is likely that Mojave fringe-toed lizard occurs in low densities across much of the project site south of the BNSR railroad and within and around soft sands associated with the drainages north of the BNSF railroad.

Staff calculated the amount of Mojave fringe-toed lizard habitat on the project site by adding the additional habitat it identified to the 16.9 acres identified by the applicant and adding a 45-meter surrounding buffer area to account for species traveling away from its primary habitat, yielding 164.7 acres of suitable habitat. (Ex. 300, pp. C.2-34 – C.2-36.)

4. Direct and Indirect Impacts and Mitigation

The CEQA Guidelines define direct impacts as those impacts that result from the project and occur at the same time and place. Indirect impacts are caused by the project, but can occur later in time or farther removed in distance while still reasonably foreseeable and related to the project. The potential impacts we consider here are those most likely to be associated with construction and operation of the project.

Impacts of the proposed project or alternatives would be considered significant and would require mitigation if the project would:

- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the BLM, CDFG, or USFWS.
- Have an adverse effect, either directly or through habitat modifications, on any species listed as endangered, threatened, or proposed for listing or critical habitat for these species.
- Have a substantial adverse effect, either directly or through habitat modifications on any species identified as a candidate for listing, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFG, BLM, or USFWS.
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinances.

- Conflict with the provisions of an adopted Habitat Conservation Plan (HCP), Natural Communities Conservation Plan (NCCP), or other approved local, regional, Federal, or State HCP. (CEQA Guidelines, (California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000 et. seq, Appendix G, Environmental Checklist Form)

White-margined beardtongue, Coves' cassia, and small-flowered sand verbena are not listed under the California or federal Endangered Species Acts. However, under significance criteria adopted by staff in the Supplemental Staff Assessment (see Section C.2.3), project impacts to these species, if not mitigated, will be considered significant pursuant to CEQA. The Energy Commission and other State agencies such as CDFG, have a history of requiring mitigation for impacts to special-status plants such as these. Under Section 15380 of the CEQA guidelines, a species may be considered endangered, rare or threatened, if it can be shown to meet the criteria for State or federal listing.

The California Native Plant Society (CNPS) cooperates under a memorandum of understanding with CDFG to identify which plants may be rare or threatened, evaluate threats to them, share occurrence data, and plan protective measures. In this role, CNPS evaluates plant taxa according to abundance, distribution, and threats, and it ranks rare species on a series of lists. The joint CNPS Rare Plant Program and CDFG's CNDDB Plant Status Review Process for CNPS List and CDFG Special Plants List status is a rigorous review process that evaluates existing literature, reviews herbarium collections, and communicates with experts before making a recommendation for listing. A summary of information on each candidate taxon is reviewed by a network of California botanists, representing State and federal agencies, environmental consulting firms, academic institutions, CNPS, and other conservation organizations.

All of the CNPS List 1B and List 2 plants potentially occurring in the project area are also included in the CDFG Special Plants List and are tracked by CDFG's CNDDB. The CNPS Inventory has been a broadly recognized and accepted source of science-based information on the rarity, endangerment, and distribution of California special-status plants since its first edition in 1974. The Energy Commission's regulations refer to CNPS Lists in the definition of "species of special concern" (California Code of Regulations, Title 20, section 1702 (q) and (v)), and the BLM has a policy of designating all CNPS List 1B plants, unless specifically excluded by the BLM State Director, as BLM Sensitive. By CNPS's standards, the plants on CNPS Lists 1A, 1B and 2 meet the definitions of Sections 2062 and 2067 (CESA) of the California Fish and Game Code, and are eligible for State listing. The Energy Commission considers those plants

appearing on CNPS List 1B or 2 to be potentially eligible, and evaluates project impacts to each one known from the site, as explained below. (Ex. 300, pp. C.2-56 – C.2-57.)

a. Construction Impacts

Construction of the Calico Solar Project would result in the permanent land use conversion of native vegetation communities and the loss of special-status plant and animal species and their habitat. Permanent loss as defined by staff involves impacts that would not recover within 5 years (above). The Calico Solar Project would have long-term impacts associated with project features (e.g., SunCatchers, expansion of the Pisgah Substation, new transmission line towers, new access roads, altered drainage features, evaporation ponds, and required maintenance activities that would routinely disturb wildlife and vegetation) that would continue throughout the life of the project, as well as habitat degradation that would persist for decades following project closure.

Vegetation

Construction of the Calico Solar Project and associated facilities would result in the permanent loss of native vegetation from the construction of new access roads, SunCatcher footings, stormwater facilities, and various appurtenant structures to support the project. In addition, the project would result in disturbance to vegetation from mowing. The applicant indicated that prior to SunCatcher installation, the SunCatcher Array area will be mowed to about 3 inches. During SunCatcher operation, if vegetation within the path of SunCatcher movement reaches a height of 8 inches, it will likely be re-mowed to 3 inches. The applicant indicates that re-mowing treatment would be applied to about 5 percent of the SunCatcher array area. Vegetation not within the path of SunCatcher movement or within the access road footprints would be allowed to re-generate. Mowing is a permanent impact to native vegetation as mowing would likely result in type conversion of re-mowed areas from creosote bush scrub to more herbaceous vegetation, and degradation of untreated or once-treated vegetation by introduction of new edge effects to remnant desert shrubland throughout the proposed project site.

Direct mortality to vegetation could occur from construction activities that remove vegetation, grade soils, or cause sedimentation or erosion. Clearing and grading may also result in the alteration of soil conditions, including the loss of native seed banks and changes to the topography and drainage of a site such that the

capability of the habitat to support native vegetation is impaired. Indirect effects could include soil compaction, disruption of the native seed bank, increased dust, sediment transport, or colonization by invasive non-native species. These actions may result in reduced habitat quality for upland plants. In addition, the removal of vegetation cover and the disruption of soil crusts create possibilities for erosion, dust, and weed invasion that can affect habitat in adjacent areas.

The vegetation present on the Calico Solar Project site supports a diversity of common and sensitive wildlife. The loss of existing vegetation and expected level of disturbance from weeds and human disturbance (described below) will alter the functional use of the remaining habitat. These direct and indirect construction impacts to vegetation, unless mitigated, would be significant under CEQA.

Weeds, include species of non-native, invasive plants included on the weed lists of the California Department of Food and Agriculture, the California Invasive Plant Council, or federally listed noxious weeds. The spread of invasive plants is a major threat to biological resources in the Mojave Desert because these invasive non-native plants can displace native plants, increase the threat of wildfire, supplant wildlife foods that are important to herbivorous species, alter the habitat structure and ecological function of wetland, riparian, and desert wash communities, and invade or threaten special-status plant occurrences and habitat.

Invasive plants, noxious weeds, and other invasive species on BLM lands will be prevented, controlled, treated, and restored through an Integrated Pest Management approach per the Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States, and the 2009 National Invasive Species Management Plan.

Construction activities and soil disturbance tend to introduce non-native invasive plant species into new areas and to facilitate their proliferation and spread. New introductions occur when seed are inadvertently introduced to a site, most often with mulch, hay bales, or wattles used for erosion control, or when they are transported on construction equipment or their tires from off-site areas. Many invasive non-native species are adapted to and promoted by soil disturbance. Once introduced, they can out-compete native species because of minimal water requirements, high germination potential and high seed production; can outcompete native annuals where nitrogen deposition (near major highways such as I 40) and precipitation rates are higher, leading to higher risk of wildfire, and can become locally dominant, representing a serious threat to native desert

ecosystems. Invasive weeds generally spread most readily in disturbed, graded, or cultivated soils, including disturbance by construction equipment. Thus, the proposed Calico Solar Project, including the solar generator construction and associated Transmission line and other facilities, could introduce or facilitate the spread of invasive non-native plants. Without control, weeds already present in the area would increase their abundance in soils disturbed by project construction throughout the project site and along the linear facilities, especially where nitrogen deposition is an issue, and that construction equipment could accidentally import new invasive species from off-site.

Undisturbed desert habitat has been less vulnerable to invasion by weedy species and only a limited suite of invasive non-native plant species are capable of invading natural desert areas. The hot and arid environment, undependable timing and amount of annual precipitation, and often saline or alkaline soils limit the range of invasive species capable of naturalization in desert areas. However, certain aspects of the proposed project would change those conditions, creating habitat more suited to a wider variety of invasive plants and to greater abundance of the invasive species already present in the area. Initial mowing and construction disturbance will disrupt soil conditions that favor the colonization by weedy species. Shade beneath the SunCatchers would then alter the micro-environments, favoring weedy ephemerals. Studies conducted in the Sonoran and Mojave Deserts have demonstrated that shading resulted in a cooler, moister microhabitat below and near structures. Shading and wind deflection caused by the structures decrease soil temperature extremes and decrease evaporation from soil surfaces. The addition of water from regular mirror washing also increases the humidity of the microhabitat around the solar structures. This change from the normal arid desert environment does not favor the native arid-adapted species and allows the weedy ephemerals to colonize.

Numerous invasive non-native weeds have already become widespread throughout the Mojave Desert and for some invasive species, the prevention of further spread is impracticable. Examples of these species include red brome, cheat grass, Mediterranean grass, red-stemmed filaree, and Russian thistle. Other invasive species, particularly Sahara mustard, can substantially alter native habitats if left uncontrolled, but to date, have not become pervasive within or adjacent to the project area. Still others (e.g., saltcedar, Tamarix ramosissima) are damaging to specific habitat types but pose little or no threat to widespread upland desert habitat.

b. Mitigation

The above impacts are reduced to less-than-significant levels with implementation of impact avoidance and minimization measures described in Conditions of Certification **BIO-1** through **BIO-31**. Those mitigation measures are summarized in Biological Resources Table 2, below.

Biological Resources Table 2
Biological Resources Mitigation Measures

Mitigation Measure	***Provisions for Scenario 5.5 site***	***Mitigation/Impacts***
BIO 1	Project Owner must assign at least one Designated Biologist, possessing specified qualifications	Facilitates monitoring compliance with the Biological Resources Conditions of Certification; specified qualifications assure the ability of the individual to properly perform her duties
BIO 2	Designated Biologists duties include advising project owner's agents and employees on implementing the Conditions of Certification; mark and periodically inspect sensitive areas, inspect for trapped animals; monitor compliance with conditions; maintain records of tasks, including those in BRMIMP, below;	Further facilitates compliance with the Conditions
BIO 3	Sets forth Biological Monitor qualifications	Specified qualifications assure the ability of the individual to properly perform her duties
BIO 4	Biological Monitor duties include assisting the Designated Biologist in conducting surveys and monitoring construction activities	Further facilitates compliance with the Conditions
BIO 5	Designated Biologist and Biological Monitor have the authority to halt activity in an area if unauthorized	Protects from unexpected or impacts to biological resources
BIO 6	Requires Worker Environmental Awareness Program (WEAP) training for all onsite employees	Assists workers in avoiding impacts to biological resources by training them to spot the resources and explaining why and how they can protect them
BIO 7	Project owner must prepare a Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP), incorporating	Consolidates measures, conditions and other information in a single place to facilitate compliance with the requirements applicable to the project

	avoidance and minimization measures from various other required plans; containing maps depicting the locations of sensitive resources; state and federal conditions; descriptions of monitoring methodologies and frequencies; mitigation performance standards and remedial measures if those standards are not met	
BIO 8	Specifies impact avoidance and minimization measures regarding disturbance areas, perimeter fencing, roads, traffic, juvenile desert tortoise and other wildlife entrapment, minimize standing water and dispose of road kill	These measures avoid injuries to sensitive species and discourage predators (ravens, etc.) from visiting the area, thereby protecting tortoises
BIO 9	Project owner must allow access to site for inspections ; Designated Biologist must monitor grading, make daily checks of tortoise exclusion; provides an annual and final(when operation begins) Listed Species Status Report	Assists in assuring compliance with Construction Facilitates verification of compliance with Conditions
BIO 10	Project owner must prepare a Revegetation Plan for areas of temporary disturbance and restore those areas according to the approved plan. Minimum Plan requirements are specified	Assures the revegetation of the temporarily disturbed lands
BIO 11	Project owner must prepare a Weed Management Plan. Minimum Plan requirements are specified	Provides for the control and eradication of invasive weeds to protect sensitive plants from invasive weeds
BIO 12	A lengthy condition containing, among other features measures to protect; guidelines for conducting summer-fall special status plant surveys, mitigation	Reduces potential impacts to special status plants to insignificance

	requirements for plants found in the survey; off-site compensatory mitigation; measures to obtain nursery stock	
BIO 13	Requires compensatory habitat, estimated at approximately 208 acres, to mitigate for loss of Mojave fringe-toed lizard habitat on the project site	Mitigates for the loss of habitat on the project site by purchasing and protecting suitable off site habitat lands
BIO 14	Requires preconstruction surveys for Gila Monsters and removal and relocation of any individuals that are found	Relocating the Gila monsters protects them from injury due to activities on the project site.
BIO 15	Specifies requirements for desert tortoise surveys, exclusion fences, tortoise handling and other matters relating to the removal for tortoise from the project site.	Protects tortoise during the process of clearing the project site.
BIO 16	Requires a Desert Tortoise Translocation Plan, compliant with recently revised guidelines from the US Department of Fish and Game's Tortoise Recovery Office	Provides for the protection of tortoise to be relocated and tortoise occupying the relocation sites. By testing the health of each, transmission of disease will be minimized
BIO 17	Requires compensatory habitat, estimated at 10,302 acres, to mitigate for loss of Mojave desert tortoise habitat on the project site	Mitigates for the loss of tortoise habitat on the project site by purchasing and protecting suitable off site habitat lands estimated at 10,302 acres
BIO 18	Requires design and implementation of a Raven Monitoring, Management, and Control Plan that is consistent with the most current USFWS-approved raven management guidelines and payment of fees to support the USFWS Regional Raven Management Program	Protects tortoise in the project vicinity by managing the population of ravens, a tortoise predator
BIO 19	Requires pre-construction nest surveys each year during the construction phase if construction activities will occur during the breeding period (from January 1 through August 1); specifies minimum	Mitigates potential impacts to migratory birds by protecting their nests from construction activities.

	requirements for such surveys and establishment of 500-foot buffer areas where active nests are found.	
BIO 20	Requires pre-construction surveys for golden eagle territories within one mile of the project site. If an occupied nest is found within one mile of the project site, a Golden Eagle Monitoring and Management Plan must be prepared according to current USFWS protocols.	Mitigates potential impacts to golden eagles to insignificant levels
BIO 21	Requires pre-construction surveys, avoidance measures, relocation, and acquisition of compensatory habitat mitigation lands for burrowing owls.	Mitigates potential impacts to burrowing owls to insignificant levels
BIO 22	Requires preparation and implementation of an Avian Protection Plan to monitor bird collisions with facility features and use of the monitoring data to inform and develop an adaptive management program to avoid and minimize project-related avian impacts.	Mitigates potential impacts to birds from collision with project equipment to insignificant levels
BIO 23	Requires daily monitoring for the presence of nelson's bighorn sheep and halting of construction activities when the bighorn sheep are within 500 feet.	Mitigates potential impacts to sheep to insignificant levels
BIO 24	Requires pre-construction surveys, avoidance measures, and relocation, for American badgers and desert kit fox.	Mitigates potential impacts to American badger and desert kit fox to insignificant levels
BIO 25	Requires surveys prior to ground disturbance, avoidance, and provision of substitute roosting habitat for bats.	Mitigates potential impacts to bats to insignificant levels
BIO 26	Requires minimization measures for impacts to jurisdictional waters of the state, including acquisition	Mitigates potential impacts to jurisdictional waters to insignificant levels

	of 153 acres of off-site mitigation lands, which may be combined (“nested”) with desert tortoise habitat obtained under Condition BIO 17, above, and best management practices in the construction and operation of the project	
BIO 27	Requires installation of netting over project evaporation ponds and implement an Evaporation Pond Design, Monitoring, and Management Plan to protect wildlife from mortality in the ponds	Mitigates potential wildlife mortality at the evaporation ponds to insignificant levels
BIO 28	Requires, at project closure, implementation of a Decommissioning and Reclamation Plan to remove the engineered diversion channels, detention basins, and other sediment control features from the project site	Mitigates potential biological impacts due to closure of the project to insignificant levels
BIO 29	Requires that the facility’s closure plan include measures and funding for the decommissioning, reclamation, and revegetation of the project site	Mitigates potential biological impacts due to closure of the project to insignificant levels
BIO 30	Allows the project owner to satisfy certain compensatory mitigation obligations by paying an in lieu fee to the Department of Fish and Game pursuant to Fish and Game code sections 2069 and 2099. Provided that the in lieu fee is found to comply with CEQA and CESA requirements.	Provides the same degree of mitigation as the original requirement.
BIO 31	Allows for the phasing of compensatory mitigation and provision of security deposits according to specified formulas	Does not affect the level of mitigation or protection of the environment.

Dust

Disturbance of the soil's surface caused by construction traffic, operations traffic, and other activities such as mirror washing would result in increased wind erosion of the soil. Windborne transport of dust and sand can result in the degradation of soil and vegetation over a widening area. Dust can have deleterious physiological effects on plants and may affect their productivity and nutritional qualities. Dust and sand can kill plants by burial and abrasion, interrupting natural processes of nutrient accumulation, and allowing the loss of soil resources. The destruction of plants and soil crusts by windblown sand and dust exacerbates the erodibility of the soil and accelerates the loss of nutrients.

To address these potential impacts, we impose Condition **BIO-8** (Impact Avoidance and Minimization Measures) and Air Quality Conditions of Certification **AQ-SC3** and **AQ-SC-7** and **SOIL&WATER-1**. Implementation of these measures would reduce impacts of dust from the proposed project to biological resources to less than significant levels by minimizing and controlling project-related dust sources during construction and operation.

Impacts to Special-Status Plants

Lane Mountain milk-vetch is the only listed threatened or endangered plant species occurring in the region. It is unlikely to occur on or adjacent to the project site because of the site's distance from known occurrences, no plants were found during the field survey, and unsuitable bajada habitat throughout most of the project site. Impacts to this species are less than significant.

One CNPS List 1B species (white-margined beardtongue) was documented on the project site, and five others could occur there, though their probabilities of occurrence are moderate to low. In Condition of Certification **BIO-12** below, we require follow-up field surveys to inventory potential project impacts to white-margined beardtongue and other List 1B species, and impact avoidance measures to conserve occurrences on-site to the greatest extent feasible. This measure provides for the conservation of rare plants in portions of the project site through avoidance and evaluates the potential existence of these species on potential mitigation lands.

Five other plant species that are designated BLM sensitive and CNPS List 1B species have low potential to occur within the project area:

- Desert cymopterus (Cymopterus deserticola)
- Barstow woolly-sunflower (Eriophyllum mohavense)
- Mojave monkeyflower (Mimulus mohavensis) – Low potential
- Creamy blazing-star (Mentzelia tridentate) – Low potential
- Rusby's desert mallow (Sphaeralcea rusbyi var. eremicola) – Low potential

Project impacts to white-margined beardtongue would consist of isolation of some plants and their habitat within the surrounding solar facility during project development and operation. In addition, indirect project impacts to this species could result on-site or off-site, from facility operations (e.g., dust, herbicide overspray, isolation from pollinators or other ecological associations, or alterations to the existing wind and hydrological conditions that transport sand. Proposed project alterations to surface hydrology would avoid or minimize impacts to minor channels where most of the white-margined beardtongue plants on-site are located.

Two white-margined beardtongue locations on the project site are near project area boundaries. One of these, where 17 individual plants were counted, is outside the proposed disturbance area, due to the plants and other resource concerns. Another location, where two plants were mapped, is on the eastern project site boundary, adjacent to the Pisgah Crater ACEC. The proposed project would avoid impacts to these plants and provide a 250-foot buffer area around them. Surface hydrology at both locations would not be altered by proposed project stormwater control structures. The other white-margined beardtongue locations also would be surrounded by 250-foot buffer areas, but would be subject to altered hydrology due to stormwater control as proposed by the applicant.

White-margined beardtongue apparently exists as a local "metapopulation" consisting of scattered small clusters or individual plants at locations that may not persist long-term. Instead, changing environmental conditions such as rainfall, drought, sand movement, or hydrology cause periodic localized extinctions and colonizations. Project development and operation would substantially alter soil, vegetation, and hydrology throughout the project area and would likely prevent new white-margined beardtongue colonizations within the project area.

The above potential impacts to white-margined beardtongue and other CNPS List 1B species are mitigated to insignificant levels by our adoption of Condition of Certification **BIO-12**, which includes measures to provide buffer areas around

white-margined beardtongue locations; monitor and manage direct and indirect project impacts and plant persistence within these areas; and monitor and manage indirect project impacts to occurrences off-site to the east, in the BLM Pisgah Crater ACEC.

Three CNPS List 2 taxa are reported on the project site, though only one of these was confirmed by 2010 field surveys. The other two species remain unconfirmed, and may have been misidentified in the original survey reports. An additional six could occur on the site, with low potential. Most or all occurrences of CNPS List 2 species onsite, whether documented by prior surveys or not, would be lost or substantially degraded due to grading; soil compaction during construction and facilities operation; and the indirect effects of increased weed abundance, weed control, and alterations to hydrology, soil temperatures, and windborne sand transport.

Small-flowered androstephium was reported at 52 locations on the project site and 14 additional occurrences within a 1000-foot buffer surrounding the site (SES 2009aa). Follow-up surveys in 2010 documented more than 1500 additional plants, mapped as one extensive occurrence throughout much of the southern part of the site. While most small-flowered androstephium on-site, would be lost or adversely impacted as described above (except those plants within white-margined beardtongue set-aside areas), those impacts would be less than significant due to numerous additional occurrences documented elsewhere in California in recent years, including new occurrences documented by the applicant on public lands to the west and east, including many in the Pisgah ACEC.

Emory's crucifixion thorn is reported from four individual plants at three locations within the survey area (TS 2010h). All three locations are north of the proposed project area, near the toe slopes of the Cady Mountains. The reduced project footprint avoids direct or indirect effects to those occurrences. Emory's crucifixion thorn is a large and distinctive shrub; it is unlikely that additional plants will be found on-site during future surveys.

Coves' cassia and small-flowered sand-verbena were reported on the project site in the Biological Resources Technical Report in 2009, but were not confirmed during more thorough 2010 field surveys. Staff believes that the original reports may have been erroneous and no impacts to either species are anticipated. However, if either species is found on-site during follow-up field surveys required

by Condition of Certification **BIO-12**, appropriate avoidance or off-site mitigation measures would be required.

Six other CNPS List 2 species have low or moderate potential to occur within the project area:

- King's eyelash grass (Blepharidachne kingie) – Low potential.
- Booth's evening primrose (Camissonia boothii var. boothii) – Moderate potential.
- Viviparous foxtail cactus (Coryphantha vivipara var. rosea) – Low potential.
- Purple-nerved cymopterus (Cymopterus multinervatus) – Low potential.
- Thorny milkwort (Polygala acanthoclada) – Low potential.
- Jackass clover (Wislizenia refracta ssp. refracta) – Moderate potential.

If any of the six species are found on-site during follow-up field surveys required by Condition of Certification **BIO-12**, appropriate avoidance or off-site mitigation measures would be implemented.

Wildlife

Construction of the Calico Solar Project would result in large scale direct and indirect impacts to common wildlife. These effects could include mortality from trampling or crushing; increased predation when wildlife is flushed from cover; increased noise levels due to heavy equipment and SunCatcher engine noise; light impacts from construction during low-light periods; increased vehicular and human presence along access roads and desert washes; displacement due to habitat modifications, including vegetation removal, alterations of existing soil conditions; fugitive dust; and a modified hydrologic and sediment regime due to the construction of the storm water management system.

More mobile species like birds and larger mammals are expected to disperse into nearby habitat areas during construction. However, the dispersal of wildlife from active construction zones would be hindered by the projects perimeter fencing (i.e., the tortoise exclusion fence).

By design, the Calico Solar Project would include perimeter fencing to prevent desert tortoise and bighorn sheep from entering the work area. Prior to construction, tortoises inhabiting the project site would be translocated to suitable

receptor sites. With the exception of birds this barrier would exclude or entrap wildlife at the project site. Therefore, during construction, terrestrial wildlife trapped within the perimeter fence would not be able to disperse from the project area. This would subject any trapped wildlife to repeated disturbance from construction and the use of roads to support maintenance activities. (Ex. 300, pp. C.2-63 – C.2-64.)

Construction noise may affect birds in several ways, including annoyance which causes birds to abandon nests that are otherwise suitable; raise the level of stress hormones, interfering with sleep and other activities; cause permanent injury to the auditory system; and interfere with acoustic communication by masking important sounds or sound components. In general, 60 dBA Leq hourly is considered the threshold for disturbance for many bird species, but some species are less sensitive.

Construction could affect wildlife in adjacent habitats by interfering with breeding or foraging activities and movement patterns, causing animals to temporarily avoid areas adjacent to the construction zone. This could disrupt foraging, breeding, sheltering, and other activities. More mobile species like birds and larger mammals are expected to disperse into adjacent habitat areas during the land clearing and grading phases associated with tower construction and road construction and widening. For example, noise and human presence are likely to adversely affect bighorn sheep which are expected to avoid the lower foothills during construction of the proposed project.

Noise from construction activities could also temporarily discourage wildlife from foraging and nesting immediately adjacent to the project area. The loudest noise likely to occur during construction is created by the operation of construction equipment. Depending on the type of equipment used, the noise produced can vary from 77 dBA to 90 dBA at 50 feet.

Noise impacts to nesting birds and other wildlife would be mitigated through implementation of Conditions of Certification **BIO-1** through **BIO-9** and **BIO-19**. These measures require buffer zones around active nests, which will sufficiently attenuate construction noise levels at the nests. (Ex. 300, pp. C.2-64 – C.2-65.)

Special Status Wildlife

Mojave fringe-toed lizards were observed by the applicant and staff at several locations on the project site, and staff estimated that a minimum of 164.7 acres of suitable habitat is found on the site. Direct project impacts to Mojave fringe-toed

lizards would include direct loss of habitat during site preparation and construction for the SunCatchers, roads, and drainage channels; mechanical crushing during site preparation, grading of access roads, preparation of staging areas, disturbance by noise or vibrations from the heavy equipment and future operations and maintenance activities; fugitive dust; and general disturbance due to increased human activity. The cryptic nature of Mojave fringe-toed lizards increases the likelihood that individuals could be injured or killed during ground-disturbing activities, even if equipment operators have been trained to avoid them.

Rather than attempt to preserve the pockets of habitat on the project site, staff recommends, and we adopt, Condition of Certification **BIO-13** requiring the acquisition, protection and maintenance of 207.5 acres of suitable off-site habitat for the species. If appropriate, that habitat may be combined or "nested" with desert tortoise habitat obtained for the project. Implementation of that condition will reduce impacts to Gila monsters and their habitat to less-than-significant levels. (Ex. 300, pp. C.2-67 – C.2-70.)

Gila monsters were not observed during biological surveys conducted in 2007, 2008, or 2010. While there is a low potential for occurrence of this species in the project area, this species occurs in low densities, is difficult to detect, and may be overlooked during surveys. If present, direct impacts to this species could include mortality during ground-disturbing activities; being hit by vehicles on access roads; mechanical crushing during site preparation, grading of spur roads or drainage features; fugitive dust; and general disturbance due to increased human activity. Indirect impacts to this species include compaction of soils and the introduction of exotic plant species.

Potential operational impacts include risk of mortality by vehicle strikes and disturbance on access roads due to increased use by the public and maintenance personnel. Other operational impacts include removal and trimming of vegetation during maintenance activities.

Staff's proposed, and we adopt, Condition of Certification **BIO-14** to requires a Gila monster survey concurrent with the desert tortoise clearance surveys and relocation of any individuals found to suitable habitat outside the project site. Implementation of that condition will reduce impacts to Gila monsters and their habitat to less-than-significant levels. (Ex. 300, p. C.2-70.)

Desert tortoises are present on the CSP project site and the adjacent desert areas both east and west of the site. Protocol surveys conducted in 2010 detected 104 tortoises within the originally proposed project footprint. The highest concentration of tortoises is located north of the Phase 1 boundary of the original project footprint, located on the foothills and bajadas of the Cady Mountains. Burrow density was also concentrated in this area; however, burrows were present to some degree in most of the project area. Although habitat utilized by desert tortoises is present across most of the site, only eight tortoises were observed in the Phase I area. Tortoise densities in the portion of the Phase II area now removed are well over the average tortoise density (4.7 tortoise/km^2) identified by the West Mojave Plan. Because of concerns presented by staff and the wildlife agencies regarding the preservation of habitat near the toe of the Cady Mountains to provide a linkage and movement corridor for desert tortoise, the applicant modified the project footprint to provide approximately 4,000 feet between the project boundary and the base of the mountains as a movement corridor, as recommended by the USFWS Desert Tortoise Recovery Office (DTRO). Subsequent to this modification, the Applicant reduced the project further in response to the September 3, 2010 Committee Order. Scenario 5.5 substantially reduces the number of desert tortoise that will be impacted and require translocation when compared to the previous proposed project configurations. The reduced acreage would avoid some tortoises and would preserve movement areas and occupied habitat for tortoises. Nonetheless, the proposed reduced acreage project would result in the loss of high density tortoise habitat. The 2010 surveys identified 10 tortoises in the reduced project footprint which equates to an estimated 22 tortoises using the USFWS formula. Implementation of Scenario 5.5 would require the translocation of approximately 13 desert tortoise (11 adults and subadults, and 2 juveniles) from the project site compared to approximately 107 (93 adults and subadults and 14 juveniles) for the proposed project. (Ex. 317, pp. C.2-14, 28.)

Desert Tortoise Impact Summary

		Estimated Number of Adult/Subadult and Juvenile Tortoise				
Project Component	**Habitat (Acres)**	**USFWS Formula (Min-Max)**	**Requiring Trans-location**	**Handled**	**Direct - Indirect Impacts (Min-Max)**	**Maximum Potential Mortality**
Revised Proposed Project	6,215	189 (69-378)	107	321	682 (300-1249)	194 tortoise 436 eggs
Scenario 5.5	4,613	22 (6-59)	13	39	181 (107-292)	29 tortoise 56 eggs

Source: Ex. 317, p. C.2-37.

Construction of the proposed project would result in the direct loss of approximately 4,613 acres of occupied desert tortoise habitat, 2,474.1 acres north of the BNSF railroad and 2,139.9 south of the BNSF railroad. Habitat north of the railroad and within the Scenario 5.5 footprint constitutes good quality habitat and supports moderate densities of desert tortoise in some areas. This area is characterized by creosote bush scrub and has less obstructed connectivity to adjacent natural lands. Although habitat for desert tortoise is present in the area between the BNSF railroad and I 40, it provides lower quality habitat for tortoises. This area is isolated by the highway and railroad, has been subject to disturbance from pipeline development, and provides little long-term value to the species. Nonetheless, tortoise sign was detected in this area. In addition, while the railroad poses a substantial barrier to movement, there are numerous corridors for dispersal beneath the many railroad trestles that span drainages.

During construction of the Calico Solar project desert tortoises could be harmed during clearing, grading, and trenching activities or may become entrapped within open trenches and pipes. Construction activities could also result in direct mortality, injury, or harassment of individuals as a result of encounters with vehicles or heavy equipment. Other direct effects could include individual tortoises being crushed or entombed in their burrows, collection or vandalism, disruption of tortoise behavior during construction or operation of facilities, disturbance by noise or vibrations from the heavy equipment and the SunCatcher engines, and injury or mortality from encounters with workers' or visitors' pets. Desert tortoises may also be attracted to the construction area by the application of water to control dust, placing them at higher risk of injury or mortality. Increased human activity and vehicle travel would occur from the construction and improvement of access roads, which could disturb, injure, or kill individual tortoises. Also, tortoises may take shelter under parked vehicles and be killed, injured, or harassed when the vehicle is moved. The applicant has recommended impact avoidance and minimization measures to reduce these direct impacts to desert tortoise, including installation of exclusion fencing to keep desert tortoises out of construction areas, translocating the resident desert tortoises from the Calico Solar site, reducing construction traffic and speed limits to reduce the incidence of vehicles strikes and worker training programs. These recommendations are included in our conditions of certification, including Conditions **BIO-1** through **BIO-9**, which apply to protect desert tortoise and other biological resources in and near the project area, and Conditions of Certification **BIO-15** through **BIO-17**, which are specific to desert tortoise.

Condition of Certification **BIO-15** (Desert Tortoise Clearance Surveys and Exclusion Fencing) requires installation of security and desert tortoise exclusionary fencing around the entire project site and along access roads. Condition **BIO-16** (Desert Tortoise Translocation Plan) requires that the applicant prepare and implement a desert tortoise translocation plan to move the tortoises found in the project area to proposed translocation sites. Condition **BIO-17** requires the acquisition, improvement, and long term maintenance of compensatory tortoise habitat.

Tortoise translocation, was the subject of extensive testimony and discussion during our evidentiary hearings. The applicant presented a draft Desert Tortoise Translocation Plan showing receptor sites to the west of the project, north of I-40 and to the southwest, in the Ord-Rodman DWMA. To date the Draft Desert Tortoise Translocation Plan remains to be finalized and is being actively reviewed and commented on by the agencies. In addition, testimony provided by the CDFG and other recognized experts during the August 18, 2010 evidentiary hearings is being reviewed by the applicant, staff, and the agencies. Based on the existing recommendations of the agencies and staff, it is expected that revisions will be made to the Translocation Plan prior to approval. The reduction in project size for Scenario 5.5 significantly reduces the number of desert tortoise that would require translocation. This substantially reduces the risks associated with handling and translocating desert tortoise and is expected to limit the amount of translocation mortality that could occur. (EX. 317, p. C.2-33)

During our hearings, the draft Translocation Plan was criticized as inadequate on various grounds. Among the criticism was that from CURE witness Scott Cashen, who complained that the draft Plan failed to meet the recently released guidelines from the USFWS Desert Tortoise Recovery Office entitled Translocation of Desert Tortoises (Mojave Population) From Project Sites: Plan Development Guidance (USFWS Guidance). We will not address the individual points of departure Mr. Cashen identified as the plan is a draft and is under review, presumably for, among other things, conformance with the USFWS Guidance. We note, however, that the USFWS Guidance specifies the following steps:

- Determining whether the proposed land use is compatible with desert tortoises continuing to live on the site.
- Estimating the number of tortoise that will be affected on the project site through the use of surveys.

- Identifying potential recipient and control sites for the tortoises to be relocated to and on which to monitor tortoises as a control group for comparison with the moved tortoises and their new neighbors.
- Estimating tortoise densities at recipient and control sites.
- Developing the translocation plan in coordination with USFWS, State wildlife agencies, and land management agencies.
- Confirming tortoise densities at the recipient and control sites, health checkups, including blood tests for disease, and attaching transmitters to tortoises. Including the relocated tortoises, density at a receiving site may not exceed 130% of mean density for the desert tortoise recovery unit.
- Determine disposition of tortoises on project site—monitor on site via telemetry, move to quarantine facility off-site, or, if health problems are suspected, transferred to the Desert Tortoise Conservation Center in Las Vegas or other facility for further evaluation, treatment, and potential return to the wild.
- Construct project fencing.
- Prepare, obtain approval, and execute disposition plan.
- Post-translocation monitoring for a minimum of five years.
- Collection of data throughout the process for use by wildlife and permitting agencies.

The Guidance also specifies measures to protect the relocated, receiving area and control area tortoises, such as disinfection of containers used to transport them, hydration within 12 hours of release, release at an unoccupied shelter site and reference to requirements contained in other protocols. In all, we find it to be a comprehensive and thorough program to minimize harm to tortoises.

Condition **BIO-16** requires compliance with the USFWS Guidance as well as any additional guidance from USFWS and CDFG. Further, the plan must be approved by the USFWS, CDFG, BLM's wildlife biologist and our Compliance Project Manager. Having established clear standards for the plan's content in Condition **BIO-16**, we do not need to wait to review the final plan prior to taking action on the project as Mr. Cashen and others suggest.

While there was some disagreement on the numbers, there is general consensus that a substantial percentage of tortoise may perish as a result of the translocation process. It is expected that 85 percent of the juvenile tortoise, by their nature difficult to detect, will not be detected during the Clearance Surveys and will remain on the site during construction, subject to the threats described above. Translocation requirements from the USFWS and CDFG include blood testing of both translocated tortoises and current residents of the receiving area to avoid mixing diseased and healthy tortoises. While multiple efforts will be expended to minimize tortoise mortality, translocated tortoise may still suffer

injury or die from the stress of handling, blood testing, predation and other causes. USFWS guidelines require that, for every tortoise translocated, one tortoise in the receiving area and one tortoise in a control area be tested and radio-tagged for tracking. Those tortoises may suffer injury or die from the stress of handling or blood testing and those in the receiving area from the additional competition for food and shelter. A scenario postulated by Staff estimates that the number of tortoise perishing due to the translocation effort could be as high as the number of tortoise that are relocated. (Ex. 317, pp. C.2-28 – C.2-29, C.2-37 – C.2-38.)

The concerns about tortoise mortality are based in large part on the preliminary results of a tortoise translocation program on the Fort Irwin military base to the north east of Barstow, where nearly 50 percent of translocated tortoises have perished in two years following their translocation. (8/25/10 RT, pp. 90 – 92.) Whether the same results will hold for this project is somewhat speculative. BLM biologist Chris Otahal opined that tortoise density in the receiving area influenced mortality and noted that the candidate receptor sites for this project had lower tortoise densities than those in the Fort Irwin project. (8/25/10 RT, pp. 134 – 135.)

Some PMPD comments assert that impacts caused by the translocation plan have not been considered or mitigated for. This is incorrect. In calculating the number of tortoise that are estimated to be impacted by this project, Staff included not only tortoises on the project site, but also those in the translocation and control areas. (Ex. 317, p. C.2-27.) This includes capture, disease testing, and relocation of desert tortoise on the project site, the control group site, and the resident translocation site. (Ex. 317, p. C.2-30) After taking account of all direct and indirect impacts to desert tortoise caused by the project, Staff concluded that the implementation of Conditions of Certification **BIO-1** through **BIO-9** and **BIO-15** through **BIO-18** would reduce impacts to desert tortoise to less-than-significant levels under CEQA and would also satisfy the CESA requirements to fully mitigate impacts to desert tortoise under Fish and Game Code Section 2081. (Ex. 317, p. C.2-29-30.) We agree.

<u>Habitat mitigation</u>. The reduction in acreage for Scenario 5.5 would significantly avoid areas currently supporting high concentrations of desert tortoise and their burrows and would substantially increase the width of the linkage area that occurs along the foothills of the Cady Mountains. Mitigation for the loss of 4,613 acres of desert tortoise habitat on the project site is not dependent on the successful relocation of tortoise found on the site. Rather, Staff, the applicant,

representatives and the USFWS and CDFG, testified that the acquisition of and enhancement of habitat compensation lands, required by Condition **BIO-17**, serves as the mitigation for the habitat loss. Translocation of tortoises serves to *minimize* harm, a requirement under the California Endangered Species Act, discussed below.

BIO-17 requires habitat acquisition and enhancement measures on the acquired land. The effectiveness of this mitigation measure comes about by improving the carrying capacity of the acquired property so that more desert tortoises will survive and reproduce on these lands, thus offsetting over time the decrease in numbers of tortoises resulting from the habitat loss and other project impacts. (Ex. 31, p 14-15.) Some of the recommended enhancement actions include habitat restoration and invasive plant control, eliminating livestock and burro grazing, fencing to exclude livestock and vehicles or reduce the incidence of road strikes, controlling tortoise predators such as ravens, feral dogs and coyotes, as well as increased law enforcement, signage and education. These measures are consistent with the USFWS desert tortoise recovery plan recommendations, which describe actions in addition to land acquisition that could reduce threats to desert tortoise populations. These measures would address specific known threats to desert tortoise as identified in the Recovery Plan, Draft Revised Recovery Plan and Spotlight Species Action Plan. These threats, which would be relieved in part through the habitat enhancement measures listed above, include proliferation of roads; off-highway vehicle activity; deliberate maiming, killing, or collecting; habitat invasion by non-native invasive species; and increased frequency of wildfire due to invasion of desert habitats by non-native plant species. (Ex. 310, p 18.)

Staff believes that habitat enhancement measures, in combination with habitat acquisition, would feasibly and effectively mitigate the project's impacts to desert tortoises. (Ex. 310, p. 18.) We agree.

CURE, in its comments on the PMPD, questioned whether acquisition of the required acreage is feasible. There is testimony in the record indicating that acquisition is feasible. (RT 8/5/10 at 145, Testimony of Amy Fesnock (BLM).)

5. Cumulative Impacts

A project may result in a significant cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in

connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (Cal. Code Regs., tit. 14, § 15130). Cumulative impacts must be addressed if the incremental effect of a project, combined with the effects of other projects is "cumulatively considerable" [14 Cal. Code Regs., § 15130(a).] Such incremental effects are to be "viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects" [14 Cal. Code Regs., § 15164(b)(1).]

The projects considered in the cumulative impacts analysis are described in Staff's Supplemental Staff Assessment, Biological Resources Table 9 (Ex. 300, pp. C.2-131 – C.2-133).

Waters of the State. The cumulative impacts of Scenario 5.5 on waters of the state would be reduced from those of the original proposal, which staff testified would not be significant after application of the mitigation measures required by Condition **BIO-26.**

Desert Tortoise. Scenarios 5.5's contribution to cumulative impacts to desert tortoise would not be considerable because the applicant is required to relocate all tortoises from the project area; prevent future on-site impacts to tortoises by fencing the site; monitor and manage raven predation on-site and contribute to regional raven management; and compensate for habitat loss by protecting extensive acreage now presently under conservation management.

Golden Eagle. While the overall loss of foraging habitat for golden eagles within the region is a cumulatively significant impact, the contribution of Scenario 5.5 to that cumulative effect is less than significant after mitigation. Condition of Certification **BIO-20** requires focused nest surveys within 1 mile of project activities and if nests are identified, the project owner would establish a disturbance-free buffer around the nest. No construction activities would be authorized within the 0.5 mile buffer pending the successful fledging of the nest. Implementation of Condition of Certification **BIO-17**, the compensatory mitigation plan for desert tortoise, would offset foraging habitat loss by the preservation of similar plant communities.

Burrowing Owl. Staff testified that Senario 5.5's contribution to significant cumulative effects on the burrowing owl will be less than significant when the incremental effects of the project, after mitigation, are viewed in connection with the effects of other projects. The incremental contribution to the cumulative effects will not be cumulatively considerable because of required avoidance and

passive relocation in Condition of Certification **BIO-21** and implementation of Condition of Certification **BIO-17**, the compensatory mitigation plan for desert tortoise, which will also benefit burrowing owls. The acquisition is expected to prevent future losses of habitat by permanently protecting more habitat lands than are being used for the project and further benefit the species by providing funding for long-term maintenance and management activities on those lands.

Le Conte's Thrasher. Scenario 5.5's incremental contribution to the cumulative effects will not be cumulatively considerable because of mitigation measures requiring pre-construction breeding bird surveys and avoidance of active nests (Condition **BIO-19**) and compensatory habitat mitigation for desert tortoise (**BIO-17**).

Migratory Birds. Scenario 5.5's incremental contribution to the cumulative effects on migratory birds will not be cumulatively considerable due to mitigation measures requiring pre-construction breeding bird surveys and avoidance of active nests (Condition **BIO-19**)) compensatory habitat mitigation for desert tortoise (**BIO-17**), and avoidance, minimization, and compensation for impacts to desert washes (**BIO-26**), thereby reducing impacts to migratory birds from habitat loss by the preservation of similar plant communities. Condition of Certification **BIO-22**'s avian protection measures further reduce impacts to migratory birds from solar technology.

Mojave Fringe-Toed Lizard. A potentially significant cumulative impact to Mojave fringe-toed lizards due to blockage of lizard movements from the east to west of the project is mitigated by the project setbacks from the BNSF railroad (Condition **TRANS-7**). The setback area will provide a suitable movement corridor.

Nelson's Bighorn Sheep. Scenario 5.5 would not contribute significantly to the loss of bighorn sheep habitat, as most occupied habitat for Nelson's bighorn sheep within the Cady Mountains does not overlap the northern portion of the scenario's development area. The scenario would avoid large open areas located on the bajada below the Cady Mountains that could provide connectivity to adjacent mountain ranges. Therefore, impacts of either scenario on bighorn sheep are not cumulatively considerable.

American Badger and Desert Kit Fox. Scenario 5.5's incremental contribution to the significant cumulative effects will be less than significant. Avoidance and minimization measures in Condition of Certification **BIO-24** combined with Condition **BIO-17**'s habitat compensation mitigation plan for desert tortoise, will

reduce the impacts of habitat loss by the preservation of habitat for other species, including the badger and kit fox.

Bats. Scenario 5.5's incremental contribution to the cumulative effects will be less than significant due to avoidance and minimization measures required by Condition of Certification **BIO-25**, **BIO-17**'s compensatory habitat mitigation for desert tortoise, which preserves habitat similar to that which is being lost, and Condition **BIO-22**'s avian protection measures would further reduce impacts to migratory birds from solar technology.

Wildlife Movement and Connectivity. Scenario 5.5, representing a further separation from the base of the Cady Mountains to the north of the project, further diminishes the project's effect on a key wildlife corridor. It's contribution is not cumulatively considerable.

Plant Communities. Scenario 5.5 would contribute at least incrementally to the cumulative impacts of future projects to Mojave creosote scrub and saltbush scrub, however that contribution would not be cumulatively considerable because the incremental effects would be reduced by the compensatory mitigation of desert tortoise habitat; implementation of Best Management Practices for minimizing construction impacts; and specifications for restoring temporarily disturbed habitat.

White-margined beardtongue. Scenario 5.5 would avoid direct impacts to white-margined beardtongue and its occupied habitat. Areas within the project boundary that contain the plant will be avoided and protected within Environmentally Sensitive Areas. Further, and measures to avoid or minimize off-site impacts to the BLM Pisgah Crater ACEC, including the management of off-site sand transport, are required in Condition of Certification **BIO-12**.

Other Special-Status Plants. Condition of Certification **BIO-12** similarly reduces, through plant avoidance and other measures reduces the contributions of the CSP to cumulative impacts to other special status plants to less than cumulatively considerable levels.

6. LORS Compliance

The CSP must comply with state and federal laws, ordinances, regulations, and standards (LORS) that address state and federally listed species, as well as other sensitive species and habitats, and must secure the appropriate permits to

satisfy these LORS. Our analysis of compliance with Federal, State, and Local LORS is summarized in Biological Resources Table 3, below, followed by additional information on selected LORS.

Biological Resources Table 3
Summary of Compliance with LORS

Applicable Law	Description	Rationale for Compliance
FEDERAL		
Federal Endangered Species Act (Title 16, United States Code, section 1531 et seq., and Title 50, Code of Federal Regulations, part 17.1 et seq.)	Designates and provides for protection of threatened and endangered plant and animal species and their critical habitat. "Take" of a federally-listed species is prohibited without an incidental take permit, which may be obtained through Section 7 consultation (between federal agencies) or a Section 10 Habitat Conservation Plan.	The applicant is currently undergoing consultation with the USFWS for project impacts to desert tortoise and a Biological Opinion will be issued for the proposed project. In addition, Conditions of Certification BIO-1 through BIO-9 and BIO-15 through BIO-18 include measures to minimize and compensate for impacts to the federally listed desert tortoise.
Migratory Bird Treaty (Title 16, United States Code, sections 703 through 711)	Makes it unlawful to take or possess any migratory nongame bird (or any part of such migratory nongame bird) as designated in the Migratory Bird Treaty Act unless permitted by regulation (e.g., duck hunting).	Condition of Certification BIO-19 includes preconstruction nest surveys, no-disturbance buffers around active nests, and monitoring of nests to minimize impacts to nesting birds covered under the Migratory Bird Treaty Act.
Clean Water Act (Title 33, United States Code, sections 1251 through 1376, and Code of Federal Regulations, part 30, section 330.5(a)(26))	Requires the permitting and monitoring of all discharges to surface water bodies. Section 404 requires a permit from the U.S. Army Corps of Engineers (USACE) for a discharge from dredged or fill materials into waters of the U.S., including wetlands. Section 401 requires a permit from a regional water quality control board (RWQCB) for the discharge of pollutants. By federal law, every applicant for a federal permit or license for an activity that may result in a discharge into a California water body, including wetlands, must request State certification that the proposed activity will not violate State and federal water quality standards.	Waters of the U.S. do not occur within the project area.
Bald and Golden Eagle Protection Act (Title 16, United States Code section 668)	Provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the take, possession, and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the act.	A recently issued Final Rule (September 2009) provides for a regulatory mechanism under the BGPA to permit take of bald or golden eagles comparable to incidental take permits under the ESA. This rule adds a new section at 50 CFR 22.26 to authorize the issuance of permits to take bald eagles and golden eagles on a limited basis. The BGPA defines the ''take'' of an eagle to include a broad range of actions, including disturbance. ''Disturb'' is defined in regulations at 50 CFR 22.3 as: ''to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.'' The proposed project may result in "take" of the golden eagle from disturbance to nesting pairs as well as loss of foraging habitat, which may result loss of

Applicable Law	Description	Rationale for Compliance
		productivity for this species. Golden eagles are known to nest within a 10-mile radius of the project and at least three pairs occur within 5-miles. Results of golden eagle nesting surveys and foraging habitat assessment are required to determine whether construction of the proposed project would result in take of the species and therefore require a permit. The USFWS Migratory Bird Division is in the process of developing guidance regarding implementation of this final rule, including establishing take thresholds within each Bird Conservation Region that must not be exceeded. If it is ultimately determined that take of golden eagle would occur as a result of the proposed project, an individual (non-programmatic) permit would be required. Permit issuance will be conditioned on various criteria, the most important of which is that the permitted take is compatible with the preservation of the bald eagle and the golden eagle (i.e., consistent with the goal of stable or increasing breeding populations). Staff encourages the applicant to coordinate closely with USFWS as guidance becomes available regarding implementation of the revised BGPA. At this time, staff is unable to determine whether the proposed project would be in compliance with the BGPA. Condition of Certification BIO-20 includes preconstruction nest surveys, no-disturbance buffers around active nests, and monitoring of nests to minimize impacts to nesting golden eagles.
California Desert Conservation Area Plan 1980, as amended (reprinted in 1999)	Administered by the BLM, the CDCA Plan requires that proposed development projects are compatible with policies that provide for the protection, enhancement, and sustainability of fish and wildlife species, wildlife corridors, riparian and wetland habitats, and native vegetation resources.	Conditions of Certification BIO-1 through BIO-30 minimize, avoid, and compensate for impacts to various biological resources covered by the CDCA Plan.
California Desert Protection Act of 1994	An Act of Congress which established 69 wilderness areas, the Mojave National Preserve, expanded Joshua Tree and Death Valley National Monuments and redefined them as National Parks. Lands transferred to the National Park Service were formerly administered by the BLM and included significant portions of grazing allotments, wild horse and burro Herd Management Areas, and Herd Areas.	Conditions of Certification BIO-1 through BIO-30 minimize, avoid, and compensate for impacts to various biological resources covered by the California Desert Protection Act of 1994.

Applicable Law	Description	Rationale for Compliance
West Mojave Plan	As an amendment to the CDCA Plan, the BLM produced the West Mojave Plan (WEMO) (BLM 2006). The WEMO is a federal land use plan amendment that (1) presents a comprehensive strategy to conserve and protect the desert tortoise, the Mohave ground squirrel (MGS) and nearly 100 other plants and animals and the natural communities of which they are part, and (2) provides a streamlined program for complying with the requirements of the California and federal Endangered Species Acts (BLM et al. 2005).	Conditions of Certification BIO-1 through BIO-30 minimize, avoid, and compensate for impacts to various biological resources covered by the West Mojave Plan.
STATE		
California Endangered Species Act of 1984 (Fish and Game Code, sections 2050 through 2098)	Protects California's rare, threatened, and endangered species. "Take" of a State-listed species is prohibited without an Incidental Take Permit.	Conditions of Certification BIO-1 through BIO-9 and BIO-15 through BIO-19 would ensure that the project is not likely to jeopardize the continued existence of desert tortoise or Swainson's hawk or result in the degradation of occupied habitat for any State-listed species.
California Code of Regulations (Title 14, sections 670.2 and 670.5)	Lists the plants and animals of California that are declared rare, threatened, or endangered.	Analysis of potential project impacts to rare, threatened, or endangered species is provided above, and Conditions of Certification are proposed that would minimize impacts to these species.
Fully Protected Species (Fish and Game Code, sections 3511, 4700, 5050, and 5515)	Designates certain species as fully protected and prohibits the take of such species or their habitat unless for scientific purposes (see also California Code of Regulations, Title 14, section 670.7).	Golden eagle is designated as fully protected and has been observed in the project area. However, Condition of Certification BIO-20 includes preconstruction nest surveys, no-disturbance buffers around active nests, and monitoring of nests to minimize impacts to golden eagles.
Nest or Eggs (Fish and Game Code section 3503 and 3503.5)	Protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird.	Condition of Certification BIO-19 includes preconstruction nest surveys, no-disturbance buffers around active nests, and monitoring of nests to minimize impacts to nesting birds. Condition of Certification BIO-6 includes a Worker Environmental Awareness Program to educate workers about compliance with environmental regulations, including Fish and Game Code section 3503.
Migratory Birds (Fish and Game Code section 3513)	Protects California's migratory birds by making it unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame birds.	Condition of Certification BIO-19 includes preconstruction nest surveys, no-disturbance buffers around active nests, and monitoring of nests to minimize impacts to nesting birds. Condition of Certification BIO-6 includes a Worker Environmental Awareness Program to educate workers about compliance with environmental regulations, including Fish and Game Code section 3513.
Significant Natural Areas (Fish and Game Code section 1930 et seq.)	Designates certain areas such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitat.	Refuges, natural sloughs, riparian areas, and vernal pools do not occur on the project site.

Applicable Law	Description	Rationale for Compliance
California Environmental Quality Act (CEQA), CEQA Guidelines section 15380	CEQA defines rare species more broadly than the definitions for species listed under the State and federal Endangered Species Acts. Under section 15830, species not protected through State or federal listing but nonetheless demonstrable as "endangered" or "rare" under CEQA should also receive consideration in environmental analyses. Included in this category are many plants considered rare by the California Native Plant Society (CNPS) and some animals on the CDFG's Special Animals List.	Implementation of Conditions of Certification BIO-1 through BIO-30 would ensure that the project remains in compliance with CEQA.
Streambed Alteration Agreement (Fish and Game Code sections 1600 et seq.)	Regulates activities that may divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake in California designated by CDFG in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit. Impacts to vegetation and wildlife resulting from disturbances to waterways are also reviewed and regulated during the permitting process.	Condition of Certification BIO-26 includes measures to minimize and avoid impacts to jurisdictional waters of the State.
California Native Plant Protection Act of 1977 (Fish and Game Code section 1900 et seq.)	Designates State rare, threatened, and endangered plants.	Conditions of Certification BIO-10 through BIO-12 include restoration and compensation for impacts to native plant communities, a Weed Management Plan, special-status plant surveys, and minimization and avoidance measures to minimize impacts to special-status plants.
California Desert Native Plants Act of 1981 (Food and Agricultural Code section 80001 et seq. and California Fish and Game Code sections 1925-1926)	Protects non-listed California desert native plants from unlawful harvesting on both public and private lands in Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego Counties. Unless issued a valid permit, wood receipt, tag, and seal by the commissioner or sheriff, harvesting, transporting, selling, or possessing specific desert plants is prohibited.	Condition of Certification BIO-12 includes a Protected Plant Salvage Plan, which would minimize impacts to specific native desert plants.
LOCAL		
San Bernardino County General Plan: Conservation/Open Space Element of the County General Plan (County of San Bernardino 2007)	Includes objectives to preserve water quality and open space to benefit biological resources, and specific policies and goals for protecting areas of sensitive plant, soils and wildlife habitat and for assuring compatibility between natural areas and development. Although the Calico Solar Project is not located on lands under county jurisdiction, the general plan provides objectives which are consistent with some of the LORS listed above.	Implementation of Conditions of Certification BIO-1 through BIO-30 would ensure that the project remains in compliance with the San Bernardino County General Plan.

a. State

The Energy Commission has a one-stop permitting process for all thermal power plants rated 50 MW or more under the Warren-Alquist Act (Pub. Res. Code § 25500). Under the act, the Energy Commission's certificate is "in lieu of" other state, local, and regional permits (*Ibid*.) The Commission's streamlined permitting process accomplishes a primary objective of the Renewable Energy Action Team, as identified in the Governor's Executive Order S-14-08 — to create a "one stop" process for permitting renewable energy generation facilities under California law. The adopted Conditions of Certification would satisfy the following state LORS and take the place of terms and conditions that, but for the Commission's exclusive authority, would have been included in the following state permits:

Incidental Take Permit: California Endangered Species Act (Fish and Game Code §§ 2050 et seq.) The California Endangered Species Act (CESA) prohibits the "take" (defined as "to hunt, pursue, catch, capture, or kill") of state-listed species except as otherwise provided in state law. Construction and operation of the CSP project will result in the take of desert tortoise, listed as threatened under CESA. Condition **BIO-17** specifies compensatory mitigation for desert tortoise habitat loss at 5:1, 3:1, and 1:1 ratios, based on the density of desert tortoise and their burrows, connectivity to adjacent habitats, maintenance of an adequate movement corridor, and general habitat quality, with BLM "nesting" their 1:1 mitigation requirement within this framework. This funding and mitigation approach, together with Conditions of Certification **BIO-1** through **BIO-9**, **BIO-15**, **BIO-16** and **BIO-18**, provides full mitigation for impacts to the desert tortoise caused by the CSP project.

Lake and Streambed Alteration Agreement, California Fish and Game Code §§ 1600 1607. Pursuant to these sections, CDFG typically regulates all changes to the natural flow, bed, or bank, of any river, stream, or lake that supports fish or wildlife resources. Construction and operation of the CSP would result in direct or indirect impacts to up to 155.2 acres of waters of the state. Staff recommends Condition of Certification **BIO-26** and **BIO-28**, which we adopt, to assure compliance.

b. Federal

The CSP project is located on federal land under BLM's jurisdiction and is therefore subject to the provisions of BLM's California Desert Conservation Area (CDCA) Plan (Revised 1999). As an amendment to the CDCA Plan, BLM

produced the West Mojave Plan (WEMO (BLM 2005). This document consists of proposed management actions and alternatives for public lands in the WEMO Planning Area. The CSP project is located in the eastern portion of the WEMO Planning Area Boundary.

The BLM has worked with the USFWS to develop a variety of land designations as tools to protect sensitive biological resources, including the desert tortoise. The siting of the CSP project considered the management direction of these designations, as described below:

- Desert Wildlife Management Areas (DWMA) are general areas recommended by the Desert Tortoise Recovery Plan (USFWS 1994) within which recovery efforts for the desert tortoise would be concentrated. DWMAs had no specific legal boundaries in the 1994 Recovery Plan. The BLM formalized the general DWMAs from the 1994 Recovery Plan through its planning process and administers them as Areas of Critical Environmental Concern (see below). The CSP project does not fall within any DWMA.

- Area of Critical Environmental Concern (ACEC) are specific, legally defined, BLM designations where special management is needed to protect and prevent irreparable damage to important historical, cultural, scenic values, fish and wildlife, and natural resources or to protect life and safety from natural hazards. The CSP project is not included within any designated ACEC.

- Critical Habitat consists of specific areas defined by the USFWS as areas essential for the conservation of the listed species, which support physical and biological features essential for survival and that may require special management considerations or protection. Critical habitat for the desert tortoise was designated in 1994, largely based on proposed DWMAs in the draft Recovery Plan. The CSP project is approximately 5 miles from the nearest desert tortoise critical habitat.

BLM provides management direction for species such as desert tortoise within the NEMO, which include five geographical areas of tortoise habitat in the planning area.

Potential take of the desert tortoise, listed as threatened by the USFWS, requires compliance with the federal Endangered Species Act (ESA) (16 USC §§ 1531 et seq.). “Take” of a federally-listed species is prohibited without an Incidental Take Permit, which would be obtained through a Section 7 consultation between BLM and the USFWS.

In order to construct and operate the CSP on BLM managed lands, the applicant has applied for a Right of Way Permit from BLM, which will address the project's compliance with federal law.

7. Public Comment

Public comments on the PMPD have been responded to by adding or modifying text above and the Conditions of Certification, below.

FINDINGS OF FACT

Based on the evidence, we find the following:

1. Construction and operation of CSP will disturb approximately 4,613 acres of desert habitat. This includes approximately 2,472 acres of relatively undisturbed habitat located north of the BNSF railroad and approximately 2,141 acres of more disturbed habitat located between the BNSF railroad and Interstate 40. Portions of this area have been subject to historic disturbance from the construction of natural gas pipelines, fiber optic infrastructure, the Pisgah electrical substation, and the BNSF railroad.

2. The diverse plant communities and landscape features in and around the CSP site support a broad diversity of wildlife, including various threatened, endangered and special-status species.
3. The CSP project area provides forage, cover, roosting, and nesting habitat for a variety of bird species.
4. Implementation of Conditions of Certification **BIO-1** through **BIO-12** and **BIO-17** will reduce impacts to plant species to insignificant levels.
5. Implementation of Conditions of Certification **BIO-1** through **BIO-9** and **BIO-13** through **BIO-27** will reduce impacts to bird and wildlife species to insignificant levels.
6. A mitigation ratio as specified in the **BIO** conditions is appropriate for the provision of habitat compensation lands for desert tortoise and other wildlife species.
7. The effects of dust on wildlife and plants will be mitigated by the implementation of Conditions **AQ-SC3**, **AQ-SC4**, **AQ-SC-7** and **Soil&Water-1**.
8. Construction noise is not expected to have a substantial impact on nearby wildlife with the implementation of Conditions **NOISE-1** through **NOISE-6**.

CONCLUSIONS OF LAW

1. The project owner will implement appropriate avoidance and mitigation measures to prevent significant adverse impacts to all sensitive species.

2. With implementation of the mitigation measures described in the evidentiary record and incorporated into the Conditions of Certification below, as well as those in other portions of this Decision, the project will not result in significant direct, indirect, or cumulative impacts to biological resources.

3. With implementation of the mitigation measures described in the evidentiary record and incorporated into the Conditions of Certification, the CSP will conform to all applicable laws, ordinances, regulations, and standards related to biological resources as identified above.

CONDITIONS OF CERTIFICATION

DESIGNATED BIOLOGIST SELECTION

BIO-1 The project owner shall assign at least one Designated Biologist to the project. The project owner shall submit the resume of the proposed Designated Biologist, with at least three references and contact information, to the Energy Commission Compliance Project Manager (CPM) and the Bureau of Land Management's (BLM's) Wildlife Biologist for approval in consultation with the California Department of Fish and Game (CDFG) and U.S. Fish and Wildlife Service (USFWS).

The Designated Biologist must meet the following minimum qualifications: Bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field;

1. Three years of experience in field biology or current certification of a nationally recognized biological society, such as The Ecological Society of America or The Wildlife Society;

2. Have at least one year of field experience with biological resources found in or near the project area;

3. Meet the current USFWS Authorized Biologist qualifications criteria (http://www.fws.gov/ventura/speciesinfo/protocols_guidelines), demonstrate familiarity with protocols and guidelines for the desert tortoise, and be approved by the USFWS; and

4. Possess a California ESA Memorandum of Understanding pursuant to Section 2081(a) for desert tortoise.

In lieu of the above requirements, the resume shall demonstrate to the satisfaction of BLM's Wildlife Biologist and the CPM, in consultation with CDFG and USFWS, that the proposed Designated Biologist or alternate has the appropriate training and background to effectively implement the conditions of certification.

Verification: No fewer than 30 days prior to construction-related ground disturbance, the Designated Biologist(s) shall complete a USFWS Desert Tortoise Authorized Biologist Request Form (http://www.fws.gov/ventura/speciesinfo/protocols guidelines) and submit it to the USFWS, BLM's Wildlife Biologist, and the CPM for review and final approval.

The project owner shall submit the resume of the Designated Biologist to the CPM and BLM within 7 days of receiving the Energy Commission Decision. No construction-related ground disturbance, grading, boring, or trenching shall commence until an approved Designated Biologist is available to be on site.

If a Designated Biologist needs to be replaced, the specified information of the proposed replacement must be submitted to BLM's Wildlife Biologist and the CPM as soon as possible prior to the termination or release of the Designated Biologist. In an emergency, the project owner shall immediately notify the BLM's Wildlife Biologist and the CPM to discuss the qualifications and approval of a short-term replacement while a permanent Designated Biologist is proposed to BLM's Wildlife Biologist and the CPM and for consideration.

DESIGNATED BIOLOGIST DUTIES

BIO-2 The project owner shall ensure that the Designated Biologist performs the activities described below during any site mobilization activities, construction-related ground disturbance, grading, boring, or trenching activities. The Designated Biologist may be assisted by the approved Biological Monitor(s) but remains the contact for the project owner, BLM's Wildlife Biologist, and the CPM. The Designated Biologist Duties shall include the following:

1. Advise the project owner's Construction and Operation Managers on the implementation of the biological resources conditions of certification;

2. Consult on the preparation of the Biological Resources Mitigation Implementation and Monitoring Plan (BRM IMP) to be submitted by the project owner;

3. Be available to supervise, conduct, and coordinate mitigation, monitoring, and other biological resources compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources, such as special-status species or their habitat;

4. Clearly mark sensitive biological resource areas and inspect these areas at appropriate intervals for compliance with regulatory terms and conditions;

5. Inspect active construction areas where animals may have become trapped prior to construction commencing each day. At the end of the day, inspect for the installation of structures that prevent entrapment or allow escape during periods of construction inactivity. Periodically inspect areas with high vehicle activity (e.g., parking lots) for animals in harm's way;

6. Notify the project owner, the BLM's Wildlife Biologist and the CPM of any non-compliance with any biological resources condition of certification;

7. Respond directly to inquiries of BLM's Wildlife Biologist and the CPM regarding biological resource issues;

8. Maintain written records of the tasks specified above and those included in the BRMIMP. Summaries of these records shall be submitted in the Monthly Compliance Report and the Annual Compliance Report to both the CPM and BLM Wildlife Biologist;

9. Train the Biological Monitors as appropriate, and ensure their familiarity with the BRMIMP, Worker Environmental Awareness Program (WEAP) training, and USFWS guidelines on desert tortoise surveys and handling procedures (http://www.fws.gov/ventura/speciesinfo/protocols guidelines); and

10. Maintain the ability to be in regular, direct communication with representatives of CDFG, USFWS, BLM's Wildlife Biologist, and the CPM, including notifying these agencies of dead or injured listed species and reporting special-status species observations to the California Natural Diversity Data Base.

Verification: The Designated Biologist shall provide copies of all written reports and summaries that document biological resources compliance activities in the Monthly Compliance Reports submitted to BLM's Wildlife Biologist and the CPM. If actions may affect biological resources during operation a Designated Biologist shall be available for monitoring and reporting. During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report unless his or her duties cease, as approved by BLM's Wildlife Biologist and the CPM.

BIOLOGICAL MONITOR QUALIFICATIONS

BIO-3 The Designated Biologist shall submit the resume, at least three references, and contact information of each of the proposed Biological

Monitors to BLM's Wildlife Biologist and the CPM. The resume shall demonstrate, to the satisfaction of the BLM's Wildlife Biologist and the CPM, the appropriate education and experience to accomplish the assigned biological resource tasks. The Biological Monitor is the equivalent of the USFWS designated Desert Tortoise Monitor (USFWS 2008c).

Biological Monitor(s) training by the Designated Biologist shall include familiarity with the conditions of certification, BRM IMP, WEAP, and USFWS guidelines on desert tortoise surveys and handling procedures (http://www. fws.gov/ventura/speciesinfo/protocols guidelines).

Verification: The project owner shall submit the specified information to the BLM's Wildlife Biologist and the CPM for approval at least 30 days prior to the start of any site mobilization or construction-related ground disturbance, grading, boring, and trenching. The Designated Biologist shall submit a written statement to BLM's Wildlife Biologist and the CPM confirming that individual Biological Monitor(s) has been trained including the date when training was completed. If additional biological monitors are needed during construction, the specified information shall be submitted to BLM's Wildlife Biologist and the CPM for approval at least 10 days prior to their first day of monitoring activities.

BIOLOGICAL MONITOR DUTIES

BIO-4 The Biological Monitors shall assist the Designated Biologist in conducting surveys and in monitoring of site mobilization activities, construction-related ground disturbance, grading, boring, or trenching. The Designated Biologist shall remain the contact for the project owner, BLM's Wildlife Biologist, and the CPM.

Verification: The Designated Biologist shall submit in the Monthly Compliance Report to BLM's Wildlife Biologist and the CPM and copies of all written reports and summaries that document biological resources compliance activities, including those conducted by Biological Monitors. If actions may affect biological resources during operation a Biological Monitor, under the supervision of the Designated Biologist, shall be available for monitoring and reporting. During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report unless their duties cease, as approved by BLM's Wildlife Biologist and the CPM.

DESIGNATED BIOLOGIST AND BIOLOGICAL MONITOR AUTHORITY

BIO-5 The project owner's construction/operation manager shall act on the advice of the Designated Biologist and Biological Monitor(s) to ensure conformance with the biological resources conditions of certification. The Designated Biologist shall have the authority to immediately stop any activity that is not in compliance with these conditions and/or order any reasonable measure to avoid take of an individual of a listed

species. If required by the Designated Biologist and Biological Monitor(s), the project owner's construction/operation manager shall halt all site mobilization, ground disturbance, grading, boring, trenching, and operation activities in areas specified by the Designated Biologist. The Designated Biologist shall:

1. Require a halt to all activities in any area when determined that there would be an unauthorized adverse impact to biological resources if the activities continued;

2. Inform the project owner and the construction/operation manager when to resume activities; and

3. Notify BLM's Wildlife Biologist and the CPM if there is a halt of any activities and advise them of any corrective actions that have been taken or would be instituted as a result of the work stoppage.

4. If the Designated Biologist is unavailable for direct consultation, the Biological Monitor shall act on behalf of the Designated Biologist.

Verification: The project owner shall ensure that the Designated Biologist or Biological Monitor notifies BLM's Wildlife Biologist and the CPM immediately (and no later than the morning following the incident, or Monday morning in the case of a weekend) of any non-compliance or a halt of any site mobilization, ground disturbance, grading, construction, and operation activities. The project owner shall notify BLM's Wildlife Biologist and the CPM of the circumstances and actions being taken to resolve the problem.

Whenever corrective action is taken by the project owner, a determination of success or failure would be made by BLM's Wildlife Biologist and the CPM within five working days after receipt of notice that corrective action is completed, or the project owner would be notified by BLM's Wildlife Biologist and the CPM that coordination with other agencies would require additional time before a determination can be made.

WORKER ENVIRONMENTAL AWARENESS PROGRAM (WEAP)

BIO-6 The project owner shall develop and implement a Project-specific Worker Environmental Awareness Program (WEAP) and shall secure approval for the WEAP from BLM's Wildlife Biologist and the CPM. The WEAP shall be administered to all onsite personnel including surveyors, construction engineers, employees, contractors, contractor's employees, supervisors, inspectors, subcontractors, and delivery personnel. The WEAP shall be implemented during site preconstruction, construction, operation, and closure. The WEAP shall:

1. Be developed by or in consultation with the Designated Biologist and consist of an on-site or training center presentation in which

supporting written material and electronic media, including photographs of protected species, is made available to all participants;

2. Discuss the locations and types of sensitive biological resources on the project site and adjacent areas, and explain the reasons for protecting these resources; provide information to participants that no snakes, reptiles, or other wildlife shall be harmed;

3. Place special emphasis on desert tortoises, Mojave fringe-toed lizards, burrowing owls, golden eagles, nesting birds, badgers, and white-margined beardtongue, including information on physical characteristics, distribution, behavior, ecology, sensitivity to human activities, legal protection, penalties for violations, reporting requirements, and protection measures;

4. Include a discussion of fire prevention measures to be implemented by workers during project activities; request workers dispose of cigarettes and cigars appropriately and not leave them on the ground or buried;

5. Require all property owner's contractors and employees to participate in BNSF's environmental sensitivity training program prior to commencing work at the Project site;

6. Describe the temporary and permanent habitat protection measures to be implemented at the project site;

7. Identify whom to contact if there are further comments and questions about the material discussed in the program;

8. Include printed training materials, including photographs and brief descriptions of desert tortoises, Mojave fringe-toed lizards, burrowing owls, golden eagles, nesting birds, badgers, and white-margined beardtongue, including behavior, ecology, sensitivity to human activities, legal protection, penalties for violations, reporting requirements, and protection measures;

9. Prominently display posters and descriptions in offices, conference rooms, employee break rooms, and other areas where employees may congregate of desert tortoises, Mojave fringe-toed lizards, burrowing owls, golden eagles, nesting birds, badgers, and white-margined beardtongue, including behavior, ecology, sensitivity to human activities, legal protection, penalties for violations, reporting requirements, and protection measures; and

10. Include a training acknowledgment form to be signed by each worker indicating that they received training and shall abide by the guidelines.

The specific program can be administered by a competent individual(s) acceptable to the Designated Biologist.

Verification: Within 7 days of publication of the Energy Commission's License Decision, or the Record of Decision/ROW Issuance, whichever comes first, the project owner shall provide to BLM's Wildlife Biologist and the CPM a copy of the final WEAP and all supporting written materials and electronic media prepared or reviewed by the Designated Biologist and a resume of the person(s) administering the program.

The project owner shall provide in the Monthly Compliance Report the number of persons who have completed the training in the prior month and a running total of all persons who have completed the training to date. At least 10 days prior to construction-related ground disturbance activities the project owner shall submit two copies of the BLM- and CPM-approved final WEAP. Training acknowledgement forms signed during construction shall be kept on file by the project owner for at least 6 months after the start of commercial operation.

Throughout the life of the project, the WEAP shall be repeated annually for permanent employees, and shall be routinely administered within one week of arrival to any new construction personnel, foremen, contractors, subcontractors, and other personnel potentially working within the project area. Upon completion of the orientation, employees shall sign a form stating that they attended the program and understand all protection measures. These forms shall be maintained by the project owner and shall be made available to BLM's Wildlife Biologist and the CPM upon request. Workers shall receive and be required to visibly display a hardhat sticker or certificate that they have completed the training.

During project operation, signed statements for operational personnel shall be kept on file for 6 months following the termination of an individual's employment.

BIOLOGICAL RESOURCES MITIGATION IMPLEMENTATION AND MONITORING PLAN

BIO-7 The project owner shall develop a Biological Resources Mitigation Implementation and Monitoring Plan (BRM IMP), and shall submit two copies of the proposed BRMIMP to the BLM-Wildlife Biologist and the CPM for review and approval. The project owner shall implement the measures identified in the approved BRMIMP. The BRMIMP shall incorporate avoidance and minimization measures described in final versions of the Hazardous Materials Plan; the Revegetation Plan; the Weed Management Plan; the Special-Status Plant Protection and Monitoring Plan; the Special-Status Plant Remedial Action Plan; the

Seed Collection Plan; the Protected Plant Salvage Plan; the Desert Tortoise Translocation Plan; the Raven Monitoring, Management, and Control Plan; the Burrowing Owl Monitoring and Mitigation Plan; the Burrowing Owl Relocation Area Management Plan; the Bighorn Sheep Mitigation Plan; the Streambed Management Plan; and the Evaporation Pond Design, Monitoring, and Management Plan.

The BRMIMP shall be prepared in consultation with the Designated Biologist and shall include accurate and up-to-date maps depicting the location of sensitive biological resources that require temporary or permanent protection during construction and operation. The BRMIMP shall include complete and detailed descriptions of the following:

1. All biological resources mitigation, monitoring, and compliance measures proposed and agreed to by the project owner;

2. All biological resources conditions of certification identified as necessary to avoid or mitigate impacts;

3. All biological resource mitigation, monitoring, and compliance measures required in federal agency terms and conditions, such as those provided in the USFWS Biological Opinion, the CDFG 2080.1 consultation, and BLM stipulations;

4. All sensitive biological resources to be impacted, avoided, or mitigated by project construction, operation, and closure;

5. All required mitigation measures for each sensitive biological resource;

6. All measures that shall be taken to avoid or mitigate temporary disturbances from construction activities;

7. Duration for each type of monitoring and a description of monitoring methodologies and frequency;

8. Performance standards to be used to help decide if/when proposed mitigation is or is not successful;

9. All performance standards and remedial measures to be implemented if performance standards are not met;

10. Biological resources-related facility closure measures including a description of funding mechanism(s);

11. A process for proposing plan modifications to BLM's Wildlife Biologist and the CPM and appropriate agencies for review and approval; and

12. A requirement to submit any sightings of any special-status species that are observed on or in proximity to the project site, or during project surveys, to the California Natural Diversity Data Base (CNDDB) per CDFG requirements.

Verification: The project owner shall submit the final BRMIMP to BLM's Wildlife Biologist and the CPM at least 30 days prior to start of any preconstruction site mobilization and construction-related ground disturbance, grading, boring, and trenching. The BRMIMP shall contain all of the required measures included in all biological Conditions of Certification. No construction-related ground disturbance, grading, boring, or trenching may occur prior to approval of the final BRMIMP by BLM's Wildlife Biologist and the CPM.

If any permits have not yet been received when the BRMIMP is first submitted, these permits shall be submitted to BLM's Wildlife Biologist and the CPM within five days of their receipt, and the BRM IMP shall be revised or supplemented to reflect the permit conditions within at least 10 days of their receipt by the project owner. Ten days prior to site and related facilities mobilization, the revised BRM IMP shall be resubmitted to BLM's Wildlife Biologist and the CPM.

To verify that the extent of construction disturbance does not exceed that described in this analysis, the project owner shall submit aerial photographs, at an approved scale, taken before and after construction to the CPM and BLM's Wildlife Biologist. The first set of aerial photographs shall reflect site conditions prior to any preconstruction site mobilization and construction-related ground disturbance, grading, boring, and trenching, and shall be submitted at least 30 days prior to initiation of such activities. The second set of aerial photographs shall be taken subsequent to completion of construction, and shall be submitted to the CPM and BLM's Wildlife Biologist no later than 90 days after completion of construction. The project owner shall also provide a final accounting of the acreages of vegetation communities/cover types present before and after construction and a depiction of the approved project boundaries superimposed on the post project aerial photograph. If final acreages and/or disturbance footprints exceed those previously approved, the project owner shall coordinate with staff, CDFG, and USFWS to determine appropriate mitigation for such impacts. Such mitigation may exceed the requirements as outlined in these Conditions of Certification (i.e., higher mitigation ratios may be imposed at the discretion of the wildlife agencies).

Verification: Any changes to the approved BRMIMP (including the project footprint) must be approved by BLM's Wildlife Biologist and the CPM and in consultation with CDFG and USFWS before such action is taken. Implementation of BRMIMP measures (for example, construction activities that were monitored, species observed) shall be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of project construction, the project owner shall provide to BLM's Wildlife Biologist and the CPM, for review and approval, a written Construction Termination Report

identifying which items of the BRMIMP have been completed, summarizing all modifications to mitigation measures made during the project's preconstruction site mobilization and construction-related ground disturbance, grading, boring, and trenching, naming any mitigation and monitoring items still outstanding, and providing a timeline for implementing outstanding items. The project owner shall coordinate with the CPM and BLM's Wildlife Biologist to revise and finalize the Construction Termination Report to fulfill its reporting requirements to be outlined in the BRIMP.

IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-8 The project owner shall undertake the following measures to manage the construction site and related facilities in a manner to avoid or minimize impacts to biological resources. All measures shall be subject to review and approval by the CPM.

1. Limit Disturbance Areas and Perimeter Fencing. The boundaries of all areas to be disturbed (including staging areas, access roads, and sites for temporary placement of spoils) shall be delineated with stakes and flagging prior to construction activities in consultation with the Designated Biologist. Spoils and topsoil shall be stockpiled in disturbed areas lacking native vegetation and which do not provide habitat for special-status species. Parking areas, staging and disposal site locations shall similarly be located in areas without native vegetation or special-status species habitat. All disturbances, project vehicles, and equipment shall be confined to the flagged areas. Tortoise fencing shall be placed along the outside perimeter of the access road that would provide access to areas north of the project site.

2. Minimize Road Impacts. New and existing roads that are planned for construction, widening, or other improvements shall not extend beyond the flagged impact area as described above. All vehicles passing or turning around would do so within the planned impact area or in previously disturbed areas. Where new access is required outside of existing roads or the construction zone, the route shall be clearly marked (i.e., flagged and/or staked) prior to the onset of construction.

3. Minimize Traffic Impacts. Vehicular traffic during project construction and operation shall be confined to existing designated routes of travel to and from the project site, and cross country vehicle and equipment use outside designated work areas shall be prohibited. The speed limit shall not exceed 25 miles per hour within the project area, on maintenance roads for linear facilities, or on access roads to the project site. Speed limits on paved roads shall be consisted with posted speed limits.

4. Monitor During Construction. Due to the likelihood that juvenile desert tortoises may persist on the site after desert tortoise clearance surveys and exclusion fencing are completed, the Designated Biologist or Biological Monitor shall be present at the construction site during all project activities that have potential to disturb soil, vegetation, and wildlife. The Designated Biologist or Biological Monitor shall walk immediately ahead of equipment during brushing and grading activities. Any time over the life of the project that a desert tortoise is found within the exclusion fencing, the Designated Biologist shall immediately contact the CPM, CDFG, BLM and USFWS; monitor the tortoise's location and activities; and implement translocation of the animal in accordance with and the approved Desert Tortoise Translocation Plan and in consultation with the USFWS, CDFG, BLM, and CPM.

5. Minimize Impacts of Transmission/Pipeline Alignments, Roads, Staging Areas. Staging areas for construction on the plant site shall be within the area that has been fenced with desert tortoise exclusion fencing and cleared. For construction activities outside of the plant site (transmission line, pipeline alignments) access roads, pulling sites, and storage and parking areas shall be designed, installed, and maintained with the goal of minimizing impacts to native plant communities and sensitive biological resources. Transmission lines and all electrical components shall be designed, installed, and maintained in accordance with the Avian Power Line Interaction Committee's (APLI C's) S*uggested Practices for Avian Protection on Power Lines* (APLIC 2006) and *Mitigating Bird Collisions with Power Lines* (APLIC 2004) to reduce the likelihood of large bird electrocutions and collisions.

6. Avoid Use of Toxic Substances. Soil bonding and weighting agents used on unpaved surfaces shall be non-toxic to wildlife and plants.

7. Minimize Lighting Impacts. Facility lighting shall be designed, installed, and maintained to prevent side casting of light towards wildlife habitat.

8. Avoid Vehicle Impacts to Desert Tortoise. Parking and storage shall occur within the area enclosed by desert tortoise exclusion fencing to the extent feasible. No vehicles or construction equipment parked outside the fenced area shall be moved prior to an inspection of the ground beneath the vehicle for the presence of desert tortoise. If a desert tortoise is observed, it shall be left to move on its own. If it does not move within 15 minutes, a Designated Biologist or Biological Monitor under the Designated Biologist's direct supervision may remove and relocate the animal to a safe location if temperatures are within the range described in

the USFWS' 2009 *Desert Tortoise Field Manual* (http:www.fws.gov/ventura/speciesinfo/protocols_guidelines). All tortoise translocation will be consistent with the measures identified in the Desert Tortoise Translocation Plan. All access roads outside of the fenced project footprint shall be delineated with temporary desert tortoise exclusion fencing on either side of the access road, unless otherwise authorized by the CPM, BLM Wildlife Biologist, USFWS, and CDFG.

9. Avoid Wildlife Pitfalls:

   a. Avoid Wildlife Entrapment. At the end of each work day, the Designated Biologist shall ensure that all potential wildlife pitfalls (trenches, bores, and other excavations) have been backfilled. If backfilling is not done, all trenches, bores, and other excavations shall be sloped at a 3:1 ratio at the ends to provide wildlife escape ramps, or covered completely to prevent wildlife access, or fully enclosed with desert tortoise-exclusion fencing. All trenches, bores, and other excavations outside the areas permanently fenced with desert tortoise exclusion fencing shall be inspected periodically, but no less than three times, throughout the day and at the end of each workday by the Designated Biologist or a Biological Monitor. Should a tortoise or other wildlife become trapped, the Designated Biologist or Biological Monitor shall remove and relocate the individual as described in the Desert Tortoise Relocation/Translocation Plan. Any wildlife encountered during the course of construction shall be allowed to leave the construction area unharmed.

   b. Avoid Entrapment of Desert Tortoise. Any construction pipe, culvert, or similar structure with a diameter greater than 3 inches, stored less than 8 inches aboveground area) for one or more nights, shall be inspected for tortoises before the material is moved, buried, or capped. As an alternative, all such structures may be capped before being stored outside the fenced area, or placed on pipe racks.

10. Minimize Standing Water. Water applied to dirt roads and construction areas (trenches or spoil piles) for dust abatement shall use the minimal amount needed to meet safety and air quality standards in an effort to prevent the formation of puddles, which could attract desert tortoises and common ravens to construction sites. A Biological Monitor shall patrol these areas to ensure water does not puddle and shall take appropriate action to reduce water application where necessary.

11. Dispose of Road-killed Animals. Road-killed animals or other carcasses detected on roads near the project area shall be picked up immediately and delivered to the Biological Monitor. For special-status species roadkill, the Biological Monitor shall contact USFWS and CDFG within 1 working day of receipt of the carcass for guidance on disposal or storage of the carcass. The Biological Monitor shall report the special-status species record as described in Conditions of Certification **BIO-2** and **BIO-26.**

12. Minimize Spills of Hazardous Materials. All vehicles and equipment shall be maintained in proper working condition to minimize the potential for fugitive emissions of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. The Designated Biologist shall be informed of any hazardous spills immediately as directed in the project Hazardous Materials Plan. Hazardous spills shall be immediately cleaned up and the contaminated soil properly disposed of at a licensed facility. Servicing of construction equipment shall take place only at a designated area. Service/maintenance vehicles shall carry a bucket and pads to absorb leaks or spills.

13. Worker Guidelines. During construction all trash and food-related waste shall be placed in self-closing containers and removed from the site regularly to prevent overflow. Workers shall not feed wildlife or bring pets to the project site. Except for law enforcement personnel, no workers or visitors to the site shall bring firearms or weapons. Vehicular traffic shall be confined to existing routes of travel to and from the project site, and cross country vehicle and equipment use outside designated work areas shall be prohibited. The speed limit when traveling on dirt access routes within desert tortoise habitat shall not exceed 25 miles per hour.

14. Implement Erosion Control Measures. Standard erosion control measures shall be implemented for all phases of construction and operation to prevent any sediment run-off from exposed slopes from entering state-jurisdictional streambeds on or off the Project site. Sediment and other flow-restricting materials shall be moved to a location where they shall not be washed back into the streambed. All disturbed soils and roads within the project site shall be stabilized to reduce erosion potential, both during and following construction, except that soil stabilizer use may be limited in portions of roads crossing washes or stream channels consistent with applicable water quality requirements.

15. Monitor Ground-Disturbing Activities Prior to Pre-Construction Site Mobilization. If pre-construction site mobilization requires ground-disturbing activities such as for geotechnical borings or hazardous

waste evaluations, a Designated Biologist or Biological Monitor shall be present to monitor any actions that could disturb soil, vegetation, or wildlife.

16. Control and Regulate Fugitive Dust. To reduce the potential for the transmission of fugitive dust the project owner shall implement dust control measures. These shall include:

    a. The project owner shall apply non-toxic soil binders, equivalent or better in efficiencies than the CARB-approved soil binders, to active unpaved roadways, unpaved staging areas, and unpaved parking area(s) throughout construction to reduce fugitive dust emissions.

    b. Water the disturbed areas of the active construction sites at least three times per day and more often if uncontrolled fugitive dust is noted.

    c. Enclose, cover, water twice daily, and/or apply non-toxic soil binders according to manufacturer's specifications to exposed piles with a 5 percent or greater silt content.

    d. Establish a vegetative ground cover, consistent with **BIO-10,** or otherwise create stabilized surfaces on all unpaved areas at each of the construction sites within 21 days after active construction operations have ceased, consistent with erosion control measures described above.

    e. Increase the frequency of watering, if water is used as a soil binder for disturbed surfaces, or implement other additional fugitive dust mitigation measures, to all active disturbed fugitive dust emission sources when wind speeds (as instantaneous wind gusts) exceed 25 mph.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP and implemented. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of project construction, the project owner shall provide to BLM's Wildlife Biologist and the CPM, for review and approval, a written construction termination report identifying how measures have been completed.

COMPLIANCE VERIFICATION

BIO-9 The project owner shall provide Energy Commission staff, BLM, CDFG, and USFWS with reasonable access to the project site and mitigation lands under the control of the project owner and shall otherwise fully cooperate with the Energy Commission's and BLM's efforts to verify the project owner's compliance with, or the effectiveness of, mitigation measures set forth in the conditions of certification. The project owner shall hold harmless the Designated Biologist, the Energy Commission and staff, BLM, and any other agencies with regulatory requirements addressed by the Energy Commission's sole permitting authority for any costs the project owner incurs in complying with the management measures, including stop work orders issued by the CPM or the Designated Biologist. The Designated Biologist shall do all of the following:

1. Notification. Notify the CPM, BLM, CDFG, and USFWS at least 14 calendar days before initiating ground-disturbing activities. Immediately notify the CPM, BLM, CDFG, and USFWS in writing if the project owner is not in compliance with any conditions of certification, including but not limited to any actual or anticipated failure to implement mitigation measures within the time periods specified in the conditions of certification. CDFG shall be notified at their Southern Region Headquarters Office, 4949 Viewridge Avenue, San Diego, CA 92123; (858) 467-4201. USFWS shall be notified at their Ventura office at 2493 Portola Road, Suite B, Ventura, CA 93003; (805) 644-1766.

2. Monitoring During Grading. Remain on site daily while grubbing and grading are taking place to avoid or minimize take of listed species, to check for compliance with all impact avoidance and minimization measures, and to check all exclusion zones to ensure that signs, stakes, and fencing are intact and that human activities are restricted in these protected zones.

3. Fence Monitoring. During construction maintain and check all of the desert tortoise exclusion fences on a weekly basis to ensure the integrity of the fence is maintained. The Designated Biologist shall be present on site to monitor construction and determine fence placement during fence installation. During operation of the project, fence inspections shall occur at least once per month throughout the life of the project, and within 24 hours after storms or other events that might affect the integrity and function of desert tortoise exclusion fences. Fence repairs shall occur within two days (48 hours) of detecting problems that affect the functioning of the desert tortoise exclusion fencing. If fence damage occurs during any time of year when tortoises may be active, the project owner shall be responsible for monitoring the site of the damaged fence until it is fully repaired, to prevent a desert tortoise from entering the project

area. All incidents of damaged tortoise exclusion fence, including dates of damage and repair; extent of damage; and monitoring summaries (methods and results) shall be reported to the BLM, CPM, CDFG, and USFWS. All wildlife found entrapped or dead in the fence shall be reported to the BLM, CPM, CDFG, and USFWS.

4. Monthly Compliance Inspections. Conduct compliance inspections at a minimum of once per month after clearing, grubbing, and grading are completed and submit a monthly compliance report to the CPM, BLM, USFWS, and CDFG. All observations of listed species and their sign shall be reported to the Designated Biologist for inclusion in the monthly compliance report.

5. Annual Listed Species Status Report. No later than January 31 of every year the Project facility remains in operation, provide the CPM, BLM, USFWS, and CDFG an annual Listed Species Status Report, which shall include, at a minimum: 1) a general description of the status of the project site and construction/operation activities, including actual or projected completion dates, if known; 2) a copy of the table in the BRMIMP with notes showing the current implementation status of each mitigation measure; 3) an assessment of the effectiveness of each completed or partially completed mitigation measure in minimizing and compensating for project impacts, 4) recommendations on how effectiveness of mitigation measures might be improved, and 5) a summary of any agency approved modifications to the BRMIMP.

6. Final Listed Species Mitigation Report. No later than 45 days after initiation of project operation, provide the CPM a Final Listed Species Mitigation Report that shall include, at a minimum: 1) a copy of the table in the BRMIMP with notes showing when each of the mitigation measures was implemented; 2) all available information about project-related incidental take of listed species; 3) information about other project impacts on the listed species; 4) construction dates; 5) an assessment of the effectiveness of conditions of certification in minimizing and compensating for project impacts; 6) recommendations on how mitigation measures might be changed to more effectively minimize and mitigate the impacts of future projects on the listed species; and 7) any other pertinent information, including the level of take of the listed species associated with the project.

7. Notification of Injured, Dead, or Relocated Listed Species. In the event of a sighting in an active construction area (e.g., with equipment, vehicles, or workers), injury, kill, or relocation of any listed species, the CPM, BLM, CDFG, and USFWS shall be notified immediately by phone by the Designated Biologist or Biological

Monitor. Notification shall occur no later than noon on the business day following the event if it occurs outside normal business hours so that the agencies can determine if further actions are required to protect listed species. Written follow-up notification via FAX or electronic communication shall be submitted to these agencies within five calendar days of the incident and include the following information as relevant:

a. Injured Desert Tortoise. If a desert tortoise is injured as a result of project-related activities during construction, the Designated Biologist shall immediately take it to a CDFG-approved wildlife rehabilitation and/or veterinarian clinic. Any veterinarian bills for such injured animals shall be paid by the project owner. Following phone notification as required above, the CPM, BLM, CDFG, and USFWS shall determine the final disposition of the injured animal, if it recovers. Written notification shall include, at a minimum, the date, time, location, circumstances of the incident, and the name of the facility where the animal was taken.

b. Desert Tortoise Fatality. If a desert tortoise is killed by project-related activities during construction or operation, or if a desert tortoise is otherwise found dead, submit a written report with the same information as an injury report. These desert tortoises shall be salvaged according to guidelines described in Salvaging Injured, Recently Dead, Ill, and Dying Wild, Free-Roaming Desert Tortoise (Berry 2001). The project owner shall pay to have the desert tortoises transported and necropsied. The report shall include the date and time of the finding or incident.

8. Stop Work Order. The CPM/BLM may issue the project owner a written stop work order to suspend any activity related to the construction or operation of the project to prevent or remedy a violation of one or more conditions of certification (including but not limited to failure to comply with reporting, monitoring, or habitat acquisition obligations) or to prevent the illegal take of an endangered, threatened, or candidate species. The project owner shall comply with the stop work order immediately upon receipt thereof.

Verification: No later than two calendar days following the above-required notification of a sighting, kill, injury, or relocation of a listed species, the project owner shall deliver to the CPM, BLM, CDFG, and USFWS via FAX or electronic communication the written report from the Designated Biologist describing all reported incidents of the sighting, injury, kill, or relocation of a listed species, identifying who was notified and explaining when the incidents occurred. In the

case of a sighting in an active construction area, the project owner shall, at the same time, submit a map (e.g., using Geographic Information Systems) depicting both the limits of construction and sighting location to the CPM, BLM, CDFG, and USFWS.

No later than January 31st of every year the Calico Solar Project facility remains in operation, provide the CPM and BLM an annual Listed Species Status Report as described above, and a summary of desert tortoise exclusion fence inspections and repairs conducted in the course of the year.

REVEGETATION PLAN AND COMPENSATION FOR IMPACTS TO NATIVE VEGETATION COMMUNITIES

BIO-10 The project owner shall provide restoration/compensation for impacts to native vegetation communities and develop and implement a Revegetation Plan for all areas subject to temporary project disturbance, including but not limited to linear features and berms of detention or debris basins, to the extent permitted by stormwater control requirements. Upon completion of construction, all temporarily disturbed areas shall be restored to pre-project grade and revegetated according to the measures described below. Temporarily disturbed areas within the project area include, but are not limited to: all areas where underground infrastructure was installed, temporary access roads, construction work temporary lay-down areas, and construction equipment staging areas. For the purpose of this mitigation measure, "temporarily disturbed areas" shall include disturbances that are considered permanent impacts in the analyses above (i.e., would take more than 5 years to recover) but would benefit from the revegetation activities identified here. The following measures shall be implemented for all temporarily disturbed areas, excluding areas immediately around facilities which may be landscaped according to a separate Landscape Plan. These measures will include:

1. Plan Details. The plans shall include at minimum: (a) locations and details for top soil storage; (b) methods to salvage and replant cacti, yucca or other species described in **BIO-12** Section E, or to plant out nursery stock of these species onto revegetation sites; (c) seed collection guidelines; (d) a schematic depicting the mitigation area; (e) time of year that the planting will occur and the methodology of the planting; (f) a description of the irrigation methodology if used; (g) measures to control exotic vegetation on site; (h) performance standards (see below); and (i) a detailed monitoring program. All habitats dominated by non-native species prior to project disturbance shall be revegetated using appropriate native species. This plan shall also contain contingency measures for failed restoration efforts (efforts not meeting success criteria).

2. Topsoil Salvage. Topsoil shall be stockpiled from the project site for use in revegetation of the disturbed soils. The topsoil excavated shall be segregated, kept intact, and protected, under conditions shown to sustain seed bank viability. The upper 1 inch of topsoil which contains the seed bank shall be scraped and stockpiled for use as the top-dressing for the revegetation area. An additional 6 to 8 inches of soil below the top 1 inch of soil shall also be scraped and separately stockpiled for use in revegetation areas. Topsoil shall be replaced in its original vertical orientation following ground disturbance, ensuring the integrity of the top one inch in particular. All other elements of soil stockpiling shall be conducted as described on pages 39-40 of *Rehabilitation of Disturbed Lands in California* (Newton and Claassen 2003).

3. Seed and Nursery Stock. Only seed or potted nursery stock of locally occurring native species shall be used for revegetation. Seeds shall contain a mix of short-lived early pioneer species such as native annuals and perennials and subshrubs. Seeding and planting shall be conducted as described in Chapter 5 of *Rehabilitation of Disturbed Lands in California* (Newton and Claassen 2003). A list of plant species suitable for Mojave Desert region revegetation projects, including recommended seed treatments, are included in Appendix A-8 of the same report. The list of plants observed during the 2010 special-status plant surveys of the Project area can also be used as a guide to site-specific plant selection for revegetation. In conformance with BLM policy, the project owner shall include salvaged or nursery stock yucca (all species), cacti (excluding cholla species, genus *Cylindropuntia),* smoke tree, mesquites, and desert ironwood in revegetation plans and implementation, as described in **BIO-12** Section E.

4. Monitoring Requirement and Performance Standards. Post-seeding and planting monitoring will be yearly and shall continue for a period of no less than 10 years or until the defined performance standards are achieved (whichever is later). Remediation activities (e.g., additional planting, removal of non-native invasive species, or erosion control) shall be taken during the 10-year period if necessary to ensure the success of the restoration effort. If the mitigation fails to meet the established performance standards after the 10-year maintenance and monitoring period, monitoring and remedial activities shall extend beyond the 10-year period until the performance standards are met, unless otherwise specified by the Energy Commission and BLM. As needed to achieve performance standards, the project owner shall be responsible for replacement planting or other remedial action as agreed to by BLM and CPM. Replacement plants shall be monitored with the same survival and growth requirements as required for original revegetation plantings.

The following performance standards must be met by the end of the monitoring period: (a) at least 80% of the species and vegetative cover observed within the temporarily disturbed areas shall be native species that naturally occur in desert scrub habitats; (b) absolute cover and density of native plant species within the revegetated areas shall equal at least 60% of the pre-disturbance or reference vegetation cover; and (c) the site shall have gone without irrigation or remedial planting for a minimum of three years prior to completion of monitoring.

5. If a fire or flood damages a revegetation area within the 10-year monitoring period, the owner shall be responsible for a one-time replacement. If a second fire or flood occurs, no replanting is required, unless the event is caused by the owner's activity (e.g., as determined by BLM or other firefighting agency investigation).

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP and implemented. Within 90 days after completion of each year of project construction, the project owner shall provide to the CPM verification of the total vegetation acreage subject to temporary and permanent disturbance. To monitor and evaluate the success of the revegetation, the project owner shall submit annual reports of the revegetation including the status of the site, percent cover of native and exotics, and any remedial actions conducted by the owner to the CPM and BLM Wildlife Biologist.

No less than 30 days following the publication of the Energy Commission License Decision or the Record of Decision/ROW Issuance, whichever comes first, the project owner shall submit to the CPM and BLM's Wildlife Biologist a final agency-approved Revegetation Plan that has been reviewed and approved by BLM's Wildlife Biologist and the CPM. The Plan shall include a Plant Salvage and Replacement Section as described in **BIO-12** Section E. All modifications to the Revegetation Plan shall be made only after approval from BLM's Wildlife Biologist and the CPM.

Within 30 days after completion of each year of project construction, the project owner shall provide to the CPM for review and approval, a written report identifying which items of the Revegetation Plan have been completed, a summary of all modifications to mitigation measures made during the project's construction phase, and which items are still outstanding.

On January 31st of each year following construction until the completion of the revegetation monitoring specified in the Revegetation Plan, the Designated Biologist shall provide a report to the CPM and BLM's Wildlife Biologist that includes: a summary of revegetation activities for the year, a discussion of whether revegetation performance standards for the year were met; and recommendations for revegetation remedial action, if warranted, are planned for the upcoming year.

WEED MANAGEMENT PLAN

BIO-11 The project owner shall revise and implement a Weed Management Plan that meets the approval of BLM and CPM. The draft Noxious Weed Management Plan submitted by the applicant shall provide the basis for the final plan, subject to review and revisions from BLM, USFWS, CDFG, and the CPM.

The final plan shall include weed control measures with demonstrated records of success, based on the best available information from sources such as: The Nature Conservancy's The Global Invasive Species Team, Cooperative Extension, California Invasive Plant Council http://www.cal-ipc.org/ip/ management/plant profiles/index.php, and the California Department of Food & Agriculture Encycloweedia: http://www.cdfa.ca.gov/phpps/ipc/encycloweedia/encycloweedia hp.htm. The methods shall meet the following criteria:

1. Manual: well-timed removal of plants or seed heads with hand tools; seed heads and plants must be disposed of in accordance with guidelines from the Riverside County Agricultural Commissioner.

2. Chemical: Herbicides known to have residual toxicity, such as pre-emergents and pellts, shall not be used in natural areas or within the engineered channels. Only the following application methods may be used: wick (wiping onto leaves); inner bark injection; cut stump; frill or hack & squirt (into cuts in the trunk); basal bark girdling; foliar spot spraying with backpack sprayers or pump sprayers at low pressure or with a shield attachment to control drift, and only on windless days, or with a squeeze bottle for small infestations.

   In addition to describing weed eradication and control methods, and a reporting plan for weed management during and after construction, the final Weed Management Plan shall include at least the following Best Management Practices to prevent the spread and propagation of weeds:

   - Limit the extent of any vegetation and/or ground disturbance to the absolute minimum needed, and limit ingress and egress to defined routes.

   - Install and maintain vehicle wash and inspection stations and closely monitor the types of materials brought onto the site.

- Reestablish vegetation on disturbed sites with native seed mixes (measures and performance standards to be consistent with Revegetation Plan, described in Condition of Certification **BIO-10**).

- Monitoring and timely implementation of control measures to ensure early detection and eradication for weed invasions. Weed infestations must be controlled or eradicated as soon as possible upon discovery, and before they go to seed, to prevent further expansion.

- Use only weed-free straw or hay bales used for sediment barrier installations, and weed-free seed.

- Reclamation and revegetation shall occur on all temporarily disturbed areas, including, but not limited to, transmission lines, temporary access roads, construction work temporary lay-down areas, and staging areas.

- Control weeds in areas where irrigation and mirror washing take place.

- Prohibit disposal of mulch or green waste from mown weed infestations around the solar generators to prevent inadvertent introduction and spread of invasive plants beyond the immediate vicinity of the project area and possibly into rare plant populations off-site. Mulch or green waste shall be removed from the site in a covered vehicle to prevent seed dispersal, and transported to a landfill or composting facility.

- Indicate where herbicides may be used, which herbicides, and specify techniques to be used to avoid chemical drift or residual toxicity to special-status plants, consistent with guidelines provided by the Nature Conservancy's The Global Invasive Species Team

  (http://www.invasive.org/gist/products. html).

- Avoid herbicide use or other control methods in or around Environmentally Sensitive Areas (ESAs, see Condition of Certification **BIO-12)** on-site or off-site; prevent any herbicide drift into ESAs.

From the time construction begins and throughout the life of the project, surveying for new invasive weed populations and the monitoring of identified and treated populations shall be required

within the project area and surrounding 250-foot buffer area. See also requirements for weed monitoring and treatment in the adjacent Pisgah Crater ACEC described in Condition of Certification **BIO-12.** Surveying and monitoring for weed infestations shall occur annually. Treatment of all identified weed populations shall occur at a minimum of once annually. When no new seedlings or resprouts are observed at treated sites for three consecutive, average rainfall years, the weed infestation at that site can be considered eradicated and weed control efforts, but not annual monitoring, may cease for that impact site.

Verification: At least 30 days prior to start of any project-related ground disturbance activities, the project owner shall provide the BLM's Wildlife Biologist and the CPM with the revised Weed Management Plan. The project owner shall coordinate with the CPM and BLM's Wildlife Biologist to revise and finalize the Weed Management Plan. Any further modifications to the approved Weed Management Plan shall be made only after consultation with the CPM and BLM's Wildlife Biologist in consultation with USFWS and CDFG. Within 30 days after completion of project construction, the project owner shall provide to the BLM's Wildlife Biologist and the CPM for review and approval, a written report identifying which items of the Weed Management Plan have been completed, a summary of all modifications to mitigation measures made during the project's construction phase, and which items are still outstanding. A summary report on weed management on the project site shall be submitted in the Annual Compliance Report during plant operations.

SPECIAL-STATUS PLANT IMPACT AVOIDANCE AND MINIMIZATION

BIO-12 This condition contains the following five sections:

- **Section A: White-margined Beardtongue Avoidance and Minimization Measures** describes measures to protect all white-margined beardtongue plants located within the project area or within 250 feet of its boundaries (including access roads, staging areas, laydown areas, parking and storage areas) from accidental and indirect impacts during construction, operation, and closure.
- **Section B: Conduct Late Season Botanical Surveys** describes guidelines for conducting summer-fall surveys to detect special-status plants that may have been missed during the spring surveys.
- **Section C: Mitigation Requirements for Special-Status Plants Detected in the Summer/Fall Surveys** outlines the level of avoidance required for plants detected during the summer-fall surveys, based on the species' rarity and conservation status. Avoidance is based on extent of local occurrences on the project site and, as applicable, extending onto contiguous public land. Where avoidance would result in on-site isolation of plant occurrences from essential ecological processes, or would cause

local populations to become inviable, then off-site compensation would be allowed.

- **Section D: Off-Site Compensatory Mitigation for Special-Status Plants** describes performance standards for mitigation for a range of options for compensatory mitigation through acquisition, restoration/enhancement, or a combination of acquisition and restoration/enhancement, based on the species' rarity and conservation status.
- **Section E: Plant Salvage** describes measures to include potted nursery stock or salvaged specimens of certain cacti, yucca, and other species listed in San Bernardino County plant protection policies in revegetation plans, in conformance with BLM policy.

"Project Disturbance Area" encompasses all areas to be temporarily and permanently disturbed by the Project, including the plant site, linear facilities, and areas disturbed by temporary access roads, fence installation, construction work lay-down and staging areas, parking, storage, or by any other activities resulting in disturbance to soil or vegetation. Nothing in this condition requires the project owner to conduct botanical surveys on private lands adjacent to the project site when the project owner has made reasonable attempts to obtain permission to enter the property for survey work but was unable to obtain such permission.

The Project owner shall implement the following measures in Section A, B, C, D and E to avoid, minimize, and compensate for impacts to certain special-status plant species, based on species rarity and conservation status:

Section A: White-margined Beardtongue Avoidance and Minimization Measures

To protect all white-margined beardtongue plants located within the project area or within 250 feet of its boundaries (including access roads, staging areas, laydown areas, parking and storage areas) from accidental and indirect impacts during construction, operation, and closure, the Project owner shall implement the following measures:

1. Designated Botanist. An experienced botanist who meets the qualifications described in Section **B-2** below shall oversee compliance with all special-status plant avoidance, minimization, and compensation measures described in this condition throughout construction, operation, and closure. The Designated Botanist shall oversee and train all other Biological Monitors tasked with conducting botanical survey and monitoring work.

2. White-margined Beardtongue Impact Avoidance and Minimization Plan. The Project owner shall prepare and implement a White-margined Beardtongue Impact Avoidance and Minimization Plan and shall incorporate the Plan into the BRMIMP (**BIO-7**). The Plan shall be designed to prevent direct or indirect effects of project construction and operation to all white-margined beardtongue occurrences within the project boundary, and to any other special status plants including small-flowered androstephium located within Environmentally Sensitive Areas (defined below). The Plan shall include the following elements:

   a. Designate Environmentally Sensitive Areas (ESAs). Before construction, designate ESAs to protect all known white-margined beardtongue locations on the project site or within 250 feet of site boundaries. The ESAs shall include, at minimum, the approximately 18 acres of white-margined beardtongue occurrences as identified on Applicant's Exhibit 57, Alternative Site Layout #2. The locations of ESAs shall be clearly depicted on construction drawings, which shall also include all avoidance and minimization measures on the margins of the construction plans. The boundaries of the ESAs shall provide a minimum of 250 feet buffer area between white-margined beardtongue plant locations and any ground-disturbing project activity. The ESAs shall be clearly delineated in the field with permanent fencing and signs prohibiting movement of the fence under penalty of work stoppages and additional compensatory mitigation. ESAs shall also be permanently marked (with signage or other markers) to ensure that avoided plants are not inadvertently harmed during construction, operation, or closure.

   b. Baseline data. Document baseline conditions, including numbers and areal extent of white-margined beardtongue and any other special-status plant occurrences within the ESAs;

   c. Success criteria. Specify success standards for protection of special-status plant occurrences within the ESAs, and identify specific triggers for remedial action (e.g., numbers of plants dropping below a threshold);

   d. Literature review. Describe and reference any available information about microhabitat preferences and fecundity, essential pollinators, reproductive biology, and propagation and culture requirements for white-margined beardtongue and any other special-status species within the ESAs;

e. Protection and avoidance measures. Describe measures (e.g., fencing, signage) to avoid direct and indirect construction and operation impacts to special-status plants within the ESAs; these shall include but shall not be limited to: (1) training components specific to protection of white-margined beardtongue and surrounding habitat buffer area, which shall be incorporated into the WEAP described in **BIO-6**; (2) detailed specifications for avoiding herbicide and soil stabilizer drift, and shall include a list of herbicides and soil stabilizers that may be used on the Project with manufacturer's guidance on appropriate use; the Plan shall reference the Weed Management Plan (see Condition of Certification **BIO-11**) and shall be consistent with provisions of that Plan; (3) measures to ensure that erosion and sediment control do not inadvertently impact special-status plants located within an ESA (e.g., by using invasive or non-native plants in seed mixes, introducing pest plants through contaminated seed or straw, etc.). Where applicable, these measures shall be incorporated in the Weed Management Plan and Storm Water Pollution Prevention Plan. Also, designate spoil areas; equipment, vehicle, and materials storage areas; parking; equipment and vehicle maintenance areas, and; wash areas at least 100 feet from boundaries of any ESAs;

f. Monitoring and Reporting Requirements. The Designated Botanist shall conduct weekly monitoring of the ESAs during any construction or decommissioning activities within 100 feet of the ESAs, and quarterly monitoring for the remainder of construction and during operations. For the life of the project, the Project owner shall also conduct annual monitoring of the avoided occurrences within ESAs on-site, and off-site occurrences that are within 250 feet from the project boundary and are located on public lands or on private lands to which the Applicant has access. The project owner shall make reasonable attempts to obtain permission to enter adjacent private property for the purpose of rare plant monitoring (see Verification, below).

g. Remedial Action Measures. Specify remedial action measures to be implemented if success standards (above) are not met at any time during the life of the project;

h. Seed Collection. Over the life of the project, the project owner shall collect a small proportion of any available seed produced by white-margined beardtongue plants protected on-site within ESAs on an annual basis until propagation research (below) is complete and seed bank curators agree

that sufficient seed has been placed into long-term storage. Seed collection must only be done under permit from the BLM; the project owner shall be responsible for obtaining and complying with applicable permit(s). The collection technique shall follow seed collection and storage guidelines contained in (Wall 2009a; Bainbridge 2007). Collection of seed shall be done by the Rancho Santa Ana Botanic Garden (RSABG) Conservation Program staff or other qualified seed or restoration specialist. The Project owner shall be responsible for all costs associated with seed collection and storage. All seed storage shall occur at RSABG or other qualified research institution and at least 40 percent of the collected seed shall remain in long-term storage at RSABG Seed Conservation Program, San Diego Natural History Museum, or other qualified seed conservation program. In the event that construction schedules or seed production prevent collection within ESAs on-site, the applicant must substitute off-site seed collection site as approved by the CPM in consultation with the BLM State Botanist;

i. Propagation research. The project owner shall be responsible for evaluating potential white-margined beardtongue propagation and reintroduction methods with the objective of developing horticultural techniques suitable for eventual introduction of nursery-grown white-margined beardtongue on-site or off-site as remedial action measures if needed (paragraph g., above); a portion of seed (paragraph h., above) shall be made available for propagation research which may at some time inform contingency propagation efforts on the project site or elsewhere; propagation experimentation shall be funded by the project owner and conducted by a qualified research institution such as Rancho Santa Ana Botanic Garden and the results shall not be subject to a non-disclosure agreement. At minimum, propagation research shall include germination and seedling establishment trials under a variety of soil and humidity conditions reflecting the range of seasonal conditions found in the plant's natural habitat on the project site; plant growth from seedling to nursery stock size; and transplantation methods. These trials shall be conducted in part within growth chambers where temperature and humidity are controlled and in part on the project site or adjacent Pisgah ACEC under natural conditions.

j. Off-site sand transport monitoring and management. The White-margined Beardtongue Impact Avoidance and

Minimization Plan shall include a sand transport monitoring and management to document and manage project effects to eastward sand transport to occupied white-margined beardtongue aeolian sand habitat off-site to the east. At minimum, the plan shall include the following elements (1) quantify baseline eastward sand transport from the project area into the adjacent BLM Pisgah Crater ACEC, following methods described by Etyemezian et al. (2010); (2) specify methods and schedule for annual sand transport monitoring throughout the first five years of the project's life; (3) identification of thresholds which would trigger remediation requirements; and (4) development of adaptive management strategies to supplement eastward sand transport into the ACEC if needed. These strategies may include revisions to project fencing design, importing sand from off-site or transporting sand across the project site for further dispersal. No sand transport remediation work would be permitted to cause new land disturbance outside the project area as analyzed in this SSA.

k. Off-site weed monitoring and management. The White-margined Beardtongue Impact Avoidance and Minimization Plan shall include methods and schedule to monitor and manage weed abundance in occupied and suitable white-margined beardtongue habitat to the east. At minimum, the plan shall (1) quantify baseline weed abundance in the portion of the ACEC adjacent BLM Pisgah Crater ACEC, adjacent to and within 500 m of the eastern project boundary, north of the BNSF railroad tracks; (2) weed abundance monitoring schedule and methods to implement throughout that area by collecting and analyzing quantitative weed abundance during every year of average or greater rainfall throughout the life of the project; (3) identify weed abundance thresholds which would trigger remediation requirements; and (4) specify weed control methods to be implemented as needed in occupied and suitable white-margined beardtongue habitat throughout the area described above.

Section B: Conduct Late-Season Botanical Surveys

The Project owner shall conduct late-summer/fall botanical surveys for late-season special-status plants as described below:

1. Survey Timing. To the extent feasible, surveys shall be timed to detect: a) summer annuals triggered to germinate by the warm, tropical summer storms (which may occur any time between June and October), and b) fall-blooming perennials that respond to the

cooler, later season storms that originate in the Pacific northwest (typically beginning in September or October), if identification may require leaves, flowers, or other structures not available during spring surveys previously completed. The survey dates shall be based on plant phenology and the timing of a significant storm (i.e., a 10 mm or greater rain or multiple storm events of sufficient volume to trigger germination, as measured at or within 1 mile of the Project site) if an event is recorded. Surveys for summer annuals shall be timed as needed and feasible to identify target species (below), based upon field visits to reference populations. However, due to the undependable nature and scattered patterns of summer and early fall rainfall, it is possible that no suitable rain event will be documented in the area. Nevertheless, the project own shall be responsible for conducting late-season botanical surveys along washes and other lowland areas on-site due to the possibility that rainstorms in the Cady Mountains may go undetected, but may initiate summer or fall blooms. In 2010, summer/fall late-season botanical surveys shall be completed throughout the project areas designated as Phases 1a and 1b and throughout washes and drainageways of project areas designated as Phase 2. Additional surveys throughout all of the Phase 2 area shall be completed during 2010 or a subsequent year, but prior to construction of that phase.

2. Surveyor Qualifications and Training. Surveys shall be conducted by a qualified botanist knowledgeable in the complex biology of the local flora, and consistent with CDFG (2009) and BLM (2009) protocols. The botanical survey crew shall be prepared to mobilize quickly to conduct appropriately timed surveys. Each field botanist shall be equipped with a GPS unit and record a complete tracklog; these data shall be compiled and submitted along with the Summer-Fall Survey Botanical Report (described below). Prior to the start of surveys, all crew members shall, at a minimum, visit target species reference sites (where available) and/or review herbarium specimens to confirm detectability and obtain a search image.

3. Target Species. Field surveys shall be designed and scheduled to locate target species, defined as all BLM Sensitive plants, CNPS List 1B or 2 (Nature Serve rank S1 and S2) or proposed List 1B or 2 taxa, and any newly reported or documented taxa. Because the potential for range extensions is unknown, the list of potentially occurring special-status plants shall include all special-status taxa known from comparable habitats in the central portion of the Mojave Desert in California. At a minimum, the list shall include all summer or fall-flowering species identified as potentially occurring on the site in the applicant's spring 2010 botanical survey report (TS 2010i) and by Andre (2010, Intervenor Defenders of Wildlife

Rebuttal Testimony). Determination of flowering season shall be based upon field visits to reference populations and data available online from the Consortium of California Herbaria and California Native Plant Society. Target species also shall include taxa with bloom seasons that begin in fall and extend into the early spring as many of these are reported to be easier to detect in fall, following the start of the fall rains.

4. Survey Coverage. At a minimum, the Applicant shall conduct comprehensive surveys (i.e., 100 percent visual coverage) of the washes, dune swales, and other lowlands within the project site. In the intervening uplands (e.g., bajadas and rock outcrops) surveys shall be conducted to ensure a 25 percent visual coverage. Other special or unique habitats associated with rare plants (such as dunes, washes, and chenopod scrubs) shall also be surveyed at 100 percent visual coverage. Transects shall be "intuitive controlled" (per BLM 2009b) to ensure a focus on habitat most likely to support rare plants (such as desert washes or dunes), rather than on pre-defined, evenly-spaced survey grids.

5. Documenting Occurrences. If a special-status plant is detected, the full extent of the population onsite shall be recorded using GPS in accordance with BLM survey protocols. Additionally, the extent and density of the occupied habitat within one mile of project boundaries shall be assessed at least qualitatively to facilitate an accurate estimation of the proportion of the occurrence affected by the project. For occurrences that are very dense or very large, the plant numbers may be estimated by simple sampling techniques and the survey report must provide qualitative or quantitative data describing the density and roughly mapping the extent on a topographic map. All but the smallest populations (e.g., a population occupying less than 100 square feet) shall be recorded as area polygons; small populations may be recorded as point features. All GPS-recorded occurrences shall include: the number of plants, phenology, observed threats (e.g., OHV or invasive exotics), and habitat or community type. The map of occurrences, to be submitted with the final botanical report, shall be prepared to ensure consistency with mapping protocol and definitions of occurrences in CNDDB: occurrences found within 0.25 miles of another occurrence of the same taxon, and not separated by significant habitat discontinuities, shall be combined into a single 'occurrence.' The Project Owner shall also submit the raw GPS shape files and metadata, and completed CNDDB forms to CNDDB for each occurrence as defined by CNDDB.

6. Reporting. Raw GPS data, metadata, and CNDDB field forms shall be provided to the CPM within two weeks of completion of each survey. If field surveys take place during two or more phases (e.g.,

late summer and fall), then a summary letter shall be submitted following each survey.

The Final Summer-Fall Botanical Survey Report shall be prepared consistent with CDFG guidelines (CDFG 2009), and BLM guidelines (2009) and shall include the following components:

a. the BLM designation, NatureServe Global and State Rank of each species or taxon found (or proposed rank, or CNPS List);

b. the number or percent of the occurrence that will be directly affected, and indirectly affected by changes in drainage patterns or altered geomorphic processes;

c. the habitat or plant community that supports the occurrence and the total acres of that habitat or community type that occurs in the Project Disturbance Area;

d. an indication of whether the occurrence has any local or regional significance (e.g., if it exhibits any unusual morphology, occurs at the periphery of its range in California, represents a significant range extension or disjunct occurrence, or occurs in an atypical habitat or substrate);

e. a completed CNDDB field form for every occurrence (i.e., the summed locations of a given species within 0.25 mile distance of another location, consistent with CNDDB methodology), and;

f. two maps: one that depicts the raw GPS data (as collected in the field) on a topographic base map with Project features; and a second map that follows the CNDDB protocol for occurrence mapping, which lumps two or more occurrences of the same species within one-quarter mile or less of each other into one occurrence.

Section C: Mitigation Requirements for Special-Status Plants Detected in the Summer/Fall Surveys

The Project owner shall apply the following avoidance standards to special-status plants that might be detected during late summer/fall season surveys. Avoidance and/or the mitigation measures described in Section D below would reduce impacts to special-status plant species to less than significant levels.

Mitigation for CNDDB Rank S1 and S2 Plants: If species with a CNDDB rank of S1 (CDFG 2010b), excluding small-flowered androstephium (CNDDB S1.2), are detected within the Project Disturbance Area or would be directly impacted by discharges from or

the diversion of streams around the Project, the Project owner shall implement avoidance measures to protect at least 75 percent of the local occurrence(s) of the species. For perennial species, the local occurrence(s) shall be measured by the number of individual plants located on the Project site or on public lands contiguous to the project site. For annual species, the occurrence(s) shall be measured as areal extent of contiguous occupied habitat on the site and on contiguous public lands. Avoidance shall include protection of the ecosystem processes essential for maintenance of the protected plant occurrence. Plants located within the ESAs established pursuant to Section A above shall be considered to be "avoided" to the extent that direct impacts on the plants are avoided and that these processes would be maintained. If special status plant occurrences are isolated by the Project from natural fluvial,–aeolian, or other processes known to be necessary for their persistence or reproduction, these occurrences shall not be considered "avoided." This evaluation shall be made in consultation among the project Botanist and the CPM, in consultation with CDFG and BLM, on a case by case basis, dependent on the species and its location on the site. The Project owner shall provide compensatory mitigation as described below in Section D for Project impacts to CNDDB Rank S1 and S2 plants that are not avoided. If, after consultation among the project Botanist, CPM, CDFG, and BLM, on-site avoidance is determined not to satisfy the long-term viability of the plant occurrence(s), then compensatory mitigation may be substituted for avoidance for up to 100% of impacts to Rank S1 and S2 plants on the site, as described below in Section D.

Mitigation for CNDDB Rank S3 Plants: If species with a CNDDB rank of 3 are detected within the Project Disturbance Area, no onsite avoidance or compensatory mitigation shall be required unless the occurrence has local or regional significance, in which case the plant occurrence shall be treated as a CNDDB 2 ranked plant. A plant occurrence would be considered to have local or regional significance if:

a. It occurs at the outermost periphery of its range in California;

b. It occurs in an atypical habitat, region, or elevation for the taxon that suggests that the occurrence may have genetic significance (e.g., that may increase its ability to survive future threats), or;

c. It exhibits any unusual morphology that is not clearly attributable to environmental factors that may indicate a potential new variety or sub-species.

Should CNDDB Rank S3 plant locations meeting any of the three criteria above be found on the project site during summer or fall field

surveys, then mitigation requirements for those species shall be as described above for CNDDB Rank S1 and S2 species.

Pre-Construction Notification for State- or Federal-Listed Species, or BLM Sensitive Species. If a state or federal-listed species or BLM Sensitive species is detected, the Project owner shall immediately notify the CDFG, USFWS, BLM, and the CPM.

***Preservation of the Germplasm of Affected Special-Status Plants*.** For all impacts to CNPS List 1 or List 2 plants, excluding small-flowered androstephium, mitigation shall include seed collection from the affected special-status plants on-site prior to construction to conserve the germplasm and provide a seed source for restoration efforts. Where construction schedules or seed availability prevents seed collection from plant locations to be impacted during a given season, seed must be collected from another portion of the project site or, as approved by the CPM in consultation with BLM's State Botanist, from public lands off-site. Seed collection must only be done under permit from the BLM; the project owner shall be responsible for obtaining and complying with applicable permit(s). The seed shall be collected under the supervision or guidance of a reputable seed storage facility such as the Rancho Santa Ana Botanical Garden Seed Conservation Program, San Diego Natural History Museum, or the Missouri Botanical Garden. The costs associated with the long-term storage of the seed shall be the responsibility of the Project owner. Any efforts to propagate and reintroduce special-status plants from seeds in the wild shall be carried out under the direct supervision of specialists such as those listed above and as part of a Habitat Restoration/Enhancement Plan approved by the CPM.

Section D: Off-Site Compensatory Mitigation for Special-Status Plants

Where compensatory mitigation is required under the terms of Section C, above, the Project owner shall mitigate Project impacts to CNPS List 1 or List 2 plants, excluding small-flowered androstephium with compensatory mitigation. Compensatory mitigation shall consist of acquisition of habitat supporting the target species, restoration/enhancement of populations of the target species, or a combination of acquisition and restoration/enhancement as provided within this Condition. Compensatory mitigation shall be at a 3:1 ratio. For annual species, compensation shall provide three acres of habitat acquired or restored/enhanced for every acre of special-status plant habitat disturbed by the Project Disturbance Area. For perennial species, compensation lands shall supporting three living plants of the same species for each plant disturbed within the project area. The Project owner shall provide funding for the acquisition and/or restoration/enhancement, initial improvement, and long-term maintenance and management of the acquired or restored lands. The actual costs to comply with this condition will vary

depending on the Project Disturbance Area, the actual costs of acquiring compensation habitat, the actual costs of initially improving the habitat, the actual costs of long-term management as determined by a Property Analysis Record (PAR) or PAR-like analysis, and other transactional costs related to the use of compensatory mitigation.

The Project owner shall comply with other related requirements in this condition:

I. Compensatory Mitigation by Acquisition: The requirements for the acquisition, initial protection and habitat improvement, and long-term maintenance and management of special-status plant compensation lands include all of the following:

Selection Criteria for Acquisition Lands. The compensation lands selected for acquisition may include any of the following three categories:

1. Occupied Habitat, No Habitat Threats: The compensation lands selected for acquisition shall be occupied by the target plant species and shall be characterized by site integrity and habitat quality that are required to support the target species, and shall be of equal or better habitat quality than that of the affected occurrence.
2. Occupied Habitat, Habitat Threats. Occupied compensation lands characterized by habitat threats may also be acquired as long as the population could be reasonably expected to recover with minor restoration (e.g., OHV or grazing exclusion, pest plant removal) and is accompanied by a Habitat Enhancement/Restoration Plan as described in Section D.II, below.
3. Unoccupied but Adjacent. The Project owner may also acquire habitat for which occupancy by the target species has not been documented, if the proposed acquisition lands are adjacent to occupied habitat. The Project owner shall provide evidence that acquisitions of such unoccupied lands would improve the defensibility and long-term sustainability of the occupied habitat by providing a protective buffer around the occurrence and by enhancing connectivity with undisturbed habitat.

Review and Approval of Compensation Lands Prior to Acquisition. The Project owner shall submit a formal acquisition proposal to the CPM describing the parcel(s) intended for purchase. This acquisition proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for special-status plants in relation to the criteria listed above, and must be approved by the CPM.

Management Plan. The Project owner or approved third party shall prepare a management plan for the compensation lands in consultation with the entity that will be managing the lands. The goal of the management plan shall be to support and enhance the long-term viability of the target special-status plant occurrences. The Management Plan shall be submitted for review and approval to the CPM.

Integrating Special-Status Plant Mitigation with Other Mitigation lands. If all or any portion of the acquired Desert Tortoise, Waters of the State, or other required compensation lands meets the criteria above for special-status plant compensation lands, the portion of the other species' or habitat compensation lands that meets any of the criteria above may be used to fulfill that portion of the obligation for special-status plant mitigation.

Compensation Lands Acquisition Requirements. The Project owner shall comply with the following requirements relating to acquisition of the compensation lands after the CPM, has approved the proposed compensation lands:

a. Preliminary Report. The Project owner, or an approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary or requested documents for the proposed compensation land to the CPM. All documents conveying or conserving compensation lands and all conditions of title are subject to review and approval by the CPM. For conveyances to the State, approval may also be required from the California Department of General Services, the Fish and Game Commission and the Wildlife Conservation Board.

b. Title/Conveyance. The Project owner shall acquire and transfer fee title to the compensation lands, a conservation easement over the lands, or both fee title and conservation easement, as required by the CPM. Any transfer of a conservation easement or fee title must be to CDFG, a non-profit organization qualified to hold title to and manage compensation lands (pursuant to California Government Code section 65965), or to BLM or other public agency approved by the CPM. If an approved non-profit organization holds fee title to the compensation lands, a conservation easement shall be recorded in favor of CDFG or another entity approved by the CPM. If an entity other than CDFG holds a conservation easement over the compensation lands, the CPM may require that CDFG or another entity approved

by the CPM, in consultation with CDFG, be named a third party beneficiary of the conservation easement. The Project owner shall obtain approval of the CPM of the terms of any transfer of fee title or conservation easement to the compensation lands.

c. Initial Protection and Habitat Improvement. The Project owner shall fund activities that the CPM requires for the initial protection and habitat improvement of the compensation lands. These activities will vary depending on the condition and location of the land acquired, but may include trash removal, construction and repair of fences, invasive plant removal, and similar measures to protect habitat and improve habitat quality on the compensation lands. The costs of these activities are estimated to be $750 per acre ($250 per acre, using the estimated cost per acre for Desert Tortoise mitigation as a best available proxy, at a 3:1 ratio, but actual costs will vary depending on the measures that are required for the compensation lands). A non-profit organization, CDFG or another public agency may hold and expend the habitat improvement funds if it is qualified to manage the compensation lands (pursuant to California Government Code section 65965), if it meets the approval of the CPM in consultation with CDFG, and if it is authorized to participate in implementing the required activities on the compensation lands. If CDFG takes fee title to the compensation lands, the habitat improvement fund must be paid to CDFG or its designee.

d. Property Analysis Record. Upon identification of the compensation lands, the Project owner shall conduct a Property Analysis Record (PAR) or PAR-like analysis to establish the appropriate amount of the long-term maintenance and management fund to pay the in-perpetuity management of the compensation lands. The PAR or PAR-like analysis must be approved by the CPM before it can be used to establish funding levels or management activities for the compensation lands.

e. Long-term Maintenance and Management Funding. The Project owner shall provide money to establish an account with long-term maintenance and management. that will be used to fund the long-term maintenance and management of the compensation lands. The amount of money to be paid will be determined through an approved PAR or PAR-like analysis conducted for the compensation lands. Until an approved PAR or PAR-like

analysis is conducted for the compensation lands, the amount of required funding is initially estimated to be $4,350 for every acre of compensation lands, using as the best available proxy the estimated cost of $1,450 per acre for Desert Tortoise compensatory mitigation, at a 3:1 ratio. This amount may be revised by the CPM in consultation with DFG, BLM and USFWS, based on further analysis of long-term management and maintenance costs. If compensation lands will not be identified and a PAR or PAR-like analysis completed within the time period specified for this payment (see the verification section at the end of this condition), the Project owner shall either: (i) provide initial payment equal to the amount of $4,350 multiplied by the number of acres the Project owner proposes to acquire for compensatory mitigation; or (ii) provide security to the Energy Commission under subsection (g), "Mitigation Security," below, in an amount equal to $4,350 multiplied by the number of acres the Project owner proposes to acquire for compensatory mitigation. The amount of the required initial payment or security for this item shall be adjusted for any change in the Project Disturbance Area as described above. If an initial payment is made based on the estimated per-acre costs, the Project owner shall deposit additional money as may be needed to provide the full amount of long-term maintenance and management funding indicated by a PAR or PAR-like analysis, once the analysis is completed and approved. If the approved analysis indicates less than $4,350 per acquired acre (at a 3:1 ratio) will be required for long-term maintenance and management, the excess paid will be returned to the Project owner. The Project owner must obtain the CPM's approval of the entity that will receive and hold the long-term maintenance and management fund for the compensation lands. The CPM will consult with CDFG before deciding whether to approve an entity to hold the Project's long-term maintenance and management funds.

The Project owner shall ensure that an agreement is in place with the long-term maintenance and management fund holder/manager to ensure the following requirements are met:

i. Interest. Interest generated from the initial capital long-term maintenance and management fund shall be available for reinvestment into the principal and for

the long-term operation, management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action that is approved by the CPM and is designed to protect or improve the habitat values of the compensation lands.

ii. Withdrawal of Principal. The long-term maintenance and management fund principal shall not be drawn upon unless such withdrawal is deemed necessary by the CPM or by the approved third-party long-term maintenance and management fund manager, to ensure the continued viability of the species on the compensation lands.

iii. Pooling Long-Term Maintenance and Management Funds. An entity approved to hold long-term maintenance and management funds for the Project may pool those funds with similar non-wasting funds that it holds from other projects for long-term maintenance and management of compensation lands for special-status plants. However, for reporting purposes, the long-term maintenance and management funds for this Project must be tracked and reported individually to the CPM.

f. Other Expenses. In addition to the costs listed above, the Project owner shall be responsible for all other costs related to acquisition of compensation lands and conservation easements, including but not limited to the title and document review costs incurred from other state agency reviews, overhead related to providing compensation lands to CDFG or an approved third party, escrow fees or costs, environmental contaminants clearance, and other site cleanup measures.

g. Mitigation Security. The Project owner shall provide financial assurances to the CPM to guarantee that an adequate level of funding is available to implement any of the mitigation measures required by this condition that are not completed prior to the start of ground-disturbing Project activities. Financial assurances shall be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security") approved by the CPM. The amount of the Security shall be based upon staff's estimate of per-acre acquisition, transaction, and management costs as described in Condition of Certification **BIO-17** for each

acre of occupied habitat impacted using the estimated cost per acre for Desert Tortoise mitigation as a best available proxy, at a 3:1 ratio; see **Revised Biological Resources Tables 5** and **7**) for every acre of habitat supporting the target special-status plant species which is significantly impacted by the project. The actual costs to comply with this condition will vary depending on the actual costs of acquiring compensation habitat, the costs of initially improving the habitat, and the actual costs of long-term management as determined by a PAR or PAR-like analysis. Prior to submitting the Security to the CPM, the Project owner shall obtain the CPM's approval of the form of the Security. The CPM may draw on the Security if the CPM determines the Project owner has failed to comply with the requirements specified in this condition. The CPM may use money from the Security solely for implementation of the requirements of this condition. The CPM's use of the Security to implement measures in this condition may not fully satisfy the Project owner's obligations under this condition, and the Project owner remains responsible for satisfying the obligations under this condition if the Security is insufficient. The unused Security shall be returned to the Project owner in whole or in part upon successful completion of the associated requirements in this condition.

h. The Project owner may elect to comply with the requirements in this condition for acquisition of compensation lands, initial protection and habitat improvement on the compensation lands, or long-term maintenance and management of the compensation lands by funding, or any combination of these three requirements, by providing funds to implement those measures into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF). To use this option, the Project owner must make an initial deposit to the REAT Account in an amount equal to the estimated costs (as set forth in the Security section of this condition) of implementing the requirement. If the actual cost of the acquisition, initial protection and habitat improvements, or long-term funding is more than the estimated amount initially paid by the Project owner, the Project owner shall make an additional deposit into the REAT Account sufficient to cover the actual acquisition costs, the actual costs of initial protection and habitat improvement on the compensation lands, and the long-term funding

requirements as established in an approved PAR or PAR-like analysis. If those actual costs or PAR projections are less than the amount initially transferred by the applicant, the remaining balance shall be returned to the Project owner.

i. The responsibility for acquisition of compensation lands may be delegated to a third party other than NFWF, such as a non-governmental organization supportive of desert habitat conservation, by written agreement of the Energy Commission. Such delegation shall be subject to approval by the CPM, in consultation with CDFG, BLM and USFWS, prior to land acquisition, enhancement or management activities. Agreements to delegate land acquisition to an approved third party, or to manage compensation lands, shall be executed and implemented within 18 months of the Energy Commission's certification of the Project.

II. Compensatory Mitigation by Habitat Enhancement/Restoration: As an alternative or adjunct to land acquisition for compensatory mitigation the Project owner may undertake habitat enhancement or restoration for the target special-status plant species. Habitat enhancement or restoration activities must achieve protection at a 3:1 ratio as described above, with improvements applied to three acres of habitat for every acre of special-status plant habitat directly or indirectly disturbed by the Project Disturbance Area for annual species; or to habitat supporting three living plants for each individual perennial plant directly or indirectly disturbed by the project. Examples of suitable enhancement projects include but are not limited to the following: i) control unauthorized vehicle use into an occurrence (or pedestrian use if clearly damaging to the species); ii) control noxious weeds that infest or pose an immediate threat to an occurrence; iii) exclude grazing by wild burros or livestock from an occurrence; or iv) restore lost or degraded hydrologic or geomorphic functions critical to the species by restoring previously diverted flows, removing obstructions to the wind sand transport corridor above an occurrence, or increasing groundwater availability for dependent species.

If the Project owner elects to undertake a habitat enhancement project for mitigation, the project must meet the following performance standards: The proposed enhancement project shall achieve rescue of an off-site occurrence that is currently assessed, based on the NatureServe threat ranking system (Master et al. 2009; Morse et al. 2004) with one of the following threat ranks: a) long-term decline 30 percent; b) an immediate threat that affects 30 percent of the population, or c) has an overall threat impact that is High to Very High. "Rescue" would be considered successful if it achieves an improvement in the occurrence trend to "stable" or "increasing" status, or

downgrading of the overall threat rank to slight or low (from “High” to “Very High”).

If the Project owner elects to undertake a habitat enhancement project for mitigation, they shall submit a Habitat Enhancement/Restoration Plan to the CPM for review and approval, and shall provide sufficient funding for implementation and monitoring of the Plan. The amount of the Security shall be based upon staff’s estimate of per-acre acquisition, transaction, and management costs as described in Condition of Certification **BIO-17**–for each acre of occupied habitat impacted by the project, using the estimated cost per acre for Desert Tortoise mitigation as a best available proxy, at a 3:1 ratio (see **Revised Biological Resources Tables 5** and **7**). The amount of the security may be adjusted based on the actual costs of implementing the enhancement, restoration and monitoring. The implementation and monitoring of the enhancement/restoration may be undertaken by an appropriate third party such as NFWF, subject to approval by the CPM. The Habitat Enhancement/Restoration Plan shall include each of the following:

1. Goals and Objectives. Define the goals of the restoration or enhancement project and a measurable course of action developed to achieve those goals. The objective of the proposed habitat enhancement plan shall include restoration of a target special-status plant occurrence that is currently threatened with a long-term decline. The proposed enhancement plan shall achieve an improvement in the occurrence trend to “stable” or “increasing” status, or downgrading of the overall threat rank to slight or low (from “High” to “Very High”).
2. Historical Conditions. Provide a description of the pre-impact or historical conditions (before the site was degraded by weeds or grazing or ORV, etc.), and the desired conditions.
3. Site Characteristics. Describe other site characteristics relevant to the restoration or enhancement project (e.g., composition of native and pest plants, topography and drainage patterns, soil types, geomorphic and hydrologic processes important to the site or species.
4. Ecological Factors. Describe other important ecological factors of the species being protected, restored, or enhanced such as total population, reproduction, distribution, pollinators, etc.
5. Methods. Describe the restoration methods that will be used (e.g., invasive exotics control, site protection, seedling protection, propagation techniques, etc.) and the long-term maintenance required. The implementation phase of the enhancement must be completed within five years.
6. Budget. Provide a detailed budget and timeline; develop clear, measurable, objective-driven annual success criteria.

7. Monitoring. Develop clear, measurable monitoring methods that can be used to evaluate the effectiveness of the restoration and the benefit to the affected species. The Plan shall include a minimum of five years of quarterly monitoring, and then annual monitoring for the remainder of the enhancement project, or until the performance standards for rescue of a threatened occurrence are met, whichever comes first. At a minimum the progress reports shall include: quantitative measurements of the projects progress in meeting the enhancement project success criteria, detailed description of remedial actions taken or proposed, and contact information for the responsible parties.
8. Reporting Program. The Plan shall ensure accountability with a reporting program that includes progress toward goals and success criteria. Include names of responsible parties.
9. Contingency Plan. Describe the contingency plan for failure to meet annual goals.
10. Long-term Protection. Include proof of long-term protection for the restoration site. For private lands this would include conservations easements or other deed restrictions; projects on public lands must be contained in a Desert Wildlife Management Area, Wildlife Habitat Management Area, or other land use protections that will protect the mitigation site and target species.

Section E: Conformance with BLM and San Bernardino County Plant Protection Policies

It is BLM policy to salvage yucca and cactus plants (excluding cholla species, genus *Cylindropuntia*) and transplant them to undisturbed sites within project Rights of Way. The San Bernardino County Plant Protection and Management Ordinance regulates the following where they occur on non-government land (San Bernardino County Code 88.01): desert native plants with stems 2 inches or greater in diameter or 6 feet or greater in height: *Psorothamnus* [*Dalea*] *spinosa* (smoke tree), *Prosopis* spp. (mesquites), all species of the family Agavaceae (century plants, nolinas, yuccas), creosote rings 10 feet or greater in diameter, all Joshua trees; and any part of any of the following species, whether living or dead: *Olneya tesota* (desert ironwood), all species of the genus *Prosopis* (mesquites), and all species of the genus *Cercidium* (palo verdes). Staff recognizes that the project site is on public land and thus not strictly subject to the County ordinance—but believes the County ordinance establishes an additional mitigation standard that should be applied to the project, as follows:

a. The project owner shall inventory all plants subject to BLM and County policies on the project site that would be removed or damaged by proposed project construction.

b. The project owner shall include salvaged plants or potted nursery stock of any species named in BLM or County policies

in on-site revegetation planning and implementation, as described in **BIO-10**. The project owner shall include a Protected Plant Salvage and Replacement Section in the Revegetation Plan, in conformance with BLM. The Section also shall provide for incorporation of salvaged or potted stock of any species identified in the San Bernardino County standards that would be impacted by project development affected. The Section shall be made available for review and approval by the CPM. For salvaged plants, the Section shall include detailed descriptions of proposed methods to salvage plants; transport them; store them temporarily (as needed); and maintain them in temporary storage (i.e., irrigation, shade protection, etc.). For both salvaged plants and potted nursery stock, the Section shall include detailed descriptions of proposed planting locations and methods; proposed irrigation and maintenance methods at planting sites; and a monitoring plan to verify survivorship and establishment of the plants for a minimum of five years.

c. Concurrent with any ground-disturbing activities within any phase of the project, the project owner shall implement the Protected Plant Replacement measures as approved by the CPM and BLM's State Botanist.

Verification: The Special-Status Plant Impact Avoidance and Minimization Measures shall be incorporated into the BRMIMP as required under Condition of Certification **BIO-7**.

Implementation of the special-status plant impact avoidance and minimization measures shall be reported in the Monthly Compliance Reports prepared by the Designated Botanist. Within 30 days after completion of Project construction, the Project owner shall provide to the CPM, for review and approval in consultation with the BLM State Botanist, a written construction termination report identifying how measures have been completed.

The Project owner shall submit a monitoring report every year for the life of the project to monitor effectiveness of protection measures for all avoided special-status plants to the CPM and BLM State Botanist. The monitoring report shall include: dates of worker awareness training sessions and attendees, an inventory of the special-status plant occurrences and description of the habitat conditions, an indication of population and habitat quality trends, and description of the remedial action, if warranted and planned for the upcoming year.

Section A. No less than 30 days prior to the start of ground-disturbing activities the Project owner shall submit grading plans and construction drawings depicting the location of Environmentally Sensitive Areas and the Avoidance and Minimization Measures contained in Section A of this Condition. The project

owner shall coordinate with the CPM and BLM's Wildlife Biologist to revise and finalize boundaries of the ESAs. The 30 day limit may be reduced by the CPM.

No less than 30 days prior to the start of ground-disturbing activities the Project owner shall submit to the CPM for review and approval, in consultation with the BLM State Botanist, the name and resume of the project's Designated Botanist. If a Designated Botanist needs to be replaced, the specified information of the proposed replacement must be submitted to BLM's Wildlife Biologist and the CPM as soon as possible prior to the termination or release of the Designated Biologist. In an emergency, the project owner shall immediately notify the BLM's Wildlife Biologist and the CPM to discuss the qualifications and approval of a short-term replacement while a permanent Designated Botanist is proposed to BLM's Wildlife Biologist and the CPM and for consideration. The 30 day limit may be reduced by the CPM.

No less than 30 days prior to ground-disturbing activities the Project owner shall submit a draft White-margined Beardtongue Impact Avoidance and Minimization Plan to the CPM for review and approval, in consultation with the BLM State Botanist. Implementation of the white-margined beardtongue impact avoidance and minimization measures shall be reported in the Monthly Compliance Reports prepared by the Designated Botanist. Within 30 days after completion of Project construction, the Project owner shall provide to the CPM, for review and approval in consultation with the BLM State Botanist, a written construction termination report identifying how measures have been completed. The 30 day limit may be reduced by the CPM.

The Project owner shall submit a monitoring report every year for the life of the project to monitor effectiveness of protection measures for all avoided white-margined beardtongue ESAs to the CPM and BLM State Botanist. The monitoring report shall include: dates of worker awareness training sessions and attendees, an inventory of the special-status plant occurrences and description of the habitat conditions, an indication of population and habitat quality trends, and description of the remedial action, if warranted and planned for the upcoming year. The project owner shall coordinate with the CPM and BLM's Wildlife Biologist to revise and finalize monitoring reports and all reports described in this section, and shall specifically report any difficulties in meeting the protection goals and cooperatively develop adaptive measures as needed.

Section B. Raw GPS data, metadata, and CNDDB field forms shall be submitted to the CPM within two weeks of the completion of each survey. A preliminary summary of results for the late summer/fall botanical surveys shall also be submitted to the CPM and BLM's State Botanist within two weeks following the completion of the surveys. If surveys are split into more than one period, then a summary letter shall be submitted following each survey period. The Final Summer-Fall Botanical Survey Report, GIS shape files and metadata shall be submitted to the BLM State Botanist and the CPM no less than 30 days prior to

the start of ground-disturbing activities. The Final Report shall include a detailed accounting of the acreage of Project impacts to special-status plant occurrences.

Section C. The Project owner shall immediately provide written notification to the CPM, CDFG, USFWS, and BLM if it detects a State- or Federal-Listed Species, or BLM Sensitive Species at any time during its late summer/fall botanical surveys or at any time thereafter through the life of the Project, including conclusion of Project decommissioning.

Prior to construction, the project owner shall provide written verification that seed of any special status plants on the project site have collected and conveyed to a facility (as described in this measure) and that suitable long-term funding has been provided by the project owner. As needed, the project owner shall consult with the CPM and BLM's State Botanist to identify appropriate seed collection sites and dates.

Section D. If compensatory mitigation is required (based upon field survey results and mitigation strategy adopted by the project owner, as described in Sections C and D), no less than 30 days prior to the start of ground-disturbing activities, the Project owner shall submit to the CPM Security adequate to acquire compensatory mitigation lands and/or undertake habitat enhancement or restoration activities, as described in this condition. The 30 day limit may be reduced by the CPM.

No fewer than 90 days prior to acquisition of compensatory mitigation lands, the Project owner shall submit a formal acquisition proposal and draft Management Plan for the proposed lands to the CPM, with copies to CDFG, USFWS, and BLM, describing the parcels intended for purchase and shall obtain approval from the CPM prior to the acquisition. No fewer than 90 days prior to acquisition of compensatory mitigation lands, the Project owner shall submit to the CPM and obtain CPM approval of any agreements to delegate land acquisition to an approved third party, or to manage compensation lands; such agreement shall be executed and implemented within 18 months of the Energy Commission's certification of the Project.

The Project owner or an approved third party shall complete the acquisition and all required transfers of the compensation lands, and provide written verification to the CPM of such completion no later than 18 months after the start of Project ground-disturbing activities. If NFWF or another approved third party is being used for the acquisition, the Project owner shall ensure that funds needed to accomplish the acquisition are transferred in timely manner to facilitate the planned acquisition and to ensure the land can be acquired and transferred prior to the 18-month deadline. If habitat enhancement is proposed, no later than six months following the start of ground-disturbing activities, the Project owner shall obtain CPM approval of the final Habitat Enhancement/Restoration Plan, prepared in accordance with Section D, and submit to the CPM or a third party

approved by the CPM Security adequate for long-term implementation and monitoring of the Habitat Enhancement/Restoration Plan.

Enhancement/restoration activities shall be initiated no later than 12 months from the start of construction. The implementation phase of the enhancement project shall be completed within five years of initiation. Until completion of the five-year implementation portion of the enhancement action, a report shall be prepared and submitted as part of the Annual Compliance Report. This report shall provide, at a minimum: a summary of activities for the preceding year and a summary of activities for the following year; quantitative measurements of the Project's progress in meeting the enhancement project success criteria; detailed description of remedial actions taken or proposed; and contact information for the responsible parties.

Within 18 months of ground-disturbing activities, the Project owner shall transfer to the CPM or an approved third party the difference between the Security paid and the actual costs of (1) acquiring compensatory mitigation lands, completing initial protection and habitat improvement , and funding the long-term maintenance and management of compensatory mitigation lands; and/or (2) implementing and providing for the long-term protection and monitoring of habitat enhancement or restoration activities.

Section E. The project owner shall coordinate with the CPM and BLM's Wildlife Biologist to revise and finalize all plans and reports named in this section. Verification and reporting shall be as described in **BIO-10** and shall be included in reports described therein. Within 90 days after completion of each year of project construction, the project owner shall provide to the CPM verification of the numbers or acreage of plants covered in this Condition (i.e., species named in BLM and County policies) which have been removed or salvaged over the course of the year. Annual revegetation reports described in **BIO-10** verification shall include summaries of salvage and planting operations and monitoring results. Compliance reports shall include summaries of written and photographic records of the plan implementation described above. Compliance reports shall be submitted annually for a period not less than 5 years to document irrigation, maintenance, and monitoring results, including plant survival.

MOJAVE FRINGE-TOED LIZARD MITIGATION

BIO-13 The project owner shall provide compensatory land to mitigate for habitat loss and direct impacts to Mojave fringe-toed lizards based on revised estimates of suitable Mojave fringe-toed lizard habitat on-site, to be verified by an expert in this animal's ecology. The project owner shall provide compensatory mitigation at a 3:1 ratio for impacts to breeding habitat (i.e., dune, sand ramp, or fine-sandy wash habitat), and at a 1:1 ratio for impacts to adjacent suitable foraging and cover habitat, such as thin aeolian sand overlying bajada surfaces, or foraging habitat surrounding the breeding habitat. Staff estimates

breeding habitat on site as 21.4 acres, and surrounding suitable foraging and cover habitat (i.e., 45 meter buffer) as 143.3 acres. Therefore, staff concludes this condition would require the acquisition and dedication in perpetuity of 207.5 acres of habitat. The project owner shall provide funding for the acquisition, initial habitat improvements, and long-term management of the compensation lands, as described below.

Biological Resources Table 17
Mojave Fringe-toed Lizard Compensation Acreage Summary

Habitat Function	Project Impact Acreage	Mitigation Ratio	Compensation Acreage
Foraging and cover	143.3 acres	1:1	143.3 acres
Breeding	21.4 acres	3:1	64.2 acres
Total	164.7 acres		207.5 acres

This compensation acreage may be included ("nested") within the acreage acquired and managed as desert tortoise habitat compensation (Condition of Certification **BIO-17**) only if:

- Adequate acreage of qualifying desert tortoise compensation lands also meet the Selection Criteria (below) as habitat for Mojave fringe-toed lizard;
- The desert tortoise habitat compensation lands are acquired and dedicated as permanent conservation lands within 18 months of the start of project construction.

If these two criteria are not met, then the project owner shall provide the required number of acres of Mojave fringe-toed lizard habitat compensation lands, adjusted to reflect the final project footprint and additional delineation of suitable habitat, independent of any compensation land required under other conditions of certification, and shall also provide funding for the initial improvement and long-term maintenance and management of the acquired lands, and shall comply with other related requirements this condition. Costs of these requirements are estimated to be $674,211.24 based on the acquisition of 207.5 acres (see **Revised Biological Resources Tables 5** and **6** for a complete breakdown of estimated costs). Regardless of actual cost, the project owner shall be responsible for funding all requirements of this condition.

The project owner shall provide financial assurances as described below, in the amount of $660,416.25. In lieu of acquiring lands itself, the Project owner may satisfy the requirements of this condition by providing funds for the acquisition to the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife

Foundation (NFWF), as described below. If the Project owner elects to establish a REAT NFWF Account and have NFWF and the resource agencies complete the required habitat compensation, then the total estimated cost of complying with this condition is $674,211.24. The amount of security or NFWF deposit shall be adjusted up or down to reflect any revised cost estimates recommended by REAT.

The actual costs to comply with this condition will vary depending on the final footprint of the Project, the actual costs of acquiring compensation habitat, the costs of initially improving the habitat, and the actual costs of long-term management as determined by a Property Analysis Report (below). The 207.5 acre habitat requirement, and associated funding requirements based on that acreage, shall be adjusted up or down if there are changes in the final footprint of the project or the associated costs of evaluation, acquisition, management, and other factors listed in **Revised Biological Resources Tables 5** and **6**. Regardless of actual cost, the project owner shall be responsible for implementing all aspects of this condition.

COMPENSATORY MITIGATION LAND ACQUISITION

1. Method of Acquisition. Compensation lands shall be acquired by either of the two options listed below. Regardless of the method of acquisition, the transaction shall be complete only upon completion of all terms and conditions described in this Condition of Certification.

a. The project owner shall acquire lands and transfer title and/or conservation easement to a state or federal land management agency or to a third-party non-profit land management organization, as approved by the CPM in consultation with BLM, CDFG, and USFWS; or

b. The Project owner shall deposit funds into a project-specific subaccount within the REAT Account established with the NFWF, in the amount as indicated in **Revised Biological Resources Tables 5** and **6** (adjusted to reflect final project footprint and any applicable REAT adjustments to costs).

2. Selection Criteria for Compensation Lands. The compensation lands selected for acquisition to meet Energy Commission requirements shall:

   a. Be sand dune or partially stabilized sand dune habitat with potential to contribute to Mojave fringe-toed lizard habitat connectivity and build linkages between known populations of Mojave fringe-toed lizards and preserve lands with suitable habitat;

b. Be biologically contiguous to lands currently occupied by Mojave fringe-toed lizard;

c. Be near larger blocks of lands that are either already protected or planned for protection, or which could feasibly be protected long-term by a public resource agency or a non-governmental organization dedicated to habitat preservation;

d. Provide quality habitat for Mojave fringe-toed lizard, that has the capacity to regenerate naturally when disturbances are removed;

e. Not have a history of intensive recreational use or other disturbance that might make habitat recovery and restoration infeasible;

f. Not be characterized by high densities of invasive species, either on or immediately adjacent to the parcels under consideration, that might jeopardize habitat recovery and restoration;

g. Not contain hazardous wastes;

h. Have water and mineral rights included as part of the acquisition, unless the CPM, in consultation with CDFG, BLM and USFWS, agrees in writing to the acceptability of land without these rights; and

i. Be on land for which long-term habitat management for Mojave fringe-toed lizard and other native biological resources is feasible.

3. Review and Approval of Compensation Lands Prior to Acquisition. The project owner shall submit a formal acquisition proposal to the CPM describing the parcel(s) intended for purchase. This acquisition proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for Mojave fringe-toed lizard in relation to the criteria listed above and must be approved by the CPM. The CPM will share the proposal with and consult with CDFG, BLM, and the USFWS before deciding whether to approve or disapprove the proposed acquisition.

4. Compensation Lands Acquisition Conditions: The project owner shall comply with the following conditions relating to acquisition of the compensation lands after the CPM, in consultation with CDFG, BLM and the USFWS, have approved the proposed compensation lands:

a. <u>Preliminary Report</u>: The Project owner, or approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary or requested documents for the proposed compensation land to the CPM. All documents conveying or conserving compensation lands

and all conditions of title are subject to review and approval by the CPM, in consultation with CDFG, BLM and the USFWS. For conveyances to the State, approval may also be required from the California Department of General Services, the Fish and Game Commission and the Wildlife Conservation Board.

b. Title/Conveyance: The Project owner shall acquire and transfer fee title to the compensation lands, a conservation easement over the lands, or both fee title and conservation easement as required by the CPM in consultation with CDFG. Any transfer of a conservation easement or fee title must be to CDFG, a non-profit organization qualified to hold title to and manage compensation lands (pursuant to California Government Code section 65965), or to BLM or other public agency approved by the CPM in consultation with CDFG. If an approved non-profit organization holds fee title to the compensation lands, a conservation easement shall be recorded in favor of CDFG or another entity approved by the CPM. If an approved non-profit holds a conservation easement, CDFG shall be named a third party beneficiary. If an entity other than CDFG holds a conservation easement over the compensation lands, the CPM may require that CDFG or another entity approved by the CPM, in consultation with CDFG, be named a third party beneficiary of the conservation easement. The Project owner shall obtain approval of the CPM, in consultation with CDFG, of the terms of any transfer of fee title or conservation easement to the compensation lands.

c. Property Analysis Record: Upon identification of the compensation lands, the Project owner shall conduct a Property Analysis Record (PAR) or PAR-like analysis to establish the appropriate amount of the long-term maintenance and management fund to pay the in-perpetuity management of the compensation lands. The PAR or PAR-like analysis must be approved by the CPM, in consultation with CDFG, before it can be used to establish funding levels or management activities for the compensation lands.

5. Compensation Lands Acquisition Costs: The Project owner shall pay all other costs related to acquisition of compensation lands and conservation easements. In addition to actual land costs, these acquisition costs shall include but shall not be limited to the items listed below. Management costs including site cleanup measures are described separately, in the following section.

a. Level 1 Environmental Site Assessment;

b. Appraisal;

c. Title and document review costs;

d. Expenses incurred from other state, federal, or local agency reviews;

e. Closing and escrow costs;

f. Overhead costs related to providing compensation lands to CDFG or an approved third party;

g. Biological survey(s) to determine mitigation value of the land; and

h. Agency costs to accept the land (e.g., writing and recording of conservation easements; title transfer).

COMPENSATORY MITIGATION LAND IMPROVEMENT

1. Land Improvement Requirements: The Project owner shall fund activities that the CPM, in consultation with the CDFG, USFWS and BLM, requires for the initial protection and habitat improvement of the compensation lands. These activities will vary depending on the condition and location of the land acquired, but may include surveys of boundaries and property lines, installation of signs, trash removal and other site cleanup measures, construction and repair of fences, invasive plant removal, removal of roads, and similar measures to protect habitat and improve habitat quality on the compensation lands.

   The costs of these activities are estimated at $250 an acre, but will vary depending on the measures that are required for the compensation lands. A non-profit organization, CDFG or another public agency may hold and expend the habitat improvement funds if it is qualified to manage the compensation lands (pursuant to California Government Code section 65965), if it meets the approval of the CPM in consultation with CDFG, and if it is authorized to participate in implementing the required activities on the compensation lands. If CDFG takes fee title to the compensation lands, the habitat improvement fund must be paid to CDFG or its designee.

COMPENSATORY MITIGATION LAND LONG-TERM MANAGEMENT

1. Long-term Management Requirements: Long-term management is required to ensure that the compensation lands are managed and maintained to protect and enhance habitat for Mojave fringe-toed lizard. Management activities may include maintenance of signs, fences, removal of invasive weeds, monitoring, security and enforcement, and control or elimination of unauthorized use.

2. Long-term Management Plan. The project owner shall pay for the preparation of a Management Plan for the compensation lands. The Management Plan shall reflect site-specific enhancement measures on the acquired compensation lands. The plan shall be submitted for approval of the CPM, in consultation with CDFG, BLM and USFWS.

3. Long-Term Maintenance and Management Funding. The Project owner shall provide money to establish an account with a long-term maintenance and management. that will be used to fund the long-term maintenance and management of the compensation lands. The amount of money to be paid will be determined through an approved PAR or PAR-like analysis conducted for the compensation lands. The amount of required funding is initially estimated to be $1,450 for every acre of compensation lands. If compensation lands will not be identified and a PAR or PAR-like analysis completed within the time period specified for this payment (see the verification section at the end of this condition), the project owner shall provide initial payment of $1,450 an acre for the acres identified in the verified and approved delineation of habitat required by this condition, or if the delineation is not completed, shall provide $300,875 calculated at $1,450 an acre for 207.5 acres into an account for long-term maintenance and management of compensation lands. The amount of the required initial payment or security for this item shall be adjusted for any change in the Project footprint as described above. If an initial payment is made based on the estimated per-acre costs, the project owner shall deposit additional money as may be needed to provide the full amount of long-term maintenance and management funding indicated by a PAR or PAR-like analysis, once the analysis is completed and approved. If the approved analysis indicates less than $1,450 an acre will be required for long-term maintenance and management, the excess paid will be returned to the Project owner.

   The project owner must obtain the CPM's approval of the entity that will receive and hold the long-term maintenance and management fund for the compensation lands. The CPM will consult with CDFG before deciding whether to approve an entity to hold the project's long-term maintenance and management funds. The CPM, in consultation with CDFG, may designate another non-profit organization to hold the long-term maintenance and management fee if the organization is qualified to manage the compensation lands in perpetuity.

   If CDFG takes fee title to the compensation lands, CDFG shall determine whether it will hold the long-term management fee in the special deposit fund, leave the money in the REAT Account, or designate another entity to manage the long-term maintenance and management fee for CDFG and with CDFG supervision.

   The Project owner shall ensure that an agreement is in place with the long-term maintenance and management fee holder/manager to ensure the following conditions:

   i. <u>Interest</u>. Interest generated from the initial capital shall be available for reinvestment into the principal and for the long-

term operation, management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action designed to protect or improve the habitat values of the compensation lands.

ii. Withdrawal of Principal. The long-term maintenance and management fee principal shall not be drawn upon unless such withdrawal is deemed necessary by the CPM, in consultation with CDFG, or the approved third-party long-term maintenance and management fee manager to ensure the continued viability of the species on the compensation lands. If CDFG takes fee title to the compensation lands, monies received by CDFG pursuant to this provision shall be deposited in a special deposit fund established solely for the purpose to manage lands in perpetuity unless CDFG designates NFWF or another entity to manage the long-term maintenance and management fee for CDFG.

iii. Pooling Funds. A CPM-approved non-profit organization qualified to hold long-term maintenance and management fees solely for the purpose to manage lands in perpetuity, may pool the fund with other funds for the operation, management, and protection of the compensation lands for local populations of Mojave fringe-toed lizard. However, for reporting purposes, the long-term maintenance and management fee fund must be tracked and reported individually to the CPM.

iv. Reimbursement Fund. The project owner shall provide reimbursement to CDFG or an approved third party for reasonable expenses incurred during title, easement, and documentation review; expenses incurred from other State or State-approved federal agency reviews; and overhead related to providing compensation lands.

COMPENSATORY MITIGATION LAND SECURITY

1. Compensation Mitigation Security: The project owner shall provide security sufficient for funding acquisition, improvement, and long-term management of Mojave fringe-toed lizard compensation land. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security"). Prior to submitting the Security to the CPM, the Project owner shall obtain the CPM's approval, in consultation with CDFG, BLM and the USFWS, of the form of the Security.

   The security amount shall be based on the estimates provided in **Revised Biological Resources Tables 5** and **6.** This amount

shall be updated and verified prior to payment and shall be adjusted to reflect actual costs or more current estimates as agreed upon by the REAT agencies.

The Project owner shall provide verification that financial assurances have been established to the CPM with copies of the document(s) to BLM, CDFG and the USFWS, to guarantee that an adequate level of funding is available to implement any of the mitigation measures required by this condition that are not completed prior to the start of ground-disturbing activities described in Section A of this condition.

In the event that the project owner defaults on the Security, the CPM may use money from the Security solely for implementation of the requirements of this condition. The CPM's use of the security to implement measures in this condition may not fully satisfy the Project owner's obligations under this condition. Any amount of the Security that is not used to carry out mitigation shall be returned to the Project owner upon successful completion of the associated requirements in this condition.

Security for the requirements of this condition shall be provided in the amount of $660,416.25 (or $674,211.24 if the project owner elects to use the REAT Account with NFWF pursuant to paragraph 4 of this condition, below). The Security is calculated in part from the items that follow but adjusted as specified below (consult **Revised Biological Resources Tables 5** and **6** for the complete breakdown of estimated costs). However, regardless of the amount of the security or actual cost of implementation, the project owner shall be responsible for implementing all aspects of this condition.

i. land acquisition costs for compensation land, calculated at $1,000/acre;

ii. Site assessments, appraisals, biological surveys, transaction closing and escrow costs, calculated as $18,000 total per parcel (presuming 320 acres per parcel);

iii. Initial site clean-up, restoration, or enhancement, calculated at $250/acre;

iv. Third-party and agency administrative transaction costs and overhead, calculated as percentages of land cost;

v. Long-term management and maintenance fund, calculated at $1,450 per acre;

vi. NFWF fees to establish a project-specific account; manage the sub-account for acquisition and initial site work; and manage the sub-account for long term management and maintenance.

2. Phasing of Security Payment: Compensatory Mitigation Land Security may be phased according to phasing of the project's approval and construction. Phasing of compensation funding shall be based upon land disturbance and habit impacts for each project phase. Phasing of the mitigation payment is described further in staff's recommended Condition of Certification **BIO-31.**

3. The project owner may elect to comply with some or all of the requirements in this condition by providing funds to implement the requirements into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF). To use this option, the Project owner must make an initial deposit to the REAT Account in an amount equal to the estimated costs of implementing the requirement (as set forth in the Security section of this condition, paragraph 3, above). If the actual cost of the acquisition, initial protection and habitat improvements, long-term funding or other cost is more than the estimated amount initially paid by the project owner, the project owner shall make an additional deposit into the REAT Account sufficient to cover the actual acquisition costs, the actual costs of initial protection and habitat improvement on the compensation lands, the long-term funding requirements as established in an approved PAR or PAR-like analysis, or the other actual costs that are estimated in the table. If those actual costs or PAR projections are less than the amount initially transferred by the applicant, the remaining balance shall be returned to the project owner.

4. The responsibility for acquisition of compensation lands may be delegated to a third party other than NFWF, such as a non-governmental organization supportive of desert habitat conservation, by written agreement of the Energy Commission. Such delegation shall be subject to approval by the CPM, in consultation with CDFG, BLM and USFWS, prior to land acquisition, enhancement or management activities. Agreements to delegate land acquisition to an approved third party, or to manage compensation lands, shall be executed and implemented within 18 months of the Energy Commission's certification of the project.

5. The project owner may request the CPM to provide it with all available information about any funds held by the Energy Commission, CDFG, or NFWF as project security, or funds held in a NFWF sub-account for this project, or other project-specific account held by a third party. The CPM shall also fully cooperate

with any independent audit that the project owner may choose to perform on any of these funds.

Verification: The project owner shall provide the CPM with written notice of intent to start ground disturbance at least 30 days prior to the start of ground-disturbing activities on the project site.

If the mitigation actions required under this condition are not completed at least 30 days prior to the start of ground-disturbing activities, the Project owner shall provide the CPM and CDFG with an approved Security in accordance with this condition of certification no later than 30 days prior to beginning Project ground-disturbing activities. Prior to submitting the Security to the CPM, the project owner shall obtain the CPM's approval, in consultation with CDFG, BLM and the USFWS, of the form of the Security. The project owner, or an approved third party, shall complete and provide written verification to the CPM, CDFG, BLM and USFWS of the compensation lands acquisition and transfer within 18 months of the start of Project ground-disturbing activities.

No later than 12 months after the start of any phase of ground-disturbing project activities, the project owner shall submit a formal acquisition proposal to the CPM describing the parcels intended for purchase, and shall obtain approval from the CPM, in consultation with CDFG, BLM and USFWS, prior to the acquisition. If NFWF or another approved third party is handling the acquisition, the project owner shall fully cooperate with the third party to ensure the proposal is submitted within this time period. The project owner or an approved third party shall complete the acquisition and all required transfers of the compensation lands, and provide written verification to the CPM, CDFG, BLM and USFWS of such completion, no later than 18 months after the issuance of the Energy Commission Decision. If NFWF or another approved third party is being used for the acquisition, the project owner shall ensure that funds needed to accomplish the acquisition are transferred in timely manner to facilitate the planned acquisition and to ensure the land can be acquired and transferred prior to the 18-month deadline,

The project owner shall complete and submit to the CPM a PAR or PAR-like analysis no later than 60 days after the CPM approves compensation lands for acquisition associated with any phase of construction. The project owner shall fully fund the required amount for long-term maintenance and management of the compensation lands for that phase of construction no later than 30 days after the CPM approves a PAR or PAR-like analysis of the anticipated long-term maintenance and management costs of the compensation lands. Written verification shall be provided to the CPM and CDFG to confirm payment of the long-term maintenance and management funds.

No later than 60 days after the CPM determines what activities are required to provide for initial protection and habitat improvement on the compensation lands for any phase of construction, the project owner shall make funding available for

those activities and provide written verification to the CPM of what funds are available and how costs will be paid. Initial protection and habitat improvement activities on the compensation lands for that phase of construction shall be completed, and written verification provided to the CPM, no later than six months after the CPM's determination of what activities are required on the compensation lands.

The project owner, or an approved third party, shall provide the CPM, CDFG, BLM and USFWS with a management plan for the compensation lands associated with any phase of construction within180 days of the land or easement purchase, as determined by the date on the title. The CPM, in consultation with CDFG, BLM and the USFWS, shall approve the management plan after its content is acceptable to the CPM.

Within 90 days after completion of all project related ground disturbance, the project owner shall provide to the CPM, CDFG, BLM and USFWS an analysis, based on aerial photography, with the final accounting of the amount of habitat disturbed during Project construction. This shall be the basis for the final number of acres required to be acquired.

GILA MONSTER MITIGATION

BIO-14 Concurrent with Desert Tortoise Clearance surveys (**BIO-15,** below), the project owner shall conduct pre-construction surveys for Gila monsters. If a Gila monster is encountered during clearance surveys or during construction, a qualified biologist experienced with Gila monster survey and capture techniques shall capture and maintain it in a cool (85 degrees F) environment until it can be released to a safe, suitable area beyond the construction impact zone. The biologist shall coordinate with staff and CDFG biologists in the transport and relocation of any Gila monsters encountered during project surveys, construction, or operation. A written report documenting any Gila monsters relocated shall be provided to the CPM within 30 days of relocation.

Verification: Within 30 days after completion of clearance surveys the Designated Biologist shall submit a report to BLM's Wildlife Biologist, the CPM, USFWS, and CDFG describing implementation and results, including description of any relocation of Gila monsters. The report shall include the number of Gila monsters moved; their state of health, including wounds or visible signs of illness; and the location of relocation.

DESERT TORTOISE CLEARANCE SURVEYS AND EXCLUSION FENCING

BIO-15 The project owner shall undertake appropriate measures to manage the construction site and related facilities in a manner to avoid or minimize impacts to desert tortoise. Methods for clearance surveys, fence specification and installation, tortoise handling, artificial burrow

construction, egg handling and other procedures shall be consistent with those described in the USFWS' 2009 *Desert Tortoise Field Manual* http://www.fws.gov/ventura/speciesinfo/protocols_guidelines or more current guidance provided by CDFG and USFWS. The project owner shall also implement all terms and conditions described in the Biological Opinion for the Project prepared by USFWS. These measures include, but are not limited to, the following:

1. Desert Tortoise Exclusion Fence Installation. To avoid impacts to desert tortoises, permanent desert tortoise exclusion fencing shall be installed along the permanent perimeter security fence and temporarily installed along the utility corridors at tower locations, laydown areas, or other staging areas. Tortoise exclusion fencing shall also be installed as necessary to prevent tortoises on the southern NAP (not a part) area (between the project site and Interstate-40) to prevent tortoises from entering the highway. If the culvert areas cannot be fenced due to restrictions associated with highway maintenance, the two tortoises would be translocated off the site (see **BIO-16**). The proposed alignments for the permanent perimeter fence and utility rights-of-way fencing shall be flagged and surveyed within 24 hours prior to the initiation of fence construction. Clearance surveys of the perimeter fence and utility rights-of-way alignments shall be conducted by the Designated Biologist(s) using techniques approved by the USFWS and CDFG and may be conducted in any season with USFWS and CDFG approval. Biological Monitors may assist the Designated Biologist under his or her supervision with the approval of the CPM, BLM, USFWS, and CDFG. These fence clearance surveys shall provide 100-percent coverage of all areas to be disturbed and an additional transect along both sides of the fence line. This fence line transect shall cover an area approximately 90 feet wide centered on the fence alignment. Transects shall be no greater than 15 feet apart. All desert tortoise burrows, and burrows constructed by other species that might be used by desert tortoises, shall be examined to assess occupancy of each burrow by desert tortoises and handled in accordance with the USFWS' 2009 *Desert Tortoise Field Manual.* Any desert tortoise located during fence clearance surveys shall be handled by the Designated Biologist(s) in accordance with the USFWS' 2009 *Desert Tortoise Field Manual.*

    a. Timing, Supervision of Fence Installation. The exclusion fencing shall be installed prior to the onset of site clearing and grubbing. Fencing shall also be placed along both sides of any construction access roads within tortoise habitat but outside the fenced construction area, and maintained throughout the construction phase of the project, unless otherwise approved by the CPM, BLM Wildlife Biologist, USFWS, and CDFG. The

fence installation shall be supervised by the Designated Biologist and monitored by the Biological Monitors to ensure the safety of any tortoise present.

b. Fence Material and Installation. The permanent tortoise exclusionary fencing shall be constructed in accordance with the USFWS' 2009 *Desert Tortoise Field Manual* (Chapter 8 – Desert Tortoise Exclusion Fence).

c. Security Gates. Security gates shall be designed with minimal ground clearance to deter ingress by tortoises. The gates may be electronically activated to open and close immediately after the vehicle(s) have entered or exited to prevent the gates from being kept open for long periods of time. Cattle grating designed to safely exclude desert tortoise shall be installed at the gated entries to discourage tortoises from gaining entry.

d. Fence Inspections. Following installation of the desert tortoise exclusion fencing for both the permanent site fencing and temporary fencing in the utility corridors, the fencing shall be regularly inspected. If tortoise were moved out of harm's way during fence construction, permanent and temporary fencing shall be inspected at least two times a day for the first 7 days to ensure a recently moved tortoise has not been trapped within the fence. Thereafter, permanent fencing shall be inspected monthly and during and within 24 hours following all major rainfall events. A major rainfall event is defined as one for which surface flow is detectable within the fenced drainage during the storm, or for which channels on-site show any evidence of newly deposited sediments, bank erosion, or channel reworking following the storm. The project owner shall be responsible for monitoring storm flows and changes to channels to evaluate need for fence inspection. Any damage to the fencing shall be temporarily repaired immediately to keep tortoises out of the site, and permanently repaired within 48 hours of observing damage. Inspections of permanent site fencing shall occur for the life of the project. Temporary fencing shall be inspected weekly and, where drainages intersect the fencing, during and within 24 hours following major rainfall events. All temporary fencing shall be repaired immediately upon discovery and, if the fence may have permitted tortoise entry while damaged, the Designated Biologist shall inspect the area for tortoise.

e. Derailment or other emergency. In the case of derailment or other emergency, project owner is required to provide BNSF access to the Project site for emergency response. This access may include, among other activities, temporary removal of

portions of the desert tortoise exclusionary fencing, the immediate placement of a temporary fence and the placement of the applicable portion of the permanent fence within 48 hours of the temporary removal of such portion.

2. Desert Tortoise Clearance Surveys within the Plant Site. Following construction of the permanent perimeter security fence and the attached tortoise exclusion fence, the permanently fenced power plant site shall be cleared of tortoises by the Designated Biologist, who may be assisted by the Biological Monitors. Clearance surveys shall be conducted in accordance with the USFWS' 2009 *Desert Tortoise Field Manual* (Chapter 6 – Clearance Survey Protocol for the Desert Tortoise – Mojave Population) and shall consist of two surveys covering 100 percent the project area by walking transects no more than 15-feet apart. If a desert tortoise is located on the second survey, a third survey shall be conducted. Each separate survey shall be walked in a different direction to allow opposing angles of observation. Clearance surveys of the power plant site may only be conducted when tortoises are most active (April through May or September through October). Surveys outside of these time periods require approval by USFWS and CDFG. Any tortoise located during clearance surveys of the power plant site shall be relocated and monitored in accordance with the Desert Tortoise Translocation Plan (Condition of Certification **BIO-1 6**).

   a. Burrow Searches. During clearance surveys all desert tortoise burrows, and burrows constructed by other species that might be used by desert tortoises, shall be examined by the Designated Biologist, who may be assisted by the Biological Monitors, to assess occupancy of each burrow by desert tortoises and handled in accordance with the USFWS' 2009 *Desert Tortoise Field Manual.* To prevent reentry by a tortoise or other wildlife, all burrows shall be collapsed once absence has been determined. Tortoises taken from burrows and from elsewhere on the power plant site shall be translocated as described in the Desert Tortoise Translocation Plan.

   b. Burrow Excavation/Handling. All potential desert tortoise burrows located during clearance surveys would be excavated by hand, tortoises removed, and collapsed or blocked to prevent occupation by desert tortoises. All desert tortoise handling and removal, and burrow excavations, including nests, would be conducted by the Designated Biologist, who may be assisted by a Biological Monitor in accordance with the USFWS' 2009 *Desert Tortoise Field Manual.*

3. Monitoring Following Clearing. Following the desert tortoise clearance and removal from the power plant site and utility corridors and initial memo or verbal completion report to BLM's Wildlife Biologist, the CPM, USFWS, and CDFG (below), workers and heavy equipment shall be allowed to enter the project site to perform clearing, grubbing, leveling, and trenching. A Designated Biologist shall monitor clearing and grading activities to find and move tortoises missed during the initial tortoise clearance survey. Should a tortoise be discovered, it shall be translocated as described in the Desert Tortoise Translocation Plan to an area approved by the Designated Biologist.

4. Reporting. The Designated Biologist shall record the following information for any desert tortoises handled: a) the locations (narrative and maps) and dates of observation; b) general condition and health, including injuries, state of healing and whether desert tortoise voided their bladders; c) location moved from and location moved to (using GPS technology); d) gender, carapace length, and diagnostic markings (i.e., identification numbers or marked lateral scutes); e) ambient temperature when handled and released; and f) digital photograph of each handled desert tortoise as described in the paragraph below. Desert tortoise moved from within project areas shall be marked and monitored in accordance with the Desert Tortoise Translocation Plan.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP and implemented. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist. Immediately upon completion of clearance surveys and desert tortoise removal from the site, the Designated Biologist shall provide an initial memo or verbal report of the results to BLM's Wildlife Biologist, the CPM, USFWS, and CDFG. Within 30 days after completion of desert tortoise clearance surveys the Designated Biologist shall submit a report to BLM's Wildlife Biologist, the CPM, USFWS, and CDFG describing implementation of each of the mitigation measures listed above and compliance with Gila monster clearance survey (**BIO-14**). The report shall include the desert tortoise survey results, capture and release locations of any relocated desert tortoises, and any other information needed to demonstrate compliance with the measures described above.

DESERT TORTOISE TRANSLOCATION PLAN

BIO-16 The project owner shall develop and implement a final Desert Tortoise Translocation Plan (Plan) in conformance with standards and guidelines described in *Translocation of Desert Tortoises (Mojave Population) From Project Sites: Plan Development Guidance* (USFWS 2010), any more current guidance or recommendations as available from CDFG or USFWS, and meets the approval of USFWS, CDFG, BLM's Wildlife

Biologist and the CPM. The goal of the Plan shall be to safely exclude desert tortoises from within the fenced project area and translocate them to suitable habitat capable of supporting them, while minimizing stress and potential for disease transmission. Tortoises to be moved farther than 500 meters shall be tested for disease prior to translocation. The Plan shall include written correspondence with CalTrans indicating whether tortoise exclusion fencing may be installed to prevent tortoises on the southern NAP area (between the project site and Interstate-40) to prevent tortoises from entering the highway. If CalTrans does not permit that fencing, then desert tortoises shall be translocated off the NAP site (see **BIO-15**). The final Plan shall be based on the draft Desert Tortoise Translocation Plan prepared by the applicant and shall include all revisions deemed necessary by USFWS, CDFG, BLM'S Wildlife Biologist, and staff. The Plan shall include but not be limited to, a list of the authorized handlers, protocols for disease testing and assessing tortoise health, proposed translocation locations and procedures, schedule of translocations, a habitat assessment of translocation lands, monitoring and reporting, and contingency planning (e.g., handling an injured or diseased tortoise).

Verification: Within 30 days of publication of the Energy Commission License Decision or BLM's Record of Decision/ROW Issuance, whichever comes first, the project owner shall provide BLM's Wildlife Biologist and the CPM with the final version of a Desert Tortoise Translocation Plan that has been reviewed and approved by BLM's Wildlife Biologist and the CPM in consultation with USFWS and CDFG. The plan shall include the locations of the translocation sites. The project owner may not translocate more than 98 tortoises unless the project owner first provides the CPM with documentation demonstrating that adequate translocation sites have been identified, and obtains CPM approval of those translocation sites. All modifications to the approved Plan shall be made only after approval by BLM's Wildlife Biologist and the CPM, in consultation with USFWS and CDFG. Within 30 days after initiation of translocation activities, the Designated Biologist shall provide to BLM's Wildlife Biologist and the CPM for review and approval, a written report identifying which items of the Plan have been completed, and a summary of all modifications to measures made during implementation of the Plan. Written monthly progress reports shall be provided to the BLM's Wildlife Biologist and CPM for the duration of the Plan implementation, including the duration of monitoring of translocated tortoises.

DESERT TORTOISE COMPENSATORY MITIGATION

DESERT TORTOISE COMPENSATORY MITIGATION

BIO-17 The project owner shall provide compensatory mitigation acreage of 10,302 acres of desert tortoise habitat lands, adjusted to reflect the final project footprint, as specified in this condition. In addition, the project owner shall provide funding for initial improvement and long-term maintenance, enhancement, and management of the acquired

lands for protection and enhancement of desert tortoise populations, and comply with other related requirements of this condition. This acreage was calculated as follows: a ratio of 1:1 for the project area south of the BNSF railroad tracks (2,140 acres); a ratio of 3:1 ratio for 2,104 acres of the project area north of the BNSF railroad tracks; and a ratio of 5:1 for 370 additional acres north of the BNSF railroad tracks. See **Table**, below.

Desert Tortoise Compensation Acreage Summary:

Location	**Project Impact Acreage**	**Mitigation Ratio**	**Compensation Acreage**
South of BNSF RR	2,140 acres	1:1	2,140 acres
North of BNSF RR (southern Phase 1b acreage)	2.104 acres	3:1	6,312 acres
North of BNSF RR (northern Phase 2 area, Scenario 5.5 only)	370 acres	5:1	1,850 acres
Scenario 5.5 Total	**4,613 acres**		**10,302 acres**

Costs of these requirements are estimated to be $31,079,934.00 for Scenario 5.5 (see Ex. 317, **Biological Resources Addendum Tables 5** and **7** for a complete breakdown of costs and acreage).

As many as 4,613 acres of the compensation lands requirement may be satisfied by applicant's compliance with the desert tortoise habitat acquisition or enhancement requirements of BLM, to be calculated as an acre-for-acre offset in the Energy Commission requirement for mitigation provided to satisfy BLM's requirements. For purposes of this paragraph, credit will be given for BLM-required mitigation without regard to whether BLM uses the mitigation funds for habitat acquisition or for enhancement projects to benefit the species.

These impact acreages shall be adjusted to reflect the final project footprint. For purposes of this condition, the Project footprint means all lands disturbed in the construction and operation of the Calico Solar Project, including all linear project components, as well as all undeveloped areas inside the Project's boundaries.

The project owner shall provide financial assurances as described below in the amount of $31,079,934.00. In lieu of acquiring lands itself, the Project owner may satisfy the requirements of this condition by depositing funds into a Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF), as described below. If the Project owner elects to establish a

REAT NFWF Account and have NFWF and the agencies complete the required habitat compensation, then the total estimated cost of complying with this condition is $31,755,574.02. The amount of security or NFWF deposit shall be adjusted up or down to reflect any revised cost estimates recommended by REAT.

The actual costs to comply with this condition will vary depending on the final footprint of the Project, the costs of acquiring compensation habitat, the costs of initially improving the habitat, and the actual costs of long-term management as determined by a Property Analysis Report or similar analysis (below). The 4,613 acre habitat requirement, and associated funding requirements based on that acreage, shall be adjusted up or down if there are changes in the final footprint of the project or the associated costs of evaluation, acquisition, management, and other factors listed in **Biological Resources Addendum Tables 5** and **7**. Regardless of actual cost, the project owner shall be responsible for funding all requirements of this condition.

COMPENSATORY MITIGATION LAND ACQUISITION

1. Method of Acquisition. Compensation lands shall be acquired by either of the two options listed below. Regardless of the method of acquisition, the transaction shall be complete only upon completion of all terms and conditions described in this Condition of Certification.

a. The project owner shall acquire lands and transfer title and/or conservation easement to a state or federal land management agency or to a third-party non-profit land management organization, as approved by the CPM in consultation with BLM, CDFG, and USFWS; or

b. The Project owner shall deposit funds into a project-specific subaccount within the REAT Account established with the NFWF, in the amount as indicated in **Biological Resources Addendum Tables 5** and **7** (adjusted to reflect final project footprint and any applicable REAT adjustments to costs).

2. Selection Criteria for Compensation Lands. The compensation lands selected for acquisition to meet Energy Commission and CESA requirements shall be equal to or better than the quality and function of the habitat impacted and:

a. be within the Western Mojave Recovery Unit, with potential to contribute to desert tortoise habitat connectivity and build linkages between desert tortoise designated critical habitat, known populations of desert tortoise, and/or other preserve lands;

b. provide habitat for desert tortoise with capacity to regenerate naturally when disturbances are removed;

c. be near larger blocks of lands that are either already protected or planned for protection, or which could feasibly be protected long-term by a public resource agency or a non-governmental organization dedicated to habitat preservation;

d. be contiguous and biologically connected to lands currently occupied by desert tortoise, ideally with populations that are stable, recovering, or likely to recover;

e. not have a history of intensive recreational use or other disturbance that might cause future erosional damage or other habitat damage, and make habitat recovery and restoration infeasible;

f. not be characterized by high densities of invasive species, either on or immediately adjacent to the parcels under consideration, that might jeopardize habitat recovery and restoration; and

g. not contain hazardous wastes that cannot be removed to the extent that the site could not provide suitable habitat; and

h. have water and mineral rights included as part of the acquisition, unless the CPM, in consultation with CDFG, BLM and USFWS, agrees in writing to the acceptability of land without these rights.

3. Review and Approval of Compensation Lands Prior to Acquisition. The project owner shall submit a formal acquisition proposal to the CPM describing the parcel(s) intended for purchase. This acquisition proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for desert tortoise in relation to the criteria listed above and must be approved by the CPM. The CPM will share the proposal with and consult with CDFG, BLM and the USFWS before deciding whether to approve or disapprove the proposed acquisition.

4. Compensation Lands Acquisition Conditions: The project owner shall comply with the following conditions relating to acquisition of the compensation lands after the CPM, in consultation with CDFG, BLM and the USFWS have approved the proposed compensation lands:

a. Preliminary Report: The Project owner, or approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary or requested documents for the proposed compensation land to the CPM. All documents conveying or conserving compensation lands and all conditions of title are subject to review and approval by the CPM, in consultation with CDFG, BLM and the USFWS. For

conveyances to the State, approval may also be required from the California Department of General Services, the Fish and Game Commission and the Wildlife Conservation Board.

b. Title/Conveyance: The Project owner shall acquire and transfer fee title to the compensation lands, a conservation easement over the lands, or both fee title and conservation easement as required by the CPM in consultation with CDFG. Any transfer of a conservation easement or fee title must be to CDFG, a non-profit organization qualified to hold title to and manage compensation lands (pursuant to California Government Code section 65965), or to BLM or other public agency approved by the CPM in consultation with CDFG. If an approved non-profit organization holds fee title to the compensation lands, a conservation easement shall be recorded in favor of CDFG or another entity approved by the CPM. If an approved non-profit holds a conservation easement, CDFG shall be named a third party beneficiary. If an entity other than CDFG holds a conservation easement over the compensation lands, the CPM may require that CDFG or another entity approved by the CPM, in consultation with CDFG, be named a third party beneficiary of the conservation easement. The Project owner shall obtain approval of the CPM, in consultation with CDFG, of the terms of any transfer of fee title or conservation easement to the compensation lands.

c. Property Analysis Record. Upon identification of the compensation lands, the Project owner shall conduct a Property Analysis Record (PAR) or PAR-like analysis to establish the appropriate amount of the long-term maintenance and management fund to pay the in-perpetuity management of the compensation lands. The PAR or PAR-like analysis must be approved by the CPM, in consultation with CDFG, before it can be used to establish funding levels or management activities for the compensation lands.

5. Compensation Lands Acquisition Costs: The Project owner shall pay all other costs related to acquisition of compensation lands and conservation easements. In addition to actual land costs, these acquisition costs shall include but shall not be limited to the items listed below. Management costs including site cleanup measures are described separately, in the following section.

a. Level 1 Environmental Site Assessment;

b. Appraisal;

c. Title and document review costs;

d. Expenses incurred from other state, federal, or local agency reviews;

e. Closing and escrow costs;

f. Overhead costs related to providing compensation lands to CDFG or an approved third party;

g. Biological survey(s) to determine mitigation value of the land; and

h. Agency costs to accept the land (e.g., writing and recording of conservation easements; title transfer).

COMPENSATORY MITIGATION LAND IMPROVEMENT

1. Land Improvement Requirements: The Project owner shall fund activities that the CPM, in consultation with the CDFG, USFWS and BLM, requires for the initial protection and habitat improvement of the compensation lands. These activities will vary depending on the condition and location of the land acquired, but may include surveys of boundaries and property lines, installation of signs, trash removal and other site cleanup measures, construction and repair of fences, invasive plant removal, removal of roads, and similar measures to protect habitat and improve habitat quality on the compensation lands.

   The costs of these activities are estimated at $250 an acre, but will vary depending on the measures that are required for the compensation lands. A non-profit organization, CDFG or another public agency may hold and expend the habitat improvement funds if it is qualified to manage the compensation lands (pursuant to California Government Code section 65965), if it meets the approval of the CPM in consultation with CDFG, and if it is authorized to participate in implementing the required activities on the compensation lands. If CDFG takes fee title to the compensation lands, the habitat improvement fund must be paid to CDFG or its designee.

COMPENSATORY MITIGATION LAND LONG-TERM MANAGEMENT

1. Long-term Management Requirements: Long-term management is required to ensure that the compensation lands are managed and maintained to protect and enhance habitat for desert tortoise. Management activities may include maintenance of signs, fences, removal of invasive weeds, monitoring, security and enforcement, and control or elimination of unauthorized use.

2. Long-term Management Plan. The project owner shall pay for the preparation of a Management Plan for the compensation lands. The Management Plan shall reflect site-specific enhancement measures

on the acquired compensation lands. The plan shall be submitted for approval of the CPM, in consultation with CDFG, BLM and USFWS.

3. Long-Term Maintenance and Management Funding. The Project owner shall provide money to establish an account with a long-term maintenance and management. that will be used to fund the long-term maintenance and management of the compensation lands. The amount of money to be paid will be determined through an approved PAR or PAR-like analysis conducted for the compensation lands. The amount of required funding is initially estimated to be $1,450 for every acre of compensation lands. If compensation lands will not be identified and a PAR or PAR-like analysis completed within the time period specified for this payment (see the verification section at the end of this condition), the Project owner shall provide initial payment of $14,937,900.00 calculated at $1,450 an acre for each compensation acre, as shown in **Biological Resources Addendum Tables 5 and 7** (above into an account for long-term maintenance and management of compensation lands. The amount of the required initial payment or security for this item shall be adjusted for any change in the Project footprint as described above. If an initial payment is made based on the estimated per-acre costs, the project owner shall deposit additional money as may be needed to provide the full amount of long-term maintenance and management funding indicated by a PAR or PAR-like analysis, once the analysis is completed and approved. If the approved analysis indicates less than $1,450 an acre will be required for long-term maintenance and management, the excess paid will be returned to the Project owner.

   The project owner must obtain the CPM's approval of the entity that will receive and hold the long-term maintenance and management fund for the compensation lands. The CPM will consult with the project owner and CDFG before deciding whether to approve an entity to hold the project's long-term maintenance and management funds on any lands. The CPM, in consultation with the project owner and CDFG, may designate another state agency or non-profit organization to hold the long-term maintenance and management fee if the organization is qualified to manage the compensation lands in perpetuity.

   If CDFG takes fee title to the compensation lands, CDFG shall determine whether it will hold the long-term management fee in the special deposit fund, leave the money in the REAT Account, or designate another entity to manage the long-term maintenance and management fee for CDFG and with CDFG supervision.

The Project owner shall ensure that an agreement is in place with the long-term maintenance and management fee holder/manager to ensure the following conditions:

i. Interest. Interest generated from the initial capital shall be available for reinvestment into the principal and for the long-term operation, management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action approved by CDFG designed to protect or improve the habitat values of the compensation lands.

ii. Withdrawal of Principal. The long-term maintenance and management fee principal shall not be drawn upon unless such withdrawal is deemed necessary by the CPM, in consultation with CDFG, or the approved third-party long-term maintenance and management fee manager to ensure the continued viability of the species on the compensation lands. If CDFG takes fee title to the compensation lands, monies received by CDFG pursuant to this provision shall be deposited in a special deposit fund established solely for the purpose to manage lands in perpetuity unless CDFG designates NFWF or another entity to manage the long-term maintenance and management fee for CDFG.

iii. Pooling Funds. A CPM- approved non-profit organization qualified to hold long-term maintenance and management fees solely for the purpose to manage lands in perpetuity, may pool the fund with other funds for the operation, management, and protection of the compensation lands for local populations of desert tortoise. However, for reporting purposes, the long-term maintenance and management fee fund must be tracked and reported individually to the CDFG and CPM.

iv. Reimbursement Fund. The project owner shall provide reimbursement to CDFG or an approved third party for reasonable expenses incurred during title, easement, and documentation review; expenses incurred from other State or State-approved federal agency reviews; and overhead related to providing compensation lands.

COMPENSATORY MITIGATION LAND SECURITY

1. Compensation Mitigation Security: The project owner shall provide security sufficient for funding acquisition, improvement, and long-term management of desert tortoise compensation land. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security"). Prior to submitting the Security to the CPM,

the Project owner shall obtain the CPM's approval, in consultation with CDFG, BLM and the USFWS, of the form of the Security.

The security amount shall be based on the estimates provided in **Biological Resources Addendum Tables 5** and **7.** This amount shall be updated and verified prior to payment and shall be adjusted to reflect actual costs or more current estimates as agreed upon by the REAT agencies.

The Project owner shall provide verification that financial assurances have been established to the CPM with copies of the document(s) to BLM, CDFG and the USFWS, to guarantee that an adequate level of funding is available to implement any of the mitigation measures required by this condition that are not completed prior to the start of ground-disturbing activities described in Section A of this condition.

In the event that the project owner defaults on the Security, the CPM may use money from the Security solely for implementation of the requirements of this condition. The CPM's use of the security to implement measures in this condition may not fully satisfy the Project owner's obligations under this condition. Any amount of the Security that is not used to carry out mitigation shall be returned to the Project owner upon successful completion of the associated requirements in this condition.

Security for the requirements of this condition shall be provided in the amount of $31,079,934 (or $31,755,574.02 if the project owner elects to use the REAT Account with NFWF pursuant to paragraph 4 of this condition, below). The Security is calculated in part from the items that follow but adjusted as specified below (consult **Biological Resources Addendum Tables 5** and **7** for the complete breakdown of estimated costs). However, regardless of the amount of the security or actual cost of implementation, the project owner shall be responsible for implementing all aspects of this condition.

i. land acquisition costs for compensation land, calculated at $1,000/acre;

ii. Site assessments, appraisals, biological surveys, transaction closing and escrow costs, calculated as $18,000 total per parcel (presuming 320 acres per parcel)

iii. Initial site clean-up, restoration, or enhancement, calculated at $250/acre;

iv. Third-party and agency administrative transaction costs and overhead, calculated as percentages of land cost;

v. Long-term management and maintenance fund, calculated at $1,450 per acre;

vi. NFWF fees to establish a project-specific account; manage the sub-account for acquisition and initial site work; and manage the sub-account for long term management and maintenance.

2. Phasing of Security Payment: Compensatory Mitigation Land Security may be phased according to phasing of the project's approval and construction. Phasing of compensation funding shall be based upon land disturbance and habit impacts for each project phase. Phasing of the mitigation payment is described further in staff's recommended Condition of Certification **BIO-31** (most recent revision, below).

3. The project owner may elect to comply with some or all of the requirements in this condition by providing funds to implement the requirements into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF). To use this option, the Project owner must make an initial deposit to the REAT Account in an amount equal to the estimated costs of implementing the requirement (as set forth in the Security section of this condition, paragraph 3, above). If the actual cost of the acquisition, initial protection and habitat improvements, long-term funding or other cost is more than the estimated amount initially paid by the project owner, the project owner shall make an additional deposit into the REAT Account sufficient to cover the actual acquisition costs, the actual costs of initial protection and habitat improvement on the compensation lands, the long-term funding requirements as established in an approved PAR or PAR-like analysis, or the other actual costs that are estimated in the table. If those actual costs or PAR projections are less than the amount initially transferred by the applicant, the remaining balance shall be returned to the project owner.

4. The responsibility for acquisition of compensation lands may be delegated to a third party other than NFWF, such as a non-governmental organization supportive of desert habitat conservation, by written agreement of the Energy Commission. Such delegation shall be subject to approval by the CPM, in consultation with CDFG, BLM and USFWS, prior to land acquisition, enhancement or management activities. Agreements to delegate land acquisition to an approved third party, or to manage

compensation lands, shall be executed and implemented within 18 months of the Energy Commission's certification of the project.

5. The project owner may request the CPM to provide it with all available information about any funds held by the Energy Commission, CDFG, or NFWF as project security, or funds held in a NFWF sub-account for this project, or other project-specific account held by a third party. The CPM shall also fully cooperate with any independent audit that the project owner may choose to perform on any of these funds.

Verification: The project owner shall provide the CPM with written notice of intent to start ground disturbance at least 30 days prior to the start of ground-disturbing activities on the project site.

If the mitigation actions required under this condition are not completed at least 30 days prior to the start of ground-disturbing activities, the Project owner shall provide verification to the CPM and CDFG that an approved Security has been established in accordance with this condition of certification no later than 30 days prior to beginning Project ground-disturbing activities. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security"). Prior to submitting the Security to the CPM, the project owner shall obtain the CPM's approval, in consultation with CDFG, BLM and the USFWS, of the form of the Security. The project owner, or an approved third party, shall complete and provide written verification to the CPM, CDFG, BLM and USFWS of the compensation lands acquisition and transfer within 18 months of the start of Project ground-disturbing activities.

No later than 12 months after the start of any phase of ground-disturbing project activities, the project owner shall submit a formal acquisition proposal to the CPM describing the parcels intended for purchase, and shall obtain approval from the CPM, in consultation with CDFG, BLM and USFWS, prior to the acquisition. If NFWF or another approved third party is handling the acquisition, the project owner shall fully cooperate with the third party to ensure the proposal is submitted within this time period. The project owner or an approved third party shall complete the acquisition and all required transfers of the compensation lands, and provide written verification to the CPM, CDFG, BLM and USFWS of such completion, no later than 18 months after the issuance of the Energy Commission Decision. If NFWF or another approved third party is being used for all or part of the acquisition, the project owner shall ensure that funds needed to accomplish the acquisition are transferred in timely manner to facilitate the planned acquisition and to ensure the land can be acquired and transferred prior to the 18-month deadline.

The project owner shall complete and submit to the CPM a PAR or PAR-like analysis no later than 60 days after the CPM approves compensation lands for

acquisition associated with any phase of construction. The project owner shall fully fund the required amount for long-term maintenance and management of the compensation lands for that phase of construction no later than 30 days after the CPM approves a PAR or PAR-like analysis of the anticipated long-term maintenance and management costs of the compensation lands. Written verification shall be provided to the CPM and CDFG to confirm payment of the long-term maintenance and management funds.

No later than 60 days after the CPM determines what activities are required to provide for initial protection and habitat improvement on the compensation lands for any phase of construction, the project owner shall make funding available for those activities and provide written verification to the CPM of what funds are available and how costs will be paid. Initial protection and habitat improvement activities on the compensation lands for that phase of construction shall be completed, and written verification provided to the CPM, no later than six months after the CPM's determination of what activities are required on the compensation lands.

The project owner, or an approved third party, shall provide the CPM, CDFG, BLM and USFWS with a management plan for the compensation lands associated with any phase of construction within180 days of the land or easement purchase, as determined by the date on the title. The CPM, in consultation with CDFG, BLM and the USFWS, shall approve the management plan after its content is acceptable to the CPM.

Within 90 days after completion of all project related ground disturbance, the project owner shall provide to the CPM, CDFG, BLM and USFWS an analysis, based on aerial photography, with the final accounting of the amount of habitat disturbed during Project construction. If this analysis shows that more lands were disturbed than was anticipated in this condition, the project owner shall provide the Energy Commission with additional compensation lands and funding commensurate with the added impacts and applicable mitigation ratios set forth in this condition. A final analysis of all project related ground disturbance may not result in a reduction of compensation requirements if the deadlines established under this condition for transfer of compensation lands and funding have passed prior to completion of the analysis.

RAVEN MONITORING, MANAGEMENT, AND CONTROL PLAN

BIO-18 The project owner shall design and implement a Raven Monitoring, Management, and Control Plan (Raven Plan) that is consistent with the most current USFWS-approved raven management guidelines and that meets the approval of the USFWS, CDFG, and the CPM. Any subsequent modifications to the approved Raven Plan shall be made only with approval of the CPM in consultation with USFWS and CDFG. The Raven Plan shall include but not be limited to a program to monitor increased raven presence in the Project vicinity and to implement raven

control measures as needed based on that monitoring. The purpose of the plan is to avoid any Project-related increases in raven numbers during construction, operation, and decommissioning. The threshold for implementation of raven control measures shall be any increases in raven numbers from baseline conditions, as detected by monitoring to be proposed in the Raven Plan. Regardless of raven monitoring results, the project owner shall be responsible for all other aspects of the Raven Plan, including avoidance and minimization of project-related trash, water sources, or perch/roost sites that could contribute to increased raven numbers. In addition, to offset the cumulative contributions of the Project to desert tortoise from increased raven numbers, the Project owner shall also contribute to the USFWS Regional Raven Management Program. The Project owner shall do all of the following:

1. Prepare and Implement a Raven Management Plan that includes the following:

    a. Identify conditions associated with the Project that might provide raven subsidies or attractants;

    b. Describe management practices to avoid or minimize conditions that might increase raven numbers and predatory activities;

    c. Describe control practices for ravens;

    d. Address monitoring and nest removal during construction and for the life of the Project, and;

    e. Discuss reporting requirements.

2. Contribute to the USFWS Regional Raven Management Program. The project owner shall submit payment to the project sub-account of the REAT Account held by the National Fish and Wildlife Foundation (NFWF) to support the USFWS Regional Raven Management Program. The amount shall be a one-time payment of $105 per acre of permanent disturbance (totaling $484,470). Payment may be made in phases corresponding to proposed phasing of the project described in Condition of Certification **BIO-31.**

Verification: No later than 30 days prior to the start of construction, the project owner shall provide written verification to the CPM that NFWF has received and accepted payment into the project's sub-account of the REAT Account to support the USFWS Regional Raven Management Program.

No later than 30 days prior to any construction-related ground disturbance activities, the Project owner shall provide the CPM, USFWS, and CDFG with the

final version of a Raven Plan. All modifications to the approved Raven Plan shall be made only with approval of the CPM in consultation with USFWS and CDFG.

Within 30 days after completion of Project construction, the Project owner shall provide to the CPM for review and approval, a written report identifying which items of the Raven Plan have been completed, a summary of all modifications to mitigation measures made during the Project's construction phase, and which items are still outstanding.

On January 31st of each year following construction the Designated Biologist shall provide a report to the CPM that includes: a summary of the results of raven management and control activities for the year; a discussion of whether raven control and management goals for the year were met; and recommendations for raven management activities for the upcoming year.

PRE-CONSTRUCTION NEST SURVEYS AND IMPACT AVOIDANCE MEASURES FOR MIGRATORY BIRDS

BIO-19 Pre-construction nest surveys shall be conducted each year during the construction phase of the project if construction activities will occur during the breeding period (from January 1 through August 1). The Designated Biologist or Biological Monitor conducting the surveys shall be experienced bird surveyors who have demonstrated experience conducting nest searches; are knowledgeable of the nesting habitats of species that may nest on the site; and are familiar with standard nest-locating techniques such as those described in Martin and Guepel (1993). Surveys shall be conducted in accordance with the following guidelines. Nothing in this condition requires the project owner to conduct burrowing owl surveys by entering private lands adjacent to the project site when the project owner has made reasonable attempts to obtain permission to enter the property for survey work but was unable to obtain such permission. In this situation only, the project owner may substitute binocular surveys for protocol field surveys.

1. Surveys shall cover all potential nesting habitat in the project site and within 500 feet of the boundaries of the plant site and linear facilities;

2. At least two pre-construction 100-percent coverage surveys shall be conducted of each proposes construction area, separated by a minimum 10-day interval. One of the surveys shall be conducted within the 10 days preceding initiation of construction activity. Additional follow-up surveys may be required if periods of construction inactivity exceed one week in any given area, an interval during which birds may establish a nesting territory and initiate egg laying and incubation;

3. If active nests are detected during the survey, a 500 foot no-disturbance buffer zone shall be implemented and a monitoring plan shall be developed. This protected area surrounding the nest may be adjusted by the Designated Biologist in consultation with CDFG, BLM, USFWS, and CPM. Nest locations shall be mapped using GPS technology and the location data provided in completion reports (below) to the CPM and BLM Wildlife Biologist; and

4. The Designated Biologist shall monitor the nest until he or she determines that nestlings have fledged and dispersed. Monitoring shall avoid disturbing the nests or causing an increased risk of predation. Activities that might, in the opinion of the Designated Biologist and in consultation with the CPM and BLM, disturb nesting activities shall be prohibited within the buffer zone until such a determination is made.

Verification: Upon completion of the surveys, and prior to initiating any vegetation removal or ground-disturbing activities (i.e., no more than 10 days prior to the start of such activities), the project owner shall provide the CPM and BLM a letter-report describing the methods and findings of the pre-construction nest surveys, including the time, date, and duration of the survey; identity and qualifications of the surveyor(s); and a list of species observed. If active nests are detected during the survey, the report shall include a map or aerial photo identifying the location of the nest and shall depict the boundaries of the no-disturbance buffer zone around the nest.

PRE-CONSTRUCTION SURVEYS FOR GOLDEN EAGLES

BIO-20 The Project owner shall implement the following measures to avoid or minimize Project-related construction impacts to golden eagles.

1. Annual Inventory During Construction. For each calendar year during which construction will occur an inventory shall be conducted to determine if golden eagle territories occur within one mile of the Project boundaries. Survey methods and surveyor qualifications for the inventory shall be as described in the Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations (Pagel et al. 2010) or more current guidance from the USFWS.

2. Inventory Data: Data collected during the inventory shall include at least the following: territory status (unknown, vacant, occupied, breeding successful, breeding unsuccessful); nest location, nest elevation; age class of golden eagles observed; nesting chronology; number of young at each visit; digital photographs; and substrate upon which nest is placed.

3. Determination of Unoccupied Territory Status: A nesting territory or inventoried habitat shall be considered unoccupied by golden eagles only after completing at least two full surveys in a single breeding season.

4. Monitoring and Adaptive Management Plan: If an occupied nest[2] is detected within one mile of the Project boundaries, the Project owner shall prepare and implement a Golden Eagle Monitoring and Management Plan for the duration of construction to ensure that Project construction activities do not result in injury or disturbance to golden eagles. The monitoring methods shall be consistent with those described in the Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations (Pagel et al. 2010) or more current guidance from the USFWS. The Monitoring and Management Plan shall be prepared in consultation with the USFWS. Triggers for adaptive management shall include any evidence of Project-related disturbance to nesting golden eagles, including but not limited to: agitation behavior (displacement, avoidance, and defense); increased vigilance behavior at nest sites; changes in foraging and feeding behavior, or nest site abandonment. The monitoring and Management Plan shall include a description of adaptive management actions, which shall include, but not be limited to, cessation of construction activities that are deemed by the Designated Biologist to be the source of golden eagle disturbance.

Verification: No later than 30 days after completion of the golden eagle inventory the project owner shall submit a report to the CPM, CDFG, and USFWS documenting the results of the inventory.

If an occupied nest is detected within one mile of the Project boundary during the inventory, the Project owner shall contact staff at the USFWS Ventura Office and CDFG within one working day of detection of the nest for interim guidance on monitoring and nest protection. The project owner shall provide the CPM, CDFG, and USFWS with the final version of the Golden Eagle Monitoring and Management Plan within 30 days after detection of the nest. This final Plan shall have been reviewed and approved by the CPM in consultation with USFWS and CDFG.

BURROWING OWL IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-21 The Project owner shall implement the following measures to avoid, minimize and offset impacts to burrowing owls. Nothing in this condition requires the project owner to conduct burrowing owl surveys by entering private lands adjacent to the project site when the project owner has made reasonable attempts to obtain permission to enter the property for survey work but was unable to obtain such permission. In

this situation only, the project owner may substitute binocular surveys for protocol field surveys.

1. Pre-Construction Surveys. The Designated Biologist or Biological Monitor shall conduct pre-construction surveys for burrowing owls no more than 30 days prior to initiation of construction activities. Surveys shall be focused exclusively on detecting burrowing owls, and shall be conducted from two hours before sunset to one hour after or from one hour before to two hours after sunrise. The survey area shall include the Project Disturbance Area and surrounding 500-foot survey buffer.

2. Implement Avoidance Measures. If an active burrowing owl burrow is detected within 500 feet from the Project Disturbance Area the following avoidance and minimization measures shall be implemented:

    a. Establish Non-Disturbance Buffer. Fencing shall be installed at a 250-foot radius from the occupied burrow to create a non-disturbance buffer around the burrow. The non-disturbance buffer and fence line may be reduced to 160 feet if all Project-related activities that might disturb burrowing owls would be conducted during the non-breeding season (September 1st through January 31st). Signs shall be posted in English and Spanish at the fence line indicating no entry or disturbance is permitted within the fenced buffer.

    b. Monitoring: If construction activities would occur within 500 feet of the occupied burrow during the nesting season (February 1 – August 31st) the Designated Biologist or Biological Monitor shall monitor to determine if these activities have potential to adversely affect nesting efforts, and shall implement measures to minimize or avoid such disturbance.

3. Passive Relocation of Burrowing Owls. If pre-construction surveys indicate the presence of burrowing owls within the Project Disturbance Area (the Project Disturbance Area means all lands disturbed in the construction and operation of the Genesis Project), the Project owner shall prepare and implement a Burrowing Owl Relocation and Mitigation Plan, in addition to the avoidance measures described above. The final Burrowing Owl Relocation and Mitigation Plan shall be approved by the CPM, in consultation with USFWS, BLM and CDFG, and shall:

    a. Identify and describe suitable relocation sites within 1 mile of the Project Disturbance Area, and describe measures to ensure that burrow installation or improvements would not affect sensitive

species habitat or existing burrowing owl colonies in the relocation area;

b. Provide guidelines for creation or enhancement of at least two natural or artificial burrows per relocated owl, including a discussion of timing of burrow improvements, specific location of burrow installation, and burrow design. Design of the artificial burrows shall be consistent with CDFG guidelines (CDFG 1995) and shall be approved by the CPM in consultation with CDFG, BLM and USFWS;

c. Passive relocation sites shall be in areas of suitable habitat for burrowing owl nesting, and be characterized by minimal human disturbance and access. Relative cover of non-native plants within the proposed relocation sites shall not exceed the relative cover of non-native plants in the adjacent habitats;

d. Provide detailed methods and guidance for passive relocation of burrowing owls occurring within the Project Disturbance Area; and

4. Acquire Compensatory Mitigation Lands for Burrowing Owls. The following measures for compensatory mitigation shall apply only if burrowing owls that are detected within the Project Disturbance Area. The Project owner shall acquire, in fee or in easement, 19.5 acres of land for each burrowing owl that is displaced by construction of the Project. This compensation acreage of 19.5 acres per single bird or pair of nesting owls assumes that there is no evidence that the compensation lands are occupied by burrowing owls. If burrowing owls are observed to occupy the compensation lands, then only 9.75 acres per single bird or pair is required, per CDFG (1995) guidelines. If the compensation lands are contiguous to currently occupied habitat, then the replacement ratio will be 13.0 acres per pair or single bird. The Project owner shall provide funding for the enhancement and long-term management of these compensation lands. The acquisition and management of the compensation lands may be delegated by written agreement to CDFG or to a third party, such as a non-governmental organization dedicated to habitat conservation, subject to approval by the CPM, in consultation with CDFG and USFWS prior to land acquisition or management activities. Additional funds shall be based on the adjusted market value of compensation lands at the time of construction to acquire and manage habitat. In lieu of acquiring lands itself, the Project owner may satisfy the requirements of this condition by depositing funds into the Renewable Energy Action Team (REAT) Account

established with the National Fish and Wildlife Foundation (NFWF), as described in Section 3.i. of Condition of Certification **BIO-17**.

a. Criteria for Burrowing Owl Mitigation Lands. The terms and conditions of this acquisition or easement shall be as described in Paragraph 1 of **BIO-17** [Desert Tortoise Compensatory Mitigation], with the additional criteria to include: 1) the mitigation land must provide suitable habitat for burrowing owls, and 2) the acquisition lands must either currently support burrowing owls or be within dispersal distance from an active burrowing owl nesting territory (generally approximately 5 miles). The burrowing owl mitigation lands may be included with the desert tortoise mitigation lands ONLY if these two burrowing owl criteria are met. If the burrowing owl mitigation land is separate from the acquisition required for desert tortoise compensation lands, the Project owner shall fulfill the requirements described below in this condition.

b. Security. If burrowing owl mitigation land is separate from the acreage required for desert tortoise compensation lands the Project owner or an approved third party shall complete acquisition of the proposed compensation lands prior to initiating ground-disturbing Project activities. Alternatively, financial assurance can be provided by the Project owner to the CPM with copies of the document(s) to CDFG, BLM and the USFWS, to guarantee that an adequate level of funding is available to implement the mitigation measure described in this condition. These funds shall be used solely for implementation of the measures associated with the Project. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security") prior to initiating ground-disturbing Project activities. Prior to submittal to the CPM, the Security shall be approved by the CPM, in consultation with CDFG, BLM and the USFWS to ensure funding. The estimated costs of enhancement and endowment are discussed in condition **BIO-17**. The final amount due will be determined by the PAR analysis conducted pursuant to **BIO-17**.

Verification: If pre-construction surveys detect burrowing owls within 500 feet of proposed construction activities, the Designated Biologist shall provide to the CPM, BLM, CDFG and USFWS documentation indicating that non-disturbance buffer fencing has been installed at least 10 days prior to the start of any construction-related ground disturbance activities. The Project owner shall report monthly to the CPM, CDFG, BLM and USFWS for the duration of construction on the implementation of burrowing owl avoidance and minimization measures. Within 30 days after completion of construction the Project owner shall provide to

the CPM, BLM, CDFG and USFWS a written construction termination report identifying how mitigation measures described in the plan have been completed.

If pre-construction surveys detect burrowing owls within the Project Disturbance Area, the Project owner shall notify the CPM, BLM, CDFG and USFWS no less than 10 days of completing the surveys that a relocation of owls is necessary. The Project owner shall do all of the following if relocation of one or more burrowing owls is required:

a. Within 30 days of completion of the burrowing owl pre-construction surveys, submit to the CPM, CDFG and USFWS a Burrowing Owl Relocation and Mitigation Plan.

b. No less than 90 days prior to acquisition of the burrowing owl compensation lands, the Project owner, or an approved third party, shall submit a formal acquisition proposal to the CPM, CDFG, and USFWS describing the 39-acre parcel intended for purchase. At the same time the Project owner shall submit a PAR or PAR-like analysis for the parcels for review and approval by the CPM, CDFG and USFWS.

c. Within 90 days of the land or easement purchase, as determined by the date on the title, the Project owner shall provide the CPM with a management plan for review and approval, in consultation with CDFG, BLM and USFWS, for the compensation lands and associated funds.

d. No later than 30 days prior to the start of construction-related ground disturbing activities, the Project owner shall provide written verification of Security in accordance with this condition of certification.

e. No later than 18 months after the start of construction-related ground disturbance activities, the Project owner shall provide written verification to the CPM, BLM, CDFG and USFWS that the compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient.

f. On January 31st of each year following construction for a period of five years, the Designated Biologist shall provide a report to the CPM, USFWS, BLM and CDFG that describes the results of monitoring and management of the burrowing owl relocation area. The annual report shall provide an assessment of the status of the relocation area with respect to burrow function and weed infestation, and shall include recommendations for actions the following year for maintaining the burrows as functional burrowing owl nesting sites and minimizing the occurrence of weeds.

BURROWING OWL IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-21 The Project owner shall implement the following measures to avoid, minimize and offset impacts to burrowing owls. Nothing in this condition requires the project owner to conduct burrowing owl surveys by entering private lands adjacent to the project site when the project owner has made reasonable attempts to obtain permission to enter the property for survey work but was unable to obtain such permission. In this situation only, the project owner may substitute binocular surveys for protocol field surveys:

1. Pre-Construction Surveys. The Designated Biologist or Biological Monitor shall conduct pre-construction surveys for burrowing owls no more than 30 days prior to initiation of construction activities. Surveys shall be focused exclusively on detecting burrowing owls, and shall be conducted from two hours before sunset to one hour after or from one hour before to two hours after sunrise. The survey area shall include the Project Disturbance Area and surrounding 500 foot survey buffer.

2. Implement Avoidance Measures. If an active burrowing owl burrow is detected within 500 feet from the Project Disturbance Area the following avoidance and minimization measures shall be implemented:

   a. Establish Non-Disturbance Buffer. Fencing shall be installed at a 250-foot radius from the occupied burrow to create a non-disturbance buffer around the burrow. The non-disturbance buffer and fence line may be reduced to 160 feet if all Project-related activities that might disturb burrowing owls would be conducted during the non-breeding season (September 1st through January 31st). Signs shall be posted in English and Spanish at the fence line indicating no entry or disturbance is permitted within the fenced buffer.

   b. Monitoring: If construction activities would occur within 500 feet of the occupied burrow during the nesting season (February 1 – August 31st) the Designated Biologist or Biological Monitor shall monitor to determine if these activities have potential to adversely affect nesting efforts, and shall implement measures to minimize or avoid such disturbance.

3. Passive Relocation of Burrowing Owls. If pre-construction surveys indicate the presence of burrowing owls within the Project Disturbance Area (the Project Disturbance Area means all lands disturbed in the construction and operation of the

Genesis Project), the Project owner shall prepare and implement a Burrowing Owl Relocation and Mitigation Plan, in addition to the avoidance measures described above. The final Burrowing Owl Relocation and Mitigation Plan shall be approved by the CPM, in consultation with USFWS, BLM and CDFG, and shall:

a. Identify and describe suitable relocation sites within 1 mile of the Project Disturbance Area, and describe measures to ensure that burrow installation or improvements would not affect sensitive species habitat or existing burrowing owl colonies in the relocation area;

b. Provide guidelines for creation or enhancement of at least two natural or artificial burrows per relocated owl, including a discussion of timing of burrow improvements, specific location of burrow installation, and burrow design. Design of the artificial burrows shall be consistent with CDFG guidelines (CDFG 1995) and shall be approved by the CPM in consultation with CDFG, BLM and USFWS;

c. Passive relocation sites shall be in areas of suitable habitat for burrowing owl nesting, and be characterized by minimal human disturbance and access. Relative cover of non-native plants within the proposed relocation sites shall not exceed the relative cover of non-native plants in the adjacent habitats;

d. Provide detailed methods and guidance for passive relocation of burrowing owls occurring within the Project Disturbance Area; and

4. Acquire Compensatory Mitigation Lands for Burrowing Owls. The following measures for compensatory mitigation shall apply only if burrowing owls that are detected within the Project Disturbance Area. The Project owner shall acquire, in fee or in easement, 19.5 acres of land for each burrowing owl that is displaced by construction of the Project. This compensation acreage of 19.5 acres per single bird or pair of nesting owls assumes that there is no evidence that the compensation lands are occupied by burrowing owls. If burrowing owls are observed to occupy the compensation lands, then only 9.75 acres per single bird or pair is required, per CDFG (1995) guidelines. If the compensation lands are contiguous to currently occupied habitat, then the replacement ratio will be 13.0 acres per pair or single bird. The Project owner shall provide funding for the enhancement and long-term management of these compensation lands. The acquisition and management of the

compensation lands may be delegated by written agreement to CDFG or to a third party, such as a non-governmental organization dedicated to habitat conservation, subject to approval by the CPM, in consultation with CDFG and USFWS prior to land acquisition or management activities. Additional funds shall be based on the adjusted market value of compensation lands at the time of construction to acquire and manage habitat. In lieu of acquiring lands itself, the Project owner may satisfy the requirements of this condition by depositing funds into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF), as described in Section 3.i. of Condition of Certification **BIO-17**.

a. Criteria for Burrowing Owl Mitigation Lands. The terms and conditions of this acquisition or easement shall be as described in Paragraph 1 of Condition of Certification **BIO-17** [Desert Tortoise Compensatory Mitigation], with the additional criteria to include: 1) the mitigation land must provide suitable habitat for burrowing owls, and 2) the acquisition lands must either currently support burrowing owls or be within dispersal distance from an active burrowing owl nesting territory (generally approximately 5 miles). The burrowing owl mitigation lands may be included with the desert tortoise mitigation lands ONLY if these two burrowing owl criteria are met. If the burrowing owl mitigation land is separate from the acquisition required for desert tortoise compensation lands, the Project owner shall fulfill the requirements described below in this condition.

b. Security. If burrowing owl mitigation land is separate from the acreage required for desert tortoise compensation lands the Project owner or an approved third party shall complete acquisition of the proposed compensation lands prior to initiating ground-disturbing Project activities. Alternatively, financial assurance can be provided by the Project owner to the CPM with copies of the document(s) to CDFG, BLM and the USFWS, to guarantee that an adequate level of funding is available to implement the mitigation measure described in this condition. These funds shall be used solely for implementation of the measures associated with the Project. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security") prior to initiating ground-disturbing Project activities. Prior to submittal to the CPM, the Security shall be approved by the CPM, in consultation with CDFG, BLM and the USFWS to ensure

funding. The estimated costs of enhancement and endowment shall be based upon land acquisition and management costs as discussed in Condition of Certification **BIO-17** and shall include all associated costs as described in that Condition. See **Revised Biological Resources Tables 5** and **7**. This amount may be revised by the CPM in consultation with DFG, BLM and USFWS, based on further analysis of long-term management and maintenance costs. The final amount due will be determined by the PAR analysis conducted pursuant to Condition of Certification **BIO-17**.

Verification: If pre-construction surveys detect burrowing owls within 500 feet of proposed construction activities, the Designated Biologist shall provide to the CPM, BLM, CDFG and USFWS documentation indicating that non-disturbance buffer fencing has been installed at least 10 days prior to the start of any construction-related ground disturbance activities. The Project owner shall report monthly to the CPM, CDFG, BLM and USFWS for the duration of construction on the implementation of burrowing owl avoidance and minimization measures. Within 30 days after completion of construction the Project owner shall provide to the CPM, BLM, CDFG and USFWS a written construction termination report identifying how mitigation measures described in the plan have been completed.

If pre-construction surveys detect burrowing owls within the Project Disturbance Area, the Project owner shall notify the CPM, BLM, CDFG and USFWS no less than 10 days of completing the surveys that a relocation of owls is necessary. The Project owner shall do all of the following if relocation of one or more burrowing owls is required:

a. Within 30 days of completion of the burrowing owl pre-construction surveys, submit to the CPM, CDFG and USFWS a Burrowing Owl Relocation and Mitigation Plan.

b. No less than 90 days prior to acquisition of the burrowing owl compensation lands, the Project owner, or an approved third party, shall submit a formal acquisition proposal to the CPM, CDFG, and USFWS describing the 39-acre parcel intended for purchase. At the same time the Project owner shall submit a PAR or PAR-like analysis for the parcels for review and approval by the CPM, CDFG and USFWS.

c. Within 90 days of the land or easement purchase, as determined by the date on the title, the Project owner shall provide the CPM with a management plan for review and approval, in consultation with CDFG, BLM and USFWS, for the compensation lands and associated funds.

d. No later than 30 days prior to the start of construction-related ground disturbing activities, the Project owner shall provide written verification of Security in accordance with this condition of certification.

e. No later than 18 months after the start of construction-related ground disturbance activities, the Project owner shall provide written verification to the CPM, BLM, CDFG and USFWS that the compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient.

f. On January 31st of each year following construction for a period of five years, the Designated Biologist shall provide a report to the CPM, USFWS, BLM and CDFG that describes the results of monitoring and management of the burrowing owl relocation area. The annual report shall provide an assessment of the status of the relocation area with respect to burrow function and weed infestation, and shall include recommendations for actions the following year for maintaining the burrows as functional burrowing owl nesting sites and minimizing the occurrence of weeds.

AVIAN PROTECTION PLAN / MONITORING BIRD IMPACTS FROM SOLAR TECHNOLOGY

BIO-22 The project owner shall prepare and implement an Avian and Bat Protection Plan to monitor bird and bat collisions with facility features (study described below). The Project owner shall use the monitoring data to inform and develop an adaptive management program that would avoid and minimize Project-related avian and bat impacts. Project-related bird and bat deaths or injuries shall be reported to the CPM, CDFG and USFWS. The CPM, in consultation with CDFG and USFWS, shall determine if the Project-related bird or bat deaths or injuries warrant implementation of adaptive management measures contained in the Avian and Bat Protection Plan. The study design for the Avian and Bat Protection Plan shall be approved by the CPM in consultation with CDFG and USFWS, and, once approved, shall be incorporated into the project's BRMIMP and implemented. The Plan shall include adaptive management strategies that include the placement of bird flight diverters, aerial markers, or other strategies to minimize collisions with the SunCatcher units.

The Avian and Bat Protection Plan shall include a Bird Monitoring Study to monitor the death and injury of birds and bats from collisions with facility features such as reflective mirror-like surfaces and from heat, and bright light from concentrating sunlight. The study design shall be approved by BLM's Wildlife Biologist and the CPM in consultation with CDFG and USFWS, and shall be incorporated into the project's BRMIMP and implemented. The Bird Monitoring Study shall be based upon prior studies by McCrary et al. (1986) or other applicable literature including the Region 8 Interim Guidelines for the Development of a Project-Specific Avian and Bat Protection Plan for Solar Energy Plants and Related Transmission Facilities (USFWS 2010), and shall include detailed specifications on data and carcass collection protocol and a

rationale justifying the proposed schedule of carcass searches. The study shall also include seasonal trials to assess bias from carcass removal by scavengers as well as searcher bias and proposed disposition of dead or injured birds.

Verification: No more than 30 days following the publication of the Energy Commission License Decision or BLM's Record of Decision/ROW Issuance, whichever comes first, the project owner shall submit to the CPM, BLM's Wildlife Biologist, USFWS and CDFG a final Avian Protection Plan. Modifications to the Avian Protection Plan shall be made only after approval from BLM's Wildlife Biologist and the CPM.

For one year following the beginning of power plant operation, the Designated Biologist shall submit quarterly reports to BLM's Wildlife Biologist , CPM, CDFG, and USFWS describing the methods, dates, durations, and results of monitoring. The quarterly reports shall provide a detailed description of any project-related bird or wildlife deaths or injuries detected during the monitoring study or at any other time. Following the completion of the fourth quarter of monitoring the Designated Biologist shall prepare an Annual Report that summarizes the year's data, analyzes any project-related bird fatalities or injuries detected, and provides recommendations for future monitoring and any adaptive management actions needed. The Annual Report shall be provided to the CPM, BLM's Wildlife Biologist, CDFG, and USFWS. Quarterly reporting shall continue until BLM's Wildlife Biologist and the CPM, in consultation with CDFG and USFWS determine whether more years of monitoring are needed, and whether mitigation and adaptive management measures are necessary. After the Bird Monitoring Study is determined by BLM's Wildlife Biologist and the CPM to be complete, the project owner or contractor shall prepare a paper that describes the study design and monitoring results to be submitted to the CPM, BLM's Wildlife Biologist, CDFG, USFWS, and a peer-reviewed scientific journal. Proof of submittal shall be provided to BLM's Wildlife Biologist and the CPM within one year of concluding the monitoring study.

NELSON'S BIGHORN SHEEP MITIGATION

BIO-23 The Designated Biologist or Biological Monitor shall be responsible for daily binocular scans of the project area and surrounding hills and bajadas to search for Nelson's bighorn sheep. At any time bighorn sheep are seen within 2000 feet of any active construction site, the Designated Biologist or Biological Monitor shall monitor their activity until the animals leave the area. If the bighorn sheep approach within 500 feet of any active construction site, then construction shall cease until the animals have moved farther than 500 feet away from construction activities, even if construction is occurring within an area that had been fenced with tortoise exclusion fencing. This buffer may be modified with the approval of the CPM, BLM, and CDFG. In addition, the project owner shall provide resource agency staff and private

conservation foundation staff and volunteers permanent access to the Cady Mountains via Hector Road or another suitable route for any activities related to Nelson's bighorn sheep monitoring or management.

Verification: Impact minimization measures and implementation methods for Nelson's bighorn sheep and their implementation methods shall be included in the final BRMIMP and implemented during construction and operation of the project. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist.

AMERICAN BADGER AND DESERT KIT FOX IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-24 Prior to ground disturbance the project owner shall conduct pre-construction surveys for American badgers and desert kit fox. These surveys may be conducted concurrent with the desert tortoise surveys. Surveys shall be conducted as described below:

Biological Monitors shall perform pre-construction surveys for badger and kit fox dens in the project area, including areas within 90 feet of all project facilities, utility corridors, and access roads. If dens are detected, each den shall be classified as inactive, potentially active, or definitely active.

Inactive dens that would be directly impacted by construction activities shall be excavated by hand and backfilled to prevent reuse by badgers or kit fox. Potentially active dens that would be directly impacted by construction activities shall be monitored by the Biological Monitor for three consecutive nights using a tracking medium (such as diatomaceous earth or fire clay) and/or infrared camera stations at the entrance. If no tracks are observed in the tracking medium or no photos of the target species are captured after three nights, the den shall be excavated and backfilled by hand.

Occupied badger dens shall be flagged and ground-disturbing activities avoided within 50 feet of the occupied den. Maternity dens shall be avoided during the pup-rearing season (15 February through 1 July) and a minimum 200-foot disturbance-free buffer established. Buffers may be modified with the concurrence of CDFG and CPM. Maternity dens shall be flagged for avoidance, identified on construction maps, and a biological monitor shall be present during construction.
If avoidance of a non-maternity den is not feasible, badgers shall be relocated or allowed to escape the project area (e.g., by providing a temporary monitored opening in the tortoise exclusion fence and directing the animal toward the opening with temporary plastic construction fencing). If necessary, dens will be slowly excavated (either by hand or mechanized equipment under the direct supervision

of the biologist, removing no more that 4 inches at a time) before or after the rearing season (15 February through 1 July). Any relocation of badgers shall occur only after consultation with the CDFG and CPM. A written report documenting the badger removal shall be provided to the CPM within 30 days of relocation. In the event that passive relocation techniques fail for badgers, the Applicant will contact CDFG to explore other relocation options, which may include trapping.

Verification: The project owner shall submit a report to the CPM, BLM, and CDFG within 30 days of completion of badger and kit fox surveys. The report shall describe survey methods, results, mitigation measures implemented, and the results of the mitigation.

BAT IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-25 The project owner shall conduct a survey for roosting bats prior to any ground disturbance activities in all areas within 200 feet of rocky outcrops or the existing BNSF railroad trestles. The project owner shall also conduct surveys for roosting bats during the maternity season (1 March to 31 July) within 300 feet of project activities at the existing railroad trestles and rocky outcrops. These areas shall be surveyed by a qualified bat biologist, who shall be approved by the Designated Biologist. Surveys shall include a minimum of one day and one evening visit. If active maternity roosts or hibernacula are found, the rock outcrop or trestle occupied by the roost shall be avoided (i.e., not removed) by the project, if feasible. If avoidance of the maternity roost is not feasible, the bat biologist shall survey (through the use of radio telemetry or other CDFG/CPM/BLM-approved methods) for nearby alternative maternity colony sites. If the bat biologist determines in consultation with and with the approval of the CDFG, BLM Wildlife Biologist, and CPM that there are alternative roost sites used by the maternity colony and young are not present, then no further action is required. However, if there are no alternative roost sites used by the maternity colony, provision of substitute roosting bat habitat is required. If active maternity roosts are absent, but a hibernaculum (i.e., a non-maternity roost) is present, then exclusion of bats prior to demolition of roosts is required.

1. Provision of substitute roosting bat habitat. If a maternity roost will be impacted by the project, and no alternative maternity roosts are in use within 1 mile of the site, substitute roosting habitat for the maternity colony shall be provided on, or in close proximity to, the project site no less than three months prior to the eviction of the colony. Alternative roost sites will be constructed in accordance with the specific bats' requirements in coordination with CDFG, BLM Wildlife Biologist, and the CPM. Alternative roost sites must be of comparable size and proximal in location to the impacted colony.

The CDFG shall also be notified of any hibernacula or active nurseries within the construction zone.

2. Exclude bats prior to demolition of roosts. If non-breeding bat hibernacula are found in rocky outcrops scheduled to be removed or in crevices in rock outcrops within the grading footprint, the individuals shall be safely evicted, according to timing and under the direction of the qualified bat biologist, by opening the roosting area to allow airflow through the cavity or other means determined appropriate by the bat biologist (e.g., installation of one-way doors). In situations requiring one-way doors, a minimum of one week shall pass after doors are installed and temperatures should be sufficiently warm for bats to exit the roost. This action should allow all bats to leave during the course of one week. Roosts that need to be removed in situations where the use of one-way doors is not necessary in the judgment of the qualified bat biologist shall first be disturbed by various means at the direction of the bat biologist at dusk to allow bats to escape during the darker hours, and the roost tree shall be removed or the grading shall occur the next day (i.e., there shall be no less or more than one night between initial disturbance and the grading or tree removal).

   If an active maternity roost is located in an area to be impacted by the project, and alternative roosting habitat is available, the demolition of the roost site must commence before maternity colonies form (i.e., prior to 1 March) or after young are flying (i.e., after 31 July) using the exclusion techniques described above.

Verification: The project owner shall submit a report to the CPM, the BLM Wildlife Biologist, and the CDFG within 30 days of completion of roosting bat surveys and any subsequent mitigation. The report shall describe survey methods, results, mitigation measures implemented, and the results of the mitigation.

STREAMBED IMPACT MINIMIZATION AND COMPENSATION MEASURES

BIO-26 The project owner shall implement the following measures to avoid, minimize and mitigate for direct and indirect impacts to jurisdictional waters of the State and to satisfy requirements of California Fish and Game Code sections 1600 and 1607. Throughout this condition, "jurisdictional" refers to streambeds or acreages of streambed meeting CDFG criteria as waters of the State.

Section A: Acquire Off-Site State Waters.

The project owner shall acquire, in fee or in easement, a parcel or parcels of land that includes no fewer than 152.3 acres of State jurisdictional waters. Prior to construction the applicant shall map the

vegetation with emphasis on desert wash, including microphyll woodland, communities within the drainages subject to project disturbance and provide a map to the CPM, CDFG and BLM. The parcel or parcels comprising the 152.3 acres of ephemeral washes shall include the same types of vegetation as mapped in the project footprint.

This compensation acreage may be included ("nested") within the acreage acquired and managed as desert tortoise habitat compensation (Condition of Certification **BIO-17**) only if:

- Adequate acreage of qualifying state-jurisdictional streambed delineated within the desert tortoise compensation lands;
- The desert tortoise habitat compensation lands are acquired and dedicated as permanent conservation lands within 18 months of the start of project construction.

If these two criteria are not met, then the project owner shall provide no fewer than 152.3 acres of state-jurisdictional streambed compensation lands independent of any compensation land required under other conditions of certification (adjusted to reflect the final project footprint and expert's delineation of streambed on the compensation lands), and shall also provide funding for the initial improvement and long-term maintenance and management of the acquired lands, and to comply with other related requirements this condition. Costs of these requirements cannot be estimated in advance because jurisdictional streambed would make up only a small portion of any acquired parcel and might vary widely among available parcels. In general, however the total costs shall be based upon land acquisition and management costs as discussed in Condition of Certification **BIO-17** and shall include all associated costs as described in that Condition. This amount may be revised by the CPM in consultation with DFG, BLM and USFWS, based on further analysis of long-term management and maintenance costs. See **Biological Resources Addendum Tables 5** and **9**. The terms and conditions of this acquisition or easement shall be as described in Condition of Certification **BIO-17**. Mitigation for impacts to State waters shall occur within the surrounding watersheds, as close to the project site as possible.

The project owner may elect to comply with the requirements in this condition for acquisition of compensation lands, initial protection and habitat improvement on the compensation lands, or long-term maintenance and management of the compensation lands by funding, or any combination of these three requirements, by providing funds to implement those measures into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF). To use this option, the Project owner must make an initial deposit to the REAT Account in an amount equal to the

estimated costs of implementing the requirement. If the actual cost of the acquisition, initial protection and habitat improvements, or long-term funding is more than the estimated amount initially paid by the project owner, the project owner shall make an additional deposit into the REAT Account sufficient to cover the actual acquisition costs, the actual costs of initial protection and habitat improvement on the compensation lands, or the long-term funding requirements as established in an approved PAR or PAR-like analysis. If those actual costs or PAR projections are less than the amount initially transferred by the applicant, the remaining balance shall be returned to the project owner.

The responsibility for acquisition of compensation lands may be delegated to a third party other than NFWF, such as a non-governmental organization supportive of desert habitat conservation, by written agreement of the Energy Commission. Such delegation shall be subject to approval by the CPM, in consultation with CDFG, BLM and USFWS, prior to land acquisition, enhancement or management activities. Agreements to delegate land acquisition to an approved third party, or to manage compensation lands, shall be executed and implemented within 18 months of the Energy Commission's certification of the project.

Management Plan for Acquired Lands: The project owner shall prepare and submit to Energy Commission CPM and CDFG a draft Management Plan that reflects site-specific enhancement measures for the drainages on the acquired compensation lands. The objective of the Management Plan shall be to enhance the wildlife value of the drainages, and may include enhancement actions such as weed control, fencing to exclude livestock, or erosion control. Where applicable, the management plan should be integrated with desert tortoise compensation land habitat management planning requirements as described in **BIO-17**.

Section B: On-site Measures:

1. Copies of Requirements, Stop Work Authority: The project owner shall provide a copy of the Streambed Impact Minimization and Compensation Measures to all contractors, subcontractors, and the applicant's project supervisors. Copies shall be readily available at work sites at all times during periods of active work and must be presented to any CDFG personnel or personnel from another agency upon demand. The CPM reserves the right to issue a stop work order after giving notice to the project owner, if the CPM, in consultation with CDFG, determines that the project owner is not in compliance with any of the requirements of this condition, including but not limited to the existence of any of the following:

a. The information provided by the applicant regarding streambed alteration is incomplete or inaccurate;

b. New information becomes available that was not known to the Energy Commission at the time of project certification; or

c. The project or project activities as described in the Supplemental Staff Assessment/ Final Environmental Impact Statement have changed.

2. Best Management Practices: The project owner shall comply with the following conditions to protect drainages near the Project Disturbance Area:

   a. The project owner shall not operate vehicles or equipment in ponded or flowing water except as described in this condition.

   b. With the exception of the retention basins and drainage control system installed for the project the installation of bridges, culverts, or other structures shall be such that water flow (velocity and low flow channel width) is not impaired. Bottoms of temporary culverts shall be placed at or below stream channel grade.

   c. When any activity requires moving of equipment across a flowing drainage, such operations shall be conducted without substantially increasing stream turbidity.

   d. Vehicles driven across ephemeral drainages when water is present shall be completely clean of petroleum residue and water levels shall be below the vehicles' axels.

   e. The project owner shall minimize road building, construction activities and vegetation clearing within ephemeral drainages to the extent feasible.

   f. The project owner shall not allow water containing mud, silt, or other pollutants from grading, aggregate washing, or other activities to enter ephemeral drainages or be placed in locations that may be subjected to high storm flows.

   g. The project owner shall comply with all litter and pollution laws. All contractors, subcontractors, and employees shall also obey these laws, and it shall be the responsibility of the project owner to ensure compliance.

   h. Spoil sites shall not be located at least 30 feet from the boundaries and drainages or in locations that may be subjected to high storm flows, where spoils might be washed back into drainages.

   i. Raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any

other substances that could be hazardous to vegetation or wildlife resources, resulting from project-related activities, shall be prevented from contaminating the soil and/or entering waters of the State. These materials, placed within or where they may enter a drainage by the project owner or any party working under contract or with the permission of the project owner, shall be removed immediately.

j. No broken concrete, debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or washings thereof, oil or petroleum products or other organic or earthen material from any construction or associated activity of whatever nature shall be allowed to enter into, or placed where it may be washed by rainfall or runoff into, waters of the State.

k. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any drainage.

l. No equipment maintenance shall occur within 150 feet of any ephemeral drainage where petroleum products or other pollutants from the equipment may enter these areas under any flow.

m. Stationary equipment such as motors, pumps, generators, and welders, located within or adjacent to a drainage shall be positioned over drip pans. Stationary heavy equipment shall have suitable containment to handle a catastrophic spill/leak. Clean up equipment such as booms, absorbent pads, and skimmers, shall be on site prior to the start of construction.

n. The cleanup of all spills shall begin immediately. The CDFG, BLM Wildlife Biologist, and CPM shall be notified immediately by the project owner of any spills and shall be consulted regarding clean-up procedures.

3. Non-Native Vegetation Removal. The owner shall remove any non-native vegetation (Consistent with the Weed Management Plan, see Condition of Certification **BIO-11**) from any on-site portion of any drainage that requires the placement of a bridge, culvert or other structure. Removal shall be done at least twice annually (Spring/Summer) throughout the life of the Project.

4. Reporting of Special-Status Species: If any special-status species are observed on or in proximity to the project site, or during project surveys, the project owner shall submit California Natural Diversity Data Base (CNDDB) forms and maps to the CNDDB within five working days of the sightings and provide the regional CDFG office with copies of the CNDDB forms and survey maps. The CNDDB

form is available online at: www.dfg.ca.gov/whdab/pdfs/natspec.pdf. This information shall be mailed within five days to: California Department of Fish and Game, Natural Diversity Data Base, 1807 13th Street, Suite 202, Sacramento, CA 95814, (916) 324-3812. A copy of this information shall also be mailed within five days to CDFG, BLM Wildlife Biologist, and the CPM.

5. Notification: Prior to any activities that cross or have the potential to impact any jurisdictional drainage, the project owner shall provide a detailed map to the CDFG, BLM Wildlife Biologist, and CPM in a GIS format that identifies all potential crossings of jurisdictional habitats including retention basins, detention basins, reconfigured channels and culverts. The maps shall identify the type of crossing proposed by the owner such as bridges, culverts, or other mechanism and the best management practices that would be employed. The project owner shall notify the CPM, BLM Wildlife Biologist, and CDFG, in writing, at least five days prior to initiation of project activities in jurisdictional areas and at least five days prior to completion of project activities in jurisdictional areas. The project owner shall notify the CPM, BLM Wildlife Biologist, and CDFG of any change of conditions to the project, the jurisdictional impacts, or the mitigation efforts, if the conditions at the site of the proposed project change in a manner which changes risk to biological resources that may be substantially adversely affected by the proposed project. The notifying report shall be provided to the CPM, BLM Wildlife Biologist, and CDFG no later than 7 days after the change of conditions is identified. As used here, change of condition refers to the process, procedures, and methods of operation of a project; the biological and physical characteristics of a project area; or the laws or regulations pertinent to the project, as described below. A copy of the notifying change of conditions report shall be included in the annual reports.

   a. Biological Conditions: a change in biological conditions includes, but is not limited to, the following: 1) the presence of biological resources within or adjacent to the project area, whether native or non-native, not previously known to occur in the area; or 2) the presence of biological resources within or adjacent to the project area, whether native or non-native, the status of which has changed to endangered, rare, or threatened, as defined in section 15380 of Title 14 of the California Code of Regulations.

   b. Physical Conditions: a change in physical conditions includes, but is not limited to, the following: 1) a change in the morphology of a river, stream, or lake, such as the lowering of a bed or scouring of a bank, or changes in stream form and configuration caused by storm events; 2) the movement of a

river or stream channel to a different location; 3) a reduction of or other change in vegetation on the bed, channel, or bank of a drainage, or 4) changes to the hydrologic regime such as fluctuations in the timing or volume of water flows in a river or stream.

c. Legal Conditions: a change in legal conditions includes, but is not limited to, a change in Regulations, Statutory Law, a Judicial or Court decision, or the listing of a species, the status of which has changed to endangered, rare, or threatened, as defined in section 15380 of Title 14 of the California Code of Regulations.

Verification: No fewer than 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall implement the mitigation measures described in this condition. No fewer than 30 days prior to the start of work potentially affecting waters of the State, the project owner shall provide written verification (i.e., through incorporation into the BRMIMP) to the CPM and BLM Wildlife Biologist that the above best management practices will be implemented and provide a discussion of work in waters of the State in Compliance Reports for the duration of the project.

Within 30 days after completion of the first year of project construction, the project owner shall provide to the CPM for review and approval a report identifying that appropriate mitigation lands have been obtained, verification of the acreage of state jurisdictional streambeds on the compensation lands (to be delineated using methodology identical to the delineation of on-site jurisdictional streambeds), a draft Management Plan for review and approval by the CPM and CDFG, and verification on ongoing enhancement techniques, and a summary of all modifications made to the existing channels on the project site.

EVAPORATION POND DESIGN, MONITORING, AND MANAGEMENT PLAN

BIO-27 The project owner shall install netting over the evaporation ponds and design and implement an Evaporation Pond Design, Monitoring, and Management Plan (Evaporation Pond Plan) to be based upon the draft Evaporation Pond Plan submitted by the applicant. The Plan shall meet the approval of the USFWS, CDFG, BLM's Wildlife Biologist, and the CPM. The goal of the Evaporation Pond Plan shall be to avoid the potential for wildlife mortality associated with the evaporation ponds. The Evaporation Pond Plan shall include: a discussion of the objectives of the Evaporation Pond Plan; a description of project design features such as side slope specifications, freeboard and depth requirements, covering, and fencing; a discussion on the placement of the evaporation pond as to reduce the potential of collision or electrocution of wildlife near the transmission line; avian, pond, and water quality monitoring for selenium and other Title 20 compounds, management actions such as bird deterrence/hazing and water level management, triggers for those management actions; and annual reporting requirements.

Verification: At least 30 days prior to start of any project-related ground disturbance activities, the project owner shall provide the CPM, BLM's Wildlife Biologist, USFWS, and CDFG with the final version of the Evaporation Pond Plan that has been reviewed and approved by USFWS, CDFG, and staff. The CPM and BLM's Wildlife Biologist would determine the plan's acceptability within 15 days of receipt of the final plan. All modifications to the approved Evaporation Pond Plan must be made only after consultation the staff, USFWS, and CDFG. The project owner shall notify the CPM and BLM's Wildlife Biologist no less than 5 working days before implementing any BLM- and CPM-approved modifications to the Evaporation Pond Plan.

Within 30 days after completion of evaporation pond construction, the project owner shall provide to the CPM for review and approval a report identifying which items of the Evaporation Pond Plan have been completed, a summary of all modifications to mitigation measures made during the project's construction phase, and as-built drawings of the evaporation ponds. Throughout the life of the project, the project owner shall provide annual reports on results of the previous year's evaporation plan monitoring, including but not limited to description and summary of wildlife mortality, water quality, and management actions taken or proposed.

CHANNEL DECOMMISSIONING AND RECLAMATION PLAN

BIO-28 Upon project closure, the project owner shall implement a final Decommissioning and Reclamation Plan to remove the engineered diversion channels, detention basins, and other sediment control features from the project site. The goal of the plan shall be to restore the site's topography and hydrology to a relatively natural condition and to establish native plant communities within the Project Disturbance Area. The Channel Decommissioning and Reclamation Plan shall include a cost estimate for implementing the proposed decommissioning and reclamation activities. The plan and cost estimate shall be consistent with the guidelines in BLM's 43 CFR 3809.550 et seq., subject to review and revisions from BLM's Wildlife Biologist and the CPM in consultation with USFWS and CDFG.

Verification: No less than 90 days from publication of the Energy Commission Decision or the Record of Decision, whichever comes first, the project owner shall provide to BLM's Wildlife Biologist and the CPM an agency-approved final Channel Decommissioning and Reclamation Plan. Modifications to the approved Channel Decommissioning Plan shall be made only after approval from BLM's Wildlife Biologist and the CPM, in consultation with USFWS, and CDFG.

No more than 10 days prior to initiating project-related ground disturbance activities the project owner shall provide financial assurances to BLM's Wildlife Biologist and the CPM to guarantee that an adequate level of funding would be available to implement measures described in the Channel Decommissioning and Reclamation Plan, pursuant to 43 CFR 3809.550 et seq.

CLOSURE PLAN MEASURES

BIO-29 The project owner shall implement and incorporate into the facility closure plan measures to address the local biological resources related to facility closure. A funding mechanism shall be developed in consultation with staff to ensure sufficient funds are available for revegetation, reclamation, and decommissioning. The facility closure plan shall address biological resources-related mitigation measures. In addition to these measures, the plan must include the following:

1. Removal of transmission conductors when they are no longer used and useful;

2. Removal of all above-ground and subsurface power plant site facilities and related facilities;

3. Methods for restoring wildlife habitat and promoting the re-establishment of native plant and wildlife species;

4. Revegetation of the project site and other disturbed areas utilizing appropriate methods for establishing native vegetation; components of the revegetation plan, including performance standards and monitoring, shall be as described in Condition of Certification **BIO-10**;

5. A cost estimate to complete closure-related activities, to be based upon decommissioning costs required under 43 CFR 3809.550 et seq.

6. An implementation and monitoring plan to ensure successful and satisfactory completion of every element of the Facility Closure Plan.

In addition, the project owner shall secure funding to ensure implementation of the plan and provide to the CPM and BLM Wildlife Biologist written evidence of the dedicated funding mechanism(s). The financial assurances may be in the form of an irrevocable letter of credit, a performance bond, a pledged savings account, or another equivalent form of security, as approved by the CPM and BLM Wildlife Biologist.

Verification: Prior to initiating ground-disturbing project activities, the project owner shall provide financial assurances (as described in this condition, above) to the CPM and BLM Wildlife Biologist to guarantee that an adequate level of funding will be available to implement decommissioning and closure activities described above.

At least 12 months prior to commencement of planned closure activities, the project owner shall address all biological resources-related issues associated with facility closure, and provide final measures, in a Biological Resources Element. The draft planned permanent or unplanned closure measures shall be submitted to the CPM, BLM Wildlife Biologist, CDFG, and USFWS. After revision, final measures shall comprise the Biological Resources Element, which shall include the items listed above as well as written evidence of the dedicated funding mechanism(s) for these measures. The final Biological Resources Element shall become part of the facility closure plan, which is submitted to the CPM and BLM Wildlife Biologist within 90 days of the permanent closure or another period of time agreed to by the CPM and BLM Wildlife Biologist.

In the event of an unplanned permanent closure, or an indeterminate suspension of operations, the project owner shall notify the CPM and BLM Wildlife Biologist , as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan (see **Compliance** Conditions of Certification).

Upon facility closure, the project owner shall implement measures in the Biological Resources Element and provide written status updates on all closure activities to the CPM and BLM Wildlife Biologist at a frequency determined by the CPM and BLM Wildlife Biologist.

IN-LIEU FEE MITIGATION OPTION

BIO-30 The Project owner may choose to satisfy certain compensatory mitigation obligations identified in this Decision by paying an in lieu fee to the Department of Fish and Game pursuant to Fish and Game code sections 2069 and 2099, to the extent the in-lieu fee provision is found by the Commission to be in compliance with CEQA and CESA requirements.

Verification: If electing to use this provision, the Project owner shall notify the Commission that it would like a determination that the in-lieu fee proposal meets CEQA and CESA requirements.

PROJECT CONSTRUCTION AND COMPENSATION PHASING PLAN

BIO-31 As an alternative to providing mitigation or security for the entire project prior to the start of the first ground-disturbing activities, the Project Owner may elect to provide compensatory mitigation for the total Project Disturbance Area in two phases and may elect to provide security in three phases as specified in this condition.

Only the phases identified as Phase 1a, Phase 1b, and Phase 2, as described in this condition, in text and maps provided on September 10, 2010 by the Project Owner (tn: 58411, Applicant's submittal of

Updated Reduced Project Boundary Scenarios 5.5 or Figures 17 and 18 [Scenario 5.5]) may be used for the phasing of mitigation and security requirements. To the extent those sources are found to contain conflicting information about Project phasing, the description in this condition shall control. In particular, the Project Owner has divided the project's Phase 1 activities into two separate sub-phases, identified as Phase 1a and Phase 1b, since the Supplemental Staff Assessment was prepared. This condition presumes that the phases identified in this condition are identical to the phases that the Bureau of Land Management (BLM) will authorize work on through issuance of "notices to proceed"; if phases used by BLM are not identical to the phases as described in this condition and the materials identified above, the Project Owner shall obtain separate written authorization from the CPM prior to beginning work on each of the three phases.

For purposes of this condition:

"Project Disturbance Area" or "ground disturbance area" means all areas that will be temporarily or permanently disturbed during construction or operation of the Project, including all linear facilities.

"Project footprint" means the Project Disturbance Area and undeveloped areas inside the Project's boundaries that will no longer provide functional habitat value, including but not limited to desert tortoise habitat, Mojave fringe-toed lizard habitat, burrowing owl habitat, rare plant habitat, and areas within ephemeral washes and drainages.

"Project construction" or "construction" means any ground-disturbing activity, including but not limited to construction work, site mobilization, fence construction, or any tortoise translocation activities.

"Security" means the security that is required under other biological conditions of certification to ensure required mitigation measures will be implemented, or payments by the Project Owner into the National Fish and Wildlife Service mitigation account in accordance with the option provided in other conditions of certification.

Overview of Project Phases

Phase 1a is strictly limited to construction of the main access road, the waterline, the Main Services Area, the substation area, the installation of 60 SunCatcher pedestals, the temporary at-grade crossing over the Burlington Northern Santa Fe (BNSF) railroad tracks, the permanent bridge spanning the railroad tracks, and any surveys, translocations, or other activities required within the Phase 1a area that are required by

Commission Conditions of Certification. The ground disturbance area during Phase 1a shall be no greater than 250 acres and shall be limited to the geographic areas indicated on the maps identified above.

Phase 1b is strictly limited to construction of solar fields and related facilities located throughout the remainder of the area identified as Phase 1 in the Supplemental Staff Assessment and in applicant's Scenario 5.5 6 (tn: 58411, Applicant's submittal of Updated Reduced Project Boundary Scenarios 5.5 Information), and any surveys, translocations, or other activities required within the Phase 1b area that are required by Commission Conditions of Certification. The ground disturbance area during Phase 1b shall be limited to the areas indicated on the maps identified above.

Phase 2 is strictly limited to the remainder of the project site as identified as Scenario 5.5 in applicant's maps (tn: 58411, Applicant's submittal of Updated Reduced Project Boundary Scenarios 5.5).

General Requirements

At no time may the Project Owner cause ground-disturbance to any location outside of the area that has been approved for construction according to the phasing plan identified in this Condition of Certification.

Prior to initiating construction in any phase of the Project, the Project Owner shall comply with all pre-construction requirements in this and other Conditions of Certification and shall notify the CPM that it has obtained a Notice to Proceed for the phase or subphase from the BLM.

Construction activities, including work on linear and non-linear features, shall not occur outside desert tortoise exclusion areas that have been fenced and cleared in accordance with USFWS protocols and as described in Condition of Certification **BIO-15** (Desert Tortoise Clearance and Exclusion Fencing).

The Project Owner shall provide security to ensure implementation of the mitigation requirements in Conditions of Certification **BIO-12** (Special-Status Plant Impact and Avoidance and Minimization)**, BIO-13** (Mojave Fringe-Toed Lizard Mitigation), **BIO-16** (Desert Tortoise Translocation Plan), **BIO-17** (Desert Tortoise Compensatory Mitigation), **BIO-21** (Burrowing Owl Impact Avoidance and Minimization Measures), and **BIO-26** (Streambed Impact Minimization and Compensation Measures) for each of the three phases prior to any Project construction associated with that phase. Phasing of security only applies to security required by the Conditions listed above. If the

Project Owner elects to phase payments of security, the amount of the security (including payments to NFWF [see definition of security above]) will be adjusted by the CPM in consultation with CDFG, BLM and USFWS prior to each phase to reflect the CPM's best estimate at that time of the estimated costs of land acquisition, long-term management and maintenance costs, and other costs that are included in the security computation. Those costs may be greater than the costs identified in the Conditions of Certification.

Even when security has been provided, the Project Owner shall complete the acquisition, protection and transfer of all compensation lands required in the Conditions of Certification listed above, as well as all funding requirements associated with those lands, within the time periods identified in those Conditions of Certification, except that the time period for providing compensation lands and funding associated with both Phases 1a and 1b shall be measured from the start of construction of Phase 1a alone, and the period for providing lands and funding required for Phase 2 activities shall be measured from the start of construction of Phase 2.

Additional requirements within the Project's Conditions of Certification that are not expressly phased in this Condition shall be phased as necessary to carry out the purpose of this condition, or to ensure that no project construction occurs in an area for which the Project Owner has not provided security and obtained permission to begin construction. Examples may include such activities as construction and location of desert tortoise exclusion fencing or timing of pre-construction clearance surveys for other species. The Project Owner shall first obtain approval from the CPM, acting in consultation with BLM, CDFG and USFWS, for the phasing of any requirements or deadlines that are not expressly phased in Conditions of Certification.

Detailed Phasing Requirements

Phased impacts and compensation requirements are described in tables below, by phase.

<u>Phase 1a</u>

Phase 1a would result in the loss or isolation of 250 acres of desert tortoise habitat from the placement of fencing, road construction, and the development of project facilities. The construction and fencing of the temporary and Main Access Road would also result in the temporary isolation of approximately 650 acres of desert tortoise habitat. In addition, proposed Phase 1a Project

construction would affect state-jurisdictional streambeds and, possibly, burrowing owl or rare plant locations that are identified during pre-construction and late-season botanical surveys. The applicant shall provide an enumeration of streambed, burrowing owl, and rare plant habitat impacts and shall provide security for required compensation those impacts as described in Conditions of Certification **BIO-12** (Special-Status Plant Impact and Avoidance and Minimization), **BIO-17** (Desert Tortoise Compensatory Mitigation)**,** **BIO-21** (Burrowing Owl Impact Avoidance and Minimization Measures), and **BIO-26** (Streambed Impact Minimization and Compensation Measures) prior to initiating Project construction associated with Phase 1a, as set forth in the verification section of this Condition.

All project access throughout Phase 1a construction shall be via temporary or permanent access as mapped by the applicant. Isolation of desert tortoise habitat between the proposed temporary and permanent construction access routes shall be limited to winter months when tortoises are largely inactive. Desert tortoise exclusion fencing shall be installed along the existing temporary construction access routes prior to other ground disturbance at the project site, and fencing shall be maintained as described in Condition of Certification **BIO-15** (Desert Tortoise Clearance and Exclusion Fencing) until completion of the proposed Main Access Road. Desert tortoise exclusion fencing shall be installed along the proposed Main Access Road alignment prior to beginning construction of that road. If project-related access along the temporary construction access route continues beyond March 15, 2011, the Project Owner shall provide additional security to the CPM for all acreage within the area isolated between the two fenced access routes (estimated by staff as approximately 650 acres) by March 15, 2011 and shall implement desert tortoise clearance surveys and translocation of any tortoises within the isolated area consistent with the requirements of Condition of Certification **BIO-15** (Desert Tortoise Clearance and Exclusion Fencing) . If the Main Access Road is complete by March 15, 2011 and no further project access via the temporary route is necessary, desert tortoise fencing along the temporary access road shall be removed on or before March 15, 2011

BIO-31 Table 1a.
Phase 1a Impacts and Compensation Acreage (Scenario 5.5)

Resource	Phase 1a Impact (acres) and Mitigation Ratios	Compensation (acres)
Direct impact: Desert tortoise habitat	56 ac. S of BNSF at 1:1 194 ac. N of BNSF at 3:1	56 582

State Jurisdictional streambed [1]	[to be provided by Project Owner] at 1:1	
Mojave fringe-toed lizard [1]	0	0
Additional (burrowing owl, special status plants) [1]	[to be provided by Project Owner] at 3:1	
Total per-acre basis for Phase 1a Security (through 15 March 2011)		**638[2] acres**
Potential impact: Isolation of desert tortoise habitat (after 15 March 2011)	650 acres at 1:1 [staff estimate; to be verified by Project Owner]	650 acres
Total per-acre basis for Phase 1a Security (after 15 March 2011, pending status of temporary access route)		**1,288[2] acres**

1. Compensation may be nested within desert tortoise compensation land.
2. Acreages to be adjusted upon completion of each construction phase and upon confirmation by CPM in consultation with CDFG, USFWS, and BLM of acres impacted.

Phase 1b

Phase 1b consists of solar generators in the central portion of the project area, north of the BNSF railroad. Phase 1b would directly impact 1,626 acres of desert tortoise habitat. Compensation mitigation ratios for these project components shall be as described in Condition of Certification **BIO-17**(Desert Tortoise Compensatory Mitigation). Construction of stormwater detention basins and debris basins that may be constructed during Phase 1b, pending hydrology analyses and BNSF review pursuant to Condition of Certification **SOIL AND WATER-8** will also result in direct impacts to State jurisdictional streambeds located downstream in portions of Phase 2. For that reason, all jurisdictional waters that occur below any future detention basins may also be included in the calculation of Phase 1b security and in the calculation of Phase 1 mitigation requirements. In addition, proposed Phase 1b Project construction could affect burrowing owl or rare plant locations that may be identified during pre-construction and late-season botanical surveys required in the Conditions of Certification described below. The applicant shall provide the CPM with an enumeration of burrowing owl and rare plant habitat impacts and shall provide security for required compensation of those impacts as described in Conditions of Certification **BIO-12** (Special-Status Plant Impact and Avoidance and Minimization)**,** **BIO-17**(Desert Tortoise Compensatory Mitigation)**,** **BIO-21** (Burrowing Owl Impact Avoidance and Minimization Measures), and **BIO-26** (Streambed Impact Minimization and Compensation Measures)**.** Security shall be provided prior to the start of any Phase 1b construction, as set forth

in the verification section of this Condition, or prior to September 1, 2011, whichever occurs first.

BIO-31 Table 1b.
Phase 1b Impacts and Compensation Acreage (Scenario 5.5)

Resource	**Phase 1b Impact (acres) and Mitigation Ratios**	**Compensation (acres)**
Desert tortoise habitat (excluding disturbed or isolated acreage reported above in Phase 1a)	1,626 at 3:1	4,878 acres
State Jurisdictional streambed [1]	[to be provided by Project Owner] at 1:1	
Mojave fringe-toed lizard [1]	[to be provided by Project Owner] at 1:1 [to be provided by Project Owner] at 3:1	
Additional (burrowing owl, special status plants) [1]	[to be provided by Project Owner]	
Total per-acre basis for Phase 1b Security		**4,878[2] acres**

1. Compensation may be nested within desert tortoise compensation land.
2. Acreages to be adjusted upon completion of each construction phase and upon confirmation by CPM in consultation with CDFG, USFWS, and BLM of acres impacted.

Phase 2

Phase 2 construction would directly impact desert tortoise habitat north and south of BNSF railroad tracks. Phase 2 would impact 2,085 acres of occupied desert tortoise habitat south of the BNSG railroad tracks to be mitigated at a 1:1 ratio. In addition, Scenario 5.5 would impact 369 acres of high-density occupied desert tortoise habitat to be mitigated at the 5:1 ratio. Compensation mitigation ratios for these project components shall be as described in Condition of Certification **BIO-17** (Desert Tortoise Compensatory Mitigation). In addition, proposed Phase 2 Project construction would affect Mojave fringe-toed lizard habitat and could affect burrowing owl or rare plant locations that may be documented during late-season field surveys. The applicant shall provide the CPM an enumeration of burrowing owl, and rare plant habitat impacts and shall provide security for required compensation of those impacts as described in Conditions of Certification **BIO-12** (Special-Status Plant Impact and Avoidance and Minimization)**,** **BIO-13** (Mojave Fringe-Toed Lizard Mitigation), **BIO-16** (Desert Tortoise Translocation Plan), **BIO-17** (Desert Tortoise Compensatory Mitigation), **BIO-21** (Burrowing Owl Impact Avoidance and Minimization Measures), and **BIO-**26 (Streambed

Impact Minimization and Compensation Measures) Security shall be provided to the CPM, prior to beginning of any project-related ground disturbing activities, as set forth in the verification section of this Condition.

BIO-31 Table 2.
Phase 2 Impacts and Compensation Acreage.

Resource	Phase 2 Impact (acres) and Mitigation Ratios	Compensation (acres)
Desert tortoise habitat (excluding disturbed or isolated acreage in Phase 1a; see Table 1a)	2,085 acres S of BNSF at 1:1 283 acres N of BNSF at 3:1	2,085 849
Desert tortoise habitat at 5:1 (Scenario 5.5 only)	369 acres at 5:1	1,845
State Jurisdictional streambed [1]	0	0
Mojave fringe-toed lizard [1]	21.4 acres at 1:1 143.3 acres at 3:1	21.4 429.9
Additional (burrowing owl, special status plants)	To be provided by the Project Owner.	
Total Scenario 5.5 per-acre basis for Phase 2 Security		**5,230[2] acres**

1. Compensation may be nested within desert tortoise compensation land.
2. Acreages to be adjusted upon completion of each construction phase and upon confirmation by CPM in consultation with CDFG, USFWS, and BLM of acres impacted.

Verification: No fewer than 30 days prior to the start of desert tortoise clearance surveys for each phase, the Project owner shall submit a description of the proposed construction activities for that phase to CDFG, USFWS and BLM for review and to the CPM for review and approval. The description for each phase shall include the proposed construction schedule, a figure depicting the locations of proposed construction and number of acres of rare plant habitat, burrowing owl habitat, and state-jurisdictional streambeds to be disturbed.

If all mitigation requirements, including habitat acquisition and protection, are not completed for a Project phase at least 30 days prior to the start of ground-disturbing activities for that phase, the Project Owner shall provide verification to the CPM and CDFG that approved security (as described in Conditions of Certification **BIO-12** (Special-Status Plant Impact and Avoidance and Minimization), **BIO-13** (Mojave Fringe-Toed Lizard Mitigation), **BIO-16** (Desert Tortoise Translocation Plan), **BIO-17** (Desert Tortoise Compensatory Mitigation), **BIO-21** (Burrowing Owl Impact Avoidance and Minimization Measures), and **BIO-26** (Streambed Impact Minimization and Compensation Measures)) has been established in accordance with these Conditions of Certification no later than 30 days prior to beginning ground-disturbing activities for each Phase. Prior to submitting verification regarding the security to the CPM, the project owner shall obtain the CPM's approval of the security as required by the other Conditions

For Phase 1b, the Project Owner shall obtain the CPM's approval of security and shall provide verification that approved security has been established by September 1, 2011 or 30 days prior to the start of Phase 1b construction, whichever occurs first. The fixed deadline for Phase 1b security is necessary because under terms of this Condition, compensation lands and associated funding for both Phase 1a and Phase 1b will be due in the first half of 2012, assuming Phase 1a construction begins as planned in late 2010, and security must be in place well in advance of the mitigation obligations that are being guaranteed.

The Project Owner shall provide written verification to the CPM, CDFG, BLM and USFWS of the compensation lands acquisition, protection, and transfer requirements and satisfaction of associated funding requirements as set forth in **BIO-17** and other conditions within the following time frames: (1) For Phase 1a and Phase 1b mitigation, verification shall be provided no later than18 months after the start of construction of Phase 1a, and (2) for Phase 2 mitigation, such verification shall be provided no later than 18 months after the start of construction of Phase 2. Other verification, notification and reporting requirements and other deadlines set forth in BIO-17 and other Conditions that relate to compensation land requirements, to the option of funding mitigation through the NFWF account, or to use of approved third parties to carry out mitigation requirements also apply to Phase 1 (1a and 1b combined) and to Phase 2.

Within 90 days after completion of all project related ground disturbance for each project phase <u>or sub phase</u>, the project owner shall provide to the CPM, CDFG, BLM and USFWS an analysis, based on aerial photography, with the final accounting of the amount of habitat disturbed during Project construction.

B. SOIL AND WATER RESOURCES

This section focuses on the soil and water resources associated with the Calico Solar Project (Calico) as proposed by the Applicant in their reduced acreage Scenario 5.5 on September 10, 2010, including the project's potential to induce erosion and sedimentation, adversely affect water supplies, and degrade water quality. Mitigation measures are included in the Conditions of Certification to ensure that the project will have no significant impacts on the environment and that it will comply with all LORS.

SUMMARY AND DISCUSSION OF THE EVIDENCE

The Applicant originally proposed an 850 MW project on 8,230 acres of undeveloped land located within the Mojave Desert in the central portion of San Bernardino County. Subsequent to the Committee Order issued on September 3, 2010, the Applicant proposed two reduced acreage scenarios for the Calico Solar Project site: Scenario 5.5 which will produce approximately 663.5 MW on 4,613 acres and Scenario 6 which will produce approximately 603.9 MW on 4,244 acres within the original project footprint. The site is located approximately 37 miles east of Barstow, California with its southern boundary adjacent to Interstate 40 (I-40) (**Soil and Water Figure** 1 with original project footprint overlay). The project will utilize SunCatchers – 40-foot tall Stirling dish technology developed by the Applicant - which track the sun and focus solar energy onto Power Conversion Units (PCU) to generate electricity. Each PCU consists of a solar receiver heat exchanger and a closed-cycle, high-efficiency Solar Stirling Engine specifically designed to convert solar power to rotary power via a thermal conversion process. The engine drives an electrical generator to produce grid-quality electricity. The site will contain approximately 26,540 SunCatchers and associated equipment and infrastructure within a fenced boundary. (Ex. 300, pp. C.7-9 to C.7-10., Ex. 317 pp. C.7-6 to C.7-7.)

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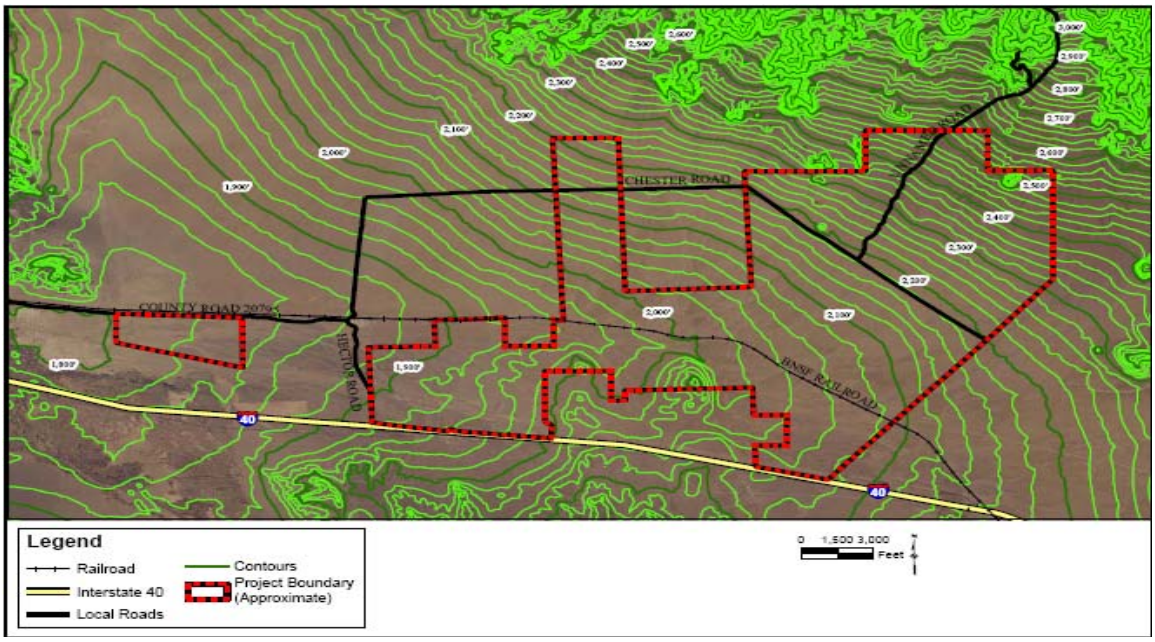
Soil and Water - Figure 1



Source: Exhibit 300

Site construction will be accomplished in two phases, Phase 1 (including Phases 1A and 1B) and Phase 2. Phase 1 construction will take place during the first 26-month period, consisting of construction of the primary access routes, the construction laydown areas, the rough grading for the Main Services Complex and the substation sites, as well as the clearing areas disturbed by the construction of each solar group. Phase 2 will take place during construction months 32 through 60. Phase 2 will mostly involve construction of additional access roads and continued solar field development. (Ex. 300, p. C.7-17.)

The project site lies within the Lavic Valley Groundwater Basin. The basin is approximately 159 square miles in area and is bounded by nonwater-bearing rocks of the Cady Mountains on the north and east, the Bullion Mountains on the south and east, the Lava Bed Mountains on the southwest, and the Pisgah fault on the west. Parts of the eastern and northern boundaries are drainage divides. The southern part of this basin lies within the Twentynine Palms Marine Corps Base. (Ex. 300, p. C.7-11.)

In the northern part of the basin, which includes the project site, surface drainage is westward toward the Mojave River. In the southern part of the basin, surface drainage is toward Lavic (dry) Lake. (Ex. 300, p. C.7-11.)

The evidence indicates that groundwater flow at the project site appears to be to the southeast, but not toward Lavic (dry) Lake which is a surface water playa

above the regional water table. Rather, groundwater apparently flows eastward into the Broadwell Valley Basin near the (ghost) town of Ludlow. This interpretation is consistent with recharge modeling that indicates the largest source of recharge to the Lavic Valley Basin is rainfall infiltration in the Bullion Mountains that border the southern end of the basin. (Ex. 300, p. C.7-11.)

Precipitation supplies water to the basin, primarily by infiltration of mountain runoff across the alluvial deposits and through ephemeral washes. Recharge from precipitation on the valley floor is minimal. When runoff or precipitation does reach the dry lakes, infiltration to groundwater is negligible and most of the water is removed by evaporation. Groundwater discharge from the basin occurs mainly through pumping and underflow towards the Las Vegas Valley. (Ex. 300, p. C.7-11.)

Water from a well in the southern part of the basin near Lavic Lake sampled in 1917 was sodium sulfate in character with total dissolved solids (TDS) content of 1,680 milligrams per liter (mg/L). Water from a well in the northeastern part of the basin sampled in the 1950s was sodium sulfate in character with a TDS content of 1,721mg/L. Water from a well in the northwestern part of the basin near Hector Siding sampled in the 1950s was calcium-sodium bicarbonate in character with a TDS content of 278 mg/L. In March 2010, the Applicant constructed a new well located on private property adjacent to the project site which was deeded to the Applicant in September 2010. Analytical test results conducted on water samples collected from the well indicate groundwater contains 1,340 mg/L total dissolved solids. The Applicant proposes to use groundwater obtained from Well #3 for project construction and operation. (Ex. 300, p. C.7-12; Ex. 114, Attachment A 4.)

1. Storm Water

The project site is in the southwest portion of the Mojave Desert, which is characterized by broad alluvial fans and fluvial terraces, playas, and scattered mountains. There are no perennial streams within the project site or in the area. The site drains towards Troy (dry) Lake in the Mojave Valley, five miles west of the site. The proposed site occupies a broad alluvial fan/plain with relatively little topographic variation. (Ex. 300, p. C.7-12.)

The overall landform is relatively flat with shallow slopes trending from the north to south and in some areas to the southwest. The ground generally slopes in a northeast-to-southwest direction, ranging from two percent to five percent across

the site, except for the western portion where the slope reduces to one percent. Several drainage patterns occur on the site. The land between I-40 and the BNSF railroad slope to the west, ultimately towards Troy Dry Lake, a playa that is located west of the site. There are no well-defined channels on-site, although some discontinuous flood terraces occur in a few areas on-site. The drainage features on-site exhibit a mixed pattern of sheet flow or shallow concentrated flow across isolated, wide areas of land. Relatively undefined drainage features traverse most of the site with evenly distributed desert scrub vegetation throughout. (Ex. 300, pp. C.7-12 to C.7-13.)

In general, drainage in Phase 1 (including 1A & 1B) of the project area flows southwest from the Cady Mountains. However, along the southern boundary of Phase 1, some flows are diverted by the railroad and flow straight west (see **Soil and Water Figure 2** through **Soil and Water Figure 3** with the original project footprint overlay). As shown, there is an offsite watershed area of nearly 20 square miles which drains either directly to the Phase 1 project site or drains to the railroad tracks and is partially diverted into the Phase 1 site. The Phase 1 site is nearly 10 square miles, so the total watershed area for Phase 1 is approximately 30 square miles. Numerous shallow undefined drainage features and discontinuous flood terraces are present throughout the Phase 1 project area and predominantly drain to the railroad at the southern boundary of the Phase 1 site. The runoff from the Phase 1 site flows through the existing trestles at the railroad. A 100-year flood will generally be conveyed along the railroad and through the trestles along the railroad right-of-way. This right-of-way is excavated and maintained by the BNSF Railroad Company to allow the water to pond and flow at low velocities. The northern edge of the right of way is delineated by a barbed wire fence along the north side of the railway. (Ex. 300, p. C.7-13.)

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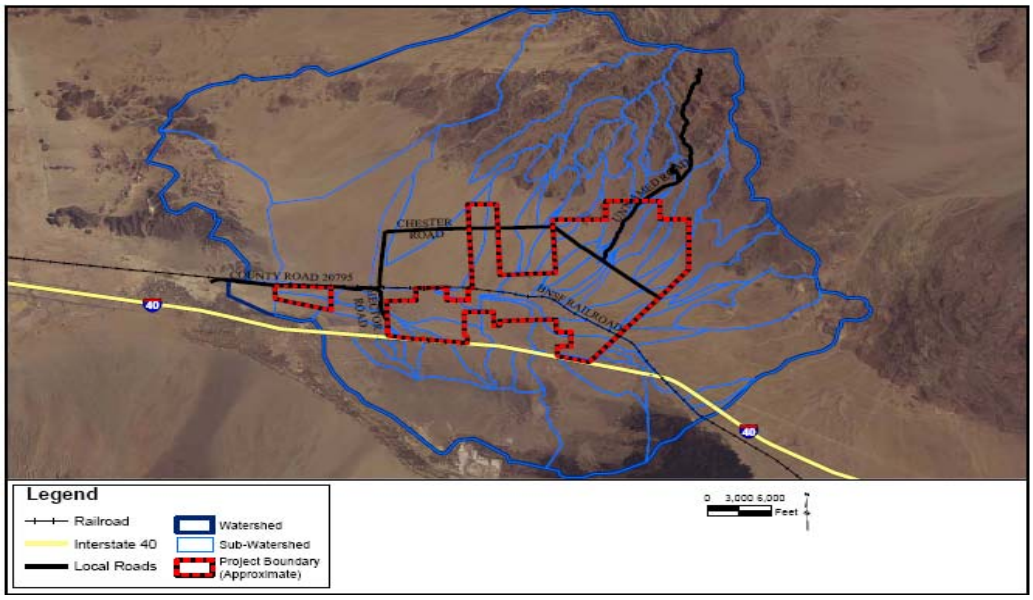
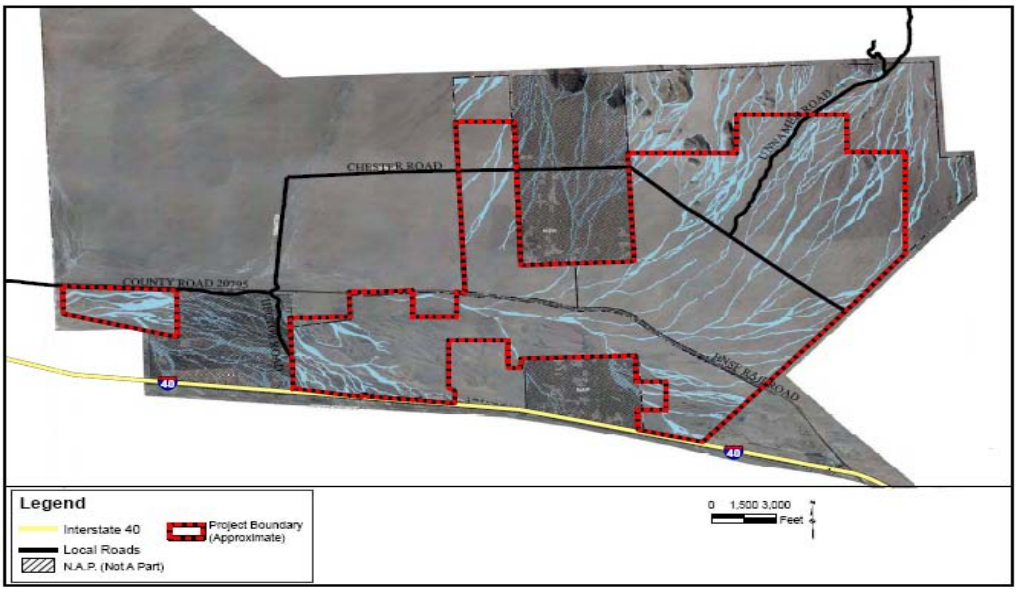
Soil and Water – Figure 2



Source: Exhibit 300

Soil and Water – Figure 3



Source: Exhibit 300

The offsite watershed impacting the Phase 1 site emanates from the Cady Mountains which flank the northeast side of the project area. Washes are often well incised near the base of the mountains. However, these same washes transition into sheet flow and shallow concentrated flow areas which do not have a well incised channel or a series of small channels which are braided, each of which may carry a fraction of the total flow. Sheet flow areas appear to be more prevalent at distal locations from the apex of the fan. These locations are

primarily within the proposed site development area. Because the sheet flow and braided wash flow may carry a sediment load and follow unpredictable flow paths, development within these areas could be impacted by the storm water. (Ex. 300, pp. C.7-13 to C.7-14.)

Flows that traverse the site emanate from the Cady Mountains watershed, drain through the trestles on the railroad and then continue west through the Phase 2 site. Upstream of the railroad trestles, the railroad embankment has diverted and channelized much of the flow creating numerous ponding areas. The trestles and ponding areas attenuate the peak flow and allow most of the sediment to drop out on the upstream (north or east) side of the railroad embankment. Additional drainage flows south from the Cady Mountains, west of the Phase 1 property limits, is diverted at the railroad tracks and then flows south in the Phase 2 area. In addition to the Cady Mountain watershed, a second watershed is located south of the freeway and includes the Pisgah Crater and lava flow area. Runoff from this watershed generally flows either north or west. It reaches I-40 and then continues north through numerous culverts and bridges into the Phase 2 project area. After flowing through the culverts at the highway, the runoff commingles with the flow from the Cady Mountains and then flows west to the outfall. As with the Cady Mountain watershed, the Pisgah watershed runoff is diverted by the I-40 road embankment and associated dikes and berms and is routed through culverts. Ponding occurs at these culvert locations and this reduces the peak flow and sediment loads which pass through the culverts. (Ex. 300, p. C.7-14.)

Storm water flows on the project site are considered “waters of the State” by the Lahontan Regional Water Quality Control Board and are subject to regulation under the Porter-Cologne Water Quality Control Act. As such, manipulation of the “waters” (i.e., area of flow) on the site and installation of project facilities within those areas would constitute “discharge of waste” subject to Waste Discharge Requirements (Ex. 300, pp. C.7-89 – C.7-121, (**Soil and Water Appendices B**, **C** and **D**). The U.S. Army Corps of Engineers has determined that no “waters of the U.S.” exist on the project so no federal wetland permitting is required. (Ex. 300, p. C.7-14.)

2. Soil and Erosion

Primarily two soil associations would be affected by project construction; the Carrizo-Rositas-Gunsight and the Nickel-Arizo-Bitter associations. The Carrizo-Rositas-Gunsight soil association occupies the majority of the site, while the

Nickel-Arizo-Bitter association is present over much of the southern portion of the site, south of the BNSF rail lines. The Rock Outcrop-Lithic Torriorthents-Calvista association is present in the mountains along the northern site perimeter and the Rock Outcrop-Upspring-Sparkhule association is present on the southwest corner of the project-site, as well as north and northwest of the site. The soil characteristics are contained in **Soil & Water Table 1**, below. (Ex. 300, p. C.7-15.)

Soil & Water Table 1
Summary of Soil Characteristics

Soil	Texture	Depth of Surface Layer (Inches)	Land Capability Class[1]	Wind Erodibility Group[2]	Erosion (K) Factor[3]	Natural Drainage Class[4]	Permeability in inches per hour[5]
Carrizo-Rositas-Gunsight	Loamy Fine Sand	9	7S	2	0.15	Somewhat Excessively Drained	6–20
Nickel-Arizo-Bitter	Gravelly Sandy Loam	7	7S	5	0.10	Well Drained	2–6
Rock Outcrop-Lithic Torriorthents-Calvista	Gravelly Loam	8	7E	8	0.20	Excessively Drained	2–6

Notes:

1 - Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat. Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

2 - Wind erodibility groups range from 1 to 8, with 1 being highly erodible and 8 having low erodibility.

3 - This is an index of erodibility for standard condition and includes susceptibility of soil to erosion and rate of runoff. Low K values (below 0.15) indicate low erosion potential. High K values (above 0.4) are highly erodible. See report text for additional information.

4 - Table presents nonirrigated land capability classification. Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Capability classes range from 1 to 8, with higher numbers indicating progressively greater limitations and narrower choices for use: Class 1 - slight limitations that restrict use; Class 2 - moderate limitations restricting choice of plants, or requiring moderate conservation practices; Class 3 - severe limitations restricting plant choice or requiring conservation; Class 4 - severe limitations, requiring very careful management; Class 5 - subject to little or no erosion, but mainly restricted use to pasture, rangeland, forestland, wildlife habitat; Class 6 - severe limitations, generally unsuitable for cultivation, restrictions per Class 5; Class 7 - severe limitations, unsuitable for cultivation, restrictions per Class 5. Capability subclasses: e - erosion is main hazard unless close-growing plant cover maintained; s - soil limited because shallow, droughty or stony; c - chief limitation is very cold or dry climate. Capability units (after '-') are soil groups within a subclass with similar suitability for crops and pasture plants with similar management requirements and productivity.

5 - Permeability refers to saturated hydraulic conductivity for the surface layer. Permeability rates listed are minimum and maximum expressed in inches/hr.

Source: (Ex. 300, p. C.7-14).

Vertical foundation elements (hollow metal pipes) for the SunCatchers will be inserted into the subsurface using track driven vibratory equipment. The vibratory insertion method eliminates conventional drilling techniques that would

generate cuttings that typically require dust suppression for stockpiling, transferring, trucking and disposal of the cuttings. The track mounted equipment will also reduce ground disturbance (rutting) by spreading the load over a larger surface area. (Ex. 300, p. C.7-17.)

2. Project Water Supply

Groundwater is the primary water source available in the site vicinity. Groundwater occurrence and quality varies significantly within the Mojave Desert. The Applicant discovered a water bearing zone beneath the site that produced a volume and rate that is sufficient to supply both construction and operation water. The well boring was drilled in March 2010, to a depth of 1,147 feet below ground surface. Aquifer testing indicated the well is capable of producing at least 100 gpm over a 24-hour period without incurring excessive drawdown. Water samples collected from the well indicate that the groundwater contains a TDS concentration of 1,340 mg/L. The record indicates that the newly constructed well will provide all water needs for the project and no back-up supplies are proposed. (Ex. 300, p. C.7-17.)

Potable Water

The Applicant proposes to use treated groundwater for potable needs. The groundwater will first be demineralized, then stored in a designated storage facility equipped with chemical dosage for disinfection. This treated potable water will be available at the Main Services Complex. (Ex. 300, p. C.7-17.)

Construction Water

Water demands during construction of the project will be relatively light for a project of this size. Site construction will be accomplished in primarily two phases, Phase 1 (including both 1A & 1B) and Phase 2. Phase 1 construction will require less than 92,107,331 gallons or approximately 282.67 AF. Phase 2 will require less than 103,421,405 gallons or approximately 317.39 AF. The Applicant estimates that during the 60 months of project construction, the water demand for combined construction and dust suppression will be less than 600 AF. During construction, water use is expected to vary from approximately 3.108 million gallons (9.54 AF) per month (at the 18th month), to 4.046 million gallons (12.42 AF) per month (after the 34th month). (Ex. 300, pp. C.7-17 to C.7-18. Ex. 317, pp. C.7-8 to C.7-10.) Condition of Certification **SOIL&WATER-4** limits construction water use to 145 AFY.

Operations Water

Water use during electricity generation will be minimal due to the technology proposed for the Calico Project (Stirling engines). The raw site groundwater will require treatment to remove dissolved solids for SunCatcher mirror wash water applications and additional treatment to meet drinking water quality standards. Water treatment processes identified by the Applicant for demineralization are Reverse Osmosis (RO) and ion exchange. Potable water consumption, groundwater treatment, and SunCatcher mirror washing under average monthly maintenance routines will require less than 15.6 gpm of water per day. A maximum requirement of less than 41 gpm of water per day will be needed during the months when each SunCatcher receives a scrub wash. (Ex. 300, p. C.7-19. Ex. 317 p. C.7-10.) Condition **SOIL&WATER-4** limits operational water use to 21 AFY.

Water consumption during operation will be limited to mirror washing (10.3 AFY), water treatment (5.2 AFY), potable use (2.2 AFY), and dust control (2.5 AFY). Additionally, water will be used to generate hydrogen used in the SunCatcher engines. The record indicates that for Scenario 5.5, less than 205 gallons per day (0.23 AFY) of water will be required to produce a sufficient volume of hydrogen for power plant use. The evidence shows that the total maximum annual consumptive use of groundwater for operation of the reduced acreage power plant will be less than 20.4 AFY. (Ex. 300, pp. C.7-17 to C.7-18. Ex. 317 pp. C.7-10 to C.7-11.)

a. Wastewater

Sanitary Wastewater

Initially, control of sanitary waste will be accomplished using portable chemical toilets. No public or private entities manage sanitary wastewater in the vicinity of the project site. Therefore, construction of a permanent onsite wastewater disposal system consisting of a septic tank and leach field will be completed to handle sanitary wastewater. According to the evidence, a facility of this type will be designed to meet the requirements of the Lahontan RWQCB and the San Bernardino County Public Health Department, and will meet operation and maintenance guidelines required by the California Department of Public Health. (Ex. 300, pp. C.7-20 to C.7-21.) **SOIL&WATER-5** requires compliance with the County of San Bernardino requirements for the construction and operation of the project's proposed sanitary waste septic system and leach field.

Construction Wastewater

Sources of wastewater will include equipment wash water and piping and vessel hydrostatic test water. Improper handling or containment of construction wastewater could cause a broad dispersion of contaminants to soil or groundwater. Discharge of any non-hazardous construction-generated wastewater will require compliance with discharge regulations. Equipment wash water would be transported to an appropriate treatment facility. Hydrostatic test water will be reused to the extent possible and, pending analytical results of the water, will be discharged to land or trucked offsite to an appropriate treatment and disposal facility. (Ex. 300, p. C.7-21.) **SOIL&WATER-2** requires compliance with Waste Discharge Requirements for any waste or storm water discharge by the project. In addition, **SOIL&WATER-10** will require the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) under the National Pollutant Discharge Elimination System (NPDES) program to protect storm water from accidental releases of wastes or other pollutants.

Process Wastewater

Extracted groundwater will require treatment to remove dissolved solids for SunCatcher mirror wash water applications and additional treatment will be required to meet current drinking water quality standards. The water will be demineralized to prevent mineral deposits forming on the SunCatcher mirrors. Treatment processes proposed to remove TDS include reverse osmosis (RO) and ion exchange. The wastewater generated by the RO unit will contain relatively high concentrations of TDS. The Applicant proposes to discharge the high TDS wastewater into two double-lined evaporation ponds. The wastewater discharge is expected to be classified as a “designated waste” and will comply with the requirements for Class II surface impoundments set forth in California Water Code section 13173. Each pond will be designed to contain one-year of discharge flow, estimated to total three million gallons. Discharge to the ponds will alternate on an annual basis, allowing one pond to undergo evaporation while the other receives the effluent. Treating the groundwater using demineralization equipment to attain a concentration suitable for mirror washing will create a waste water stream that will contain four to five times as much TDS as the source water, or approximately 5,500-7,000 mg/L. (Ex. 300, p. C.7-2.1.) **SOIL&WATER-2** requires the project owner to comply with the Waste Discharge Requirements regarding the design, construction and operation of the impoundments and the monitoring and reporting associated with the operation of waste water evaporation ponds.

3. Impact Evaluation Criteria

To evaluate if significant environmental impacts to soil or water resources would occur, we apply the following criteria. Where a potentially significant impact is identified, we apply mitigation to reduce the potential impacts to less than significant levels.

- Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding or substantial erosion or siltation on or offsite?
- Would the project create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?
- Would the project place structures within a 100-year flood hazard area which would impede or redirect flood flows?
- Would the project violate any water quality standards or waste discharge requirements?
- Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?
- Would the project contribute to any lowering of groundwater levels in the groundwater wells of other public or private water users?
- Would the project contribute to any lowering of the groundwater levels such that protected species or habitats are affected?
- Would the project cause substantial degradation to surface water or groundwater quality?

4. Construction Impacts and Mitigation

As proposed in reduced acreage Scenario 5.5, the project will be developed in two phases. Construction of Phase 1 is expected to take 26 months to complete and Phase 2 is expected to take 28 months. Construction will, therefore, occur over three or four winter seasons. Construction of the proposed project would

include soil excavation, grading, installation of utility connections, installation of finned pole SunCatcher foundations, road building, paving, erection of structures and the use of groundwater. (Ex. 300, pp. C.7-21 to C.7-22.)

Groundwater use will primarily be for dust suppression, hydrostatic testing of the project's pressure vessels, moisture conditioning compacted soil and mixing concrete. Potential impacts to soils related to increased erosion or release of hazardous materials are possible during construction. Potential storm water impacts could result in an increase in flooding and sedimentation downstream if there is an increase in runoff flow rates and volume discharges from the site. Water quality could be impacted by discharge of hazardous materials released during construction. Project water demand could decrease the quantity of groundwater available. (Ex. 300, p. C.7-22.)

These construction activities can impact soil resources including increased wind and water-related soil erosion, soil compaction, loss of soil productivity, and disturbance of soils crucial for supporting vegetation and ephemeral water dependant habitats. Activities that expose and disturb the soil leave soil particles vulnerable to detachment by wind and water. Soil erosion results in the loss of topsoil and increased sediment deposition downstream. (Ex. 300, p. C.7-24.)

The magnitude, extent, and duration of those impacts depends on several factors, including the exposure of the soils to water and wind, the soil types affected, and the method, duration, and time of year of construction activities. Prolonged periods of precipitation or high intensity and short duration runoff events coupled with earth disturbance activities can result in accelerated on-site erosion. In addition, high winds during grading and excavation activities can result in wind borne erosion leading to increased particulate emissions that adversely impact air quality. The implementation of appropriate erosion control measures will help conserve soil resources, protect downstream properties and resources, and protect air quality. Conditions of Certification in the **Air Quality** section of this Decision provide mitigation that would prevent significant impacts from fugitive dust and soil erosion. Conditions of Certification **AQ-SC3** and **AQ-SC7** limit vehicle speed to 10 miles per hour during project construction and require all unpaved roads and disturbed areas in the project and linear construction sites to be watered as frequently as necessary during grading and stabilized thereafter with a non-toxic soil stabilizer or soil weighting agent. Condition of Certification **AQ-SC4** and **BIO-8** establishes performance standards for controlling fugitive dust and requirements for additional effort should they be exceeded. The requirement to use soil weighting and bonding agents following

grading would conserve freshwater by reducing the need for water as a means to control fugitive dust. (Ex. 300, p. C.7-24.) These techniques and erosion controls measures will also be reflected in the SWPPPs and the staff's Drainage, Erosion and Sediment Control Plan (DESCP) as required in the Conditions of Certification **SOIL&WATER 1, 2, 3, 8, 10 and 11**.

The evidence analyzed the potential impacts to soil resources, including the effects of construction activities that could result in erosion and downstream transportation of soils and the potential contamination of soils and groundwater. There are extensive regulatory programs in effect that are designed to prevent or minimize these types of impacts. These programs are effective, and absent unusual circumstances, an Applicant's ability to identify and implement program-approved Best Management Practices (BMPs) to prevent erosion or contamination is sufficient to ensure that these impacts will be less than significant. In addition, soils will be protected by the development and implementation of grading plans and a Drainage, Erosion and Sedimentation Control Plan (DESCP). The DESCP provides the plan for the use of BMPs to mitigate erosion and sedimentation impacts caused by site grading and other construction activities. (Ex. 300, pp. C.7-24 to C.7-25.)

The temporary erosion and sedimentation control measures to be used during construction will be designed to prevent sediment from being displaced and carried off-site by storm water runoff. Before beginning excavation activities, any proposed on-site debris basins, silt fence, straw bales, or other BMPs will be installed along the perimeter of the Project, where minor runoff to off-site areas could occur. On-site debris basins may be constructed for the major site runoff discharge and could also provide for low flow detention. The silt fences will filter sediments from construction runoff. Berms with culverts may be used at road crossings and other locations as needed to pass flows. During construction, the extent of earth disturbances will be minimized as much as is practical. (Ex. 300, p. C.7-27.)

If necessary, as determined by the studies required by Condition of Certification **SOIL&WATER-8**, diversion swales with berms will be constructed to divert runoff from off-site areas and on-site undisturbed areas around the construction site. Temporary BMP control measures will be maintained during the rainy season throughout the construction period. Proposed erosion and sedimentation control measures include, but are not limited to: scheduling installation of BMPs to precede or coincide with construction activities; on-site debris and detention basins; preserving the existing vegetation to the extent possible; wetting or using

soil binders or weighting agents in active construction and laydown areas; controlling speed on unpaved surfaces; placing gravel in entrance ways; and placement of straw bales, silt fences, and earthen berms. The Applicant will conduct a geomorphic and hydraulic analysis and other analyses to determine the maximum design storm that can be routed through the site and what drainage features must be incorporated into the project design to avoid adverse impacts to the railroad, roads or adjacent properties resulting from drainage and storm flows (**SOIL&WATER-8**). These analyses will be used in the development and implementation of a DESCP as required in Condition of Certification **SOIL&WATER-1** to ensure potential erosion and loss of soil is mitigated. In addition, Condition of Certification **SOIL&WATER-2** requires the compliance with waste discharge requirements for any waste or storm water discharges and **SOIL&WATER-10** requires the project owner to develop and implement a construction SWPPP and comply with the dredge and fill requirements developed by the Lahontan RWQCB. (Ex. 300, p. C.7-27; Ex. 317, pp. c.7-12 through C.7-15.) The construction SWPPP and discharge controls will incorporate the findings and recommendations of the Condition of Certification **SOIL&WATER-8** analyses.

Due to the project's large scale, numerous physical variables exist that could affect the soil resources within the site boundaries. These variables are associated with various site conditions (erodibility) and potential environmental considerations (precipitation). In order to address possible outcomes given the various site conditions and possible environmental factors, the record contains mathematical calculations and probabilistic modeling to estimate anticipated potential impacts. While modeling and calculations can be used in an attempt to estimate future effects from a variety of environmental considerations, and they provide a basis for structural design parameters, these methods are based on assumptions and projections that are imprecise and untested in this environment. Should these assumptions and calculations be inaccurate, the consequences of flash flood damage or modified sedimentation and erosion rates could be significant. (Ex. 300, pp. C.7-27 to C.7-28.)

Condition of Certification **SOIL& WATER-3** will mitigate potential scour and flood impacts by requiring that all SunCatcher pole foundations will be designed to withstand storm water scour from surface erosion or channel migration based on the results of the **SOIL&WATER-8** analyses. **SOIL& WATER-3** will also require the project owner to develop a Storm Water Damage Monitoring and Response Plan to evaluate potential impacts from storm water, including pole foundations that fail due to storm water flow or otherwise break and scatter mirror debris and

other SunCatcher components on to the ground surface. We find that implementation of Conditions of Certification **SOIL&WATER-1, -2**, **-3, -8 and -10** will mitigate potential impacts from construction activities to soils at the project site below significance.

Water used for construction of the Calico Solar Project will have a less than significant impact on the groundwater balance and the availability of groundwater to other basin users. The average annual water use during construction (150 AFY) is 38-75 percent of the estimated recharge to the Lavic Valley Basin (200 to 400 AFY), and average water use over the life of the project (31 AFY) is only six to 13 percent of the estimated recharge. The record shows that no other local users are known to rely on that recharge. The water use is less than one percent of the yield of the Lavic-Broadwell-Bristol Lake groundwater system, given the range of estimates of yield for the Bristol Lake Basin (5,000 AFY). (Ex. 300, p. C.7-31; Ex. 317, p. C.7-8 and C.7-10.) Condition of Certification **SOIL&WATER-4** limits water use to less than 145 AFY during construction and less than 21 AFY during operation and requires annual reporting of actual use to the Energy Commission. In addition, Condition of Certification **SOIL&WATER-7** requires continual groundwater monitoring and reporting by the Applicant.

The record further shows that project pumping will not affect groundwater levels or flow from discharging playas so any impact to groundwater salinity is less than significant. We find that construction impacts to groundwater levels will be mitigated below significance.

Improper handling or containment of construction waste water creates a potential risk that the material would percolate down to the water table and contaminate groundwater. The evaluation of impacts associated with hazardous materials indicated that liquid hazardous wastes present at the site would consist of fuels, solvents, cleaners, motor oil, lubricants and paints. The record shows that because of their small quantities and low mobility and/or toxicity, there is limited potential for off-site impacts. We find that potential on-site impacts are less than significant due to physical and administrative controls over the storage and use of these materials imposed by measures **HAZ-1** through **HAZ-5** that provide for worker training, spill response, safety plans, site control and other measures that minimize the risk of a leak or spill capable of contaminating groundwater. (Ex. 300, p. C.7-35.) These controls will also be reflected in the measures implemented under **SOIL&WATER-2** and in the construction SWPPP required by **SOIL&WATER-10**.

Sources of waste water would also include equipment wash water and piping and vessel hydrostatic test water. Equipment wash water will be transported to an appropriate treatment facility. Hydrostatic test water will be reused to the extent possible and, pending analytical results of the water, will be discharged to land or trucked offsite to an appropriate treatment and disposal facility in accordance with the SWRCB Water Quality Order No. 2003-003-DWQ as a discharge to land with a low threat to groundwater and the requirements identified in the SSA, Appendices C, D, and E (Ex. 300, pp. C.7-101—C.7-132.)

Appendix C identifies waste discharge requirements prescribed by the LRWQCB that places limitations on the discharge of waste to surface waters, including limitations on storm water and non-storm water discharge of ammonia, bacteria, chemicals, dissolved oxygen, oil, and pesticides, and pH among others. Appendix C further requires stabilization from erosion, controls for sedimentation, and maintenance of vegetative cover to reduce erosion. Appendix D prescribes a monitoring and reporting program for surface water, both during construction and operation, to test surface waters for turbidity, temperature, dissolved oxygen, suspended solids, total dissolved solids, and ph. Appendix D further specifies methods for sampling, analysis, and reporting to ensure uniformity and compliance. Appendix E prescribes a monitoring and reporting program for groundwater and surface impoundment. Like Appendix D, Appendix E specifies methods for data analysis and reporting, both during construction and operation. Applicant's compliance with the procedures prescribed in these Appendices, as required by Condition of Certification **SOIL&WATER-2**, will therefore ensure that any potential impacts from wastewater discharge will be reduced to insignificant levels. (Ex. 300, p. C.7-36.)

With the implementation of the mitigation measures described above, construction related impacts of the Calico Solar Project to erosion of soils; drainage of surface water, groundwater supplies and groundwater quality will not be significant.

5. Operational Impacts and Mitigation

The record analyzed impacts from the operation of the Calico Solar Project that could lead to accelerated soil erosion, increased storm water runoff, as well as potential water quality and water supply impacts. Soils may be potentially impacted through wind and water-related erosion or the release of hazardous materials used in the operation of the proposed project. Storm water runoff from the project could result in potential impacts if increased runoff flow rates and

volumes discharged from the project increase erosion of the soil and increase downstream flooding. Water quality could be impacted by discharge of eroded sediments from the project or discharge of hazardous materials released during operation. Water supply used for dust suppression, SunCatcher mirror washing, and fire protection could lead to potential quantity or quality impacts to groundwater resources. (Ex. 300, p. C.7-36.)

The analysis of record considered the potential impacts to soil resources caused by operation of the facility that could result in erosion and downstream transportation of soils and the potential contamination of soils and groundwater. There are extensive regulatory programs in effect (NPDES, SWPPP, NRCS) that are designed to prevent or minimize these types of impacts. These programs are effective, and absent unusual circumstances, an applicant's ability to identify and implement program-approved BMPs to prevent erosion or contamination is sufficient to ensure that these impacts will be less than significant. The requirements of these programs are reflected in Condition of Certification **SOIL&WATER-11**. In addition, soils would be protected by the development and implementation of the DESCP required in **SOIL&WATER-1**. (Ex. 300, pp. C.7-36 to C.7-37.)

The proposed project will be located on a series of undeveloped alluvial fans. Construction of the proposed project will change natural drainages, remove some natural vegetation and soil structure, and add impervious areas to the site, all of which could cause an increase in storm water runoff. (Ex. 300, p. C.7-37.)

Storm water flow volume and velocity is affected by several parameters, such as surface infiltration rates and the roughness of the flow surface. Construction, operation, and decommissioning of the proposed project may modify the infiltration rate through several processes, including earthmoving, compaction, and use of dust suppressants. (Ex. 300, p. C.7-37.)

Water quality could also be impacted if the storm water drainage pattern concentrates runoff in areas that are not properly designed or protected with BMPs or causes increased erosion and sediment discharge offsite. Project components that could alter or concentrate existing drainage patterns could include the installation of linear fences, access roads, buildings, SunCatchers, and associated infrastructure. (Ex. 300, pp. C.7-37 to C.7-38.)

With concentrated flows, scour may transport sediment long distances. Scour may occur under sheet flow conditions due to water depths, velocities, and soil

parameters. Scour of existing or future channelized flow paths can meander and move during large flow events, which is common on alluvial fans. The proposed reduced acreage Scenario 5.5 includes a total of 26,540SunCatchers supported by a single metal fin-pipe foundation hydraulically driven into the ground. Migration of channels and local scour caused by storm water flows could remove sediment supporting individual poles and cause them to fall to the ground. Once on the ground during a storm event, the broken glass associated with the mirrors could further break and be transported downstream. Also, the SunCatchers structure itself and the associated wiring and piping, could be transported downstream. Although the security fence located on the downstream side of the proposed project area could stop larger pieces from leaving the property, it would not stop small glass fragments. Also, the fence itself could be threatened by storm water flows and could not guarantee the onsite capture of all damaged materials. (Ex. 300, p. C.7-37; Ex. 317 p. B.1-2.)

The record establishes that the effects of wind and water-related erosion and storm water flow onto and off the proposed project will be mitigated through implementation of Conditions of Certification **SOIL&WATER-1**, **-2**, **-3, -8 and -11**. **SOIL&WATER-1** requires the project Applicant to develop a DESCP to ensure protection of water quality and soil resources. **SOIL&WATER-2** requires the Applicant to develop Construction and Industrial SWPPPs that meet the requirements for discharges of storm water. Condition of Certification **SOIL&WATER-3** requires the Applicant to develop a Storm Water Damage Monitoring and Response Plan to monitor the SunCatchers and mitigate potential impacts from SunCatchers damaged during storm events. **SOIL&WATER-11** requires the Applicant to comply with the RWQCB requirements for operational stormwater protection. All of these plans and designs will be based on the results of analyses required by Condition of Certification **SOIL&WATER-8** and maintained over the life of the project. We find that Conditions of Certification **SOIL&WATER-1, -2**, **-3, -8 and -11** mitigate these potential stormwater flow impacts below significance. (Ex. 300, p. C.7-39; Ex. 317 p. C.7-12 through C.7.15.)

Intervenor, BNSF devoted substantial time developing a record to suggest the need to include drainage basins in the design and implementation of stormwater protection BMPs. (9/20/10 RT 73-326). Although the testimony varied on the necessity for drainage basins at the site, the parties agreed that the determination of the need for drainage basins would benefit from a hydrologic study. (*Id*.) **SOIL&WATER-12** requires the Applicant to fund a hydrologic study commissioned by BNSF to determine the erosion and sedimentation impact, if any, on BNSF infrastructure resulting from the project's planned emplacement of

SunCatchers, flood control structures and runoff control measures. (9/20/10 RT 73:24-75:13).

The project's operational water demand is estimated to be approximately 20.4 AFY. The Applicant has proposed to pump groundwater from Well #3, a well located on private land adjacent to the project site. The water will be pumped from the well, conveyed in an underground pipe to a water storage tank, treated and dispersed for on-site use. (Ex. 300, p. C.7-39.)

Sanitary wastewater from buildings on the site will be disposed of by means of an on-site septic system and leach field. Reject brine from the demineralization facility will be discharged to two on-site ponds for evaporation. (Ex. 300, p. C.7-39.)

As described above under "Construction Impacts and Mitigation," the impact of the project on groundwater levels will be negligible and the impact less than significant from project construction as well as operation. Condition of Certification **SOIL&WATER-4** will ensure the project supply will be limited to the maximum needed for project construction and operation. To ensure the well can provide an adequate water supply, the project owner will be required to comply with Condition of Certification **SOIL&WATER-9** that requires a Water Conservation and Alternative Water Supply Plan, should groundwater monitoring indicate long-term downward trends in water levels and storage. (Ex. 300, p. C.7-40.)

Although there are no known existing groundwater users near enough to the project site to be substantially affected by project pumping, hydrogeologic conditions are uncertain. The evidence shows that the Pisgah Fault likely prevents drawdown from extending into the Lower Mojave River Basin and any overdraft effects in the Lower Mojave River Basin from extending into the Lavic Lake Basin. To confirm these findings, Condition of Certification **SOIL&WATER-7** will require the Applicant to comply with the County of San Bernardino's Desert Groundwater Management Ordinance and implement a monitoring plan that would characterize baseline water levels in the project vicinity, characterize aquifer materials, integrate water level measurement with any existing monitoring network, and provide for analysis of the project effects on water levels in the area. The Applicant will monitor static water levels quarterly in the project water supply well and select dedicated wells located on the east side of the Pisgah Fault. The Applicant will also obtain, summarize, and analyze relevant water level data collected by other parties for wells located on the west

side of the Pisgah Fault. The data will be made available to San Bernardino County and agencies responsible for regional water level monitoring (i.e., DWR and USGS). If monitoring data indicate downward trends in water levels and groundwater water storage, Condition of Certification **SOIL&WATER-9** requires the project owner develop and implement a Water Conservation and Alternative Water Supply Plan to mitigate impacts. (Ex. 300, p. C.7-40.)

Project operation will produce three wastewater streams that are potential sources of groundwater contamination: reject brine from the RO/demineralization facility, utility water used for equipment washing and maintenance, and septic system leachate from domestic water use. (Ex. 300, pp. C.7-40 to C.7-41.)

During project operation, septic system percolation will amount to approximately 2.2 AFY, which is the amount of water used for domestic purposes. The unsaturated zone above the water table is 344 feet thick at the project site (the depth to water in Well #3). Percolation through the unsaturated zone is expected to remove pathogens in the waste water and will likely allow substantial denitrification. Domestic water use normally contributes approximately 200 mg/L of total dissolved solids to waste water. The TDS concentration of domestic water will be at least partially demineralized to meet the secondary drinking water standard of 1,000 mg/L. The TDS concentration of sanitary waste water would therefore be around 1,200 mg/L, or comparable to the local TDS concentration in the aquifer (1,340 mg/L at Well #3). Therefore, the septic leachate will not increase groundwater salinity. Further, the septic system will meet the permitting requirements of the San Bernardino County Department of Public Health as required in **SOIL&WATER-5**. All of these factors support our conclusion that the impact of the septic system on groundwater quality will be less than significant. (Ex. 300, p. C.7-41.)

The Applicant proposes to discharge the reject brine waste water to one of two concrete-lined evaporation ponds. Each pond will be sized to contain one year of discharge flow or approximately three million gallons. A minimum of one year is expected to be required for the waste water to undergo the evaporation process. After the first year, the second pond will receive all treatment waste water while the first pond is undergoing evaporation. The two ponds will alternate their functions on an annual basis. After the brine has gone through the evaporation process, the solids that settle at the bottom of the evaporation pond will be analyzed by the Applicant and disposed of in an appropriate non-hazardous waste disposal facility. The solids will be scheduled for removal during the dry summer months. As indicated by the Lahontan Regional Water Quality Control

Board (see the SSA Soil and Water Appendices B, C, D and E, Ex. 300, pp. C.7-101—C.7-132.), the Applicant has not provided information necessary to complete development of requirements for discharges of brine waters to evaporation ponds or sanitary septic systems. This information is needed to ensure that the ponds will be designed, constructed and operated to prevent concentrated brine leaking and reaching the water table. However, the requirements for the design, construction and operation of the evaporations pond as well as the restrictions on the waste water are very specific. The use of these types of surface disposal facilities is well documented and is prevalent in power plant siting cases. Impacts associated with the construction and operation of these disposal facilities are routinely mitigated. As a result, we find that impacts will be mitigated to less than significant with the implementation of Condition of Certification **SOIL&WATER-2** which requires the project owner to comply with the Waste Discharge Requirements regarding the design, construction and operation of the impoundments as well as the monitoring and reporting associated with the operation of waste water evaporation ponds. (Ex. 300, p. C.7-41.)

Maintenance of the Power Conversion Units (PCU) and other mechanical devices (e.g., drive repair) will be performed in onsite service stations. These service stations consist of modular, containerized work stations to perform equipment prewash and inspection, disassembly/reassembly, parts storage, end of service inspection, etc. The prewash and inspection station will include heated, pressurized water spray to clean engine components before maintenance performance. Expected waste water production is 15 gallons per wash (3 gpm sprayer for five minutes). The waste water generated will be captured in the service station and diverted to containers (e.g., drums) for offsite recycling by third party providers. Prior to disassembly of engines, the fluids will be drained and captured for recycling. These engine fluids will be captured, aggregated in containers (e.g., drums) and recycled by third party providers. Collection and recycling of this waste water will be managed in accordance with Conditions of Certification **WASTE-7** and -**8**. (Ex. 300, p. C.7-42.)

There will be no significant wastewater related impacts to water or soil during operations if the project owner complies with proposed Conditions of Certification **SOIL&WATER-2** and -**5**. **SOIL&WATER-2** establishes the requirements for waste and storm water discharges and **SOIL&WATER-5** establishes the requirements for the installation of the proposed septic tank and leach field. (Ex. 300, p. C.7-42.)

6. Cumulative Impacts and Mitigation

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (California Code Regulation, Title 14, section 15130). NEPA states that cumulative effects could result from individually minor but collectively significant actions taking place over a period of time (40 CFR §1508.7). There is the potential for future development in the Lavic Valley area and throughout the southern Mojave Desert region. Cumulative impacts can occur if implementation of the proposed project could combine with those of other local or regional projects. The locations of existing and reasonably foreseeable developments in the Lavic Valley area are presented in **Soil & Water Table 2 and 3.** (Ex. 300, p. C.7-56.)

Soil & Water Table 2

Existing Projects in the Newberry Springs/Ludlow Area

ID	Project Name	Location	Agency/ Owner	Status	Project Description
1	Twentynine Palms Marine Corps Air Ground Combat Center (MCAGCC)	Morongo Basin (to the south of project site)	U.S. Marine Corps	Existing	The Marine Corps' service-level facility for Marine Air Ground Task Force training. It covers 596,000 acres to the south of the Calico Solar Project site and north of the city of Twentynine Palms
2	SEGS I and II	Near Daggett (17 miles west of project site)	Sunray Energy, Inc.	Existing	Solar parabolic trough facilities generating 13.8 MW and 30 MW, respectively.
3	CACTUS (formerly Solar One and Solar Two)	Near Daggett (to the west of project site)	University of California Davis	Existing	A non-working 10 MW solar power tower plant converted by UC Davis into an Air Cherenkov Telescope to measure gamma rays hitting the atmosphere. The site is comprised of 144 heliostats. This project had its last observational run in 2005. SCE has requested funds from the California Public Utilities Commission to decommission the Solar Two project. (UC Davis 2009)
4	Mine	2 miles west of project site along I-40		Existing	Small-scale aggregate operation (AFC p. 5.3-12)
5	Mine	14 miles west of project site along I-40		Existing	Larger aggregate mining operation that produced less than 500,000 tons per year in 2005 (AFC p. 5.3-12)

Source: Ex. 300, p. B.3-9.

Soil & Water Table 3
Future Foreseeable Projects in the Newberry Springs/Ludlow Area

ID	Project Name	Location	Agency/ Owner	Status	Project Description
A	SES Solar Three (CACA 47702)	T's. 8, 9N., R5E (Immediately west of project site)	SES Solar Three, LLC	BLM received completed amended application June 2007. SES withdrew the application for Solar Three in December 2009. As there was a second-in-line application, this application becomes the project proposed at this location. .	914 MW Stirling solar plant on 6,779-acre site.
B	Broadwell BrightSource (CACA 48875)	Broadwell Valley (T'8N and 9N; R7E) – in northeast direction of project site	Bright-Source Energy, Inc.	Application filed with BLM. Potential conflict with proposed National Monument. Plans withdrawn/put on hold in September 2009.	5,130-acre solar thermal facility using power tower technology.
C	SCE Pisgah Substation expansion	Immediately southeast of project site	Southern California Edison		Substation upgrade from 220-kV to 500-kV

ID	Project Name	Location	Agency/ Owner	Status	Project Description
D	Pisgah-Lugo transmission upgrade	Pisgah Substation (SE side of project site) to Lugo Substation (near Hesperia)	Southern California Edison		The proposed 850 MW Calico Solar Project would require removal of 65 miles of existing 220-kV transmission line and reinstallation with a 500-kV line. The Reduced Acreage Alternative (275 MW) would require an upgrade of the telecommunication facilities serving the existing 200-kV Pisgah-Lugo transmission line. Specifically, it would require: • Replacement of a portion of existing Eldorado-Lugo 500 kV overhead ground wire with new optical ground wire between the Lugo and Pisgah Substations • Installation of a new fiber-optic line between the Pisgah Substation and Cool Water Substation (new fiber to be installed on approximately 20 miles of existing electric distribution poles).
E	Twentynine Palms Expansion	Morongo Basin (south of project site)	U.S. Marine Corps	NOI to prepare EIS to study alternatives published in Oct. 2009. Draft EIS expected September 2010.	400,000-acre expansion on the east, west, and south of the existing 596,000-acre Twentynine Palms Marine Corps base. In June 2009, approximately 60,000 acres in all study areas were removed from further study, leaving 360,000 acres under study (USMC 2009).

ID	Project Name	Location	Agency/ Owner	Status	Project Description
F	Solel, Inc. (CACA 049424)	Southwest of proposed site, immediately north of Twentynine Palms MCAGCC	Solel, Inc.	BLM received application in July 2007, POD is under review.	600 MW solar thermal plant proposed on 7,453 acres.
G	Wind project (CACA 48629)	Black Lava T2N, R5E, T1N, R5E	Oak Creek Energy	BLM received application December 2006. Issues with partial location in ACEC.	Wind project on 17,920 acres
H	Wind Project (CACA 48667)	South Ludlow T6N/R6E, T7N/R6E, T6N/R7E, T7N/R7E, T6N/R8E, T7N/R8E (In southeast direction of project site)	Oak Creek Energy	Pending	Wind project on 25,600 acres
I	Wind project (CACA 48472)	Troy Lake T9N&10N, R4E (In west direction of project site)	Power Partners SW (enXco)	Pending review of EA.	Wind project on 10,240 acres
J	Twin Mountain Rock Venture	10 miles west of Ludlow and 1 mile south of I-40; APN 0552-011-10-0000	Rinker Materials	Permit granted to extend permit to 2018	Plan to re-permit a cinder quarry on approximately 72 acres of leased land. No development activity has occurred on project site.
K	Solar thermal (CACA 49429)	Stedman (in southeast direction of project site)	Solel, Inc.	Application filed with BLM.	600 MW solar project on 14,080 acres. POD under review.

ID	Project Name	Location	Agency/ Owner	Status	Project Description
L	Proposed National Monument (former Catellus Lands)	Between Joshua Tree National Park and Mojave National Preserve		In December 2009, Sen. Feinstein introduced bill S.2921 that would designate 2 new national monuments including the Mojave Trails National Monument.	The proposed Mojave Trails National Monument would protect approximately 941,000 acres of federal land, including approximately 266,000 acres of the former railroad lands along historic Route 66. The BLM would be given the authority to conserve the monument lands and also to maintain existing recreational uses, including hunting, vehicular travel on open roads and trails, camping, horseback riding and rockhounding.
M	BLM Renewable Energy Study Areas	Along the I-10 corridor between Desert Center and Blythe	BLM	Proposed, under environmental review	The DOE and BLM identified 24 tracts of land as Solar Energy Study Areas in the BLM and DOE Solar PEIS. These areas have been identified for in-depth study of solar development and may be found appropriate for designation as solar energy zones in the future.

Source: Ex. 300, pp. B.3-10 through B.3-13Cumulative Impacts to Soiland Storm Water

Construction and operation of the Calico Solar Project will result in both temporary and permanent changes to the soil and storm water drainage patterns at the project site. Without the use of BMPs determined by the results of analyses required by Condition of Certification **SOIL&WATER-8** that would be incorporated into a final DESCP and construction SWPPP, these changes could incrementally increase local soil erosion and storm water runoff. However, as discussed above, these potential impacts would be prevented or reduced to a level of less than significant through the implementation of BMPs, a final DESCP, and construction SWPPP, and compliance with all applicable erosion and storm

water management LORS. Similarly, compliance with these LORS and **SOIL&WATER-1**, -**2** and -**3**, would ensure that the Calico Solar Project's contribution to cumulative impacts would not be cumulatively considerable. (Ex. 300, p. C.7-60; Ex. 317 C.7-12 through C.7-15.)

Cumulative Impacts to the Basin Balance

As discussed above, during construction and operation of the Calico Solar Project, the groundwater demand would average less than 150 AFY during construction and less than 20.4 AFY during operation. Because of subsurface flow between basins, the groundwater system that would be affected by groundwater pumping for the project includes the Lavic Valley, Broadwell Valley and Bristol Lake Basins. Six projects listed in **Soil and Water Table 2 and 3** would be located within that area and would consume groundwater. These include a reactivated cinder quarry and an expansion of the Twentynine Palms Marine Corps base. The water requirements for those projects are not known. The remaining four projects are solar power projects. Two of those projects would be dry cooled and have small water requirements similar to those of the Calico Solar Project: the Stirling Energy Systems Solar Three Project (application withdrawn but replaced by another renewable energy project ROW application with the BLM) adjacent to the west boundary of the Calico Solar Project and the Bright Source (power tower) project in the Broadwell Valley. The remaining two proposed solar power projects appear to use solar trough technology, but the proposed method of cooling is unclear. If the projects use wet cooling, groundwater consumption per megawatt-hour of energy production would be on the order of 10 times larger than dry-cooled plants such as the Calico Solar Project. (Ex. 300, p. C.7-60 to C.7-61; Ex. 317 C.7-8 and C.7-10.)

The record indicates that wet-cooling of parabolic trough solar power plants requires an average of 930 gallons of water per megawatt-hour of electricity generated. A wet-cooled parabolic trough plant the size of the Calico Solar Project (850 MW) operating 2,500 hours per year would consume 6,000 AFY of water, or 300 times more than the Calico Solar Project. Dry-cooled parabolic trough plants typically consume 80 gallons per megawatt-hour of energy produced, which is still 30 times larger than water use for the Calico Solar Project. From the standpoint of efficient use of scarce water resources, the incremental impact of the Calico Solar Project groundwater use is minute compared to the potential impact of any wet-cooled projects. (Ex. 300, p. C.7-61.)

If all four of the other solar projects are as water-efficient as the Calico Solar Project, their combined consumptive use of groundwater (approximately 100 AFY during operation) would be small compared to total groundwater recharge to the Lavic-Broadwell-Bristol Lake groundwater system. For example, groundwater consumption for those projects is 25- to 50-percent of the recharge in just the Lavic Lake Basin, and therefore probably insignificant relative to the entire Lavic-Broadwell-Bristol Lake groundwater system which receives substantially more than 200 to 400 acre-feet per year of recharge. Nevertheless, even in the absence of more evidence, we conclude that the Calico Project's negligible contribution to cumulative impacts to the groundwater basin will not be cumulatively considerable.

Cumulative Impacts to Wells

The cumulative impact on groundwater levels caused by groundwater pumping to supply the four additional solar projects in the Lavic-Broadwell-Bristol Lake basin area depends on the type of technology and cooling method selected for those plants. If all four were as water-efficient as the Calico Solar Project, water level declines at Bristol Lake and nearby wells would be less than one inch. A single wet-cooled plant with a generating capacity as large as the Calico Solar Project (850 MW) would more than double estimated groundwater pumping from the three basins and potentially cause significant impacts. Nevertheless, we still find that the Calico Project' contribution to cumulative impacts to the groundwater basin will not be cumulatively considerable.

7. Compliance with LORS

<u>Clean Water Act</u>

The proposed project would satisfy the requirements of the RWQCB with the adoption of the following Conditions of Certification:

1) Development of the DESCP in accordance with **SOIL&WATER-1**;

2) Development of a Storm Water Damage Monitoring and Response Plan in accordance with **SOIL&WATER-3**,

3) Compliance with wastewater discharge requirements in accordance with **SOIL&WATER-2** and as specified in **Soil & Water Appendix B, C**, and **D**. In addition, the Applicant would be required to comply with California Department of Fish and Game's Streambed Alteration Agreement requirements in accordance with Condition of Certification **BIO-27**.

4) Compliance with storm water protection in accordance with **SOIL&WATER-10 and -11**.

Public Resources Code, Sections 25300 through 25302

Through compliance with Conditions of Certification **SOIL&WATER-4**, information required by Staff to conduct assessments and forecasts of potable and industrial water consumption by power plants is achieved. The Commission also promotes "all feasible means" of water conservation and "all feasible uses" of alternative water supply sources (*Section 25008*).

California Water Code Section 6000 to 6004.5 and 6025.5

Through compliance with **SOIL&WATER-8** and **GEO-2** and -**3**, information required by Staff to analyze the Applicant's compliance with these sections is achieved. The Applicant will provide information that the debris basins are in compliance with the State of California Department of Water Resources, Division of Safety of Dams (DOSD).

California Code of Regulations, Title 23, Division 2, Chapter 1, Article 303

Through compliance with **SOIL&WATER-8** and **GEO-2** and -**3**, information required by Staff to analyze the Applicant's compliance with this regulation is achieved. If necessary, Applicant will provide evidence that the developer has appropriate water rights before an application for the construction or enlargement of a DOSD Jurisdictional dam can be approved.

Energy Commission Policy

Sources of Policy

The Energy Commission has four sources for statements of policy relating to water use in California applicable to power plants. They are the California Constitution, the Warren-Alquist Act, the Commission's restatement of the state's water policy in the 2003 Integrated Energy Policy Report ("IEPR") and the State Water Resources Control Board ("SWRCB" or "Board") resolutions (in particular Resolutions 75-58 and 88-63).

California Constitution

California's interest in conserving water is so important to our thirsty state that in 1928, the common law doctrine of reasonable use became part of the state Constitution. Article X, Section 2 calls for water to be put to beneficial use, and that "waste or unreasonable use or unreasonable *method of use* be prevented." (Cal. Const., art. X, § 2; emphasis added.) The article also limits water rights to reasonable use, including reasonable methods of use. (*Ibid*.) Even earlier in the 20th Century, a state Supreme Court case firmly established that groundwater is subject to reasonable use. (*Katz v. Walkinshaw* (1903) 141 Cal. 116.) Thus, as modern technology has made dry-cooling of power plants feasible, the

Commission may regard wet-cooling as an unreasonable method of use of surface or groundwater, and even as a wasteful use of the state's most precious resource.

Warren-Alquist Act

Section 25008 of the Commission's enabling statutes echoes the Constitutional concern, by promoting "all feasible means" of water conservation and "all feasible uses" of alternative water supply sources. (Pub. Res. Code § 25008.)

Integrated Energy Policy Report

In the 2003 Integrated Energy Policy Report ("IEPR" or "Report"), the Commission reiterated certain principles from SWRCB's Resolution 75-58, discussed below, and clarified how they would be used to discourage use of fresh water for cooling power plants under the Commission's jurisdiction. The Report states that the Commission will approve the use of fresh water for cooling purposes only where alternative water supply sources or alternative cooling technologies are shown to be "environmentally undesirable" or "economically unsound." (IEPR (2003), p. 41.) In the Report, the Commission interpreted "environmentally undesirable" as equivalent to a "significant adverse environmental impact" under CEQA, and "economically unsound" as meaning "economically or otherwise infeasible," also under CEQA. (IEPR, p. 41.) CEQA and the Commission's siting regulations define feasible as "capable of being accomplished in a successful manner within a reasonable amount of time," taking into account economic and other factors. (Cal. Code Regs., tit. 14, § 15364; tit. 20, § 1702, subd. (f).) At the time of publication in 2003, dry cooling was already feasible for three projects - two in operation and one just permitted. (IEPR, p. 39.)

The Report also notes California's exploding population, estimated to reach more than 47 million by 2020, a population that will continue to use "increasing quantities of fresh water at rates that cannot be sustained." (IEPR, p. 39.)

State Water Resources Control Board Resolutions

The SWRCB primarily considers protection of water quality in its resolutions. It also addresses beneficial uses of water based on its water quality characteristics and water rights. In 1975, the Board adopted the *Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling* (Resolution 75-58). In it, the Board encourages the use of wastewater for power plant cooling. It also determined that water with a TDS concentration of 1,000 mg/L or less should be considered fresh water (Resolution 75-58). One express purpose

of that Resolution was to "keep the consumptive use of fresh water for power plant cooling to that *minimally essential*" for the welfare of the state (*Ibid*; emphasis added).

In 1988, the Board determined that water with TDS concentrations of 3,000 mg/L or less should be protected for and considered as potential supplies for municipal or domestic use unless otherwise designated by one of the Regional Water Quality Control Boards (Resolution 88-63.)

San Bernardino County Ordinance 3872 (Code Title 3, Division 3, Chapter 6, Article 5)

To help protect groundwater resources in San Bernardino County, the County enacted Ordinance 3872. This ordinance requires a permit to locate, construct, operate, or maintain a new groundwater well within the unincorporated, unadjudicated desert region of San Bernardino County. CEQA compliance must also be completed prior to issuance of a permit. The article does not apply to "groundwater wells located on Federal lands unless otherwise specified by inter-agency agreement." The BLM and County entered into a MOU that provides that the BLM will require conformance with Article 5 for all projects proposing to use groundwater from beneath public lands. The MOU provides that the County and BLM will work cooperatively together to ensure conformance with applicable LORS by project developers on BLM land. As part of meeting the requirements of the County's permitting process, the County may require the project owner to prepare a groundwater monitoring plan in accordance with the County's "*Guidelines for Preparation of a Groundwater Monitoring Plan*" dated January 1998. Condition of Certification **SOIL&WATER-7** will require the project owner to ensure that all onsite groundwater wells would be installed in accordance with the County of San Bernardino requirements and to submit a well construction packet to the County for comment and written evaluation. The project owner would also be required to submit well completion reports to the DWR in accordance with the DWR well completion reporting requirements.

8. Public Comment

Public comments regarding the Calico Project's effect on soil and water resources were received and responded to in the Supplemental Staff Assessment. Suggestions for changes to the Conditions of Certification were discussed during PMPD comment conferences and staff workshops on October 22 and 26, 2010 and responses are reflected in the revised conditions set out below. In general, we grant the applicant's request for an opportunity to review

and comment to the Project Owner about soil and water plans and reports relevant to its desire to protect its tracks from water damage, but with shorter than requested deadlines in order to reduce delay.

FINDINGS OF FACT

1. The Calico site (Scenario 5.5) will contain approximately 26,540 SunCatchers and associated equipment and infrastructure within a fenced boundary.

2. No “waters of the U.S.” exist on the project and therefore no federal wetland permitting is required. Storm water flows on the project site are considered “waters of the State” by the Lahontan Regional Water Quality Control Board and are subject to regulation under the Porter-Cologne Water Quality Control Act.

3. The newly constructed Well #3 adjacent to the project site will provide for all water needs for the project.

4. Phase 1 construction will require less than 92,107,331 gallons or less than 282.67 AF.

5. Phase 2 will require less than 103,421,405 gallons or less than 317.39 AF.

6. During the 60 months of project construction, the water demand for combined construction and dust suppression will be less than 600 AF.

7. Condition of Certification **SOIL&WATER-4** limits construction water use to 145 AFY.

8. Water consumption during operation will be limited to mirror washing (10.3 AFY), water treatment (5.2 AFY), potable use (2.2 AFY), dust control (2.5 AFY) and hydrogen generation (0.23 AFY).

9. The total maximum annual consumptive use of groundwater for operation of the power plant will be less than 20.4 AFY.

10. Condition **SOIL&WATER-4** limits operational water use to 21 AFY.

11. Compliance with Condition of Certification **SOIL&WATER-5**, will mitigate any potential impacts from the operation of sanitary waste septic system and leach field to a less than significant level.

12. The BMPs identified in the record and required by the Conditions of Certification will avoid significant soil erosion and subsequent sedimentation during construction.

13. Conditions of Certification in the **Air Quality** section of this Decision provide mitigation that would prevent significant impacts from fugitive dust and soil erosion.

14. Adherence to the procedures and restrictions of the Waste Discharge Requirements required by Condition **SOIL&WATER-2,** the DESCP required by Condition **SOIL&WATER-1** and compliances with the requirements of the NPDES program required by **SOIL&WATER-10 and -11** will conserve soil resources, maintain water quality, prevent accelerated soil loss, and protect air quality.

15. Conditions of Certification **SOIL&WATER-1, -2**, **-3, -8,-10 and 11** will mitigate potential impacts to soils at the project site below significance.

16. Water used for construction and operation of the Calico Solar Project will have a less than significant impact on the groundwater balance and the availability of groundwater to other basin users.

17. Calico Solar Project pumping will not affect groundwater levels or flow from discharging playas; any impact to groundwater salinity is therefore less than significant.

18. Potential on-site impacts from the risk of a leak or spill of hazardous materials contaminating groundwater are less than significant due to physical and administrative controls over the storage and use of these materials imposed by measures **HAZ-1** through **HAZ-5**.

19. Compliance with the requirements identified in **Soil and Water Appendices B**, **C**, **D** and **E** that are referenced in Condition of Certification **SOIL&WATER-2** will reduce the potential impacts from release of wastewater to less than significant levels.

20. The SWPPP and DESCP required by Condition **SOIL&WATER-1** through Condition **SOIL&WATER-3** and **SOIL&WATER-8, -10 and -11** which establish methods to control and manage storm water flow ensure that construction and operational impacts of the Calico Solar Project to erosion of soils, drainage of surface water, groundwater supplies and groundwater quality will not be significant.

21. Wastewater will be processed and disposed of according to standards, required by Condition **SOIL&WATER-2 and -5**, that will protect surface waters and ground water.

22. Condition of Certification **SOIL&WATER-7** requires the project owner to comply with the County of San Bernardino's Desert Groundwater Management Ordinance and implement a monitoring plan that will

23. If monitoring data indicate downward trends in water levels and groundwater water storage, Condition of Certification **SOIL&WATER-9** requires the project owner develop and implement a Water Conservation and Alternative Water Supply Plan to mitigate impacts.

24. **SOIL&WATER-5** ensures that the impact of the septic system on groundwater quality will be less than significant as the septic system must meet the permitting requirements of the San Bernardino County Department of Public Health.

25. Calico Solar Project will annually alternate discharging waste water into one of two concrete-lined evaporation ponds sized to contain one year of discharge flow or approximately three million gallons.

26. Implementation of Condition of Certification **SOIL&WATER-2** which requires the project owner to comply with the Waste Discharge Requirements, including monitoring and reporting associated with the operation of waste water evaporation ponds, will mitigate impacts attributable to the evaporation ponds to less than significant.

27. The Calico Solar Project's contribution to cumulative impacts to soil and water resources will not be cumulatively considerable.

CONCLUSIONS OF LAW

1. With implementation of the Conditions of Certification as set forth herein, the Calico Solar Project will comply with all applicable LORS, and will not result in any unmitigated and significant direct, indirect or cumulative adverse impacts related to Soil or Water Resources.

CONDITIONS OF CERTIFICATION

DRAINAGE EROSION AND SEDIMENTATION CONTROL PLAN

SOIL&WATER-1

Prior to Pre-Construction Site Mobilization, the project owner shall submit for BNSF's review, and comment as to those portions of deliverables relating to the study and requirements of **SOIL&WATER-12**, a site specific

Drainage, Erosion and Sediment Control Plan (DESCP) that ensures protection of: 1) water quality and soil resources of the project site; 2) all linear features on the project site, including but not limited to maintenance, access and perimeter roads, SunCatchers, power feed lines, and hydrogen lines; 3) all other structures on the project site; and 4) adjacent properties, including the BNSF right of way, for both the construction and operational phases of the project. Subsequent to delivery of the DESCP to BNSF, the project owner shall deliver the DESCP to the CPM for its review and approval. This plan shall address appropriate methods and actions, both temporary and permanent, on the project site, for the protection of water quality and soil resources, and for the protection of adjacent properties, including the BNSF right of way. The plan shall demonstrate no increase in off-site flooding potential, and no increase in storm water runoff or sediment transport off the project site and onto the BNSF right of way. The plan shall protect the BNSF right of way from storm water runoff and sediment transport in excess of existing conditions. The plan shall identify all monitoring and maintenance activities. The project owner shall complete all necessary engineering plans, reports, and documents necessary for BNSF and the CPM to conduct a review of the proposed project and provide a written evaluation as to whether the proposed grading, drainage improvements, and flood management activities will comply with all requirements presented herein.

The plan shall be developed based upon:

1) the Initial Drainage Report prepared for the applicant by Stantec Consulting dated October 2008;

2) the Drainage Erosion and Sediment Control Plan prepared for the applicant by Huitt Zollars dated August 25, 2009;

3) the Existing Conditions Hydrologic and Hydraulics Study prepared for the applicant by Huitt Zollars dated April 23, 2009 and the alternative mitigation recommendations contained therein; and

4) the Infiltration Report required by Condition of Certification **SOIL&WATER-13**.

The plan shall comply at a minimum, with the following:

1) the San Bernardino County Hydrology Manual and 2007 Development Code (amended, March 25, 2010);

2) the regulations of the County of San Bernardino Department of Public Works (CSBDPW);

3) all State SWPPP requirements;

4) FEMA Guidelines for Determining Flood Hazards on Alluvial Fans and Guidelines and Specifications for Flood Hazard Mapping Partners, Appendix G, Guidance for Alluvial Fan Flooding Analyses and Mapping. Specifically, pursuant to the FEMA-administered National Flood Insurance Program adopted by San Bernardino County, the project design shall be based on the assumption that the primary flow from the apex of the alluvial fan may flow to any single location within the site. 44 C.F.R. 65.13.

The DESCP shall contain the following elements:

1) Vicinity Map: A map shall be provided indicating the location of all project elements with depictions of all major geographic features both on the project site and upstream and downstream from the project site, to include watercourses, ephemeral washes, irrigation and drainage canals, major utilities, and sensitive areas.

2) Site Delineation: The site and all project elements shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, underground utilities, roads, drainage facilities and easements. Adjacent property owners shall be identified on the plan maps. All maps shall be prepared at a scale of 1" – 50'. The site delineation shall be based on the State Plane Coordinates System.

3) Drainage: The DESCP shall include the following analyses, in order to verify compliance with the minimum performance standards set forth in **SOIL&WATER-8** (1)(a-p):

   a. Topography. Topography for offsite areas is required to define the existing upstream tributary areas to the site and downstream to provide enough definition to map the existing storm water flow and flood hazard. Spot elevations shall be required where relatively flat conditions exist.

   b. Proposed Grade. Proposed grade contours shall be shown at a scale of 1" – 50' with current mapping to 1' contour interval accuracy in order to accurately delineate onsite ephemeral washes, drainage ditches, and tie-ins to the existing topography.

c. Hydrology. Existing and proposed hydrologic calculations for onsite areas and offsite areas that drain to and from the site; include maps showing the drainage area boundaries and sizes in acres, topography and typical overland flow directions, show all existing, interim, and proposed drainage infrastructure and their resulting direction of flow, and depict where any proposed drainage is intended to alter the direction, velocity or volume of existing flow.

d. Hydraulics. Provide hydraulic calculations to support the selection and sizing of the onsite drainage network, diversion facilities and Best Management Practices (BMPs) preventing impacts to project features and the BNSF right of way.

e. Sedimentation. Calculations of existing sediment transport conditions, and an analysis of sediment transport across and off the project site shall be provided.

4) Watercourses and Critical Areas: The DESCP shall show the location of all onsite and nearby watercourses including ephemeral washes, irrigation and drainage canals, and drainage ditches, and shall indicate the proximity of those features to the project site and both sides of the BNSF right of way and other adjacent properties.

5) Clearing and Grading: The plan shall provide a delineation of all areas to be cleared of vegetation, areas to be preserved, and areas where vegetation would be cut to allow clear movement of the SunCatchers. The plan shall require that clearing be kept to a minimum, and shall provide for the planting of approved erosion control vegetation. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross-sections, cut/fill depths or other means. The locations of any disposal areas, fills, or other special features shall also be shown. Existing and proposed topography tying in proposed contours with existing topography shall be illustrated. The DESCP shall include a statement of the quantities of material excavated at the site, whether such excavations or fill is temporary or permanent, and the amount of such material to be imported or exported or a statement explaining that there would be no clearing and/or grading conducted for each element of the project. Areas of no disturbance shall be properly identified and delineated on the plan maps.

6) Soil, Wind, and Water Erosion Control: The plan shall address exposed soil treatments to be used during construction and operation of the proposed project for both road and non-road surfaces including

the specific identification of all chemical-based dust palliatives, soil bonding, and weighting agents appropriate for use at the proposed project site that would not cause adverse effects to vegetation. BMPs shall include measures designed to prevent wind and water erosion including application of chemical dust palliatives after rough grading to limit water use. The plan shall identify and quantify the area of all surfaces where chemical dust palliatives, soil binders and weighting agents shall be used. The plan shall demonstrate, through these or other control measures, the prevention of changes in the direction, volume or velocity of storm water runoff off the site. The location and use of all dust palliatives, soil binders, and weighting agents shall be approved by the CPM prior to use. The plan shall provide for the regular maintenance of any debris and detention basins or other structural controls. The plan shall also demonstrate on-site roadways and other infrastructure are designed and located to avoid altering existing and proposed flow paths.

7) Project Schedule: The DESCP shall identify on the topographic site map the location of the site-specific BMPs to be employed during each phase of construction (initial grading, project element construction, and final grading/stabilization) and during operation. Separate BMP implementation schedules shall be provided for each project element for each phase of construction and operation. This scheduling should require the installation of debris basins, detention/ infiltration basins, swales, and related storm water management facilities before construction commences on each phase. Existing Conditions Hydrologic and Hydraulics Study prepared for the applicant by Huitt Zollars dated April 23, 2009 and the alternative mitigation recommendations contained therein;

8) Best Management Practices: The DESCP shall include BMPs which would prevent project-related adverse impacts to project features or the BNSF right of way. The DESCP shall show the location, timing, and maintenance schedule of all erosion-and sediment-control BMPs to be used prior to initial grading, during project element excavation and construction, during final grading/stabilization, and after construction. BMPs shall include measures designed to control dust and stabilize construction access roads and entrances. The maintenance schedule shall include post-construction maintenance of treatment-control BMPs applied to disturbed areas following construction, which areas may include artificial gulleys created along or around project features during weather events.

9) Erosion Control Drawings: The erosion-control drawings and narrative shall be designed, stamped and sealed by a professional engineer or erosion-control specialist.

10) Comments: The DESCP shall include copies of recommendations, conditions, and provisions from the BNSF, County of San Bernardino, California Department of Fish and Game (CDFG), and the Lahontan Regional Water Quality Control Board (LRWQCB) and FEMA.

11) Monitoring Plan: Monitoring activities shall include inspection of erosion and sedimentation control measures, routine measurement of the volume of accumulated sediment in the onsite drainage ditches, and storm water diversions and the requirements specified in Soil and Water Appendix B, C, and D. Monitoring activities shall be conducted prior to each forecasted storm event and following any storm event. A storm event is defined in the verification for this Condition, and any change in the definition shall be provided in advance to BNSF.

Verification: The DESCP shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL-1**, and relevant portions of the DESCP shall clearly show approval by the chief building official (CBO). In addition, the project owner shall do all of the following:

a) No later than forty-five (45) days prior to the start of Pre-Construction Site Mobilization, the project owner shall submit a copy of the DESCP to BNSF for review, and comments as to those portions of deliverables relating to the study and requirements of **SOIL&WATER-12**. Fifteen (15) days after delivery of the DESCP to BNSF, the project owner shall deliver the DESCP to the County of San Bernardino, the LRWQCB, California Department of Fish and Game, FEMA Region IX, BNSF and the CPM for review and comment. The CPM shall consider comments received within 15 days, in approving the plan.

b) During construction, the project owner shall provide BNSF and the CPM an analysis in the monthly compliance report on the effectiveness of the drainage-, erosion- and sediment-control measures and the results of monitoring and maintenance activities.

c) Once operational, the project owner shall provide BNSF and the CPM information on the results of storm water BMP monitoring and maintenance activities after each storm event and in the annual compliance report. A storm event is defined as rainfall of 10mm or more in a 24-hour period, as measured at or within 1 mile of the Project site.

d) The project owner shall provide BNSF and the CPM with two copies each of all monitoring or other reports required for compliance with San Bernardino County Department of Public Works Flood Control District, CDFG, LRWQCB, and FEMA.

WASTE DISCHARGE REQUIREMENTS

SOIL&WATER-2

The project owner shall comply with the Waste Discharge Requirements presented in the SSA Appendices B, C, D, and E for Soil and Water Resources (Ex. 300, C.7-89-C.7-132) and hereby incorporated by reference, for the design, construction and operation of the surface impoundments (evaporation ponds) and storm water management system. These requirements relate to discharges, or potential discharges, of waste that could affect the quality of waters of the state, and were developed in consultation with staff of the State Water Resources Control Board and/or the applicable California Regional Water Quality Control Board (hereafter "Water Boards"). It is the Commission's intent that these requirements be enforceable by both the Commission and the Water Boards. In furtherance of that objective, the Commission hereby delegates the enforcement of these requirements, and associated monitoring, inspection and annual fee collection authority, to the Water Boards.

Accordingly, the Commission and the Water Board shall confer with each other and coordinate, as needed, in the enforcement of the requirements. The project owner shall pay the annual waste discharge permit fee associated with this facility to the Water Boards. In addition, the Water Boards may "prescribe" these requirements as waste discharge requirements pursuant to Water Code Section 13263 solely for the purposes of enforcement, monitoring, inspection, and the assessment of annual fees, consistent with Public Resources Code Section 25531, subdivision (c).

Verification: No later than sixty (60) days prior to any wastewater or storm water discharge, the project owner shall provide documentation to BNSF and the CPM, with copies to the LRWQCB, demonstrating compliance with the WDRs established in Appendices B, C, D and E. Any changes to the design, construction, or operation of the evaporation ponds or storm water management system shall be requested in writing to the CPM, with copies to BNSF and the LRWQCB, and approved by the CPM, in consultation with the LRWQCB, prior to initiation of any changes. The CPM shall consider comments received within thirty (30) days from BNSF and LRWQCB, in approving the plan. The project owner shall provide to the CPM, with copies to the LRWQCB and BNSF, all monitoring reports required by the WDRs, and fully explain any violations, exceedances, enforcement actions, or corrective

actions related to construction or operation of the ponds or storm water system.

STORM WATER DAMAGE MONITORING AND RESPONSE PLAN

SOIL&WATER-3

The project owner shall ensure that all SunCatcher pole foundations are designed to withstand storm water scour from surface erosion and/or channel migration based on a Scour Analysis and Pole Foundation Stability Report to be completed by a Professional Engineer and Professional Geologist. The Pole Foundation Stability Report shall establish a Minimum Depth Stability Threshold. In developing the Pole Foundation Stability Report, the engineer shall use models approved by FEMA, and shall comply with all applicable FEMA regulations and standards. The Scour Analysis shall consider the unstable nature of high-energy, debris laden stream flows based on supercritical flow depths and velocities and using the correct Equation 6.1 from the Federal Highway Administration's Hydraulic Engineering Circular 18, which has factors of K1, K2, K3, and K4. The additional factors account for the unstable nature of flood flows in steep, alluvial washes during moderate to large flood events. The project owner shall also develop a Storm Water Damage Monitoring and Response Plan to evaluate potential impacts from storm water, including pole foundations that fail due to storm water flow or otherwise break and scatter mirror debris and other SunCatcher components on to the ground surface. The Storm Water Damage Monitoring and Response Plan shall include the following elements:

1. Detailed maps showing the installed location of all SunCatcher pole foundations within each project phase, including existing and proposed drainage channels.

2. Each SunCatcher pole foundation should be identified by a unique ID number marked to show initial ground surface at its base, and the depth to the tip of the pole below ground.

3. Minimum Depth Stability Threshold to be maintained of SunCatcher pole foundations to meet long-term stability for applicable wind, water and debris loading effects, as determined by the Scour Analysis and the Pole Foundation Stability Report.

4) The depth of scour associated with each SunCatcher support, and the natural erosion associated with lateral migration of channels.

5) Above and below ground construction details of a typical installed SunCatcher pole foundation.

6) BMPs to be employed to prevent the potential impact of broken mirrors to soil resources.

7) Methods and response time of mirror cleanup and measures that may be used to mitigate further impact to soil resources from broken mirror fragments.

8) A demonstration that the project design will withstand erosional forces which could impact site operations, and that would not result in transportation of damaged materials outside the site boundary.

9) A protocol for monitoring and responding to storm events, which shall require communication of response activities to BNSF and the CPM, and coordination with BNSF and the CPM for response activities where applicable.

Monitor and Inspect Site Before First Seasonal and After Every Storm Event:

1) Security and Tortoise Exclusion Fence: Inspect for damage and buildup of sediment or debris.

2) SunCatcher Pole Foundations within Drainages or Subject to Drainage Overflow: Inspect for tilting, mirror damage, depth of scour compared to foundation depth below ground and the Minimum Depth Stability Threshold, collapse, and downstream transport.

3) Drainage Channels: Inspect for substantial migration or changes in depth, and transport of broken mirror glass.

4) Constructed Diversion Channels: Inspect for scour and structural integrity issues caused by erosion, and for sediment and debris buildup.

Documentation: A detailed summary of the periodic inspections and any necessary maintenance and repairs shall be provided to BNSF and the CEC after each inspection. Short-Term Incident-Based Response:

1) Security and Tortoise Exclusion Fence: repair damage, and remove build-up of sediment and debris.

2) SunCatcher Pole Foundations: Remove broken glass, damaged structures, and wiring from the ground, and for foundations no longer meeting the Minimum Depth Stability Threshold, either replace/reinforce or remove the SunCatcher to avoid exposure for broken glass.

3) Drainage Channels: no short-term response necessary unless changes indicate risk to facility structures.

4) Constructed Diversion Channels: repair damage, maintain erosion control measures and remove built-up sediment and debris.

Long-Term Design-Based Response:

1) Propose operation/BMP modifications to address ongoing issues. Include proposed changes to monitoring and response procedures, frequency, or standards.

2) Replace/reinforce SunCatcher Pole Foundations no longer meeting the Minimum Depth Stability Threshold or remove the SunCatchers to avoid exposure for broken glass.

3) Propose on-site design modifications to address ongoing issues. This may include construction of active on-site storm water management diversion channels, debris basins and/or detention ponds.

4) Inspection, short-term incident response, and long-term design-based response may include activities both inside and outside of the approved right-of-way on BLM land. For activities outside of the approved right-of-way, the Applicant will notify BLM and acquire environmental review and approval before field activities begin.

Verification: At least thirty (30) days prior to construction, the project owner shall submit a copy of the Scour Analysis and Pole Foundation Stability Report and the Storm and the Storm Water Damage Monitoring and Response Plan to BNSF for review and comment and to the CPM for review and approval. The CPM shall consider comments received within fifteen (15) days, in approving the Scour Analysis and Pole Foundation Stability Report and the Storm Water Damage Monitoring and Response Plan. The project owner shall retain a copy of these documents onsite at the power plant at all times. The project owner shall prepare an annual summary of the number of pole foundations failed, cause of the failures, and cleanup and mitigation performed for each failed pole foundation.

CONSTRUCTION AND OPERATIONS WATER USE

SOIL&WATER-4

The proposed project's use of groundwater for all construction activities shall not exceed 145 AFY. The proposed project's use of groundwater for all operational activities shall not exceed 21 AFY. Use of ground or other water sources in excess of these limits are prohibited unless the project owner seeks a Project Amendment.

Prior to the use of groundwater for construction, the project owner shall install and maintain metering devices as part of the water- supply and distribution system to document project water use and to monitor and record in gallons per day the total volume(s) of water supplied to the project from the water source. Documentation of the installation and operation of the metering devices shall be submitted to the Commission prior to use of any groundwater for project activities. The metering devices shall be operational for the life of the project. An annual summary of daily water use by the project shall be submitted to the CPM in the annual compliance report.

Verification: At least thirty (30) days prior to the start of construction of the proposed project, the project owner shall submit to the CPM a copy of evidence that metering devices have been installed and are operational.

Beginning six (6) months after the start of construction, the project owner shall prepare a semi-annual summary of amount of water used for construction purposes. The summary shall include the monthly range (daily minimum and daily maximum) and monthly average of daily water usage in gallons per day.

The project owner shall prepare an annual summary, which will include daily usage, monthly range and monthly average of daily water usage in gallons per day, and total water used on a monthly and annual basis in AF. For years subsequent to the initial year of operation, the annual summary will also include the yearly range and yearly average water use by source. For calculating the total water use, the term "year" will correspond to the date established for the annual compliance report submittal.

SEPTIC SYSTEM AND LEACH FIELD REQUIREMENTS

SOIL&WATER-5

Prior to the start of construction of Phase 1b, the project owner shall provide the design of a sanitary waste septic system that complies with the County of San Bernardino requirements for the construction and operation of the project's proposed sanitary waste septic system and leach field to the CPM for review and approval.

Project operation shall not commence until documentation equivalent to the County's required wastewater treatment system permits are issued by the County and approved by the CPM.

The project owner shall remain in compliance with the County requirements for the life of the project.

Verification: The Project owner shall submit all necessary information and the appropriate fee to the County of San Bernardino to ensure that the project has complied with the county's sanitary waste disposal facilities requirements. A written assessment prepared by the County of San Bernardino confirming that the design of the project's sanitary waste septic system conforms with county requirements must be provided to the CPM for review and approval thirty (30) days prior to the start of site construction.

A written assessment prepared by the County of San Bernardino of the project's compliance with county's sanitary waste disposal facilities requirements must be provided to the CPM for review and approval sixty (60) days prior to the start of power plant operation.

DECOMMISSIONING PLAN

SOIL&WATER-6

The Project owner shall identify likely decommissioning scenarios and develop specific decommissioning plans for each scenario that will identify actions to be taken to avoid or mitigate long-term impacts related to or resulting from decommissioning project features, including but not limited to roadways and roadway treatments, structures and SunCatchers, and water and wind erosion after decommissioning. Actions may include such measures as a decommissioning SWPPP, monitoring of revegetation and restoration of disturbed areas, post-decommissioning maintenance, collection and disposal of project materials and chemicals, and access restrictions.

Verification: At least thirty (30) days prior to Pre-Construction Site Mobilization, the project owner shall submit decommissioning plans to BNSF and the CPM for review and comment. The CPM shall consider comments received within fifteen (15) days, in approving the plan. The project owner shall amend these documents as necessary, with approval from the CPM, should the decommissioning scenario change in the future.

GROUNDWATER LEVEL MONITORING AND REPORTING PLAN

SOIL&WATER-7

The project owner shall submit a Groundwater Monitoring and Management Plan to BNSF and San Bernardino County for review and comment, and to the CPM for review and approval. The CPM's approval shall be in accordance with the County of San Bernardino Code Title 3, Division 3, Chapter 6, Article 5 (Desert Groundwater Management Ordinance).

The Groundwater Monitoring and Management Plan shall provide a detailed methodology for monitoring background and site groundwater levels.

Monitoring shall be conducted prior to construction, during construction, and throughout project operation. The primary objective for the monitoring is to establish pre-construction and project related groundwater level trends that can be quantitatively compared against observed and simulated trends near the project pumping well and dedicated monitoring wells. Water level measurements in the project's water supply well shall represent non-pumped conditions, and be collected a minimum of four hours after pump shut-down.

Prior to project construction, monitoring shall commence to establish pre-construction base-line conditions and reporting shall include existing monitoring data collected in the project area useful for quantifying hydraulic gradients across the Pisgah Fault and between the Lavic Lake and Lower Mojave groundwater basins. The monitoring network shall therefore be designed to also incorporate and report relevant ongoing monitoring and reporting activities currently occurring in existing groundwater wells located within the Lavic Lake and Lower Mojave groundwater basins.

In areas where groundwater elevation data is needed but existing wells are absent or do not represent the water-bearing zone from which the project water supply well extracts groundwater, the monitoring network shall be comprised of wells screened to measure water levels representing the water-bearing zone from which the project water supply well will extract groundwater.

In addition, the project owner shall install 5 surveyed monument markers between the Railroad ROW and the water supply well, with one marker adjacent to the supply well. If the measured static groundwater level drops 5' or more, the project owner shall: (1) notify the CPM and BNSF of the drop and (2) prepare a Subsidence Mitigation Plan that will be reviewed and commented on by BNSF, and approved by the CPM.

Verification: The project owner shall complete the following:

a) At least two (2) months prior to power plant construction, a Groundwater Monitoring and Management Plan shall be submitted to BNSF and the County of San Bernardino for review and comment, and to the CPM for review and approval before completion of Condition of Certification **SOIL&WATER-3.** The CPM shall consider comments received within fifteen (15) days, in approving the Plan. The plan shall include a scaled map showing the site and vicinity, existing well locations, and proposed monitoring locations (both existing wells and new monitoring wells proposed for construction). The map shall also include relevant natural and man-made features (existing and proposed as part of this project). The plan also shall provide: (1) well construction information and borehole lithology for each existing well proposed for use as a monitoring well; (2)

description of proposed drilling and well installation methods for new wells; (3) proposed monitoring well design; and, (4) schedule for completion of the work.

b) At least one (1) month prior to construction, a Groundwater Level Network Report shall be submitted to BNSF and to the CPM. The report shall include a scaled map showing the final monitoring well network. It shall document the drilling methods employed, provide individual well construction as-builds, borehole lithology recorded from the drill cuttings, well development, and well survey results for all new wells. The well survey shall measure the location and elevation of the top of the well casing and reference point for all water level measurements, and shall include the coordinate system and datum for the survey measurements. Additionally, the report shall describe the water level monitoring equipment employed in the wells and document their deployment and use.

c) As part of the monitoring well network development, any newly constructed monitoring wells shall be permitted and constructed consistent with San Bernardino County and State specifications.

d) At least one (1) week prior to project construction, all water level monitoring data shall be provided to BNSF and to the CPM. The data transmittal shall include an assessment of pre-project water level trends, a summary of available climatic information (monthly average temperature and rainfall records from the nearest weather station), and a comparison and assessment of water level data.

e) After project construction and during project operations, the project owner shall submit the monitoring data annually to BNSF and to the CPM. The summary shall document water level monitoring methods, the water level data, water level plots, and a comparison between pre- and post-project start-up water level trends. The report shall also include a summary of actual water use conditions, monthly climatic information (temperature and rainfall), and a comparison and assessment of water level data. As part of this assessment, the project owner shall calculate water level trends and complete a 5-year projection of future water levels based on these trends and an evaluation of water supply reliability.

STORMWATER CONTROL/FLOOD PROTECTION DESIGN PLANS

SOIL&WATER-8: Prior to Pre-Construction Site Mobilization, the project owner shall submit two copies of the basis of design report, and the subsequent 30-percent, 60- percent, and 90-percent design drawings for the grading, drainage, and storm water mitigation facilities to BNSF for review, and comment as to those portions of the deliverables relating to the study and requirements of **SOIL&WATER-12**. Subsequent to submittal to BNSF, project owner shall submit two copies of the basis of design report, and the

subsequent 30-percent, 60-percent, and 90-percent design drawings for the grading and drainage and storm water mitigation facilities to BNSF and the CPM for review and comment. The 30-percent, 60-percent, and 90-percent design drawings for the grading, drainage, and storm water mitigation facilities shall have been preceded by a basis of design report to convey and support the design approach. To prepare the grading, drainage and storm water mitigation facilities drawings and accompanying basis of design report, the project owner shall do the following:

1. At a minimum, the design report shall ensure the project meets the following performance standards:

    a. Project construction and operation shall not alter either the existing watershed or sub-watershed boundaries, as depicted in the Scour/Flood Risk Map: Existing Conditions, Appendix A, page 2, Existing Condition Hydrologic and Hydraulic Study for Solar One (Phase 1 and 2) Project Site, prepared for the applicant by Huitt-Zollars dated April 3, 2009, that flow to the various structures within the BNSF right of way.

    b. Project construction and operation shall not adversely affect any railroad structure, series of structures or embankments through changes in the concentration, volume or velocity of storm water runoff, or the volume of sediment reaching the railroad right of way and all structures within it, and shall not result in concentrations of storm water runoff or sediment that could affect the integrity and safety of the BNSF right of way or its operations. Specifically, project owner's on-site drainage improvements shall be designed and constructed to ensure that the BNSF right of way is protected from sediment transport and peak storm water flows resulting from a 100-year, 6-hour flood event. Any of project owner's on-site detention or debris basins shall be designed and constructed to ensure the BNSF right of way is protected from sediment transport and peak storm water flows resulting from a 100-year, 24-hour flood event. In performing this analysis a FEMA approved model for alluvial fans shall be utilized.

    c. Subject to subparagraph b above, post-development runoff from the project site shall be equal to or less than predevelopment runoff.

    d. Post development sediment transport through the project site shall be equal to predevelopment sediment transport.

e. The project shall not increase erosion of the desert soils or divert storm water from its current path, including at site boundaries.

f. The project owner's installation grid of SunCatchers shall not result in diverting storm water across existing watershed or sub-watershed boundaries.

g. All on-site maintenance and access roads shall be constructed and aligned with existing storm water conveyance channels to ensure the maintenance of current channelization of storm water runoff patterns.

h. Once it is determined where SunCatchers can be located, the burial depth and foundation characteristics shall be based on the Pole Foundation Stability Report and Scour Analysis.

i. No SunCatcher shall be placed in an area where, in light of the engineering standards to be used in installing the SunCatchers, the hydrologic study required pursuant to **SOIL&WATER-12** indicates the integrity of the installation could be undermined, using the FEMA standards which require the hydrologic analysis to assume that the primary flow from the apex of the alluvial fan flows to said SunCatcher.

j. No SunCatcher shall be placed in an area where the computed storm water flows using the hydrologic study required pursuant to **SOIL&WATER-12** from a 100-year, 24-hour storm and following appropriate FEMA guidelines and standards for the distribution of these flows, could result in more scour than is recommended in the Scour Analysis and Pole Foundation Stability Report, using the correct and current local scour equation from the Federal Highway Administration's Hydraulic Engineering Circular 18 (HEC-18), which includes velocity, the characteristics of the natural sediment, and the possibility of unstable wave formations during moderate to large floods.

k. All detention and debris basins or other flood control structures shall fully prevent potential net increases in storm water runoff at the project boundary to the BNSF right of way.

l. All detention and debris basins or other flood control structures shall be sized and located to intercept storm water flow from off-site areas as it enters and flows across the project site.

m. Existing vegetation shall be preserved to the extent possible and erosion control vegetation shall be planted where applicable.

n. Runoff from the project site shall be controlled at all times through the use of appropriate BMP measures.

o. BMPs shall be established to ensure that all drainage control structures are properly maintained.

p. If it is determined that detention basins are needed, size, locate, and design each basin to allow the pass through design storm to move through the site unimpeded while capturing larger design storm flows and related sediment and debris to protect the proposed infrastructure and prevent any increase in quantity or velocity or change in location of storm water runoff or sediment transport to adjacent properties, including the BNSF right of way.

2. Ensure that all deliverables required pursuant to this condition comply with the requirements of:

   (i) the San Bernardino County Hydrology Manual and 2007 Development Code (amended, March 25, 2010);

   (ii) the regulations of the County of San Bernardino Department of Public Works (CSBDPW);

   (iii) all State SWPPP requirements;

   (iv) FEMA Guidelines for Determining Flood Hazards on Alluvial Fans and Guidelines and Specifications for Flood Hazard Mapping Partners, Appendix G, Guidance for Alluvial Fan Flooding Analyses and Mapping. Specifically, pursuant to the FEMA-administered National Flood Insurance Program adopted by San Bernardino County, the project design shall be based on the assumption that the primary flow from the apex of the alluvial fan may flow to any single location within the site. (44 C.F.R. 65.13.)

3. Ensure that all maps, plans, surveys and site delineations shall be as current as possible and shall be at a 1”-50’ scale with current mapping to 1’ contour interval accuracy, such that depths of the washes can be accurately understood.

4. A basis of design report that shall include:

   a. An analysis to quantify discharges and associated volumes of water, debris, and sediment associated with the 100-year storm at the apex of the alluvial fans under current watershed conditions.

b. A geomorphic and hydraulic analysis to determine the maximum design storm that can be routed through the site utilizing existing fluvial washes that will not result in significant damage to proposed site infrastructure and determine the ability of the proposed site infrastructure to withstand the storm at the proposed location of said site infrastructure. The result of this analysis shall not conflict with the requirement that the project not contribute to any impacts to the BNSF right of way due to a 100-year storm.

c. A geotechnical report for the project site based on site investigations that includes an analysis of subsurface soil, rock, and water conditions and the effectiveness of design and construction recommendations for roadways, foundations and other improvements in preventing impacts to the BNSF right of way. The report shall contain as a minimum:

   (i) Summary of all subsurface exploration data, including subsurface soil profile, exploration logs, laboratory or in situ test results, and ground water information;

   (ii) Interpretation and analysis of the subsurface data;

   (iii) Specific engineering recommendations for design;

   (iv) Specification of conditions for resolution of anticipated problems; and

   (v) Recommended geotechnical special provisions.

d. A geomorphic and biologic analysis to determine the minimum design storm that can be routed through the site utilizing existing fluvial washes that will provide the necessary sediment load through the site and "downstream areas" to maintain existing sensitive habitat needs, as described in the Geomorphic Assessment of Calico Solar Project Site. This analysis must consider and address the need for fine sand to support the existing sensitive habitat and the potential episodic nature of the associated dune complex evolution that depends upon El Nino events (i.e., wet winters occurring approximately every three to seven years) delivering sediment to the lower fan and the accompanying La Nina events (i.e., dry winters occurring approximately every three to seven years) eroding and transporting fine sands to these dunes through wind action.

e. A determination of the pass through design storm that can be routed through the site unimpeded to deliver the necessary sediment load through the site to maintain existing sensitive

habitat needs in "downstream areas" and not result in significant damage to proposed site infrastructure.

f. Design of each basin or other structural controls by showing supporting calculations and design drawings to convey the basin or other structural controls in plan view, cross-sections, depth to spillway if applicable, amount of freeboard volume of structural control retention, description of sidewall slopes if applicable, method of providing pass through design storm and related sediment unimpeded, method of providing erosion protection of structural control side walls, inlet design, outlet design, spillway design, spillway erosion control, combined outlet maximum flow, transition from outlet to existing downstream fluvial wash, tortoise fence location and design, maintenance of tortoise fence, maintenance of basin, maintenance of excess sediment in structural controls from larger flood flows. Structural control shall fully prevent potential net increases in storm water flows at the project boundary to the BNSF right of way.

g. For all structural control features that include flood control basin dams, at a minimum:

- specific locations of basins and dams on appropriate scale map,
- configuration of all basins and dams including basin-specific cross sections,
- a description of all materials designed to be used in the construction of the dams,
- footings designs,
- designs of cutoff walls,
- designs of keyways,
- description and design of drainage pass though methods,
- flow metering (ability to maintain maximum discharge to that of the maximum on-site flow design) technique and design,
- method of and design of debris deflection (i.e. trash racks) for each basin,
- emergency spillway design,
- pass through pipe outlet energy dissipation method and design, and basin inlet erosion protection,
- basin inlet erosion protection.

5. The project owner shall request comments from BNSF and the Department of Water Resources Division of Safety of Dams (DSOD) for the plans and specifications for the construction of any dam(s) or reservoir(s) that are under DSOD jurisdiction prior to beginning construction, and shall forward all comments to BNSF, DSOD and the CPM.

6. The project owner shall prepare a set of design specifications to supplement the 60-percent and 90-percent design drawings for BNSF review and comment. Plans, specifications, computations and other data shall be prepared by persons properly licensed by the State of California. If the 60-percent or 90-percent plans and specifications do not comply with the appropriate Conditions of Certification, the necessary changes or revisions to the plans shall be made by the project owner. If the CPM finds that the work described in the plans and specifications conform to the Conditions of Certifications in the Energy Commission Decision and other pertinent LORS, then the project owner shall submit two copies of the 100- percent set for BNSF review and for CPM review and approval. All design drawings must be submitted on bound or stapled 24" x 36" size paper.

Verification: The project owner shall do all of the following:

a) Prior to Pre-Construction Site Mobilization and before submitting the 30-percent grading, drainage, and storm water mitigation facilities drawings, the project owner shall submit a basis of design report to BNSF for review, and comment as to those portions of deliverables relating to the study and requirements of **SOIL&WATER-12**. Within fifteen (15) days, the project owner shall submit the basis of design report to BNSF and the CPM for review and comment. The CPM shall consider comments received within fifteen (15) days, in approving the basis of design report.

b) No later than thirty (30) days after the CPM's approval of the basis of design report, the project owner shall submit preliminary (30-percent) grading, drainage, and storm water mitigation facilities drawings and accompanying basis of design report to BNSF for its review, and comment as to those portions of deliverables relating to the study and requirements of **SOIL&WATER-12**. Within fifteen (15) days, the project owner shall deliver the preliminary (30-percent) grading, drainage, and storm water mitigation facilities drawings and accompanying basis of design report to BNSF and the CPM for review and comment. The CPM shall consider comments received within fifteen (15) days, in approving the 30-percent drawings and accompanying basis of design report.

c) No later than thirty (30) days after the CPM's approval of the 30-percent drawings, the 60-percent set of design drawings and accompanying basis

of design report shall be submitted to BNSF for review, and comment as to those portions of deliverables relating to the study and requirements of **SOIL&WATER-12.** Within fifteen (15) days, the project owner shall submit the 60-percent drawings percent drawings and accompanying basis of design report to BNSF and the CPM for review and comment. The CPM shall consider comments received within fifteen (15) days, in approving the 60-percent drawings.

d) After the person who originally drew the plan or their duly authorized agent addresses BNSF's and the CPM's 60-percent submittal comments and the CPM's required changes, the 90-percent set of design drawings and accompanying basis of design report shall be submitted to BNSF for review, and comment as to those portions of deliverables relating to the study and requirements of **SOIL&WATER-12**. Within fifteen (15) days after delivery of the 90-percent design drawings and accompanying basis of design report to BNSF, the project owner shall submit the 90-percent drawings and accompanying basis of design report to BNSF for review and comment and the CPM for review and approval. The CPM shall consider comments received within fifteen (15) days, in approving the 90-percent drawings.

e) The 100-percent design drawings and specifications (construction documents) shall be signed and sealed by a Registered Professional Engineer in the State of California and a Registered Professional Geologist in the State of California and submitted as the final, approved set of construction documents prior to Pre-Construction Site Mobilization. Prior to initiation of site construction, the 100-percent design drawings and specifications (construction documents) shall be submitted along with the final basis of design report signed and sealed by a Registered Professional Engineer and a Registered Professional Geologist in the State of California to BNSF for review, and comment as to those portions of deliverables relating to the study and requirements of **SOIL&WATER-12**. Fifteen (15) days after delivery of the 100-percent design drawings to BNSF, the project owner shall submit the 100-percent design drawings to BNSF and the CPM for review and comment. The CPM shall consider comments received within fifteen (15) days, in approving the 100-percent drawings.

f) Thirty (30) days prior to initiation of construction of any dams that would be considered under the jurisdiction of DSOD, the project owner shall receive approval for dam construction from the CPM based on comments the CPM has received from the DSOD for dam design adequacy.

PROJECT WATER SUPPLY MONITORING

SOIL&WATER-9

The annual monitoring report required by **SOIL&WATER-7** shall include an evaluation of water supply reliability. Based on the results of this evaluation, the CPM may request the project owner develop and submit a Water Conservation and Alternative Water Supply Plan. The purpose of this plan is to curtail and minimize water use to remediate observed water level and storage declines in the water bearing zone utilized by the project until the proposed alternative supply is available.

Verification: The project owner shall provide a Water Conservation Plan within thirty (30) days after the request of the CPM. The plan shall be implemented immediately upon approval by the CPM. Part of this plan shall include suspension of mirror washing until the water supply has stabilized or an alternative supply is available to provide the water. The project owner shall submit a Notice of Completion to the CPM within thirty (30) days of securing the alternative supply. The Notice of Completion shall list each plan component and document that it has been completed. Part of the documentation shall include water use records that show the conservation savings achieved. If development of an alternative water supply was part of the plan, the project owner shall provide all documentation, permits, as-builts, proof of a contract or other right to a long term supply and test results that may be required for the water supply. The Water Conservation Plan shall remain in effect until CPM approval of the project owner's Notice of Completion.

STORM WATER PERMITS

SOIL&WATER-10 NPDES GENERAL PERMIT FOR CONSTRUCTION ACTIVITY.

The project owner shall comply with the most recent requirements of the general National Pollutant Discharge Elimination System (NPDES) permit for discharge of storm water associated with construction activity. The project owner shall submit copies of all correspondence between the project owner and the State Water Resources Control Board (SWRCB) or the LRWQCB regarding this permit to BNSF and the CPM. The project owner shall also develop and implement a construction SWPPP for construction on the Calico Solar Project main site, laydown areas, pipeline, and transmission line. The SWPPP shall include construction BMPs to prevent storm water runoff and sediment transport off the project site.

Verification: Prior to submittal of the proposed construction SWPPP to the SWRCB or the LWRQCB, the project owner shall submit the same to the CPM and BNSF for review and comment. At least ten (10) days prior to Pre-Construction Site Mobilization, the project owner shall submit a copy of the construction SWPPP to BNSF for review and comment and to the CPM for

review and approval. The CPM shall consider comments received within fifteen (15) days, in approving the construction SWPPP. The project owners hall retain a copy of the approved SWPPP on site throughout construction. Prior to submittal of the construction NPDES permit application to the SWRCB or the LRWQCB, the project owner shall submit the same to the CPM and BNSF for review and comment. The project owner shall submit copies of all other correspondence between the project owner and the SWRCB or the LRWQCB regarding the NPDES permit for the discharge of storm water associated with construction activity to BNSF and the CPM within ten (10) days of its receipt or submittal. Copies of correspondence shall include the Notice of Intent sent to the SWRCB, the confirmation letter indicating receipt and acceptance of the Notice of Intent, any permit modifications or changes, and completion/permit Notice of Termination.

SOIL&WATER-11 INDUSTRIAL FACILITY SWPPP

The project owner shall comply with the requirements of the General NPDES Permit for Discharges of Storm Water Associated with Industrial Activity, including development of an Industrial Facility SWPPP. The SWPPP shall include operational BMPS to prevent storm water runoff and sediment transport off the project site. If the Regional or State Board finds the project does not require a General NPDES Permit for Discharges of Storm Water Associated with Industrial Activity, written confirmation from either board confirming this permit is not required would satisfy this Condition.

Verification: Prior to submittal of the proposed Industrial Facility SWPPP to the SWRCB or the LRWQCB, the project owner shall submit the same to the CPM and BNSF for review and comment. The project owner shall submit a copy of the Industrial Facility SWPPP for operation of the project to BNSF and the CPM at least sixty (60) days prior to the start of commercial operation and shall retain a copy of the approved SWPPP on site throughout the life of the project. Prior to submittal of the proposed industrial NPDES to the SWRCB or the LRWQCB, the project owner shall submit the same to the CPM and BNSF for review and comment. The project owner shall submit copies of all other correspondence between the project owner and the LRWQCB regarding the general NPDES permit for discharge of storm water associated with industrial activity to BNSF and the CPM within ten (10) days of its receipt or submittal. Copies of correspondence shall include the Notice of Intent sent by the project owner to the SWRCB, the confirmation letter indicating receipt and acceptance of the Notice of Intent, and any permit modifications or changes.

HYDROLOGY STUDY

SOIL&WATER-12

Prior to the production of the deliverables required under SOIL&WATER-13, project owner shall fund a hydrologic study commissioned by BNSF to determine the erosion and sedimentation impacts, if any, on BNSF infrastructure resulting from the project owner's planned emplacement of SunCatchers, flood control structures and runoff control measures.

Verification: No later than thirty (30) days prior to the production of the deliverables required under **SOIL&WATER-13**, the project owner shall fund a hydrologic study commissioned by BNSF. Within ninety (90) days of completion of the hydrologic study, the project owner shall provide documentation to the CPM that the study has been paid in full. Within thirty (30) days of completion of the hydrologic study, the results of study shall be provided to BNSF, the CPM and the project owner.

INFILTRATION REPORT

SOIL&WATER-13

Prior to the deliverables required under **SOIL&WATER-1**, project owner shall submit to BNSF for review, and comment as to those portions of the deliverables relating to the study and requirements of **SOIL&WATER-12**, an Infiltration Report. The Infiltration Report shall include an analysis of rainfall on the project site, with the objective of quantifying the amount of change in infiltration due to the project. The report shall include a calculation of the amount of storm water runoff for 1) the existing soil conditions, 2) the temporarily disturbed conditions resulting from construction, and 3) the final conditions after the installation of SunCatchers and the construction of roads and buildings is complete. This analysis shall be conducted using the 2-year, 5-year, 10-year, and 100-year storm intensities, considering durations of both 6 hours and 24 hours. The Infiltration Report shall identify all areas on the project site where permeability of the ground surface may be changed due to the project, including:

1) both the pedestals and solar concentrator dishes of the SunCatchers;

2) any areas where facilities will be constructed, fill deposited, or soil compacted;

3) any areas which will be paved or treated with soil stabilizers or soil weighting agents; and

4) any other areas where construction or operational activities may result in impacts to drainage, vegetation and soil infiltration rates.

The report shall include a model of soil-water flow to assess the significance of SunCatchers, roadways, soil binders, and construction and operational activities on the effective infiltration over the project site. The amount of impervious surface created by each project feature shall be estimated by considering worst-case conditions. In the case of SunCatchers, this means considering the impact when the SunCatchers are fully open to their maximum diameter of 38 feet. In the case of untreated dirt roads, this means considering long-term compaction caused by construction and maintenance vehicles. In the case of roads treated with soil-binding agents, this means considering the permeability that results from application of the selected treatment.

The Infiltration Report shall also include an analysis based on worst-case vegetation conditions over the life of the project as affected by, without limitation, the following factors: clearance, soil compaction, shading of vegetation by SunCatchers, relocation of precipitation by SunCatchers, addition of water through the washing of SunCatchers, modification of storm water flow by presence of SunCatchers and access and maintenance roads, use of dust suppressants, and use of weed management practices.

The Infiltration Report shall be used to determine the change in post-construction run-off caused by the project. The results of the Infiltration Report shall be considered in developing the plans and reports required pursuant to **SOIL&WATER-1** and **SOIL&WATER-8**.

Verification: At least thirty (30) days prior to submitting the deliverables required under **SOIL&WATER-1**, the project owner shall submit to BNSF for review, and comment as to those portions of the deliverables relating to the study and requirements of **SOIL&WATER-12**, the Infiltration Report. Within thirty (30) days of delivery of the Infiltration Report to BNSF, project owner shall submit the Infiltration Report to BNSF for review and comment and the CPM for review and approval. The CPM shall consider comments received within 15 (15) days in approving the report.

ELECTRONIC DELIVERY OF DOCUMENTS

SOIL&WATER-14

All deliverables submitted by applicant pursuant to the Conditions of Certification, and all engineering plans, reports, documents, maps and surveys relied upon, shall be made available to BNSF and the CPM in electronic format. All surveys and plans shall be provided in AutoCAD, and all reports shall be provided in an editable format to the commenting parties.

CONSISTENCY OF REPORTS, STUDIES, AND PLANS

SOIL&WATER-15

All reports, studies, and plans submitted pursuant to SOIL & WATER Conditions of Certification **SOIL&WATER-1 – 13** and Civil Engineering Condition of Certification **CIVIL-1** and **CIVIL-4** shall be based on and utilize consistent data and assumptions. In the event of any inconsistency, the CPM shall consult with Project Owner, BNSF, and any applicable agencies and determine how to resolve the inconsistency to ensure compliance with the performance standards contained in the **SOIL & WATER** Conditions of Certification.

SOIL&WATER-16 This condition applies to Phase 1a, as defined in **BIO-31** (Project Construction and Compensation Phasing Plan). The first three paragraphs of the General Requirements of **BIO-31** shall also apply to this condition.

A. DRAINAGE EROSION AND SEDIMENTATION CONTROL PLAN Prior to site mobilization for Phase 1a, the project owner shall obtain the CPM's approval of a site specific Drainage, Erosion and Sediment Control Plan (DESCP) for Phase 1a that ensures protection of: 1) water quality and soil resources of the project site; 2) all linear facilities on the project site, including but not limited to, maintenance, access roads, and pedestals: 3) all other structures on the project site; and 4) adjacent properties, including the BNSF right of way. The plan shall address appropriate methods and actions, both temporary and permanent, on the project site, to meet these performance standards. The plan shall demonstrate no increase in off-site flooding potential and no increase in storm water runoff or sediment transport off the project site and onto the BNSF right of way, and identify all monitoring and maintenance activities. The project owner shall complete all necessary engineering plans, reports, and documents necessary for Burlington Northern Santa Fe Railway (BNSF) and the CPM to conduct a review of the proposed Phase 1a and provide a written evaluation as to whether the proposed grading, drainage improvements, and flood management activities comply with all requirements presented herein. The plan shall contain the following elements:

• **Vicinity Map:** A map shall be provided indicating the location of all Phase 1a project elements with depictions of all major geographic features to include watercourses, washes, irrigation and drainage canals, major utilities, and sensitive areas in Phase 1a.

• **Site Delineation:** The Phase 1a site and all project elements shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, underground utilities, roads, and drainage facilities. Adjacent property owners shall be

identified on the plan maps. All maps shall be presented at a legible scale.

• **Drainage:** The DESCP shall include the following elements:

a. Topography. Topography for offsite areas as necessary to define the existing upstream tributary areas to the site and downstream to provide enough definition to map the existing storm water flow and flood hazard. Spot elevations shall be required where relatively flat conditions exist.

b. Proposed Grade. Proposed grade contours for Phase 1a shall be shown at a scale appropriate for delineation of onsite ephemeral washes, drainage ditches, and tie-ins to the existing topography.

c. Hydrology. Existing and proposed hydrologic calculations for Phase 1a onsite areas and offsite areas that drain to the Phase 1a area; include maps showing the drainage area boundaries and sizes in acres, topography and typical overland flow directions, and show all existing, interim, and proposed drainage infrastructure and their intended direction of flow.

d. Hydraulics. Provide hydraulic calculations to support the selection and sizing of the Phase 1a onsite drainage network, diversion facilities and Best Management Practices (BMPs) to control construction related impacts related to Phase 1a.

• **Watercourses and Critical Areas:** The DESCP shall show the location of all Phase 1a onsite and nearby watercourses including washes, irrigation and drainage canals, and drainage ditches, and shall indicate the proximity of those features to the Phase 1a construction site.

• **Clearing and Grading:** The plan shall provide a delineation of all Phase 1a areas to be cleared of vegetation, areas to be preserved, and areas where vegetation would be cut to allow clear movement of the heliostats. The plan shall provide elevations, slopes, locations, and extent of all proposed grading in Phase 1a as shown by contours, cross-sections, cut/fill depths or other means. The locations of any disposal areas, fills, or other special features in Phase 1a shall also be shown. Existing and proposed topography tying in proposed contours with existing topography in Phase 1a shall be illustrated. The DESCP shall include a statement of the quantities of material excavated in Phase 1a, whether such excavations or fill is temporary or permanent, and the amount of such material to be imported or exported or a statement explaining that there would be no clearing and/or grading

conducted for each element of the project. Areas of no disturbance in Phase 1a shall be properly identified and delineated on the plan maps.

• **Soil Wind and Water Erosion Control:** The plan shall address exposed soil treatments to be used during construction of Phase 1a for both road and nonroad surfaces including the specific identification of all chemicalbased dust palliatives, soil bonding, and weighting agents appropriate for use at the proposed project site that would not cause adverse effects to vegetation. BMPs shall include measures designed to prevent wind and water erosion including application of chemical dust palliatives after rough grading to limit water use. All dust palliatives, soil binders, and weighting agents shall be approved by the CPM prior to use. With regard to erosion risk and stormwater runoff, the plans shall identify storm water management facilities, if any, that are necessary to ensure no adverse water quality impacts either onsite or offsite will result from construction of Phase 1a. On-site roadways and other infrastructure in Phase 1a shall be designed and located to avoid existing and proposed flow paths to the extent feasible.

• **Project Schedule:** The DESCP for Phase 1a shall identify on the topographic site map the location of the site-specific BMPs to be employed during Phase 1a construction (initial grading, project element construction, and final grading/stabilization). This scheduling should require the installation of any necessary storm water management facilities, identified in the plans, before construction commences on Phase 1a.

• **Best Management Practices:** The DESCP for Phase 1a shall show the location, timing, and maintenance schedule of all erosion- and sediment-control BMPs to be used in Phase 1a prior to initial grading, during project element excavation and construction, during final grading/stabilization, and after construction. BMPs shall include measures designed to control dust and stabilize construction access roads and entrances. The maintenance schedule for Phase 1a shall include post-construction maintenance of treatment-control BMPs applied to disturbed areas of Phase 1a following construction.

• **Erosion Control Drawings:** The erosion-control drawings and narrative for Phase 1a shall be designed, stamped and sealed by a professional engineer or erosion-control specialist.

• **Comments:** The DESCP for Phase 1a shall include copies of recommendations, conditions, and provisions from the BNSF, County of San Bernardino, California Department of Fish and Game (CDFG), and Lahontan Regional Water Quality Control Board (RWQCB).

• **Monitoring Plan:** Monitoring activities for Phase 1a shall include routine measurement of the volume of accumulated sediment in the onsite drainage ditches, and storm water diversions and the requirements specified in SSA Soil and Water Appendicies B, C, and D**.**

Verification A: The DESCP for Phase 1a shall clearly show approval by the chief building official (CBO). In addition, the project owner shall do all of the following:

a) No later than 30 days prior to start of site mobilization of Phase 1a, the project owner shall submit a copy of the DESCP to the County of San Bernardino, the RWQCB, BNSF and the CPM for review and comment. The CPM shall consider comments received within 15 days in approving the plan.

b) During construction of Phase 1a, the project owner shall provide BNSF and the CPM an analysis in the monthly compliance report on the effectiveness of the drainage-, erosion- and sediment-control measures and the results of monitoring and maintenance activities.

c) The project owner shall provide BNSF and the CPM with two copies each of all monitoring or other reports required for compliance with San Bernardino County, CDFG, and RWQCB.

B. STORMWATER CONTROL/FLOOD PROTECTION DESIGN PLANS: The project owner shall submit two copies of the 30-percent, 60- percent and 90-percent design drawings for the grading and drainage facilities of Phase 1a to BNSF and the CPM for review and comment. The 30-percent, 60-percent and 90-percent design drawings for the grading and drainage facilities for Phase 1a shall be accompanied by a basis of design report to convey and support the design approach. To prepare the grading and drainage facilities drawings and accompanying basis of design report for Phase 1a, the project owner shall do the following:

1. At a minimum, the design report shall ensure Phase 1a meets the following performance standards:

a. Construction of Phase 1a shall not alter the existing watershed boundaries.

b. Construction of Phase 1a shall not adversely affect any railroad structures through changes in the volume or velocity of storm water runoff reaching the railroad structure.

c. No SunCatcher shall be placed in an area where approved hydrologic studies indicate the water surface resulting from a 100 year, 24-hour storm could be more than 1.5 feet above the pre-storm ground surface.

d. Post development runoff from Phase 1a shall be equal to or less than predevelopment runoff.

e. Post development sediment transport through Phase 1a shall be equal to predevelopment sediment transport.

f. At a minimum, all storm water, hydraulic and drainage reports used for project development shall comply with the requirements of the San Bernardino County Drainage Manual (SBCDM).

2. Conduct an analysis of Phase 1a to quantify the design discharges and associated volumes of water, debris, and sediment associated with the 100-year storm at the apex of the fan under current watershed conditions.

3. Conduct a geomorphic and hydraulic analysis of Phase 1a to determine the maximum design storm that can be routed through Phase 1a utilizing existing fluvial washes that will not result in significant damage to proposed Phase 1a infrastructure.

4. Conduct a geomorphic and biologic analysis to determine the minimum design storm that can be routed through Phase 1a utilizing existing fluvial washes that will provide the necessary sediment load through Phase 1a and “downstream areas” to maintain existing sensitive habitat needs, as described in the *Geomorphic Assessment of Calico Solar Project Site.* This analysis must consider and address the need for fine sand to support the existing sensitive habitat and the potential episodic nature of the associated dune complex evolution that depends upon El Niño events (i.e., wet winters occurring approximately ree to seven years) delivering sediment to the lower fan and the accompanying La Niña events (i.e., dry winters occurring approximately every three to seven years) eroding and transporting fine sands to these dunes through wind action.

5. Determine the pass through design storm that can be routed through Phase 1a unimpeded to deliver the necessary sediment load through Phase 1a to maintain existing sensitive habitat needs in “downstream areas” and not result in significant damage to Phase 1a infrastructure.

6. The project owner shall prepare a set of design specifications to supplement the 90-percent design drawings for Phase 1a. Plans, specifications, computations and other data shall be prepared by persons properly licensed by the State of California. If the 60-percent plans or 90-percent plans and specifications for Phase 1a do not comply with the appropriate Conditions of

Certification, the necessary changes or revisions to the plans shall be made by the project owner. If the CPM finds that the work described in the plans and specifications conform to the Conditions of Certifications in the Energy Commission Decision and other pertinent LORS, then the project owner shall submit two copies of the 100- percent set for CPM review and approval. All design drawings must be submitted on bound or stapled 24” x 36” size paper.

Verification B: Prior to site mobilization for Phase 1a, the project owner shall prepare preliminary (30-percent) grading and drainage facilities drawings and accompanying basis of design report for BNSF review and CPM review and approval. No later than 30 days after publication of the Energy Commission Decision, the 60-percent set of designdrawings and accompanying basis of design report for Phase 1a shall be submitted to the BNSF for review and CPM for review and approval. The project owner shall submit the 90-percent design drawings and accompanying basis of design report for Phase 1a to BNSF for review and the CPM for review and approval after the person who originally drew the plan or their duly authorized agent addresses the CPM’s 60-percent submittal comments and required changes. The 100-percent design drawings and specifications (construction documents) for Phase 1a shall be signed and sealed by a Registered Professional Engineer in the State of California and submitted as the final, approved set of construction documents prior to site mobilization for Phase 1a. Prior to initiation of sites (construction documents) shall be submitted along with the final basis of design report signed and sealed by a Registered Professional Engineer and a Registered Professional Geologist in the State of California to the CPM for review and approval.

C. CULTURAL RESOURCES

The potential for impacts to cultural resources depends upon whether such resources are present and whether they would actually be encountered during project development and construction activities. Cultural resource materials such as artifacts, structures, or land modifications reflect the history of human development. Certain places that are important to Native Americans or local national/ethnic groups are also considered valuable cultural resources. Analysis in this topic area pertains to the structural and cultural evidence of human development in the project vicinity, as well as appropriate mitigation measures should cultural resources be disturbed by project excavation and construction. Potential impacts to these resources from the proposed project may include, but are not limited to, destruction of resources, alteration of a historical feature and diminishment of the significance of a cultural resource caused by construction and operation the facility. These impacts and the thresholds for determining the significances of these impacts are discussed in this section.

The discussion focuses primarily on the requirements of the California Environmental Quality Act (CEQA), local laws, ordinances, and regulations, and eligibility of cultural resources for listing in the California Register of Historical Resources (CRHR). However, because the proposed project will be located on federal land, several federal laws are equally applicable to this project. As a result, this the discussion includes certain findings and conclusions reached by the Bureau of Land Management (BLM) relating to the National Environmental Policy Act (NEPA), consultation with Native American tribes and representatives, and eligibility of cultural resources for listing in the National Register of Historic Places (NRHP) under Section 106 of the National Historic Preservation Act (NHPA).[1]

The supporting evidence for this analysis is contained in the following exhibits: 8/18/10 RT 413-462, 8/25/10 RT 19-74, 113-118,Exs. 1, § 5.7, 57, 75,108, 129, 133, 300, §B.3, 309;§ C-2-2, 312, 441, 442.

[1] Given that the proposed Calico Solar Project is located on lands managed by BLM and requires BLM authorization, the proposed action is considered a federal undertaking, and must comply with the NHPA and implementing regulations. NEPA addresses compliance with the NHPA, and the required corresponding environmental documentation (whether it is an Environmental Assessment or an Environmental Impact Statement) must discuss cultural resources.

Determining the Historical Significance of Cultural Resources

Three kinds of cultural resources, classified by their origins, are considered in this assessment: prehistoric, ethnographic, and historic. Cultural resources are categorized as buildings, sites, structures, objects, and districts under both federal law for the purposes of the National Environmental Policy Act and the National Historic Preservation Act), Section 106, and under California state law for the purposes of the California Environmental Quality Act.

California Register of Historic Resources and CEQA

When a cultural resource is determined to be significant, it is eligible for inclusion in the California Register of Historic Resources (CRHR). (Pub. Res. Code, § 5024.1; Cal. Code Regs., tit. 14, § 4850 et seq.) An archaeological resource that does not qualify as an historic resource may be considered a "unique" archaeological resource under CEQA. (*see* Pub. Res. Code, § 21083.2.) In addition, structures older than 50 years (or less if the resource is deemed exceptional) can be considered for listing as significant historic structures. The Office of Historic Preservation's Instructions for Recording Historical Resources (1995) endorses recording and evaluating resources over 45 years of age to accommodate a five-year lag in the planning process.

The CEQA Guidelines define historical resources to include:

(1) A resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the CRHR,

(2) A resource included in a local register of historical resources or identified as significant in a historical resource survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, or

(3) Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the lead agency's determination is supported by substantial evidence in light of the whole record. [Cal. Code Regs. tit. 14, § 15064.5(a).]

Historical resources that are automatically listed in the CRHR include California historical resources listed in or formally determined eligible for the National Register of Historic Places (NRHP) as well as California Registered Historical Landmarks from No. 770 onward. [Pub. Res. Code, § 5024.1(d).]

Under the CEQA Guidelines, a resource is generally considered to be historically significant if it meets the criteria for listing in the CRHR. These criteria are

essentially the same as the eligibility criteria for the NRHP. In addition to being at least 50 years old, a resource must meet at least one of the following four criteria: (1) it is associated with events that have made a significant contribution to the broad patterns of our history (Criterion1); (2) it is associated with the lives of persons significant in our past (Criterion 2); (3) the resource embodies the distinctive characteristics of a type, period, or method of construction, or that it represents the work of a master, or possesses high artistic values (Criterion 3); or, (4) the resource has yielded, or may be likely to yield, information important to history or prehistory (Criterion 4). (Pub. Res. Code § 5024.1.) Historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association (Cal. Code Regs., tit. 14, § 4852(c); Pub. Res. Code § 5020.1 (j), 5024.1).

Even if a resource is not listed or determined to be eligible for listing in the CRHR, CEQA allows the lead agency to make a determination as to whether the resource is a historical resource.

Resources include historic district or landscapes. There are state and federal guidelines for evaluating whether certain resources are historic districts. The National Park Service defines a historic district as “a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development” (U.S. Department of the Interior, National Park Service 2002:5).For a grouping of cultural resources to be considered eligible for listing in the NRHP as a “district,” those resources must be historically or functionally related and visually convey a historical theme or environment. In addition, the district must possess sufficient historical significance and integrity.

The California Code of Regulations similarly defines historic districts as “unified geographic entities which contain a concentration of historic buildings, structures, objects, or sites united historically, culturally, or architecturally. Historic districts are defined by precise geographic boundaries. Therefore, districts with unusual boundaries require a description of what lies immediately outside the area, in order to define the edge of the district and to explain the exclusion of the adjoining areas” [Title 14, California Code of Regulations, Chapter 11.5, Section 4852(a)(5)].

With respect to historic landscapes, the National Park Service provides the following definition: “a geographical area that historically has been used by people, or shaped or modified by human activity, occupancy, or intervention, and

that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features" (U.S. Department of the Interior, National Park Service 1999:1-2).

Historic landscapes exhibit evidence of human use or activities and typically are one of the following types: agriculture (including various types of cropping and grazing); industry (including mining, lumbering, fish-culturing, and milling); maritime activities such as fishing; shell fishing, and shipbuilding recreation (including hunting or fishing camps); transportation systems; migration trails; conservation (including natural reserves), and sites adapted for ceremonial, religious, or other cultural activities, such as camp meeting grounds (U.S. Department of the Interior, National Park Service 1999:3).

Although the National Park Service recognizes the cultural landscape categories as descriptive terms, landscapes that are listed in or determined eligible for the NRHP are officially classified as districts. Sites are small landscapes with no buildings or structures as sites. Larger landscapes with numerous buildings, structures, and sites are classified as districts.

NEPA and National Historic Preservation Act

As discussed above, this discussion also considers actions and determinations of BLM under NEPA and Section 106 of the National Historic Preservation Act (NHPA). (16 United States Code [USC] 470f).) NEPA is implemented by regulations of the Council on Environmental Quality, 40 CFR 1500-1508. In summary, NEPA establishes national policy for the protection and enhancement of the environment. Part of the function of the Federal Government in protecting the environment is to "preserve important historic, cultural, and natural aspects of our national heritage."

Cultural resources are not required to be NHPA to receive consideration under NEPA.

Section 106 of NHPA requires federal agencies to consider the effects of their undertakings on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places (NRHP) and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on such undertakings (36 CFR Part 800.1). Under Section 106, the significance of any adversely affected cultural resource is assessed and mitigation measures are proposed to resolve such effects.

Under NHPA (36 CFR Part 800), significant resources that might be affected by the undertaking must be identified. Significant cultural resources (historic properties) are those resources that are listed in or are eligible for listing on the NRHP per the criteria listed at 36 CFR 60.4 (Advisory Council on Historic Preservation 2000). Impacts to the resources must be identified and mitigation measures must be developed an implemented to offset or eliminate adverse impacts. All three steps require consultation with interested Native American tribes, local governments, and other interested parties.

Value criteria for NRHP eligibility fall into the following categories:

1. **Associate Value (Criteria A and B):** Properties significant for their association with or linkage to events (Criterion A) or persons (Criterion B) important in the past.

2. **Design or Construction Value (Criterion C):** Properties significant as representatives of the man-made expression of culture or technology.

3. **Information Value (Criterion D):** Properties significant for their ability to yield important information about prehistory or history.

Cultural resources deemed eligible for listing in the NRHP (with State Historic Preservation Officer (SHPO) concurrence), are termed “historic properties” under Section 106, and are afforded the same protection as sites listed in the NRHP.

Criteria for Determining the Significance of Project Impacts on Historically Significant Cultural Resources

Guided by the requirements of CEQA, NEPA, and Section 106, we evaluated the character of the effects or impacts that a proposed project may have on historically significant cultural resources. The analysis takes into account three primary types of potential impacts: 1) direct effects or impacts, (2) indirect effects or impacts, and (3) cumulative effects or impacts. We discuss the character of the potential impact, whether each such effect is significant, relative to specific regulatory criteria under CEQA, NEPA, and Section 106, and feasible mitigation.

Direct and Indirect Impacts under CEQA

In general, direct impacts to cultural resources are those associated with project development and construction. Construction usually entails surface and subsurface disturbance of the ground, and direct impacts to archaeological resources may result from the immediate disturbance of the deposits, whether from vegetation removal, vehicle travel over the surface, earth-moving activities,

excavation, or demolition of overlying structures. Construction can have direct impacts on historic built-environment resources when those structures must be removed to make way for the project or when the vibrations of construction impair the stability of historic structures nearby.

New structures can have direct impacts on historic structures when the new structures are stylistically incompatible with their neighbors and the setting, and when the new structures produce something harmful to the materials or structural integrity of the historic structures, such as emissions or vibrations.

Indirect impacts to cultural resources and archaeological resources in particular, are those which may result from increased erosion due to site clearance and preparation, or from inadvertent damage or outright vandalism to exposed resource components due to improved accessibility. Similarly, historic structures can suffer indirect impacts when project construction creates improved accessibility and vandalism or greater weather exposure becomes possible. (Ex. 309, pp. C.2-7 – C.2-11.)

Direct and Indirect Effects under NEPA

The concepts of direct and indirect effects under NEPA are almost equivalent to those under CEQA. Direct effects under NEPA are those "which are caused by the [proposed or alternative] action and [which] occur at the same time and place" (40 CFR § 1508.8(a)). Indirect effects are those "which are caused by the [proposed or alternative] action and are later in time or farther removed in distance, but are still reasonably foreseeable" (40 CFR § 1508.8(b)).

Direct and Indirect Effects under Section 106

The Section 106 regulation narrows the range of direct effects and broadens the range of indirect effects relative to the definitions of the same terms under CEQA and NEPA. The regulatory definition of "effect," pursuant to 36 CFR § 800.16(i), is that the term "means alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register." In practice, a "direct effect" under Section 106 is limited to the direct physical disturbance of a historic property. Effects that are immediate but not physical in character, such as visual intrusion, and reasonably foreseeable effects that may occur at some point subsequent to the implementation of the proposed undertaking are referred to in the Section 106 process as "indirect effects."

Cumulative Impacts

The concept of cumulative impacts applies under CEQA and NEPA. Although each law has its own definition of cumulative impacts, both definitions encompass the idea that cumulative impacts reaches beyond the project area of analysis or the area of potential effects. It is a consideration of how the effects of a proposed or alternative action in those areas contributes or does not contribute

to the degradation of a resource group or groups that is or are common to the project area of analysis and the surrounding area or vicinity. (Pub. Resources Code sec. 21083; Cal. Code Regs., tit. 14, secs. 15064(h), 15065(a)(3), 15130, and 15355, 40 CFR § 1508.7, (40 CFR § 1508.27(b)(7).)

Cumulative Effects under Section 106

The Section 106 regulation makes explicit reference to cumulative effects only in the context of a discussion of the criteria of adverse effect (36 CFR § 800.5(a)(1)). Cumulative effects are largely undifferentiated as an aspect of the potential effects of an undertaking. Such effects are enumerated and resolved in conjunction with the consideration of direct and indirect effects.

Section 106 regulation makes explicit reference to cumulative effects only in the context of a discussion of the criteria of adverse effect (36 CFR § 800.5(a)(1)). Cumulative effects are largely undifferentiated as an aspect of the potential effects of an undertaking. Such effects are enumerated and resolved in conjunction with the consideration of direct and indirect effects.

SUMMARY AND DISCUSSION OF THE EVIDENCE

1. Project Area of Analysis

The project area of analysis (or “project area”) is the area within and surrounding the Calico Solar project site, as well as all associated linear facility corridors. The evidence shows that the area reflects the minimum standards set out in the Energy Commission Power Plant Site Certification Regulations (Cal. Code Regs., tit. 20, § 1701 et seq., Appen. B, subd. (g)(2)) and is large and comprehensive in geographic area to facilitate and encompass considerations of both direct and indirect effects to archaeological, ethnographic, and built-environment resources.

The project area is a composite geographic area that allows for analysis of the following resource types:

- For archaeological resources, the project area of analysis is minimally defined as the project site footprint, plus a buffer of 200 feet, and all project linear facilities routes, plus a buffer of 50 feet to either side of the rights-of way for these linear routes.
- For built-environment resources, the project area of analysis is confined to one parcel deep from the project site footprint in urban areas, but in rural areas is expanded to include a half-mile buffer from the project site and above-ground linear facilities to encompass resources whose setting could be adversely affected by industrial development.
- For a historic district or a cultural landscape, the project area of analysis is based on the particular characteristics of each siting case (i.e., specific to that project).
- For ethnographic resources, the project area of analysis is expanded to take into account traditional use areas and traditional cultural properties which may be far-ranging, including views that contribute to the significance of the property. These resources are often identified in consultation with Native Americans and other ethnic groups, and issues that are raised by these groups may define the area of analysis. (Ex. 309, pp. C-2-3 – C-2-4.)

2. Physical Setting

The proposed Calico Solar project is located on 4,613 acres in eastern San Bernardino County within the central Mojave Desert, approximately 115 miles east of Los Angeles and 37 miles east of Barstow, California. Nearby communities include Newberry Springs and Ludlow, both approximately 12 miles to the west and east, respectively, of the project site.

The project site is situated on the north side of Interstate-40 (I-40), primarily east of Hector Road. The southern project boundary borders I-40, the western boundary borders undeveloped BLM land, the southeastern boundary borders an existing transmission line; and the northern and eastern site boundaries border the base of the Cady Mountain range.

The Cady Mountain Wilderness Study Area and the Sleeping Beauty Proposed Wilderness Area are located north and northeast, respectively, of the project area. Pisgah Crater, located within the Pisgah Area of Critical Environmental Concern, is located south of the project site.

The project area is rural but there is evidence of prior land use activities in the form of dilapidated mining-related structures, mining processing equipment, corrals, water tanks, barbed wire fencing, and several underground and above-

ground utilities. The primary sources of previous disturbance within and adjacent to the project area include cattle grazing, off-road vehicle use, historic mining activities, construction of a series of underground pipelines, construction and use of the Southern California Edison (SCE) Pisgah Substation and associated transmission lines, and the construction and use of a number of transportation routes, including the Burlington Northern Santa Fe (BNSF) railroad tracks,[2] the National Old Trails Road, U.S. Route 66, and I-40.

3. Environmental Setting

a. Geology and Geomorphology

The Project area is located within the geomorphic province of the Mojave Desert, which occupies approximately 25,000 square miles of southeastern California The Mojave Desert is a wedge shaped area largely bound by major faults and structurally referred to as the Mojave Block.

The Mojave Desert Geomorphic Province is characterized by broad expanses of desert with localized mountains and dry lakebeds and is bound by the San Bernardino Mountains and the Pinto fault to the south, the San Andreas fault to the west, the Garlock fault to the north and the Basin and Range Province to the east. The Mojave Block has a series of northwest to southeast striking faults referred to as the Eastern California Shear Zone (ECSZ).

The project area of analysis is within a broad valley between the Southwestern and Southeastern Cady mountains, in the central portion of the Mojave Desert Geomorphic Province. (Ex. 309, pp. C.2-21 – C.2-22.) More particularly, the area is characterized by Holocene-age and Pleistocene-age alluvial deposition. Alluvial deposits from the adjacent highlands are composed of silty sands and gravels with localized gravel and cobble channels.

The Mojave River has been a significant factor affecting the geomorphology of the Mojave region, and specifically the Calico Solar project area of analysis. This river and its drainage system represent the largest present-day hydrological system in the Mojave Desert. Climate changes and the changing path of the Mojave River resulted in the formation of several freshwater lakes including Lake Manix, which consists of several subbasins. It appears that at one point in time, the Lake Manix shoreline reached an elevation of 557 meters. At this level, the

[2] This railway was formerly known as the Atlantic & Pacific Railroad/Atchison Topeka & Santa Fe Railroad.

southern extent of the lake itself would have pushed east, potentially abutting the westernmost Calico Solar project area of analysis. Extensive prehistoric remains are found along the shores of Lake Manix, indicating that this lake was an important element in a regional network involving the inhabitants of the project area.

Desert pavements occur within the Calico Solar project area of analysis**.** In particular, the pavements on the slopes of the Cady Mountains are broader and better developed atop the older, up-slope Pleistocene fanglomerates as compared to the younger surfaces at lower elevations. The older surfaces, and likely the younger ones as well, predate the accepted presence of man in the new world. The most stable pavements, and likely the oldest, lie atop Quaternary alluvium woven among the fanglomerate hills and lava flows within the southern portion of the project area of analysis. Buried cultural deposits are not likely to be found beneath these stable surfaces. (Ex. 309, pp. C-2-22 – C-2-23.)

b. Paleoecology.

The Calico Solar project is located within the Mojave Valley-Granite Mountains ecological subsection (Subsection 322Ah) of the broader Mojave Desert. The general environmental setting is that of a wide valley within arid desert, along which is an expansive alluvial fan that is divided by numerous unnamed south-southwest trending washes and ephemeral drainages.

The project area is composed of multiple Life Zones whose animal and plant communities attracted and tempered the settlement and adaptations of a long sequence of prehistoric and historic populations. The Life Zones are identified as: Arctic/Alpine (10,000 feet and above), Canadian/Hudsonian (7,000 to 10,000 feet), Transition (5,000 to 7,000 feet), Upper Sonoran (3,300 to 5,000 feet), and Lower Sonoran (3,300 feet and below). Most settlement and subsistence activities were concentrated in the Transition, Upper Sonoran, and Lower Sonoran Zones.d -227 feet in altitude (approximately a mile vertical distance).

The inhabitants of the project area are presumed to have lived primarily in the Lower Sonoran Life Zone, when Troy Lake, Lavic Lake, and Broadwell Lake were wet. During times when the lakes were dry, settlement and subsistence were focused on the Upper Sonoran Life Zone in the Cady Mountains and beyond. (Ex. 309, pp. C.2-23-24.)

c. Geoarchaeological Investigation.

The record describes the geoarchaeological sensitivity analysis performed by the Applicant to assess the potential for buried archaeological sites with no surface manifestations. (Exs. SES 2009dd, 309, p. C-2-25.) The Applicant identified major landforms within the project area using aerial photography in combination with existing geologic maps of the area. This information then informed assumptions that the Applicant verified and modified during an initial field reconnaissance. This reconnaissance included an on-the-ground examination of the landscape and key indicators such as relative slope, desert pavement development, and subsoil formation. It also included subsurface examinations.

The Applicant's boring and test pit activity is detailed in the record. According to the Applicant, no archaeological materials were observed during any of the geotechnical borings or test pits. (Exs. 1, 309, pp. C-2-24 to C-2-25.)

The Applicant also identified and described major landforms within the project area. (Ex. 309, pp. C.2-25 to C.2-36.) **Cultural Resources Table 1** below summarizes the potential for these land forms to harbor buried archaeological deposits. As shown by the Applicant's investigatory results, there is a range of no to low potential for all areas except the Axial Channel of the southern section, which shows very low to moderate potential.

Cultural Resource Table 2
Summary of Geoarcheological Sensitivity of Landforms within the Calico Solar Project Study Area

Area	Landform	Age	Depositional Regime*	Sensitivity
Northern Section	Rock Outcrops	Tertiary or older	Erosional	None
	Upper Alluvial Fan Piedmont	Pleistocene to Mid-Holocene	Erosional	Very Low
	Lower Alluvial Fan Apron	Pleistocene to Holocene	Variable	Low
Southern Section	Pisgah Lava	Late Pleistocene	Stable	None to very low
	Erosional Fan Remnant (fanglomerate)	Pleistocene	Erosional	Very Low
	Inset Fans	Pleistocene to Holocene	Variable	Very Low to Low
	Relict Alluvial Flat	Pleistocene (?)	Erosional (variable)	Very Low
	Axial Channel (and associated minor landforms)	Late Holocene	Variable	Very Low to Moderate

Staff provided supplementary narrative regarding each identified landform and restated the significant conclusions of the Applicant's geoarchaeological investigation. (Ex. 309, pp. C-2-25 to C-2 -36.)

As explained by Staff, the Applicant's investigation indicates that the axial channel and associated deposits may represent the only geomorphic feature in the Calico Solar project area where buried archaeological deposits (with no surface manifestation) may reasonably be expected. (Ex. 309, pp. C-2-36 to C-2-37.) If present, these deposits will likely be sparse, in aerially confined sites, and buried under up to two meters of very recent fine-grain alluvium.

Because the vast majority of the northern alluvial fan piedmont is represented by a subsurface depositional environment that is too high-energy and coarse, with no observed paleosols, to preserve buried archaeological deposits, buried deposits are not expected in this portion of the project area. The lack of depositional sensitivity together with an absence of economically viable lithic resources and high-energy erosional contacts between buried paleo-surfaces and overlying mantle deposits within the fan aprons, largely precludes the

presence of buried archaeological deposits within in this portion of the project area as well. (*Id.*)

Both the very old age and largely erosional nature of the major landforms in the southern section of the project area indicate that buried archaeological sites (with no surface manifestation) are very unlikely. It appears that the greatest potential for site burial in the southern portion of the Calico Solar project area is in those places where unconsolidated and active eolian sands have obscured alluvial landforms. However, these eolian features appear to be so limited that they are unlikely to obscure any significant portion of an archaeological site. (Id.)

The information obtained from the investigation further indicates that prehistoric site location within the Calico Solar project area seems to be largely dictated by the availability of raw lithic materials. The series of coalescing fans that make up the alluvial fan piedmont north of the railroad tracks have their source in the Cady Mountains.

The evidence indicates that the dominant material present above these fans is granite to quartz monzonite, with more limited and likely more resistant outcrops of basalt and andesite. For instance, the subsurface geoarchaeological investigations of the alluvial fans show that the majority of material present is coarse-grained granitic sands, gravels, and cobbles, with little utility for prehistoric tool making. In comparison, the fanglomerate remnant alluvial fans and inset alluvial fans, which are generally comprised of reworked fanglomerates that make up the majority of the landforms south of the railroad tracks, have a much more variable parent material and are more conducive to prehistoric tool production. (Ex. 309, pp. C.2-36 to C.2-37.)

4. Historical Setting

a. Prehistoric Background

Human populations have occupied the California desert for at least 10,000 years. The Paleo-Indian Complex (about 10,000–8000 cal B.C.) occurred during the first half of the early Holocene. A common theme among nearly all North American Paleo-Indian sites was tool assemblages of fluted projectile points. The Lake Mojave Complex (ca 8000-6500 cal B.C.) occurred during the second half of the early Holocene and is characterized Lake Mojave projectiles (leaf-shaped, long-stemmed points with narrow shoulders) and Silver Lake projectiles (short-bladed, stemmed pints with distinct shoulders), abundant bifaces, flaked stone crescents,

and a variety of large, well-made scrapers, gravers, perforators, heavy core tools, and ground stone implements. (Ex. 309, pp. C.2-37 to C.2-38.)

The Pinto Complex (ca. 6500-4000 cal. B.C.) spans portions of the early and middle Holocene. Toolstone use, based on sites attributed to this complex, focus upon use of flaked stone technology, including less reliance on obsidian and cryptocrystalline silicates, as well as the prevalence of ground stone implements in the material culture. Beginning roughly in 3000 to 2000 BC, conditions in the Mojave Desert were warmer and drier and few archaeological sites date to this period. This suggests population densities were very low and it is possible some areas were largely abandoned. The Gypsum Complex (ca. 2000 cal B.C.–cal A.D. 200), is characterized by medium to large stemmed and corner notched projectile points, including Elke series, Humboldt Concave Base, and Gypsum.

During the Rose Spring Complex (ca cal. A.D. 200 - 1100), cultural systems changed in the southern California deserts with the introduction of the bow and arrow. During this time, a major increase in population appears to have occurred, possibly resulting in part from a more efficient hunting technology. During the Late Prehistoric Period (cal. A.D. 1100–Contact), horticultural practices and pottery were introduced (most likely from the Anasazi in the southwest). Characteristic artifacts of this Complex include Desert series projectile points, Brownware ceramics, and unshaped handstones and millingstones. The use of obsidian dropped off during this time with the increase used of cryptocrystallined silicates. (Ex. 309, pp. C-2-37 to C-2- 43.)

b. Ethnographic Background

Ethnographic resources represent the heritage of a particular ethnic or cultural group, such as Native Americans or African, European, or Asian immigrants. These resources can include traditional resource collecting areas, ceremonial sites, topographic features, cemeteries, shrines, or ethnic neighborhoods and/or structures.

During prehistoric times, there was a large movement of people across the Mojave Desert and ethnographically, several groups are associated with the project area of analysis and surrounding Mojave Desert region. (Ex. 309, p. C-2-44.) The Kawaiisu, Kitanemuk, Southern Piute, Serrano, Chemhuevi, Tabtulabal, and Panamint occupied the Mojave Desert region to the north, south, west, and east of the project site. (Ex. 309, p. C-2-44.)

The Serrano, Vanyume (Beñeme), and the Chemehuevi occupied the region in which the project is located. However, the project area of analysis and surrounding valleys were not conducive for large scale inhabitation based on the fluctuating environmental conditions and overall arid nature of the region; therefore, groups occupying and using the area would have been small and nomadic. (Ex. 309, pp. C-2-44 to C-2-48.)

Other groups who used and occupied the Mojave Desert included the Anasazi and Mohave. The Anasazi of southern Nevada influenced cultures within the region as they traveled to take advantage of turquoise deposits. The Mohave similarly influenced the culture of the region even though they lived southeast of the project area, along the east and west banks of the Colorado River, as they traveled throughout southern California and northern Arizona spreading new technologies, beliefs, and ideas throughout the desert southwest region. (Ex. 309, pp. C.2-47 to C-2-48.)

c. Major Regional Historical Themes

The major historical themes for the Mojave Desert region and the Calico Solar vicinity in particular, are centered on the establishment of transportation routes, water access, mineral exploitation, and military uses. (Ex. 309, pp. C.2-49 to C-2-61.)

Soon after California was granted statehood in 1850, the government sought to promote immigration to the state, facilitate trade and communication, and develop routes of defense by recognizing all of the trails running through California. (Ex. 309, p. C-2-50.) In the late 1850s the General Land Office in California began the process of mapping the Mojave Desert areas. (Ex. 309, p. C.2-51.) Beale's Wagon Road was built in 1857 north of the project area and was used through 1861. However, it appears that most of the traffic through the Mojave Desert into Southern California took place via the Old Spanish Trail to the west of the project area or the Mojave Road to the north.

After the Civil War ended, the Atlanta & Pacific Railroad (A & P) partnered with the St. Louis & San Francisco Railroad and the Atchison, Topeka, & Santa Fe Railroad to construct a transcontinental railroad that would include a railway from the east to the California border. (Ex. 309, p. C.2-51.) The Southern Pacific Railroad also constructed a rail line that ran between Mojave and Needles. (Ex. 309, p. C-2-52.)

The Southern Pacific's route through the Mojave Desert facilitated mining operations. This railroad, which was later acquired by A&P, changed the course of travel across the Mojave Desert in the project vicinity by facilitating the transport of miners to the region.

By 1885, the California Southern Railroad and A&P joined to provide service from Kansas City to San Diego. The junction of the lines was located at what is now known as Barstow. This rail service brought more settlers and miners to the area and was a popular line for freight and passenger service. (The A&P is now known as the Burlington Northern Santa Fe Railway). Specifically with respect to mining, the desert region has produced a variety of mineral deposits, including gold, silver, manganese, and copper. The period between 1900 and 1919 was known as the "Great Years" for mining in northeastern San Bernardino County. (Ex. 309, p. C.2-57.) Mining still occurs in the desert area, particularly around the Kings Mountains in the vicinity of Interstate 15. (Id.)

Automobile travel across and within the Mojave Desert area first developed using existing wagon roads. By the early twentieth century, the automobile became the preferred means of transportation, and in 1916, Congress approved the Federal Highway Aid Act to help fund rural roads. In 1926, the National Old Trails Road in the Mojave Desert was redesignated as U.S. Route 66. The section of U.S. Route 66 from Needles to Los Angeles was the most heavily traveled section of the highway. While accommodations in the project area were limited to road-side camping, the heavy use of U.S. Route 66 caused thousands of businesses to emerge, such as grocery stores, service stations, restaurants, and motels, to serve cross-country travelers. (Ex. 309, pp. C-2-54 to C.2-55.)

Throughout the 1950s and 1960s, U.S. Route 66 served as the primary road between the midwest and west coast. It was eventually replaced by a newer interstate highway system. (Id.)

In 1958, Interstate 15 opened between Victorville and Barstow and began the modern highway era in the Barstow area. Thereafter, in 1961, the entire length of Interstate 15 from Los Angeles to Las Vegas was opened. (Ex. 309, p. C-2-56.) Interstate 40 begins at the junction of Interstate 15 with Interstate 40 in Barstow. Interstate 40 runs through the Mojave Desert to Needles and into Arizona. Interstate 40 is located along the southern edge of project area of analysis. The segment of Interstate 40 in the project vicinity was not constructed until 1968.

In addition to transportation improvements, the region saw other development. For instance, the Hoover Dam was constructed between 1931 and 1935 and power production for use began in 1936. Furthermore, the SCE 220-kilovolt North and South transmission lines, constructed between 1939 and 1941, originate at the SCE switchyard at the Hoover Dam and terminate in Chino, California. The lines were constructed to deliver power from the Hoover Dam to SCE service areas in southern California. (Ex. 309, p. C-2-58.)

5. Cultural Resources at the Calico Solar Site

a. Records Searches

The Applicant performed a literature and records search including all known cultural resources within a one-half-mile radius of the plant site, laydown area, and appurtenant linear facilities. Sources checked included:

- The San Bernardino Archaeological Information Center (SBAIC), which is the California Historical Resource Information System (CHRIS) cultural resources database repository for San Bernardino County;
- Previously documented cultural resources or archaeological studies in the project area and a one-mile search radius;
- National Register of Historic Places (NHRP);
- California Register of Historical Resources (CRHR);
- California Landmarks; and
- California Places of Historical Interest (Ex. 309, p. C.2-62.)

The SBAIC/CHRIS literature research shows that cultural resources studies have been conducted within the project footprint and a one-mile search radius. One of these studies (Class II inventory–literature review) was prepared for the BLM on behalf of the Applicant, and was submitted in August of 2006. This earlier report provided a preliminary assessment of the project area and includes a cultural resource record search results and background setting, but does not include a pedestrian survey of the Calico project area. It appears that about 95 percent of the Calico project area had not been previously investigated.

Nineteen of the previous survey reports within the record search radius were positive for cultural resources, 10 of those reports pertain to the Calico Solar project footprint. With the exception of a few recent studies, the majority of these previous investigations were conducted more than 15 years ago. (Ex. 309, pp.

C.2-63 to C.2-64.) The various survey reports are identified with particularity in the record. (Id.)

Sixty-eight previously documented cultural resources were identified in the project area of analysis and the one-mile search radius. Of these resources, 24 are prehistoric isolates, 38 are prehistoric archaeological sites, and six are historic-era resources (two of which are built-environment properties). Sixteen of these previously recorded cultural resources occur either partially or fully within the Calico project area of analysis**,** including one prehistoric isolate, twelve prehistoric archaeological sites, one historic archaeological site, and two historic built-environment resources. (Ex. 309, pp. C-2-66 to C-2-67.) **Cultural Resources Table 2** below identifies the 68 previously recorded cultural resources.

Cultural Resources Table 2:
Previously Recorded Cultural Resources Within the Calico Project Area and One-mile Radius

Resource Designation	Cultural Resource Type	Cultural Resource Description	In Project Footprint	Within the one-mile research radius	Latest Update
36-061415	Prehistoric	Isolated jasper flake		X	1990
36-061416	Prehistoric	Two isolated chalcedony flakes		X	1990
36-061417	Prehistoric	Isolated chalcedony flake		X	1990
36-061420	Prehistoric	Isolated chalcedony flake and isolated rhyolite flake		X	Unknown
36-061421	Prehistoric	Isolated jasper flake		X	1991
36-061423	Prehistoric	Isolated cryptocrystalline flake		X	1990
36-061424	Prehistoric	Isolated white cryptocrystalline flake		X	1990
36-061425	Prehistoric	Isolated white cryptocrystalline flake		X	1990
36-061426	Prehistoric	Isolated red cryptocrystalline flakes		X	1990
36-061427	Prehistoric	One isolated red cryptocrystalline flake tool and one red cryptocrystalline flake		X	1990
36-061428	Prehistoric	Two isolated cryptocrystalline flakes		X	1990
36-061429	Prehistoric	Isolated cryptocrystalline silicate flake		X	1990
36-061430	Prehistoric	Isolated cryptocrystalline silicate flake		X	1990
36-061431	Prehistoric	Isolated cryptocrystalline		X	1990

Resource Designation	Cultural Resource Type	Cultural Resource Description	In Project Footprint	Within the one-mile research radius	Latest Update
		silicate flake			
36-061432	Prehistoric	Isolated cryptocrystalline silicate flake		X	1990
36-061433	Prehistoric	Two isolated cryptocrystalline silicate flakes		X	1990
36-061434	Prehistoric	Isolated cryptocrystalline silicate flake		X	1990
36-061435	Prehistoric	Isolated cryptocrystalline silicate flake		X	1990
36-061436	Prehistoric	Isolated cryptocrystalline silicate flake		X	1990
36-064406	Prehistoric	Isolated chert flake and one piece of angular waste		X	2001
36-064407	Prehistoric	Two isolated chalcedony flakes	X		2001
36-064408	Prehistoric	Isolated red jasper flake fragment		X	2001
36-064409	Prehistoric	Isolated agate bifacial core		X	2001
36-064410	Prehistoric	One isolated red jasper flake and a second flake with dorsal scars		X	2001
CA-SBR-10649H	Prehistoric	Small lithic test and quarry area with flakes and one core	X		2001
CA-SBR-1585	Prehistoric	Also known as EM-266, this is a Petroglyph Site		X	1976
CA-SBR-1793	Prehistoric	Pottery sherds, awl, two bifaces		X	1963
CA-SBR-1889	Prehistoric	Lithic scatter containing metates, projectile points and debitage		X	1969
CA-SBR-1893	Prehistoric	Also known as SBCM 674, this site consists of two projectile points, scrapers flakes and bone which were collected at time of recordation	X		1963
CA-SBR-1905	Prehistoric	Jasper quarry with sparse scatters consists of flakes, bifaces and scrapers		X	1980
CA-SBR-1907	Prehistoric	Large quarry area containing debitage, cores and bifaces		X	1990
CA-SBR-1908	Prehistoric	Low density; sparse cobble testing/ quarry area consisting of cryptocrystalline silicate, basalt and rhyolite materials.	X	X	1979

Resource Designation	Cultural Resource Type	Cultural Resource Description	In Project Footprint	Within the one-mile research radius	Latest Update
CA-SBR-2910H	Historic	Also known as National Old Trails Road/Highway 66/ SM364. This is an early 20th century two lane paved road at Mile Post 183 where it becomes a graded dirt road.	X	X	2001
CA-SBR-3515	Historic/ Prehistoric	Two rock rings, it was not determined if they were historic or prehistoric		X	1978
CA-SBR-3516	Prehistoric /Historic	Lithic quarry site containing flakes and cores of chert material and historic trash scatter		X	1991
CA-SBR-3076	Prehistoric	Chalcedony lithic scatter	X		1985
CA-SBR-4307	Prehistoric	Several lithic scatters		X	1980
CA-SBR-4308	Prehistoric	Two lithic reduction stations that contain flakes and cores		X	1980
CA-SBR-4309	Prehistoric	Lithic scatter with a lithic reduction station. Possible basalt and andesite tools present on site.		X	1980
CA-SBR-4405H	Historic	A booth and cargo loading platform located where the railroad splits.		X	1980
CA-SBR-4558H	Historic	Also known as SBCM 4918, This site is a 1930s and 1940s manganese mining area containing a galvanized steel structure, mill tailings, mine and historic trash scatters	X	X	1979
CA-SBR-4681	Prehistoric	Lithic scatter	X		1980
CA-SBR-5600	Prehistoric	Lithic reduction station	X		1980
CA-SBR-5598	Prehistoric	Large cobble test/quarry area		X	1991
CA-SBR-5599	Prehistoric	Lithic scatter and rock rings		X	1980
CA-SBR-5794	Prehistoric	Cobble quarrying and lithic reduction area		X	1989
CA-SBR-5795	Prehistoric	Lithic scatter originally containing 100s of flakes, several biface fragments and cores		X	2001
CA-SBR-5796	Prehistoric	Low density lithic scatter containing flakes and cores	X		2001
CA-SBR-6511	Prehistoric	Very large low density lithic scatter containing debitage and shatter	X		1989
CA-SBR-6512	Prehistoric	Also known as MP-26, this is a small low density lithic scatter that contains debitage		X	1989

Resource Designation	Cultural Resource Type	Cultural Resource Description	In Project Footprint	Within the one-mile research radius	Latest Update
CA-SBR-6513	Prehistoric	Also known as MP-27, this is a single segregated lithic reduction locus containing approximately 15 felsite flakes total		X	1989
CA-SBR-6517	Prehistoric	Small flake scatter with one core and eight flakes		X	1989
CA-SBR-6518	Prehistoric	Small cobble test and quarry area with two segregated reduction loci and debitage		X	1989
CA-SBR-6519	Prehistoric	A single Segregated Reduction Locus made up of approximately four flakes		X	1989
CA-SBR-6520	Prehistoric	Small cobble test and quarry area with one segregated reduction locus and debitage	X		1989
CA-SBR-6521	Prehistoric	Low density cobble test and quarry area with debitage, cores, bifaces and blanks	X		1989
CA-SBR-6522/H	Prehistoric and Historic	Low density cobble test and quarry area with debitage, cores, bifaces and blanks		X	1989
CA-SBR-6525	Prehistoric	Also known as MP-84, this is a low density lithic scatter that contains one lithic reduction locus flakes and debitage		X	1989
CA-SBR-6526	Prehistoric	Also known as MP-85, this site contains two adjacent lithic reduction loci and flakes		X	1989
CA-SBR-6527	Prehistoric	Also known as MP-86, this site is a small low density flaked stone scatter		X	1989
CA-SBR-6528	Prehistoric	Also known as MP-87, this is a small density lithic scatter	X		1989
CA-SBR-6693H NRHP E SBR 94028	Historic	Railroad Line built in 1883 for the Atlantic and Pacific Railroad Co., associated artifacts include track and train parts, railroad tableware, and insulator glass fragments	X	X	2001
CA-SBR-6786	Prehistoric	Cobble quarrying area comprised of approx. 200 flakes and four cores		X	1990
CA-SBR-6836	Prehistoric	Small lithic scatter containing approximately six jasper flakes		X	1991
CA-SBR-6895	Prehistoric	Single Segregated Reduction Locus containing flakes		X	1990
CA-SBR-10637	Prehistoric	Small lithic scatter containing at least nine chert flakes		X	

Resource Designation	Cultural Resource Type	Cultural Resource Description	In Project Footprint	Within the one-mile research radius	Latest Update
P1084-1	Historic	Two sets of foundations (one concrete and one concrete slab)		X	
P1793-1H	Historic	Hector train siding, 20 miles west of Ludlow, CA	X	X	

b. Consultations

Although the Energy Commission has no specific regulatory obligation to consult with Native American tribes and/or individuals as a requirement under CEQA, Staff routinely consults with local Native American representatives as a matter general policy. The consultations are intended for Staff to obtain input and identify any concerns regarding potential effects to cultural resources of importance to Native Americans.

Because the proposed Calico Solar project is located on land owned by the federal government and managed by BLM, BLM took the lead in all Native American Consultation in this project in accordance with the *Memorandum of Understanding between the U.S. Department of the Interior, Bureau of Land Management, California Desert District, and the California Energy Commission Staff Concerning Joint Environmental Review for Solar Thermal Power Plant Projects* (http://www.energy.ca.gov/siting/solar/BLM_CEC_MOU.PDF).

Staff presented evidence of the following consultation efforts:

- On August 20, 2007, the BLM initiated contact with local Native American tribal organizations regarding a number of upcoming solar energy projects proposed on BLM land in the region, including the Calico Solar project. The Chemehuevi Reservation; the San Manuel Band of Mission Indians; the Colorado River Indian Tribe; and the Twenty-nice Palms Band of Mission Indians; and the Fort Mojave Indian Tribe were among the tribal organizations contacted.
- On July 22, 2008, the Applicant contacted the Native American Heritage Commission (NAHC) requesting a search of the NAHC's Sacred Lands File (SLF) to determine the presence or absence of Native American sacred sites within the project area. The response from the NAHC in July 2008 indicated that the SLF search identified no sacred sites in the project area of analysis. The response also included a list of local Native

American representatives who could be contacted regarding potential concerns or knowledge of cultural resources that could be affected by the project.

- In a letter dated November 5, 2008, the BLM initiated formal consultation with the tribes as a part of its obligation under Section 106 of the NHPA. Since that time, the BLM has maintained ongoing communications with the local tribal organizations through letters, phone calls, and meetings.

  It appears that to date, no Native American representatives have identified specific cultural resources of concern to them within the project limits; however, they have indicated an interest in the project and concerns for the resources that the Applicant has identified as being in the project area.

- On April 29, 2010, Staff attended the BLM's Cultural Resources Programmatic Agreement (i.e., possible 36 CFR §§ 800.6 or 800.14(b) agreement among agencies that include the Bureau of Land Management or other Federal agencies, and the California State Historic Preservation Officer), kick-off meeting for this project. Also present at that meeting were representatives of the San Manuel Band of Mission Indians, who expressed concerns for both cultural and biological resources that may be affected by the project.

- On June 13, 2010, Staff participated in an onsite field visit with the BLM and several members of the local Native American community including representatives of the San Manuel Band of Mission Indians; the Chemehuevi Tribe, the Twentynine Palms Band of Mission Indians; the Fort Mojave Indian Tribe, and the AhaMaKav Cultural Society. During the field visit, the participants visited selected sites and expressed interest in and concern with the cultural resources identified by the Applicant during the cultural resource inventory.

- On July 26, 2010, in follow up to the June 13, 2010, site visit, Staff attempted further contact with several tribal members. Staff's discussions with tribal members indicated that the tribes and/or members were not necessarily aware or fully informed of the other remaining archaeological sites in the project area beyond those identified on June 13, 2010.

In addition to the consultations with Native American representatives, there were consultations with other third parties. The Applicant contacted the San Bernardino County Land Use Services, City of Barstow Community Development department, and Mojave River Valley Museum to identify cultural resources within a one-mile radius around the project footprint that had been listed pursuant to ordinance or recognized by a local historical society or museum. According to the evidence, no esponses were received from these agencies and entities.

In July and August 2010, Staff also consulted with the following organizations regarding built-environment resources: Route 66 Corridor Preservation Progam

of the National Park Service; San Francisco Architectural Heritage; and the Western Regional Office of the National Trust for Historic Preservation. (Ex. 309, pp. C-2-70 to C-2-72.)

c. New Inventory Investigations

The evidence shows that several field surveys and inventories were conducted. The Applicant conducted an initial cultural resource field inventory between August 4 and October 31, 2008. Additional field surveys and more refined site recordation took place between October 2009 and March 2010. The cultural resource inventory discussed herein encompasses the initially-proposed 8,230-acre project site (the project footprint was reduced to 6,215 acres in June 2010 and reduced again in September 2010 to 4,613 acres).).

Included among the surveys was a Class III Intensive Field Survey. The pedestrian survey covered the original 8,230-acres and an additional 200 feet beyond the project site. The principal survey methods consisted of a systematic walk-over in regularly spaced parallel transect intervals. With the exception of certain caves and ridge tops situated within or atop steep terrain, the Applicant did not survey areas of steep terrain (i.e., terrain at an angle greater than 45°), where access was not feasible due to unsafe or unstable surfaces. The angle and decomposition of volcanic rocks eroding downslope in these areas, which total less than 11 acres and occur within the northeastern project area along the south-southwest facing slope of the Cady Mountains, suggest that these areas have an extremely low likelihood of containing cultural resources.

The Applicant reported that the archaeological data recorded during the Class III intensive field survey represents a preliminary in-the-field assessment based solely on observations of artifacts and other cultural components visible on the surface. (Ex. 309, p. C.2-73.). BLM Barstow archaeologist Jim Shearer provided the guidelines applied by the Applicant to field survey and its recordation of cultural resources within the Project area of analysis. Based on this guidance and previous archaeological investigations completed within or near the Calico Solar project area, the Applicant developed 14 categories of archaeological site types that one could expect to encounter during the Class III intensive field survey and which provide a framework for the definition and documentation of resources identified in the project area. Each category type is described in the record. (Ex.1,§5.7 309, p.C-2-74 –C-2-76.)

The Applicant identified a total of 335 cultural resources, including 206 archaeological isolates, 119 archaeological sites, and 10 historic built environment resources. These resources include 12 of the 16 previously-recorded cultural resources and are specifically identifies as P-36-064407, CA-SBR-1908, CA-SBR-2910H, CA-SBR-3076, CA-SBR-4681, CA-SBR-5600, CA-SBR-5794, CA-SBR-5796, CA-SBR-6521, CA-SBR-6528, CA-SBR-6693H, and P1793-1H were relocated during filed surveys. The remaining four resources (CA-SBR-10649, CA-SBR- 1893, CA-SBR- 6511, and CA-SBR- 6520) appear to no longer exist. (Ex. 309, pp. C-2-72 to C-2-73.) (Ex. 309, pp. C-2-72 to C-2-84.)

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Each of these archaeological resources is described in **Cultural Resources Table 3** below.

Cultural Resource Table 5
Cultural Resources Inventory for the Calico Solar Project Area

Site Designation	Cultural Context	Site Taxonomy	Project Phase	Geomorphic Landform	Potential for Buried Deposits Based on Geomorphic Landform	Applicant/BLM Eligibility Recommendations
CA-SBR-1908/H UPDATE	Multi-Component Archaeological Site	Lithic Reduction Scatter Rock Cluster Features Historical Refuse Fire Affected Rocks and/or Hearths	Phase 2	Erosional Fan Remnant/Inset Fan	Very Low to Low	**Rock Feature Recommended Eligible by Applicant & BLM**; Lithic Reducion Scatter and historical refuse are Non-Contributing
CA-SBR-3076 UPDATE (EJK-021)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Relict Alluvial Flat/ Inset fan/ Axial Channel	Very Low to Moderate	Recommended Not Eligible
CA-SBR-4558H UPDATE (Logan Mine)	Historic Archaeological Site	Historical Refuse Historical Mining Site Historical Structure	Phase 1	Upper Alluvial Fan Piedmont	Very Low	Recommended Not Eligible
CA-SBR-4681/H UPDATE (RAN-102/H)	Multi-Component Archaeological Site	Complex Lithic Scatter Historical Survey/Mapping Features	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-5600/H UPDATE (RAN-189/H)	Multi-Component Archaeological Site	Complex Lithic Scatter	Phase 2	Erosional Fan Remnant/ Inset Fan/ Pisgah Lava	None to Low	Recommended Not Eligible
CA-SBR-5796 UPDATE (DRK-180)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-6521 UPDATE (RAN-115)	Prehistoric Archaeological Site	Lithic Reduction Scatter Rock Features	Phase 2	Erosional Fan Remnant/Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-6528 UPDATE (RSS-020)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-12990 (DRK-001)	Prehistoric Archaeological Site	Lithic Reduction Scatter	200 Foot Buffer	Lower Alluvial Fan Apron	Low	Recommended Not Eligible
CA-SBR-12991 (DRK-012)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 1	Lower Alluvial Fan Apron	Low	Recommended Not Eligible
CA-SBR-12992H (DRK-021H)	Historic Archaeological Site	Historical Refuse	200 Foot Buffer	Lower Alluvial Fan Apron	Low	Recommended Not Eligible

CA-SBR-13020 (DRK-173)	Prehistoric Archaeological Site	Lithic Reduction and Groundstone Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13021 (DRK-174)	Prehistoric Archaeological Site	Lithic Reduction Scatter and Possible Hearth	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13022/CA-SBR-13024 (DRK-175/DRK-177)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13025 (DRK-178)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13026 (DRK-182)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant/Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13027 (DRK-184)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13028 (KRM-002)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Upper Alluvial Fan Piedmont	Very Low	Recommended Not Eligible
CA-SBR-13029 (KRM-003)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Upper Alluvial Fan Piedmont	Very Low	Recommended Not Eligible
CA-SBR-13030 (KRM-008)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Upper Alluvial Fan Piedmont/ Lower Alluvial Fan Apron	Very Low to Low	Recommended Not Eligible
CA-SBR-13031 (KRM-024)	Prehistoric Archaeological Site	Trail	Phase 2	Lower Alluvial Fan Apron	Low	Recommended Not Eligible
CA-SBR-13032 (KRM-028)	Prehistoric Archaeological Site	Trail	Phase 2	Upper Alluvial Fan Piedmont	Very Low	Recommended Not Eligible
CA-SBR-13038/CA-SBR-13040/H (KRM-160/KRM-167/H)	Multi-Component Archaeological Site	Lithic Reduction Scatter Rock Cluster Features	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13039 (KRM-164)	Prehistoric Archaeological Site	Lithic Reduction Scatter Rock Ring Feature	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13041 (KRM-170)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13042 (LTL-008)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13044 (LTL-011)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible

CA-SBR-13045 (LTL-012)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13046 (LTL-015)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13047 (LTL-016)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13048 (LTL-017)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13049 (LTL-018)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13050 (LTL-019)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13051 (LTL-022)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Pisgah Lava	None to Very Low	Recommended Not Eligible
CA-SBR-13052 (LTL-023)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan Pisgah Lava	None to Very Low	Recommended Not Eligible
CA-SBR-13053 (RAN-011)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Upper Alluvial Fan Piedmont	Very Low	Recommended Not Eligible
CA-SBR-13054 (RAN-025)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 1	Upper Alluvial Fan Piedmont	Very Low	Recommended Not Eligible
CA-SBR-13055 (RAN-101)	Prehistoric Archaeological Site	Lithic Reduction Scatter Rock Cluster Features	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13056 (RAN-108)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13059 (RAN-114)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13060 (RAN-116)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13061/CA-SBR-13076 (RAN-118/RAN-173)	Prehistoric Archaeological Site	Lithic Reduction Scatter Rock Cluster Features Historical Refuse	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13062 (RAN-120)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13063/H (RAN-123/H)	Multi-Component Archaeological Site	Lithic Reduction Scatter Rock Cluster Features Historical Refuse	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible

CA-SBR-13064 (RAN-128)	Prehistoric Archaeological Site	Lithic Reduction Scatter Rock Cluster Features	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13065 (RAN-131)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Axial Channel	Very Low to Moderate	Recommended Not Eligible
CA-SBR-13066 (RAN-138)	Prehistoric Archaeological Site	Lithic Reduction Scatter Historical Refuse	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13068 (RAN-146)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13069 (RAN-154)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13070/CA-SBR-13067/H (RAN-155/RAN-139/H)	Multi-Component Archaeological Site	Lithic Reduction Scatter Historical Refuse Fire Affected Rocks and/or Hearths	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13071 (RAN-163)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13072 (RAN-168)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Axial Channel	Very Low to Moderate	Recommended Not Eligible
CA-SBR-13073 (RAN-169)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Lower Alluvial Fan Apron	Low	Recommended Not Eligible
CA-SBR-13074 (RAN-170)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Lower Alluvial Fan Apron	Low	Recommended Not Eligible
CA-SBR-13075 (RAN-171)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Lower Alluvial Fan Apron Axial Channel	Very Low to Moderate	Recommended Not Eligible
CA-SBR-13078 (RAN-177)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13079 (RAN-179)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13080 (RAN-180)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Axial Channel	Very Low to Moderate	Recommended Not Eligible
CA-SBR-13081 (RAN-181)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Axial Channel	Very Low to Moderate	Recommended Not Eligible
CA-SBR-13082 (RAN-183)	Prehistoric Archaeological Site	Lithic Reduction Scatter Rock Cluster Features	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13083 (RAN-186)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible

CA-SBR-13084 (RAN-188)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Erosional Fan Remnant/Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13085 (RAN-190)	Prehistoric Archaeological Site	Lithic Reduction Scatter Rock Cluster Features	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13086 (RSS-005)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13089 (RSS-009)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Axial Channel/Relict Alluvial Flat	Very Low to Moderate	Recommended Not Eligible
CA-SBR-13091 (RSS-013)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Axial Channel	Very Low to Moderate	Recommended Not Eligible
CA-SBR-13092 (RSS-014)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13093/H (RSS-017/H)	Multi-Component Archaeological Site	Complex Lithic Scatter Rock Cluster Features	Phase 2	Erosional Fan Remnant/ Axial Channel/ Inset Fan	Very Low to Moderate	**Rock Features and Cleared Areas are Recommended Eligible by Applicant & BLM;** Complex Lithic Scatter are Non-Contributing
CA-SBR-13094 (RSS-018)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13096 (SGB-013)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 1	Lower Alluvial Fan Apron	Low	Recommended Not Eligible
CA-SBR-13097 (SGB-017)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 1	Lower Alluvial Fan Apron	Low	Recommended Not Eligible
CA-SBR-13104 (SGB-041)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Upper Alluvial Fan Piedmont	Very Low	Recommended Not Eligible
CA-SBR-13105 (SGB-097)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Rock Outcrop within the Upper Alluvial Fan Piedmont	None to Very Low	Recommended Not Eligible
CA-SBR-13106 (SGB-099)	Prehistoric Archaeological Site	Lithic Reduction Scatter Fire Affected Rocks and/or Hearths	Phase 2	Rock Outcrop within the Upper Alluvial Fan Piedmont	None to Very Low	Recommended Not Eligible
CA-SBR-13107 (SGB-104)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Rock Outcrop within the Upper Alluvial Fan Piedmont	None to Very Low	Recommended Not Eligible
CA-SBR-13111 (SGB-120)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13122 (KRM-165)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible

CA-SBR-13123 (EJK-002)	Prehistoric Archaeological Site	Lithic Reduction Scatter Historical Refuse	Phase 2	Relict Alluvial Flat/Axial Channel	Very Low to Moderate	Recommended Not Eligible
CA-SBR-13124/H (EJK-004/H)	Multi-Component Archaeological Site	Lithic Reduction Scatter Historical Refuse	Phase 2	Relict Alluvial Flat/Axial Channel	Very Low to Moderate	Recommended Not Eligible
CA-SBR-13125/H (EJK-005/H)	Multi-Component Archaeological Site	Lithic Reduction Scatter Historical Refuse	Phase 2	Relict Alluvial Flat	Very Low	Recommended Not Eligible
CA-SBR-13126/ CA-SBR-5794/H (EJK-009/H)	Multi-Component Archaeological Site	Complex Lithic Scatter Rock Cluster Features Historical Refuse	Phase 2	Axial Channel/Relict Alluvial Flat	Very Low to Moderate	**Recommended Eligible by Applicant & BLM;** Parts of the Site Within the project area of analysis are Non-Contributing
CA-SBR-13349/H (RSS-006/ SGB-112/ SGB-114/SGB-118/SGB-127/H)	Multi-Component Archaeological Site	Complex Lithic and Groundstone Scatter Historical Refuse	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13441 (RAN-107/RAN-110)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13442 (DRK-133/LTL-009)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Erosional Fan Remnant/Inset Fan	Very Low to Low	Recommended Not Eligible
CA-SBR-13443/H (DRK-176/RAN-175/H)	Multi-Component Archaeological Site	Complex Lithic and Groundstone Scatter Historical Refuse	Phase 2	Axial Channel	Very Low to Moderate	**Prehistoric Component Recommended Eligible by Applicant & BLM;** Historic Component Recommended as Non-Contributing
CA-SBR-13444 (DRK-170/DRK-171)	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
CA-SBR-13445 (RSS-008/RSS-011)	Prehistoric Archaeological Site	Complex Lithic Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
DRK-S1-001H	Historic Archaeological Site	Trail	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible

DRK-S1-013	Indeterminate	Rock Cluster Feature	Phase 2		Very Low	Recommended Not Eligible
MN-S1-001	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
MN-S1-004	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
MN-S1-005	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
MN-S1-009	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
MN-S1-017H	Historic Archaeological Site	Historical Refuse	Phase 2	Axial Channel	Very Low to Moderate	Recommended Not Eligible
NOTR-PRM-S1-002/H	Multi-Component Archaeological Site	Lithic Reduction Scatter Historical Refuse	Phase 2	Erosional Fan Remnant	Very Low	Recommended Not Eligible
PRM-S1-009	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Upper Alluvial Fan Piedmont	Very Low	Recommended Not Eligible
PRM-S1-021H	Historic Archaeological Site	Rock Cluster Features Historic Survey/Mapping Features	Phase 2	Upper Alluvial Fan Piedmont	Very Low	Recommended Not Eligible
P36-014578 (RAN-035)	Indeterminate	Rock Cluster Features	Phase 2	Upper Alluvial Fan Piedmont	Very Low	Recommended Not Eligible
P1793-1H (RAN-050/H)	Multi-Component Archaeological Site	Historical Refuse	Phase I	Axial Channel	Low	Recommended Not Eligible
SM-S1-001	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible
SM-S1-003	Prehistoric Archaeological Site	Lithic Reduction Scatter Fire Affected Rocks and/or Hearths	Phase 2	Inset Fan/Erosional Fan Remnant	Very Low to Low	Recommended Not Eligible
SM-S1-005	Prehistoric Archaeological Site	Lithic Reduction Scatter	Phase 2	Inset Fan	Very Low to Low	Recommended Not Eligible

As shown, the archaeological sites comprise 94 prehistoric sites, eight historic-era sites, 15 multi-component sites (containing both prehistoric and historic-era components), and two rock cluster feature sites of indeterminate age.

In summary, results of the Applicant's investigation show the overall potential for buried archaeological resources to occur in the project area ranges from very low to moderate, depending on the underlying landform and the degree of desert pavement stabilization present on the project site. "Desert pavement" is defined

in the Applicant's analysis as a desert surface covered with closely packed, interlocking angular or rounded rock fragments of pebble and cobble size.

Staff provided further explanation of the Applicant's results. (Ex. 309, pp. C.2-84 — C.2-87.) According to Staff, it appears that the less stable or poorly developed desert pavement surfaces exhibit more sediment visibility and are therefore more likely to contain buried archaeological deposits. (As shown, the archaeological sites include 94 prehistoric sites, eight historic-era sites, 15 multi-component sites (containing both prehistoric and historic-era components), and two rock cluster feature sites of indeterminate age. And, although a well-formed desert pavement does not preclude the existence of a buried component to a site located on that pavement, it does significantly decrease the likelihood that a buried archaeological deposit not already evident on the surface is buried below it.

The majority of archaeological sites identified during the survey were found in the southern portion of the project area where the land surface is covered by varying degrees of desert pavement. These areas contain an abundance of naturally occurring cryptocrystalline silicate materials such as chalcedony and jasper, which are suitable for the production of flaked stone tools. Thus, the locations of the prehistoric sites observed within the project study area appear to be largely dictated by the availability of these lithic raw materials that are constituents of the desert pavements. (Id.)

Furthermore, according to the Applicant's study, the most likely sources for buried archaeological deposits within the archaeological sites are the Holocene alluvial deposits within and adjacent to the landform identified as the east-west Axial Channel. The Channel is in the southern portion of the project area. Archaeological sites identified along this drainage contain a variety of artifact types, including groundstone and other indications of, at the least, food processing localities. The loose sandy matrix and the seasonal rain and flood events are likely to have obscured portions of these deposits. (Id.)

The Applicant's survey and prior research in the Calico Solar project area revealed 21 temporally diagnostic prehistoric artifacts (one of which was previously collected in 1990 for a different project), which indicate a broad time span of regional site use. Of the total temporally diagnostic artifacts in the project area, 18 occur at archaeological sites and three are isolated finds. The record identifies each artifact. (Exs. 309, p. C.2-87, -

d. Built Environment Survey

On August 19 and October 27 through 28, 2008, the Applicant conducted a historic built environment field survey within the project footprint and a one-half-mile built-environment buffer. The Applicant focused on properties that appeared older than 45 years and evaluated them under NRHP and CRHR eligibility criteria.

The Applicant also conducted site-specific and general primary and secondary research using SBAIC/CHRIS and university resources, and initiated contact with entities that included but were not limited to the San Bernardino County Land Use Services, City of Barstow Community Development Department, and the Mojave River Valley Museum, and SCE. The Applicant also obtained and reviewed historic maps including 1955 15-minute U.S. Geological Survey quadrangles, five maps depicting the Old National Trails Highway, *Punnett Brothers Map of San Bernardino County* (1914), *Kremmerer's map of San Bernardino County* (1925), and *Thomas Brothers Settlers* and *Miner's Map of San Bernardino County* (1932). (Ex. 309, pp. C-2-87 – C-2-88.)

As a result of its surveys, the Applicant identified 10 built-environment resources older than 45 years. The properties are identified in **Cultural Resources Table 4** below. (Ex. 309, pp. C.2-89 – C-2-90.)

Cultural Resources Table 4:
Built-Environment Resources within the Calico Solar Project Area

Trinomial	Resource Name	Year Constructed	Description of Resource	Recommended Eligible by Applicant	Location
CA-SBR-2910H	National Old Trails Road	1912	remnants of historic road	No	Phase 2 and one half-mile buffer
CA-SBR-2910H	U.S. Route 66	1930s	historic highway	No/Yes (conflicting recommendation)	One half-mile buffer
CA-SBR-6693H	Atlantic & Pacific Railroad/Atchison, Topeka, & Santa Fe Railroad	1882-1883	historic railroad and associated bridge structures	Yes	One half-mile buffer
CA-SBR-13114H	SCE 12-kilovolt power line	1961	pine T-post utility pole transmission line	No	One half-mile buffer

Trinomial	Resource Name	Year Constructed	Description of Resource	Recommended Eligible by Applicant	Location
CA-SBR-13115H	SCE 220-kilovolt North Transmission Line	1936-1939	single-circuit, steel lattice tower transmission line	Yes	One half-mile buffer
CA-SBR-13116H	SCE 220-kilovolt South Transmission Line	1939-1941	single-circuit, steel lattice tower transmission line	Yes	One half-mile buffer
CA-SBR-13117H	Pisgah Substation	1940	SCE switching station including switch gear, bus bars, and 3 structures used for relay and station battery equipment and storage	Yes	One half-mile buffer
CA-SBR-13118H	Hector Road	late 1930s to early 1950s	one-lane, graded dirt road	No	Phase 1 and Phase 2
CA-SBR-13119H	Pisgah Crater Road	late 1930s to early 1950s	asphalt paved road	No	One half-mile buffer
N/A	Pacific Gas and Electric Pipeline	prior to 1955	natural gas pipeline	Exempt under Sec. 106. Not evaluated – no effect.	Phase 2 and one half-mile buffer
N/A	Mojave Pipeline	prior to 1955	natural gas pipeline	Exempt under Sec. 106. Not evaluated – no effect.	Phase 2 and one half-mile buffer

Key:
SCE- Southern California Edison

* Both the National Old Trails Road and 1930s alignment of U.S. Route 66 have been recorded under site number CA-SBR-2910H. Because remnants of both the 1912 alignment of the National Old Trails Road and the 1930s alignment of U.S. Route 66 are located within the Project area of analysis, these resources are listed separately and separate update forms were completed.

6. Historical Significance of Archaeological Resources

a. Individual Prehistoric Archaeological Resources

Staff testified that the Applicant's data regarding available prehistoric archaeological resources is not sufficiently refined to inform an adequate evaluation of the significance of these resources. According to Staff, the data potential of the prehistoric resources within the project area of analysis was not exhausted through recordation and additional investigation is warranted to more

definitively draw conclusions regarding archaeological site significance. (Ex. 309, p. C-2-91.)

BLM revisited seven of the 119 archaeological sites identified by the Applicant. These sites appear to have been selected on following criteria: (1) the types of surface artifacts observed during site recordation (all sites are classified as *Complex Lithic Scatters,* with the exception of one); (2) the location of the sites in proximity to the Axial Channel/Inset Fan (which is considered to have a moderate sensitivity for subsurface archaeological deposits per the geoarchaeological analysis); 3) the presence of rock cluster features or potential hearths (because the rock cluster features are indeterminate and have not been formally evaluated, the BLM is assuming them to be eligible for the NRHP); and (4) the low degree of desert pavement development reported during the Applicant's site recordation.

Although BLM did not prepare a formal report of its investigation, it submitted informal data to Staff. BLM's activities and conclusions regarding the seven sites are summarized as follows:

- CA-SBR-13126/H – BLM excavated five "post-holes" (11-inch diameter) to a depth of 70 centimeters. No cultural artifacts or organic staining (midden) were observed from the post-hole excavation, but subsurface remains may exist in the portion of the site that lies outside the project area of analysis to the west. BLM determined that the portion of the site within the project area of analysis is not eligible for nomination to the NRHP.
- CA-SBR-13443/H – One "post-hole" (11-inch diameter) was excavated to a depth of 70 centimeters. In-situ fire-affected rock was recovered from 50 to 70 centimeters below the surface. BLM concluded that subsurface cultural remains exist in at least one portion of the site that also has groundstone and flaked stone assemblages on the surface. BLM further determined that this site is eligible for nomination to the NRHP.
- CA-SBR-13093/H –BLM determined, without engaging in subsurface testing, that the portion of this resource that contains 37 rock cluster features, is eligible for nomination to the NRHP. However, it also determined that the remaining portions of the site, which contain complex lithic scatter loci, are non-contributing elements to the rock features and are, therefore, not eligible for nomination to the NRHP.
- CA-SBR-1908/H – BLM determined, without engaging in subsurface testing, that the portion of this resource that contains 498 rock cluster features is eligible for nomination to the NRHP. BLM has also determined that the remaining portions of the site, which contain lithic reduction scatter loci, are non-contributing elements to the rock features and are, therefore, not eligible for nomination to the NRHP.

- CA-SBR-13075 – The Department of Parks and Recreations (DPR) site form prepared by the Applicant indicated that there was a near absence of well-developed desert pavement surface. BLM concluded that the site is covered by "moderate desert pavement development." On this basis and without engaging in subsurface testing, BLM concluded that there is no potential for subsurface cultural artifacts and, therefore, determined that the site is not eligible for nomination to the NRHP.
- CA-SBR-13007 – The DPR site form prepared by the Applicant indicated that the soils throughout the site show no development of desert pavement. BLM concluded that the site area is covered by "moderate desert pavement development that has been disturbed throughout by braided slope erosion." On this basis and without engaging in subsurface testing, the BLM concluded that there is no potential for subsurface cultural artifacts to occur at this site and, therefore, determined that the site is not eligible for nomination to the NRHP.
- CA-SBR-6528 – The DPR site form prepared by the Applicant indicated that ten of the 27 loci are on poorly developed desert pavement surfaces, one is on loose sands with no desert pavement, and the rest are on moderately to well developed desert pavement. BLM concluded that "the site area is covered by low to moderate desert pavement development." On this basis and without engaging in subsurface testing, BLM concluded that there is no potential for subsurface cultural artifacts to occur here and, therefore, determined that the site is not eligible for nomination to the NRHP.

Thus, based on its own investigation, BLM determined that three of the 119 archaeological sites in the project area of analysis are eligible for nomination to the NRHP (CA-SBR-13126/H, CA-SBR-13443/H, and CA-SBR-13093/H), discussed above,) (Ex. 309, pp. C-2-91 – C-2-92.)

With respect to the remaining 116 sites, the Applicant applied NRHP and CRHR eligibility criteria to each one and recommended that all are ineligible for NRHP and CRHR. (Ex. 309, p. C-2-92.) The Applicant's rationale is presented in the record. (*Id*.)

Guided by concerns about project impacts to biological and cultural resources, the Applicant reduced the original 8,230-acre footprint to 6,215 acres and reconfigured the portions of the southern project area to avoid all or portions of the three archaeological sites identified as NRHP eligible. (Ex. 57 More specifically, CA-SBR-13443/H has been entirely excluded from the project area and the majority of the two other sites (i.e., the portions containing the rock cluster features), CA-SBR-1908/H and CA-SBR-13093/H, have also been excluded from the project footprint. In September 2010, the project site was

reduce again to 4,613 acres. Only the "non-contributing" (lithic scatter) portions of these two sites remain within the project area of analysis. (Ex. 309, pp. C.2-91 – C.2-93.)

Ten additional archaeological sites are now also excluded from the project footprint based on the alternative project layout. These sites were in close proximity to the site areas targeted for avoidance and/or proximity to biological resources being avoided, The ten additional archaeological sites now wholly excluded from the project footprint include: CA-SBR-4558H; CA-SBR-13013; CA-SBR-13028; CA-SBR-13029; CA-SBR-13030; CA-SBR-13054; CA-SBR-13105; CA-SBR-13107; P36-014578; SM-S1-005. A portion of site CA-SBR-13126/H is now also excluded from the project footprint. (Ex. 309, p. C.2-93.)

Thus, 108 archaeological sites are currently entirely or partially within the most recent proposed project footprint and would be directly affected by the project. Among the 108 remaining archaeological sites, 100 are prehistoric sites (14 of which are multi-component sites with a minor historic component), seven are historic sites, and one is indeterminate.

Based on the evidence as just summarized above, the Applicant has recommended, and the BLM has determined, *based on surface observations*, that the data potential has been exhausted through recordation for all 108 archaeological sites within the project current footprint and those sites are, therefore, not eligible for nomination to the NRHP or CRHR. (Ex. 309, p. C.2-93.)

Despite the Applicant's and BLM's investigatory efforts, we are unable to conclude that all potentially significant datasets have been identified and that representative samples of archaeological data potential have been exhausted through recordation for the 100 remaining prehistoric archaeological sites in the project area. Staff submitted evidence underscoring the necessity of further study. (Ex. 309, pp. C.2-93 – C.2-96.) We are particularly persuaded by Staff's contention that the Calico project area is compelling in that: (1) a large number of formed artifacts were reported in the DPR forms for the sites in the project area; (2) because the project will be on public land, there is a high likelihood that unauthorized artifact collection (i.e., looting) has occurred in the project area, which may have skewed the surface visibility of lithic materials (particularly diagnostic artifacts) and correspondingly, any conclusions drawn about the sites based on surface observations alone; (3) the geology of the area is such that a sizable expanse of toolstone-quality material was available and actively exploited by prehistoric inhabitants over an apparently broad expanse of time, and the

sites' constituents reflect the importance of lithic raw material procurement and initial treatment activities; and (4) while the project area of analysis was predominantly a lithic raw material procurement/assaying area, there is also evidence of other activities beyond primary lithic reduction (e.g., secondary/tertiary lithic reduction, late-stage bifacial tools, fire-affected rock, and groundstone artifacts).

Furthermore, the sites in the project area suggest that activities were not limited to basic toolstone procurement. (Ex. 309, pp. C-2-95 to C-2-96.) Thus, given the size and quantity of the pavement quarry area, attempts to more accurately characterize the technology and reduction organization through further study of the sites prior to their permanent destruction by the project's construction are warranted to more precisely determine archaeological site significance. (Ex. 309, pp. C-2-94 – C-2-96, C-2-100, 8/18/10 RT 418-426.) We have adopted Conditions of Certification **CUL-4** and **CUL-5** to accomplish this.

b. Prehistoric Archaeological Landscape

The Applicant and BLM on the one hand and Staff on the other hand, presented different characterizations of the project area landscape. (Ex. 309, pp. C-2-96 to C-2-100.) In Staff's view, the potential prehistoric archaeological landscape is a subtle but potentially significant resource that may reflect underappreciated patterns of prehistoric land use that were important to the economy and to the maintenance of the regional social fabric during particular periods in prehistory. The landscape retains sufficient integrity to convey this significance. As explained by Staff, the landscape has potential to provide information necessary to the reconstruction of those economic and social patterns, and may also provide information important to the reconstruction of toolstone acquisition and lithic production trajectories in prehistory. Staff is therefore concerned that the project would permanently destroy a large portion of a prehistoric archaeological landscape that may exist on the project site. (Ex. 309, p. C-2-96.)

In contrast, the Applicant and BLM argue against the significance of the landscape. The Applicant agrees that bolson in which the project area of analysis is situated can be characterized as an archaeological landscape, but suggests that in terms of a definable geographic area that can be distinguished from surrounding properties by changes such as density, scale, type, age, or style of sites, rich sources of tool stone are not confined to the project area, nor are they unique. As a result, the tool stone source and landscape is not well

bounded and that similar formations occur throughout the southern California deserts that were used prehistorically.

The Applicant further asserts that the characteristic theme of the archaeological landscape cannot be dated and does not have the distinctive or significant qualities required for eligibility under Criterion C/3. In addition, the lack of datable material at the sites within the project area precludes their consideration for eligibility under Criteria A/1 and B/2, as both criteria require information – which is not known -that could link the landscape with particular events and trends, or with historically significant people. The Applicant also asserts, based on underlying data that the lithic reduction sites and landscape do not have sufficient data potential to qualify for listing under Criterion D/4.

We find that the evidence shows that the project may result in the permanent loss of important prehistoric landscape and this impact would be significant. (Ex. 309, pp. C-2-96 – C-2-102.) We concur with Staff's recommendation that the preparation of carefully crafted protcols is required before the start of ground disturbance. These protocols shall facilitate the gathering and analysis of information to further refine the assessment of the historical significance of the archaeological resources in the project areas. We have adopted Condition of Certification **CUL-4** to require the project owner to prepare the protocols subject to a suite of specified criteria and standards. Subsequent to the completion of the implementation of each protocol, the project owner must prepare and submit for the review and approval of the Compliance Program Manager, separate reports on the results of the implementation of each protocol, on the analysis and interpretation of that data, and on the CRHR evaluation of the resource type, type group, or large-scale resource that a subject protocol addresses.

Meaningful testimony was presented by Staff, BLM and intervenor California Unions for Reliable Energy (CURE) regarding the proposed design and methodology for retrieving the data contemplated by Condition of Certification **CUL-4**. (8/25/10 RT 21-71.). While Staff, BLM, and the SHPO (by way of written correspondence) were in general agreement that some form of mechanical excavation would be appropriate, CURE submitted an opposing view. According to the testimony of CURE witness Dr. David Whitley, hand excavation is the only acceptable method in this case (8/25/10 RT 62-71). Dr. Whitley was also concerned that the criterion for eligibility for the subject sites is going to be based primarily on whether subsurface archaeological deposits are present or are not present. In his view, this is unsatisfactory as there are many examples of archaeological sites that have provided very important scientific information even

though they are surface archaeological manifestations. (Id.) We have considered the evidence and testimony and are persuaded that the proposed design and methodology as set forth in **CUL-4** are appropriate and adequate for this project.

And, with implementation of Condition of Certification **CUL-5**, the project owner, prior shall – before the start of ground disturbance - submit a Cultural Resources Monitoring and Mitigation Plan (CRMMP), to the CPM for review and approval. The CRMMP shall be prepared by or under the direction and shall identify general and specific measures to minimize potential impacts to sensitive cultural resources.

In combination, these Conditions would address questions pertaining to the eligibility of the prehistoric sites within the project area and would provide for mitigation for any significant impacts, should any of the sites be determined eligible for the NRHP or CRHR.

c. Historical Archaeological Resources

After the Applicant reduced the project footprint from 8,230-acres to the current 6,215 acres, the total number of historical archaeological sites within the project area of analysis was reduced to 19 sites. Among these 19 sites, 16 are comprised of historical refuse deposits consisting of a sparse distribution of domestic, commercial, construction, or industrial debris (e.g., cans, bottles, ceramic tableware, milled lumber, machinery, and appliances) that predates 1963. The three remaining sites consist of a survey/mapping feature, mining remains, and a trail, respectively. In September 2010, the project site was reduced again to 4,613 acres to address biological resources concerns associated with the northern portions of the site.

The Applicant applied the NRHP and CRHR criteria to each of the historical archaeological sites and does not recommend any for NRHP or CRHR eligibility. According to the Applicant, (1) the sites are not associated with events that have made a significant contribution to the broad patterns of the history and cultural heritage of the United States or California (Criterion A/1); (2) the sites are not associated with the lives of persons significant to the nation's or California's past (Criterion B/2); (3) the sites do not embody distinctive characteristics of a type, period, region, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represents a significant and distinguishable entity whose components may lack individual distinction (Criterion C/3); and (4) based on the geology of the sites, there is low likelihood of buried

archaeological remains. Thus, according to the Applicant, research potential of the 19 sites has been exhausted through recordation and they are not likely to yield information important to the prehistory or history of the nation or of California (Criterion D/4). (Ex. 309, pp. C.2-101 – C.2-102.) Based on its own review of the site information, Staff concurs that these 19 historical archaeological sites/components within the project area are not eligible for the NRHP or CRHR. We find that the evidence supports the Applicant's and Staff's conclusions.

7. Historical Significance of Built-Environment Resources

As discussed above, the historic built environment survey identified 10 resources within the project area of analysis. The Applicant recommends the following five of the historic built resources within the project area of analysis as eligible for listing on the NRHP and CRHR:

National Old Trails Road (CA-SBR-2910H)

Within the project area of analysis, the National Old Trails Road consists of eight remnant segments of a batched mix oil road. The condition of the road segments is poor. Most of the road surface is crumbled, cracked, and has eroded away in places. Some segments are buried in sand, but may be partially intact.

Based on the historic context and evaluative considerations for NRHP and CRHR eligibility as discussed above, the portions of Old National Trails Road in the project area of analysis would not be considered a contributing element to the potential significance of the entire Old National Trails Road alignment or considered an individually significant segment of Old National Trails Road.

For instance, within the six-mile segment of the roadway within the project area, there are no standing structures or architectural properties associated with Old National Trails Road, such as businesses, roadside attractions, automobile courts, and so on. Nor are there properties within the project area associated with the theme of automobile transportation in the Old National Trails Road era. Further, the portion of the former roadway within the project area does not reflect any important trend or accomplishment associated with road engineering, highway design, or construction and there are no major or significant erosion-control features or landscape modifications within the segment. Distinctive engineering features are lacking and the general feeling of the open roadway within the desert in this segment has been affected by the modern non-historic visual and atmospheric intrusions, such as the multi-lane Interstate 40, wooden

and metal lattice tower power lines, transmission lines, and a fairly large electrical substation with associated infrastructure.

These intrusions have diminished the property's visual narrative, context, and feeling. This portion of Old National Trails Road is not contiguous with rest of the Old National Trails Road/U.S Route 66 system, and is not associated with events which reflect the important land use activities, traditional cultural activities, and development that has characterized (and is important) to San Bernardino County, California, and the nation. There are no important people or events associated with this segment of the roadway. In addition, the property does not have the potential to yield important information.

The Applicant concluded that the portion of Old National Trails Road within the project area of analysis does not appear to be a contributing element to the significance of the entire National Old Trails Road/U.S. Route 66 system. And, therefore, it does not appear to be individually eligible for the NRHP, CRHR, or considered a historical resource for purposes of CEQA.

Staff performed an independent evaluation of this segment and similarly concluded that it does not appear to possess sufficient historic integrity of setting, feeling, materials, workmanship, and association to be considered eligible for listing to the NRHP, CRHR, or considered a historical resource for purposes of CEQA. Staff further determined that the addition of a solar plant near the roadway would not create a new adverse effect or significant impact to the portion of the historic-period property within the project area.

We find that the evidence presented supports the conclusions reached by the Applicant and Staff. (Ex. 309, pp.C.2- 102 - C.2-104.)

U.S. Route 66 (CA-SBR-2910H)

The Applicant evaluated the eligibility of the segment of Route 66 in the project area of analysis: Applicant identified eligible Route 66 resources to include individual properties such as motels, gas stations, restaurants and cafes, and roadside attractions that may be individually eligible for listing on the NRHP. In order to be eligible as a Route 66 resource, a resource must be able to reflect its association with the theme of automobile transportation in the Route 66 era.

Guided by eligibility criteria, the Applicant initially determined that that the portion of Route 66 within the built-environment area of analysis does not appear to be a contributing element to the significance of the entire U.S. Route 66 system, and

the segment within the one-half mile built-environment area of analysis does not appear to be individually eligible for the NRHP, the CRHR, and would not be considered a historical resource for purposes of CEQA. (). However, at Staff's request, the Applicant considered whether three historic districts should be defined within the area of analysis, including a "National Old Trials Road/U.S. Route 66 Historic District." As part of this evaluation, the Applicant concluded that the segment of U.S. Route 66 in the project area of analysis retains historical integrity and is considered eligible. This revised conclusion caused Staff to further research the history, context and character-defining features of U.S. Route 66. (Exs., 309, pp. C-2-104 to C.2-106).

The record discloses Staff's independent evaluation of this segment of Route 66. Unlike the Applicant who appeared to focus primarily on the architecture that resulted from the establishment of Route 66 as a major travel route, Staff considered the significance of Route 66 itself as a national highway. In so doing, Staff consulted and presented evidence of the Route 66 Corridor Preservation Program, established by National Park Service as a result of *Public Law 102-400, the Route 66 Study Act of 1990*. This reference notes the significance of Route 66 as the nation's first all-weather highway linking Chicago and Los Angeles and described in some detail, hallmarks of Route 66 including its symbolizing the optimism that pervaded the nation's post World War II economic recovery. According to the evidence, the Route 66 Corridor Preservation Program commissioned the *Route 66 Corridor National Historic Context Study,* published in 2004, which details the national significance of Route 66, identifies the period of significance (1926-1970), and identifies the historic and architectural property types associated with it. The *Route 66 Corridor National Historic Context Study* also identifies those features that a road segment must retain in order to be considered eligible, including the original cross -section template (cut banks, fill slopes, roadbed, grade); original alignment or later realignment; and associated features such as bridges and culverts (even if they have been modified or replaced). The context study also states that those segments of road that have been widened after the end of the period of significance may still be included if they link other significant sections of the route, and, notably, that pavement is "an inherently fragile feature of highways and is routinely covered over and replaced." (Ex. 309, pp. C-2-106 – C-2-108.)

Staff applied the information from the *Route 66 Corridor National Historic Context Study* to Route 66 as described in the original evaluation in the project area of analysis. Staff determined that this section would be a contributor to a larger U.S. Route 66 historic district, should such a resource be determined eligible, and that

this section would therefore be considered a historic resource for the purposes of CEQA based on factors such as the section of roadway being pristine; it is a realigned section of the road to reduce sharp turns, steep grades and accommodate higher speeds. And, while there is evidence that the road has been resurfaced and widened since its construction at undetermined times, Staff posits that these changes took place within the identified Route 66 period of significance 1926-1970 to accommodate modern traffic. (*Id*.)

This section of road also retains those character-defining eligibility features noted in the *Route 66 National Historic Context Study:* the original cross-section template, later (1934) realignment, and four associated single-span bridges that were constructed from 1939 to 1952. These bridges retain features that indicate they are likely original features of Route 66, including the concrete decking, and are in good state of preservation. (*Id*.).

Staff produced evidence that the Southern California Edison (SCE) 220-Kilovolt North and South Transmission Lines and the Pisgah Substation were all constructed between 1936 and 1941, beginning only two years after the construction of Route 66 in 1934. Interstate 40 was constructed in 1968, also within the national period of significance. The SCE 220 kV lines and the Pisgah Substation have been determined to be NRHP- and CRHR-eligible resources for their association with the Hoover Dam and their significance in the World War II effort (Criterion A/1). These resources would have been part of the Route 66 travel experience and landscape across this section of the Mojave Desert, and therefore would not compromise the integrity of Route 66. (*Id.*)

Staff's reported consultation with the Route 66 Corridor Preservation Program further underscores Staff's position that rural sections of Route 66, such as that found in the project area and in the eastern Mojave Desert in general, are particularly significant for the vast, open landscapes and viewsheds. Those landscapes and viewsheds are considered character-defining features of the travel experience of Route 66. The consultation further informed Staff that the project area was initially included in the proposed Mojave Trails National Monument currently being heard by Congress, one purpose of which is the preservation of Route 66 (http://www.opencongress.org/bill/111-s2921/text), but recent changes in the MTNM proposal may have excluded the project area from the MTNM boundaries.. (*Id*.)

In light of the evidence presented, we concur with Staff's determination that the portion of Route 66 within the project area of analysis contributes to the

significance of Route 66, is potentially eligible for the NRHP and CRHR as a contributing resource to the larger Route 66 system under Criterion A/1 for its association as one of the first all-weather highways in the United States, and is therefore it is a historical resource for the purposes of CEQA.

Atlantic & Pacific/Atchison Topeka & Santa Fe Railroad (CA-SBR-6693H)

SBR-6693H is the railroad line that was originally built in 1883 for the Atlantic and Pacific Railroad Company. From 1890, the railroad was operated by the Atchinson, Topeka & Santa Fe Railroad until its merger in 1996 with the Burlington Northern Santa Fe Railway (BNSF). Between 1993 and 2002 portions of this site (none within the project area) have been given status codes 2S2 (individual property determined eligible for the NRHP by a consensus through Section 106 process; listed in the CR) and 6Y (determined ineligible for NR by consensus through Section 106 process, not evaluated for CR or Local Listing). SBR-6693H bisects the project area and is located within both phases of project construction.

The BNSF Railway is located within the one-half mile built-environment area of analysis. In addition to the railroad track, associated historical artifacts include glass, metal, track and train parts, and railroad tableware. The railroad has been previously determined to be eligible for the NRHP and the CRHR under Criterion A (Criterion 1) for its association with the history of transportation in California.

Although much of the railroad has been upgraded for continued use and few historical materials remain in place, the Applicant states that it retains integrity of location and the level of significance established by the previous recordings. However, we agree that the evidence presented by Staff showing that the replacement of railway and bridge historic materials with modern materials and the resulting loss of integrity do not support a recommendation of NRHP or CRHR eligibility for the BNSF Railway and five bridge structures within the project buffer. (Ex. 309, pp. C-2-109 to C-2-110.)

Southern California Edison 12-Kilovolt Transmission Line (CA-SBR-13114H)

The SCE 12-kilovolt transmission line was constructed in 1961 as a rural distribution line. The line within the project area of analysis consists of fifteen 40-foot-tall utility poles, which are each 0.75 foot in diameter. The poles have a single T-post on the top with 3 ceramic insulators and 3 transmission lines. The poles are creosote-treated pine and each pole features an identification tag and an embossed nail on the left for height (40) and an embossed date nail (61) on

the right. There also is an associated 207-foot-long historic transmission road and sparse historic trash in the vicinity of the transmission line.

The evidence shows that the 12-kv transmission line is not associated with any distinctive or significant event, persons design or construction, and all data potential has been accounted for during the recordation process. Thus, we concur that based on site investigations and historic research, the SCE 12-kilovolt transmission line is recommended not eligible for the NRHP or the CRHR under any of the criterion for eligibility, and there is not a historic resource pursuant to CEQA. (Ex. 309, p. C-2-110.)

Southern California Edison 220-Kilovolt North and South Transmission Lines (CA-SBR-13115H and CA-SBR-13116H)

The SCE 220-kilovolt North and South Transmission Lines are single-circuit transmission lines with lattice steel, wedge A-frame and metal-waisted tower structures. The evenly-spaced tower structures are approximately 75-feet-tall and include 3 conductor wires, 2 static wires, and insulators. The transmission lines originate at the SCE switchyard at the Hoover Dam and terminate in Chino, California.

Two approximately 4.7-mile-long segments of the transmission lines were recorded within the historic built-environment one-half mile project area of analysis. Within the project area each tower structure has four legs, which are anchored in concrete footings. The transmission lines are located in a rural setting on property managed by the BLM.

The SCE 220-Kilovolt North Transmission Line was constructed between 1936 and 1939, using the same design and technology SCE had been using for its existing high-voltage transmission lines in southern California (including its Vincent 220-kilovolt line), and the design used by the Metropolitan Water District for its Hoover Dam line. The transmission line began receiving power from the Hoover Dam in 1939, after the completion of Hoover generating units A-6 and A-7 (Myers 1983; Schweigert and Labrum 2001). When World War II began in Europe, SCE planners anticipated an increase in demand for power in southern California. SCE began construction on a second transmission line, the SCE South 220-Kilvolt South Transmission Line (SCE South or Hoover-Chino No. 2), in 1939.

The lines are associated with the early operation of Hoover Dam and both played a significant role in providing electricity essential to World War II industries

located in southern California. Both lines were previously recorded in Nevada (site numbers 26CK6249 and 26CK6250) during the Boulder City/U.S. 93 Corridor Study, and were determined eligible for the NRHP by the Federal Highway Administration and Nevada State Historic Preservation Office (Federal Highway Administration 2005).Furthermore, both lines are in-use and regularly maintained in the project area.

The evidence also establishes that the lines retain sufficient integrity to be considered for listing on the NRHP and CRHR. (Ex. 309. pp. C-2-110 to C-2-112.)

Pisgah Substation (CA-SBR-13117H)

The Pisgah Substation is a Southern California Edison switching station that was constructed in 1940 during the construction of the SCE South 220-Kilvolt South Transmission Line and is considered a component of the transmission line. A switching station is an intermediate station, which has incoming and outgoing power lines of the same voltage. Unlike other substations, a switching station does not transfer power from a higher voltage to a lower voltage, but instead works to control increases and decreases in voltage. The Pisgah Substation also has three buildings, which house the relay station and battery equipment. All of the buildings are in good condition and appear to be in-use.

The evidence shows that the Pisgah Substation is not associated with distinctive or significant person, is typical of the design of its era, and is not considered a rare surviving example of its era. However, this switching station is associated with the Southern California Edison 220-Kilovolt North and South Lines, which – as discussed above -are recommended eligible for the NRHP and CRHR under Criteria A/1. Because the Pisgah Substation is a component of the transmission line, it is appropriate for an NRPH or CRHR eligibility recommendation under Criterion A/1. It is also appropriately characterized as a historic resource under CEQA. (Ex. 309, pp. C-2-112 to C-2-113.)

Hector Road (CA-SBR-13118H)

Four segments of Hector Road were recorded within Phase 1 and Phase 2 of the project area of analysis. The Hector Road interchange on I-40 provides access to the project area of analysis. South of the interchange, Hector Road is a two-lane paved roadway that extends south for a short distance to U.S. Route 66. North of the Interstate 40 interchange, Hector Road is reduced to one-lane, graded, dirt roadway. This segment of the roadway has been realigned since its original construction, and much of the historic segment of the road between Interstate 40

and the BNSF is not within the project area of analysis. An improved railroad crossing has been constructed at Hector Road, which remains locked with a gate and padlock and is only used by local traffic with access permission. The improved crossing includes crossing arms and slightly sloped asphalt ramps that bring the road up to railroad grade and back down to road grade level.

From the BNSF Railroad, Hector Road continues northward about one mile to the northwest corner of Section 3, Township 8 North, Range 6 East, and then continues eastward along the section line for three miles. At the northeast corner of Section 1, Township 8 North, Range 6 East, Hector Road turns to the southeast and continues across sections 6 and 8 until its junction with the SCE 220-kV transmission line road. This segment of the road is a one-lane, graded dirt road that appears to be maintained and frequently used. The route of Hector Road from the railroad to the transmission line road has not been modified since its original construction in the late 1930s or early 1950s. Sometime after 1955, Hector Road was extended about one-half mile southeast to a road that leads to the Black Butte manganese mine. Hector Road likely was constructed to provide access to mines in the Project vicinity. The road also could have been used to transport construction materials to the SCE 220-kV transmission line and the Pisgah Substation from the railroad.

According to the evidence, Hector Road is a modest example of a typical one-lane dirt graded rural road. It is not associated with any distinctive or significant events, persons, design/construction, or has the potential to yield important information about the past. The road is representative of typical construction, which has been well-documented in California and the West. Thus, we concur with the Applicant's and Staff's respective conclusions as supported by on site investigations and historic research, that Hector Road is not eligible for listing in the NRHP and CRHR, and would not be considered a historic resource pursuant to CEQA. (Ex. 309, p. C.2-113.)

Pisgah Crater Road (CA-SBR-13119H)

Pisgah Crater Road currently runs between the SCE 220-kilovolt transmission line road to the Pisgah Crater, a volcanic cinder cone located south of the project area of analysis. U.S.G.S. 15-minute topographic quadrangles indicate that this road was extended sometime after 1955 because the map only depicts the road between Pisgah Crater south of U.S. Route 66 and a small segment north of U.S. Route 66 that terminates at the BNSF Railway. The segment of Pisgah Crater Road that is 45 years old or older is paved with asphalt and is approximately 24 feet wide.

The Pisgah Crater currently is being mined for aggregate and is located on private land. The road does not appear to be regularly maintained and likely is only sporadically used to access the mine.

The evidence indicates that Pisgah Crater Road is not associated with any distinctive or significant event, person, design, or construction, and the data potential has been accounted for during the recordation process. The majority of the road is located on private land and much of the crater has been destroyed by mining.

As further explained by Staff, no records were found to indicate that the Pisgah Crater was ever a well-known tourist destination for U.S. Route 66 travelers. The road is representative of typical construction and design, which has been well-documented in California and the west, and further study, is unlikely to yield important information about the past.

We therefore find that Pisgah Crater Road is not eligible for listing in the NRHP or the CRHR and is not a historical resource pursuant to CEQA. (Ex. 309, pp. C.2-113 to C.2-114.)

Pacific Gas and Electric and Mojave Pipelines

The Pacific Gas and Electric Pipeline and the Mojave Pipeline are natural gas pipelines constructed before 1995 that run through the Phase 2 portion of the project area. According to the evidence, there are no visible features of either pipeline in the project area. In addition, the Advisory Council on Historic Preservation has exempted federal agencies from taking into account the effects of their undertakings on historic natural gas pipelines (Advisory Council on Historic Preservation 2002). Thus, the pipelines appear are ineligible for NRHP or CRHR under any criteria. PR 523 forms were not completed for either pipeline. (Ex. 309, p. C-2-114.)

8. Ethnographic Resources

There are no known ethnographic resources within the footprint or viewshed of the proposed project area. (Ex. 309, p. C.2-115.)

9. Historic Districts and Landscape Considerations

Southern California Edison Historic District

Resources that could be included in the potential SCE Historic District are the SCE 220-kV North and South Transmission Lines (CA-SBR-13115H and CA-SBR-13116H), Pisgah Substation (CA-SBR-13117H), and archaeological site CA-SBR-12992H.

As discussed above, the SCE transmission lines originate at the SCE switchyard at Hoover Dam. They terminate in Chino, California. Because of the association of the transmission lines to Hoover Dam and their significance in the World War II effort, the SCE 220-Kilovolt North and South Lines were evaluated as eligible for the NRHP under Criterion A and the CRHR under Criterion 1. And, because the Pisgah Substation is a component of the SCE 220-kV North and South Transmission Lines, is also deemed eligible for the NRHP under Criterion A and for the CRHR under Criterion 1.

Archaeological site CA-SBR-12992H near the SCE North and South Transmission Lines, and may be the remains of a work camp related to the construction of the transmission lines and the Pisgah Substation. More particularly, the site is a small, low density scatter of historic trash with four concentrations of historic refuse. The record shows that the site was evaluated as not eligible for the NRHP and CRHR because of the low quantity of artifacts, lack of integrity, low probability of subsurface artifacts and features, and little potential for the site to yield important information or be a contributor to the potential historic district.

Both the National Park Service and State of California definitions indicate that historic districts must have definable and precise boundaries and that these boundaries rarely are defined by planning or management boundaries, or by ownership parcels, but rather must be based upon the spatial locations of the district's contributing properties (Title 14, California Code of Regulations, Chapter 11.5, Section 4852(a)(5); U.S. Department of the Interior, National Park Service 2002). Only about 4.7 miles of the transmission lines were recorded as part of the Calico Solar project within the historic built environment one-half mile buffer. Because the entire route of the transmission line was not studied as part of the project, the evidence does not allow for the delineation of a boundary that is not arbitrarily defined. Therefore, based on the evidence, it appears inappropriate to define a district based on these resources. (Ex. 309, pp. C.2-117 to C.2-118.)

Atlantic & Pacific (Atchison Topeka & Santa Fe) Railroad Historic District

Resources that could be included in a potential A&P Railroad historic district are the railroad (CA-SBR-6693H) and seven nearby refuse deposits. The Atlantic & Pacific Railroad was originally recorded as a historic resource in California in 1990. The railroad currently is used and maintained as the BNSF. In the project area of analysis, the railroad has a double trackway on a raised, ballasted bed. The railroad has been previously evaluated as eligible for the NRHP and CRHR under Criterion A/1 for its association with the history of transportation in California. Although much of the railroad has been upgraded for continued use and few historical materials remain in place, the segment in the Project vicinity retains integrity of location. Thirteen previously unrecorded bridges were identified during the Class III intensive field survey along the railroad within the Project area of analysis and the one-half mile built environment buffer. Five of these retain sufficient integrity to be considered contributing elements to the railroad.

As discussed above, both the National Park Service and State of California definitions indicate that historic districts must have definable and precise boundaries and that these boundaries rarely are defined by planning or management boundaries. The railroad is a long, linear resource that extends across seven states, and only about 10.5 miles of the railroad were recorded as part of this Project within the historic built environment one-half mile buffer. Because the entire route of the railroad was not studied as part of this Project, we cannot delineate a boundary for a segment of the railroad in the Project vicinity that would not be arbitrarily defined by the Project and buffer areas. Therefore, it seems inappropriate to define a district.

With respect to the seven historic refuse sites located in the vicinity of the railroad, including CA-SBR-13002/H, -13012H, -13014H, -13017H, -13023/H, -13101, and -13108H, the evidence shows they have few temporally diagnostic artifacts. It is therefore unclear whether these sites are contemporaneous. In addition, the types of artifacts associated with these sites do not indicate clear associations with the railroad. Three of these sites were evaluated as not eligible for the NRHP and CRHR because of the low quantity of artifacts, lack of integrity, low probability of subsurface artifacts and features, and little potential to yield important information. Four of these sites (CA-SBR-13002/H, -13012H, -13014H, and -13017H) were recommended as eligible for the NRHP and CRHR for their potential to yield important information although further testing is required to determine if additional information can be obtained to support the hypothesis that these sites are related to railroad activities or some other activity. Inclusion of

those properties in a historic district would not upgrade their status for preservation purposes. (Ex. 309, pp.C-2-118 –C-119.)

National Old Trails Road/U.S. Route 66 Historic District

Resources that could be included in the potential National Old Trails Road /U.S. Route 66 Historic District are extant segments of National Old Trails Road, U.S. Route 66, and two rock concentrations. The CEC and BLM identified a third rock concentration, P36-014578, that appears unrelated to the highways.

National Old Trails Road and U.S. Route 66 are more fully discussed above. In summary, the evidence shows National Old Trails Road in the project area of analysis is represented by eight remnant segments of a batched mix oil road. The condition of the road segments is poor—most of the road surface is crumbled and cracked, and in places has eroded. Some segments buried by sand may be partially intact.

In 1926, the National Old Trails Road was designated as U.S. Route 66, but in the 1930s the segment in the project area of analysis was abandoned in favor of a route to the south, which is the current alignment of historical U.S. Route 66. Both the National Old Trails Road and 1930s alignment of U.S. Route 66 have been recorded under site number CA-SBR-2910H, and previously evaluated as eligible for the NRHP under Criterion A as one of the first all-weather highways in the United States. The segment of U.S. Route 66 in the project area of analysis retains historical integrity and is considered eligible. The National Old Trails Road in the project area of analysis is isolated, segmented, in generally poor condition, and is recommended as a non-contributing element of the highway.

Two rock clusters also were recorded (P36-014519 and P36-014520) along the abandoned segment of the National Old Trails Road. However, no historical as-built drawings of the highway have been located, and thus, a direct association between the rock clusters and the highway remains ambiguous. The rock clusters are recommended ineligible for the NRHP and not significant historical resources eligible for listing in the CRHR.

Segments of U.S. Route 66 and the National Old Trails Road have been listed in the NRHP in several states. U.S. Route 66 related districts have been listed but they include properties such as roadside businesses related to the development of the highway within the boundaries of a specific town or locality. There are no such properties in the project vicinity.

A statewide inventory of U.S. Route 66 has not been conducted for California. If a historic district or multiple property listing of the highway was defined in California, the segment of the 1930s U.S. Route 66 in the Project vicinity probably would be considered a contributing element. However, defining a U.S. Route 66 district at the project limits would be arbitrary for a highway that ran through Illinois, Missouri, Kansas, Oklahoma, Texas, New Mexico, Arizona, and California. Further, because the other associated properties have little historic value, there is no established justification for defining a National Old Trails Road/U.S. Route 66 Historic District. (Ex. 309, pp. C-2-119 to C-2-120.)

Potential Early Twentieth Century Gravel Mining Landscape

Staff recommended the consideration of a historical archaeological landscape that represents an early twentieth century gravel mining operation in the south-central portion of the project area of analysis. Gravel was applied to sections of the road during improvement activities in the mid 1920s, and some of this gravel may have been obtained from the well- developed desert pavements adjacent to the road alignment.

Research and site revisits have revealed no conclusive data to determine the age of the surface disturbance (cleared area) along the National Old Trails Road that occurs within the Project area of analysis. There have been several other past Projects (historic and modern) that may be attributed to the surface disturbance found within the Project area of analysis other than the National Old Trails Road, such as the BNSF railroad and three pipelines within the same area as the disturbances. Modern surface prospects also occur in the Project area of analysis. These modern prospects are found on modern maps (1982 U.S.G.S. 7.5-minute topographic quadrangles), and are absent from historic maps (1955 U.S.G.S. 15-minute quadrangles). In addition, the majority of surface deposits lack diagnostic material (documentation and/or datable cans/refuse). San Bernardino County was responsible for route planning at the time the National Old Trails Road was designated, and the route may or may not have been professionally engineered. No historical as-built drawings of the highway have been located, and thus, a direct association between surface disturbances remains ambiguous.

The National Park Service states that the boundaries of a district or landscape "must be a definable geographic area that can be distinguished from surrounding properties by changes such as density, scale, type, age, style of sites, buildings, structures and objects, or by documented differences in patterns of historic development or associations" (U.S. Department of the Interior, National Park

Service 2002:6). In this regard, the evidence indicates that while the spatial relationship between historic road and surface gravel mining disturbance is distinctive, the utilization of the surface for stone resources within the project area of analysis cannot be well bounded. As a result, defining an early twentieth century gravel mining landscape seems inappropriate because the activity lacks sufficient data to be directly attributed to gravel mining for the construction and maintenance of the National Old Trails Road. Additionally, the surface mining activity cannot be clearly linked with the early twentieth century period because a number of historic and modern ground disturbing related Projects have taken place in this area over time, the lack of directly associated temporally diagnostic artifacts, and the absence of historical documentation providing location and time period for this specific activity. The lack of datable material also severely limits the utility of cleared areas to address important research issues. Thus, there is no basis for defining a landscape. (Ex. 309, pp. C-2-120 to C-2-122.)

10. Construction and Operation Impacts

We have evaluated the potential project impacts to the identified CRHR-eligible cultural resources to determine if these impacts are substantial and adverse. We have also assessed whether the proposed project has the potential to impact as-yet-unknown buried archaeological resources. Our findings are summarized below.

a. Construction Activities

Site preparation would be based on avoiding major washes and minimizing surface-disturbing activities. Areas of sensitive habitat and cultural resources would also be avoided wherever possible. Brush trimming, which consists of cutting the top of the existing brush while leaving the existing native plant root system in place to minimize soil erosion, would be conducted between alternating rows of SunCatchers™.

After brush trimming, blading for roadways and foundations will be conducted between alternating rows of SunCatchers™ to provide access to individual SunCatchers™. Blading would consist of removing terrain undulations and would be limited to 3 feet in cut and 3 feet in fill. The blading operations would keep native soils within 100 feet of the pre-development location, with no hauling of soils across the site.

Paved roadways would be constructed as close to the existing topography as possible, with limited cut-and-fill operations to maintain roadway design slope to

within a maximum of 10 percent. Minor grading would also be required for building foundations and pads and parking areas in the Main Services Complex and substation areas. The clearing, blading, and grading operations would be undertaken using standard contractor heavy equipment.

From the preliminary geotechnical investigations, it is expected that lightly loaded equipment and structures, would be supported on shallow footings. Shallow footings would be continuous strip and isolated spread footings.

The majority of each SunCatcher™ would be supported by a single metal pipe foundation that is hydraulically driven into the ground. These foundations are expected to be approximately 20 feet long and 24 inches in diameter. Shallow drilled pier concrete foundations of approximately 36 inches in diameter and an embedment depth with a minimum socketed depth into rock of 6 feet would be used for hard and rock-like ground conditions. The buildings and major structures such as yard tanks would be supported on shallow spread and continuous footings or mat-type foundations. Deep foundations would be required for heavy items, such as the power transformers at the electrical substation.

With respect to materials and equipment staging**,** 100-acre lay down yard will be cleared on the southeast corner of the project site where SunCatchers will be assembled. Assembly buildings will be constructed adjacent to the Main Services Complex for the onsite assembly of the SunCatchers. The assembly buildings will be decommissioned and salvaged for re-use once all Calico Solar SunCatchers have been installed. SunCatchers will be installed in the area vacated by the removal of the construction laydown areas and assembly buildings when construction is completed.

Regarding trenching for buried linear facilities (i.e., pipelines, transmission) SunCatcher systems will be tied together by an underground cable system. And, Final design and construction of transmission facilities and reliability upgrades at the SCE Pisgah Substation and the Pisgah-Lugo 230 kV Transmission Line (should they be required) will be completed by SCE as more fully discussed in the Project –Related Future Actions section below.

b. Construction Impacts

As discussed above, the 6,215 acre footprint will avoid three sites identified by BLM as eligible for inclusion in the NRHP. As a result, BLM issued a finding of no adverse effect to historic properties and sought concurrence from the State Historic Preservation Officer (SHPO). (Ex. 309, p. C.2-26.) The SHPO concurred

with BLM's determination that the sites deemed eligible are eligible for NRHP. that BLM the SHPO neither concurred with nor objected to the BLM's determination that the remaining sites within the area of potential effects were not eligible. (8/25/10 RT .21.)

But, as also discussed above, Staff has produced evidence establishing that construction of the project may wholly or partially destroy the majority of surface archaeological resources in the project area, which were identified by the Applicant. More particularly, it appears that 100 surface prehistoric archaeological sites in the current project footprint have not yet been adequately investigated or evaluated in terms of potential to yield data important to the study of prehistory. It also appears that project construction has potential to destroy a large portion of a potential prehistoric archaeological landscape that may exist in the project area.

The evidence also establishes the potential for indirect effects to archeological sites in the exclusion areas as a result of activities such as increased traffic during project construction. Project area may also increase the amount of sheet washing and water runoff during heavy rainfall and indirectly cause damage to sites outside the project area.

The evidence presented does not identify precisely which of the different archaeological resources are historically significant, leaving us unable to identify with particularity the exact character of the effects that the construction of the proposed facility would have on such resources. We can nonetheless draw a reasonable inference from the evidence that the construction of the proposed facility could have a significant effect on the environment that requires mitigation under CEQA and that feasible mitigation measures can be implemented building upon the analytical process that has already been initiated, documented, and explained in the record.

More specifically, the Applicant, Staff, and BLM have defined an appropriate geographic extent of the project area of analysis and they have collectively contributed to the creation of an inventory of the known cultural resources within that area. With implementation of Conditions of Certification **CUL-1** through **CUL-5** and **CUL-7** through **CUL-11,** potential impacts to both known and unknown resources will be avoided or mitigated to less than significant levels**.**
The Conditions of Certification require the project owner to collect the necessary surface and subsurface data on the resources sufficient to develop formal recommendations of historical significance, assess effects to significant

resources, and implement mitigation measures that meet the standards for the resolution of significant effects to significant cultural resources. In addition, Energy Commission licensing decisions and BLM right-of-way grant decisions also typically identify the likelihood of encountering previously unknown resources and contain provisions that require specific procedures to ensure that any effects to these resources can be resolved.

Cultural resources that are found to be significant on the basis of their information value (principally archaeological deposits) would be subject to treatments which would variably be to actively avoid all or part of subject deposits, to record and preserve representative samples of the unique spatial or associative information that is intrinsic to the depositional history of each deposit, to collect and curate representative samples of material culture assemblages, to provide for the preparation and dissemination of professional technical publications and public interpretative materials, and to develop and implement plans to foster the long-term historic preservation of subject deposits. Archaeological resources in the project area of analysis that may be subject to unique treatment plans may include archaeological landscapes and/or districts, in addition to individual archaeological sites.

c. Operation Activities and Impacts

SunCatcher mirror washing, operations dust control, potable water use, and water treatment under regular maintenance routines will require an average of 33.4 gallons of raw water per minute, with a daily maximum requirement of 56.6 gallons of raw water per minute during the summer peak months each year, when each SunCatcher receives a single mechanical wash. Road and SunCatcher area long-term maintenance would include:

- Temporary soil stabilization (SS) techniques, such as scheduling construction sequences to minimize land disturbance during the rainy and non-rainy seasons and employing BMPs appropriate for the season; preserving existing vegetation by marking areas of preservation with temporary orange propylene fencing; using geotextiles, mats, plastic covers, or erosion control blankets to stabilize disturbed areas and protect soils from erosion by wind or water; using earth dikes, drainage swales, or lined ditches to intercept, divert, and convey surface runoff to prevent erosion; using outlet protection devices and velocity dissipation devices at pipe outlets to prevent scour and erosion from storm water flows; and/or using slope drains to intercept and direct surface runoff or groundwater to a stabilized water course or retention area.
- Sediment Control (SC) techniques, such as using silt fences, straw bales, and/or fiber rolls to intercept and slow the flow of sediment-laden runoff such that sediment settles before runoff leaves the site.

- Wind Erosion (WE) control by applying water or dust palliatives, as required, to prevent or alleviate windblown dust.
- Tracking Control (TC) techniques to limit track-out, such as using stabilized points of entering and exiting the project site and stabilized construction roadways on the site.
- Other measures, as appropriate, to comply with the regulations.

Many direct and indirect impacts described above as part of construction also apply to the operation phase. During operation of the proposed power plant, repair of a buried utility or other buried infrastructure could require the excavation of a large hole. Such repairs have the potential to impact previously unknown subsurface archaeological resources in areas unaffected by any original trench excavation. Thus, Conditions of Certification **CUL-1**, **CUL-2**, and **CUL-8** through **CUL-10** are equally applicable to project operations to mitigate impacts to known and unknown archaeological resources. (Ex. 309, pp.C.2-129 to C-2-130.)

11. Impacts to Built-Environment Resources

As discussed above, four built-environment resources are eligible for NRHP or CRHR (U.S. Route 66 (CA-SBR-2910H), the SCE 220-kilovolt (kV) North and South Transmission Lines (CA-SBR-13115H and 13116H, respectively), and the Pisgah Substation (CA-SBR-13117H)).

The evidence shows that there will be a direct visual effect to U.S. Route 66 from the installation of the proposed 26,540 solar dishes. The installation of this large number of SunCatchers, consisting of an approximate 40-foot diameter solar concentrator dish that supports an array of curved glass mirror facets, will alter the vast, open landscape that is a character-defining feature of this section of Route 66, as well as of the rest of Route 66 in the Mojave Desert. The travel experience of this section of Route 66—which has been substantially unchanged since its construction—will be permanently impaired.

Potential mitigation measures were proposed such a providing on-site and/or off-site screening or eliminating the first few rows of solar dishes. Screening measures are infeasible given that the area is relatively flat and consists only of scrub vegetation. The significance of Route 66 in the Mojave is the view of the vast, unobstructed, flat expanse of desert landscape which would be impeded by any type of screening, either on the roadway itself or on the edge of the project site. Furthermore, eliminating the first few rows of solar dishes would not lessen

the visual impact of the proposed project, as the views are unobstructed for approximately 20 miles.

Although we therefore find that this impact is significant and unavoidable, we have also determined that overriding considerations justify this impact and make factual findings in support thereof in the **Override Findings** section of this Decision.

Notwithstanding the unmitigable nature of the impact, we also adopt Condition of Certification **CUL-6** requiring photodocumentation of the roadway view of the 9-mile segment of roadway and associated landscapes and viewsheds within the project area. The photodocumentation would include large-format negatives that clearly depict the appearance of the property and areas of significance or the site, perspective-corrected and fully captioned. Undertaking the HABS recordation activities prior to certification would not affect the project's certification prospects. (Ex. 309, pp. C-2-128 to C-2-129.)

12. Project Closure and Decommissioning

Decommissioning of the proposed project may wholly or partially destroy all archeological sites on the surface of the project area. (Ex. 309, p. C.2-90.) Re-excavation and removal of SunCatchers™ and ancillary facilities could impact cultural resources. Conditions of Certification **CUL-1**, **CUL-2**, and **CUL-8** through **CUL-10** would provide for mitigating impacts to cultural resources encountered during project decommissioning activities.

13. Project –Related Future Actions

We also consider the potential impacts of future transmission line construction, line removal, substation expansion, and other upgrades that might be required by SCE as a reasonably foreseeable result of the Calico Solar project if approved and constructed as proposed. (Ex. 309, pp. C-2-136 to C-2-141.)

Our focus here is on two possible upgrade scenarios:

(1) The 275 MW Early Interconnection Option – This includes upgrades to the existing SCE system to result in 275 MW of additional latent system capacity. The Pisgah Substation would be expanded adjacent to the existing substation, one or two new 220kV structures would be constructed to support the gen-tie line from the project into the Pisgah Substation, and new telecommunications facilities would be installed within existing rights of way.

(2) The 850 MW Full Build-Out Option – This include replacing a 67-mile 220 kV SCE transmission line with a new 500kV line, expanding the Pisgah Substation at a new location and making other telecommunication upgrades to allow for additional transmission system capacity to support operation of the Calico Solar project. (Ex. 309, p. C.2-137.)

Staff produced evidence generally describing the potential environmental and health effects that may result from these upgrades. BLM and the California Public Utilities Commission will fully evaluate the SCE upgrades and related projects in an Environmental Impact Report/Environmental Impact Statement (EIR/EIS).

Environmental Setting

The upgrades would be within the Lugo-Pisgah project area located in the western Mojave Desert where numerous large-scale inventory projects have been conducted. In part, these projects have defined a cultural chronology for the area that spans the last 12,000 years. Ethnographically, the project area is centered on the traditional lands of the Serrano, a Numic speaking group related to the Shoshone. Between these earliest and latest Native American periods is a rich cultural history.

The Mojave Desert is suggested to have been the area of principal point of origin for the migration of the Numic language group, which spread northeastward into the Great Basin and eventually the northern Colorado Plateau. Many of the distinctive projectile point types described for the Great Basin and Southwest culture areas may have originated in the broad geographic area of the Mojave Desert.

Native American history begins with the Clovis culture, the earliest substantively established cultural period in the Western Hemisphere and the only “classic” Paleo-Indian period represented in the project area. Dated from 10,000 to 8,000 B.C., the Clovis period is represented by distinctive spear points with a central flute or groove on either side of the point. These points are extremely well made and have been found in association with extinct Pleistocene megafauna.

The evidence shows that the transition from the Pleistocene to the Holocene is marked by significant environmental changes that resulted in equally significant changes in human settlement and subsistence strategies. The Lake Mojave Complex follows Clovis and subsumes several other named complexes, including the Western Pluvial Lakes Tradition and the San Dieguito Complex, among others. Again, the Mojave Complex is represented by a distinct projectile

point that tapers to a rounded base. Dates of the complex are ca. 8000 to 6000 B.C. The period is associated with relatively wet conditions and periodic lake recharge in the region. Material culture for the period is dominated by a stone tool technology geared towards a forager-like subsistence strategy. Such a strategy reflects the frequently changing environmental conditions and patchy resources that would be available necessitating frequent settlement shifts.

Changing environmental conditions to more arid, present-day conditions, marks the transition to the Middle Holocene and the Pinto Complex, which overlaps slightly with the preceding Lake Mojave Complex, and persists to about 3000 B.C. There is broad similarity with the Lake Mojave Complex, especially in toolstone selection and overall technology; however, the Pinto Complex begins the first extensive use of milling tools presumed to reflect the intensification of vegetal processing. An emphasis towards plant resources probably reflects a more predictable biotic environment. The range of settlements across the landscape also suggests more predictable subsistence resources and characterizes the complex overall as spatially extensive.

The evidence details the characteristics of complexes, including the Deadman Lake Complex (7500 – 5200 B.C.) and the post 2000 B.C. Gypsum Complex, represented by well-known projectile point styles, including the contracting stemmed Gypsum, Elko series, and Humboldt series projectile point types. By A.D. 200 the Rose Springs Complex marks the introduction of the bow and arrow technology and significant population increase.

The Late Prehistoric period extends from the close of the Rose Springs Complex ca. A.D. 1100 and ends with the ethnographically described groups occupying the area at contact in the 16th century. It is during this period that Ancestral Puebloan groups are known to have exploited turquoise mines and probably interacted with resident Numic speaking Paiute and Shoshone groups. It is during this period that the postulated Numic expansion took place out of the Mojave Desert northeastward into the Great Basin. A return of warm and dry conditions, coupled with linguistic evidence, suggest this expansion began sometime before A.D. 1000 (SES 2008a).

Spanish settlement of southern California took place after the first mission was established in 1769. The Serrano, a Shoshonean group, were the primary inhabitants of the project area. Serrano lived in large square communal houses and practiced an extensive trade network with the coast. Secularization of the Spanish missions in 1834 led to the development of large ranchos that extended

into the interior from the coast. Ranchos often forced Native American groups into a form of indentured servitude. These closed, fortified communal settlements continued after non-Mexican immigrants entered the region. Upon statehood in 1850, industrialization began with the building of railroads, including the Atchison, Topeka & Santa Fe (AT&SF), mining, and the development of military installations ((Ex. 309, pp C.2-137-C.2-139.)

Potential Cultural Resources.

To date, no formal file and literature review and no intensive cultural resources inventory has taken place in the area of potential effect along the Lugo-Pisgah right of way (ROW).

Based on the cultural resources overview presented above, it is likely that a number of prehistoric cultural resources would be identified during inventory for the proposed area of the 850 MW Full Build-Out upgrades. The 275 MW Early Interconnection upgrades would require substantially less ground disturbance and the chance of encountering cultural resources would be reduced. Likely locations for prehistoric archaeological sites include the edges of intermittent drainages, such as those that drain into Antelope Valley near the western end of the project area and ultimately the terraces above the Mojave River. East of the Mojave River it is expected that the number of prehistoric resources will decrease as the corridor extends across Apple and Fifteen-Mile Valleys. However, the many ephemeral drainages that bisect these areas are relict stream channels that could have archaeological sites in association. The margins of both Rabbit Lake and Lucerne Lake also have the potential to contain prehistoric resources. Sites along relict stream channels and desiccated lake margins could include prehistoric campsites and resource processing localities.

Potential historic resources include both the Pisgah and Panoche/Lugo substations, if more than 45-years old, and the 220 kV transmission line that is to be replaced by the new 500-kV line. If these resources meet the age criteria for consideration then a qualified architectural historian must document the resources on appropriate Department of Parks and Recreation (DPR) forms and assess the significance and potential impact to these resources. Other potential historic resources include the crossing of the AT&SF Railroad (two locations) and the California Aqueduct. Numerous other transmission lines would also be crossed. (Ex. 309, p. C.2-139.)

Environmental Impacts

Impacts to cultural resources are unknown pending a formal file and literature review and intensive inventory. Since the proposed **500 kV** transmission line corridor would follow an existing ROW for much of its proposed length, it is possible that impacts to cultural resources would be lower due to prior impacts. New construction would have the potential to adversely affect cultural resources from ROW/access road construction, blading, equipment storage, pole placement, substation expansion and line installation.

Ground disturbance, the presence of vehicles driving over the top of sites and the installation of new towers could damage archaeological resources. After the work area is defined and after archaeological and historic surveys are complete in any areas that have not been protocol-level surveyed previously by SCE, archaeological sites or historic resources within the built environment may be identified. Depending on when they were built, if the existing SCE 220 kV line or the Pisgah and Panoche/Lugo Substations are determined eligible for the National Register of Historic Places (NRHP), the upgrades and removal effort would result in an impact to historical resources. Other potential historic resources include the crossing of the AT&SF Railroad (two locations) and the California Aqueduct. Whether the impact is significant would need to be determined after the line, substations and/or other infrastructure are evaluated.

Some new lines would be installed in places where there were none previously, and some existing overhead lines would have structures retrofitted and replaced along existing lines. The trench for undergrounding for the Pisgah-Gale fiber optic cable (under the 275 MW Early Interconnection) would normally be excavated in an existing underground cable trench or in a new 600-foot-long trench near the SCE Pisgah Substation, and trenching would not come within 12 inches from any existing fence, wall, or outbuilding associated with an adjacent property. Therefore, there would be no potential to adversely impact the physical condition of existing above-ground cultural resources. The only potential to adversely impact existing above-ground cultural resources would arise from a change in the visual setting of the property due to the addition of taller poles or new poles, new overhead lines, and new substation equipment depending on the location in the project area.

Any potential for the project to impact cultural resources would be limited to undiscovered below-ground cultural deposits. It is possible that buried cultural deposits could be encountered during ground disturbing project activities including trenching for the installation of underground fiber optic cables, during ground

disturbance associated with the removal or installation of transmission structures, or ground disturbance associated with the expansion at the Pisgah Substation. The 275 MW Early Interconnection upgrades would require substantially less ground disturbance than the 850 MW Full Build-Out, and the chance of impacting cultural resources would be reduced. (Ex. 309, p. C-2-140.)

Mitigation

Prior to the start of construction, cultural resources sites would be identified and avoided by vehicles and construction activities. After the construction area has been identified and after work for Section 106 has been completed, Staff recommends that the archeological sites be evaluated for eligibility for listing in the NRHP or CRHR if it appears that any would be affected by the project. Sites that have been evaluated as “not eligible” would warrant no further consideration and avoidance will be required.

Sites that have not been evaluated and sites that are considered “potentially eligible” should be treated as eligible resources pending formal evaluation. If found to meet age and significance criteria, the historic resources identified above, including the substations and the existing 220 kV transmission line, would require Level 1 Historic American Engineering Records (HAER) be completed in order to mitigate adverse effects. The crossing of the AT&SF railroad, other historic transmission lines, and the California Aqueduct would likely result in the determination of no adverse effect.

Staff recommends conducting data recovery as a mitigation measure for archaeological sites that are recommended as eligible to the CRHR or NRHP and would be impacted by the project. Monitoring of project-related excavation within an archaeological site is not appropriate mitigation and may destroy the site. SCE should comply with provisions of the National Historic Preservation Act and should consult with a California State Historic Preservation Officer regarding appropriate mitigation should any cultural materials be encountered during construction or other ground-disturbing activities.

In the event of a site discovery during project implementation, all work shall stop in the immediate area in order to afford time for documentation, evaluation, and consultation between the lead federal agency, the California State Historic Preservation Officer (SHPO), and all consulting tribes if a discovery is aboriginal in origin. Consultation with the above entities would ensue regardless of whether the discovery is located on private or federal lands. If consultation determines that the discovery is eligible for the NRHP, a consideration of effects should be

undertaken pursuant to 36 CFR 800.5 of the National Historic Preservation Act (NHPA, 1966, as amended). If consultation results in a determination of adverse effects to a historic property, mitigation measures would be proposed and implemented following consultation with the California SHPO, the lead federal agency, the Advisory Council on Historic Preservation (ACHP), and all consulting Tribes, if necessary. Avoidance would be the preferable mitigation measure in all instances. (Ex. 309, pp. C-2-140 to C-2-141.)

Staff's analysis further indicates that while SCE would attempt to avoid effects to known cultural sites, it is possible that the corridors have sensitive cultural resources that may not be avoidable and could be affected. Thus, with implementation of Conditions of Certification adopted herein, it would be possible to mitigate all impacts to cultural resources to less than a significant level and to implement recommended measures that apply to cultural resources. Known sensitive areas would be avoided and construction activities would be monitored. (Ex. 309, p.C.2-141.)

14. Cumulative Impacts

The geographic area considered for cumulative impacts on cultural resources is the Calico Solar Project area (Newberry Springs/Ludlow area). Future development projects in the immediate Newberry Springs/Ludlow area have also been identified. The following projects or developments are considered most relevant to effects on cultural resources. (Ex 309, p. 309, p C-2-142, See also Ex. 300, §B.3, Tables 1A, 1B, 2, 3, Figures 1 - 3):

Project	Location
Twentynine Palms Marine Corps Air Ground Combat Center (MCAGCC)	Morongo Basin (to the south of project site)
SEGS I and II	Near Daggett (17 miles west of project site)
CACTUS (formerly Solar One and Solar Two)	Near Daggett (to the west of project site)
Mine	2 miles west of project site along I-40
Mine	14 miles west of project site along I-40

According to the evidence, cultural resources in the geographic area have been impacted by past and currently approved projects in the following ways:

1. Because cultural resources are non-renewable, the removal or destruction of any resource results in a net loss of resources.

2. Existing development in the Newbury Springs/Ludlow area and the surrounding areas has resulted in the removal or destruction of cultural resources, which has resulted in a net loss of resources in these areas.

Cultural resources are also expected to be further affected by the following reasonably foreseeable future projects:

SES Solar Three (CACA 47702)
SES Solar Six (CACA 49540)
SCE Pisgah Substation Expansion
Pisgah-Lugo transmission upgrade
Twentynine Palms Expansion
Broadwell BrightSource (CACA 48875)
Wind project (CACA 48629)
Wind Project (CACA 48667)
Wind project (CACA 48472)
Twin Mountain Rock Venture
Solar thermal (CACA 49429)
Proposed National Monument (former Catellus Lands)
BLM Renewable Energy Study Areas
SES Solar Three (CACA 47702)
SES Solar Six (CACA 49540)
SCE Pisgah Substation Expansion
Pisgah-Lugo transmission upgrade
Twentynine Palms Expansion
Broadwell BrightSource (CACA 48875)
Wind project (CACA 48629)
Wind Project (CACA 48667)
Wind project (CACA 48472)
Twin Mountain Rock Venture
Solar thermal (CACA 49429)
Proposed National Monument (former Catellus Lands)
BLM Renewable Energy Study Areas

In combination with the above-identified projects, the construction of the Calico Solar project would likely result in permanent adverse impacts related to the removal or partial destruction of archaeological resources on the project site during construction-related ground disturbance. As discussed above, the construction of the proposed project would also result in unmitigable adverse impacts to several built-environment resources, particularly a contributing

segment of U.S. Route 66, due to the profound visual intrusion of the project on the landscape.

It is further expected that the construction of some or all of the foreseeable cumulative projects which are not yet built may also result in the permanent, potentially unmitigable, adverse impacts as a result of the removal or partial destruction of the archaeological resources on the sites for those projects and as a result of the visual intrusion of some of these projects on Mojave Desert vistas.

The construction of the Calico Solar Project and other foreseeable cumulative projects will contribute to permanent long term, potentially unmitigable, adverse impacts as a result of the physical degradation of and visual intrusion on significant cultural resources on those sites and an overall net reduction in cultural resources in the area.

Project operation may also result in similar impacts as a result of some or all of the cumulative projects, as more people come into this area associated with those new land uses. As a result, operation the Calico Solar Project and the other cumulative projects may contribute to a cumulative adverse impact on cultural resources as a result in increased access to the area and the potential for increased vandalism, illegal collection of artifacts, and/or destruction of resources during operation related activities. (Ex. 309, pp. C-2-141 to C-2-144.) To minimize the region-wide, significant cumulative impacts to less than significant levels, we adopt Conditions of Certification **CUL-1** through **CUL-10.**

15. Compliance with LORS

Projects licensed by the Energy Commission are reviewed to ensure compliance with all applicable laws. Although the Energy Commission has pre-emptive authority over local laws, it typically ensures compliance with local laws, ordinances, regulations, standards, plans, and policies. The BLM is responsible for compliance with NEPA and Section 106 of the NHPA.

The evidence discussed above establishes that, if Conditions of Certification **CUL-1** through **CUL-11** are properly implemented, the proposed project would be in compliance with CEQA and all applicable state laws, ordinances, regulations, and standards (LORS). The applicable LORS are identified in **Appendix A** to this Decision, and resolve effects under Section 106 of the NHPA on known and newly found cultural resources. The Applicant proposed **CUL-11** to ensure

compliance with the requirement of California Health and Safety Code section 7050.5 if human remains are encountered.

Specifically with respect to local LORS, the County of San Bernardino's General Plan has general language promoting the county-wide preservation of cultural resources. The Conditions of Certification require specific actions to promote and effect historic preservation and mitigate impacts to all cultural resources. Thus, if the project owner implements the Conditions, its actions would be consistent with the County's historic preservation goals.

16. Response to Comments

Intervenor California Unions for Reliable Energy (CURE) commented on the cultural resources section of the SA/DEIS relating to opportunities for meaningful public participation in the proceedings, the sufficiency of environmental setting description and data relating to potentially significant impacts to cultural resources. Those comments, and Staff's responses, are more fully set forth in the SSA, Ex. 309, pages C.2-145 through C.2-147. We have carefully considered the comments and responses, and that consideration is reflected in our discussion of this topic and our findings. No public comments were received.

FINDINGS OF FACT

Based on the evidence, the Commission makes the following findings and reaches the following conclusions:

1. Without mitigation, the Calico Solar project would have a significant direct impact on historically significant archaeological resources.
2. Without mitigation, the Calico Solar project has the potential to have a significant indirect impact on contributors to a historically significant cultural landscape, including ethnographic resources.
3. There are resources within the proposed Calico Solar site footprint and linear facilities corridor that are eligible or assumed eligible for listing in the NRHP and the CRHR.
4. Tribal governments have been contacted for a Section 106 consultation.
5. The project will result in a significant and unavoidable visual impairment impact to a segment of historic U.S. Route 66 by altering the vast, open landscape that is a character-defining feature of that section of Route 66; overriding considerations justify approving this project despite this and other significant unmitigated impacts as is more fully explained in the **Override Findings** section of this Decision.

6. Conditions of Certification **CUL-1** through **CUL-11** ensure that all direct, indirect, and cumulative impacts to cultural resources will be mitigated to insignificant levels.

CONCLUSIONS OF LAW

1. With implementation of the Conditions of Certification below, the Calico Solar Project will conform to all applicable laws, ordinances, regulations, and standards relating to cultural resources as set forth in the pertinent portion of **Appendix A** of this Decision.

2. Even with implementation of the Conditions of Certification the project will have a significant and unavoidable impact to a segment of U.S. Route 66 by altering the Route's viewscape in the project vicinity. All other potential direct, indirect, and cumulative cultural resources impacts are mitigated to insignificant levels.

CONDITIONS OF CERTIFICATION

CUL-1 Prior to the start of ground disturbance (includes "preconstruction site mobilization," "ground disturbance," and "construction grading, boring, and trenching," as defined in the General Conditions for this project), the project owner shall obtain the services of a Cultural Resources Specialist (CRS) and one or more alternate CRSs (at the project owner's option).

The CRS shall manage all cultural resources monitoring, mitigation, curation, and reporting activities in accordance with the Conditions of Certification (Conditions). The CRS may elect to obtain the services of Cultural Resources Monitors (CRMs) and other technical specialists, if needed, to assist in monitoring, mitigation, and curation activities. The project owner shall ensure that the CRS makes recommendations regarding the eligibility for listing in the California Register of Historical Resources (CRHR) of any cultural resources that are newly discovered or that may be affected in an unanticipated manner. No ground disturbance shall occur prior to Compliance Project Manager (CPM) approval of the CRS and alternates, unless such activities are specifically approved by the CPM.

Approval of a CRS may be denied or revoked for reasons including but not limited to non-compliance on this or other Energy Commission projects. After all ground disturbance is completed and the CRS has fulfilled all responsibilities specified in these cultural resources conditions, the project owner may discharge the CRS, if the CPM approves. With the discharge of the CRS, these cultural resources conditions no longer apply to the activities of this power plant.

Cultural Resources Specialist

The resumes for the CRS and alternate(s) shall include information demonstrating to the satisfaction of the CPM that their training and backgrounds conform to the U.S. Secretary of Interior's Professional Qualifications Standards, as published in Title 36, Code of Federal Regulations, part 61 (36 C.F.R., part 61). In addition, the CRS shall have the following qualifications:

1. The CRS's qualifications shall be appropriate to the needs of the project and shall include a background in anthropology, archaeology, history, architectural history, or a related field;
2. At least three years of archaeological or historical, as appropriate (per nature of predominant cultural resources on the project site), resource mitigation and field experience in California; and
3. At least one year of experience in a decision-making capacity on cultural resources projects in California and the appropriate training and experience to knowledgably make recommendations regarding the significance of cultural resources.

The resumes of the CRS and alternate CRS shall include the names and telephone numbers of contacts familiar with the work of the CRS/alternate CRS on referenced projects and demonstrate to the satisfaction of the CPM that the CRS/alternate CRS has the appropriate training and experience to implement effectively the Conditions.

Cultural Resources Monitors

CRMs shall have the following qualifications:

1. a B.S. or B.A. degree in anthropology, archaeology, historical archaeology, or a related field, and one year experience monitoring in California; or
2. an A.S. or A.A. degree in anthropology, archaeology, historical archaeology, or a related field, and four years experience monitoring in California; or
3. enrollment in upper division classes pursuing a degree in the fields of anthropology, archaeology, historical archaeology, or a related field, and two years of monitoring experience in California.

Cultural Resources Technical Specialists

The resume(s) of any additional technical specialist(s), e.g., historical archaeologist, historian, architectural historian, and/or physical anthropologist, shall be submitted to the CPM for approval.

Verification: At least 45 days prior to the start of ground disturbance, the project owner shall submit the resume for the CRS, and alternate(s) if desired, to the CPM for review and approval.

At least 10 days prior to a termination or release of the CRS, or within 10 days after the resignation of a CRS, the project owner shall submit the resume of the proposed new CRS to the CPM for review and approval. At the same time, the project owner shall also provide to the proposed new CRS the AFC and all cultural resources documents, field notes, photographs, and other cultural resources materials generated by the project. If no alternate CRS is available to assume the duties of the CRS, a monitor may serve in place of a CRS so that ground disturbance may continue up to a maximum of 3 days without a CRS. If cultural resources are discovered then ground disturbance will remain halted until there is a CRS or alternate CRS to make a recommendation regarding significance.

At least 20 days prior to ground disturbance, the CRS shall provide a letter naming anticipated CRMs for the project and stating that the identified CRMs meet the minimum qualifications for cultural resources monitoring required by this Condition.

At least 5 days prior to additional CRMs beginning on-site duties during the project, the CRS shall provide letters to the CPM identifying the new CRMs and attesting to their qualifications.

At least 10 days prior to any technical specialists, other than CRMS, beginning tasks, the resume(s) of the specialists shall be provided to the CPM for review and approval.

At least 10 days prior to the start of ground disturbance, the project owner shall confirm in writing to the CPM that the approved CRS will be available for onsite work and is prepared to implement the cultural resources conditions.

CUL-2 Prior to the start of ground disturbance, if the CRS has not previously worked on the project, the project owner shall provide the CRS with copies of the AFC, data responses, confidential cultural resources reports (upon BLM approval), and the Energy Commission's Supplemental Staff Assessment Part II (SSA Part II) and the BLM's Final Environmental Impact Statement (FEIS) for the project. The project owner shall also provide the CRS and the CPM with maps and drawings showing the footprints of the power plant, all linear facility routes, all access roads, and all laydown areas. Maps shall include the appropriate USGS quadrangles and a map at an appropriate scale (e.g., 1:2400 or 1" = 200') for plotting cultural features or materials. If the CRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the CRS and CPM. The CPM shall review map submittals and, in consultation with the CRS, approve those that are appropriate for use in cultural resources planning activities. No ground disturbance shall occur prior to CPM approval of maps and drawings, unless such activities are specifically approved by the CPM.

If construction of the project would proceed in phases, maps and drawings not previously provided shall be provided to the CRS and

CPM prior to the start of each phase. Written notice identifying the proposed schedule of each project phase shall be provided to the CRS and CPM.

Weekly, until ground disturbance is completed, the project construction manager shall provide to the CRS and CPM a schedule of project activities for the following week, including the identification of area(s) where ground disturbance will occur during that week.

The project owner shall notify the CRS and CPM of any changes to the scheduling of the construction phases.

Verification: At least 15 days prior to the start of ground disturbance, the project owner shall provide the AFC, data responses, confidential cultural resources documents, the SSA Part II, and the FEIS to the CRS, if needed, and the subject maps and drawings to the CRS and CPM. The CPM will review submittals in consultation with the CRS and approve maps and drawings suitable for cultural resources planning activities.Project owner shall submit confidential information to the CPM, only after receiving approval from the BLM.

At least 15 days prior to the start of ground disturbance, if there are changes to any project-related footprint, the project owner shall provide revised maps and drawings for the changes to the CRS and CPM.

At least 15 days prior to the start of each phase of a phased project, the project owner shall submit the appropriate maps and drawings, if not previously provided, to the CRS and CPM.

Weekly, during ground disturbance, a current schedule of anticipated project activity shall be provided to the CRS and CPM by letter, e-mail, or fax.

Within 5 days of changing the scheduling of phases of a phased project, the project owner shall provide written notice of the changes to the CRS and CPM.

CUL-3 Changes to the proposed project or to the character of its construction, operation, and maintenance that may become necessary subsequent to the approval of the project, were such approval to occur, may in turn require the re-consideration of the extent of the original project area. Where such changes indicate the need to alter the original project area to include additional lands that were not elements of analysis during the certification process, the effects of any proposed changes on historical resources that may be on such lands would need to be taken into account. Changes in the character of the construction, operation, and maintenance of the proposed project may include such actions as decisions to use non-commercial borrow or disposal sites.

Upon the recognition that proposed changes to the project would require the use of lands that were not a part of the original project area of analysis, the project owner shall ensure that the CRS surveys any such lands for cultural resources and record each newly found resource on DPR 523 Series forms. Exceptions would be made to this protocol in cases where cultural resources surveys no greater than five years in

age are documented for the entirety of the subject lands and approved by the CPM. Where new cultural resources surveys are warranted, the project owner shall convey the results of such surveys, along with the CRS's recommendations for further action, to the CPM, who will determine whether further action is necessary. If the CPM determines that historical resources may be present and that any such resource may be subject to a substantial adverse change in its significance, the project owner shall ensure that the CRS provides the CPM with substantiated recommendations on whether each such resource is eligible for listing in the CRHR and recommendations for the resolution of any such significant effects. The CRS, the project owner, and the CPM shall then confer on said recommendations, and, upon the concurrence of the CPM with those recommendations, the project owner shall ensure that the CRS proceeds to implement them, and reports on the methods and the results of any such work in the final Cultural Resources Report (CRR) (**CUL-8**).

Verification: Upon the recognition that proposed changes to the project or to the character of the construction, operation, and maintenance of the project would require the use of lands that were not a part of the original project area, the project owner shall notify the CRS and CPM. The project owner shall then provide, for CPM review and approval, documentation of any cultural resources surveys five years or less in age that exist for the additional lands.

At least 105 days prior to the use of the new additional project area lands, in the absence of any such cultural resources surveys or when the extant cultural resources surveys do not cover the entirety of the lands to be added to the project area, the project owner shall ensure that the CRS surveys the additional lands for cultural resources, notifies the project owner and the CPM of the results of the new cultural resources survey, and recommends further action.

No more than 15 days subsequent to the receipt of the information in verification 2, **CUL-3**, above, the CPM shall determine whether historical resources may be present and whether any such resources may be subject to substantial adverse changes in significance.

At least 60 days prior to the use of the new additional project area lands, if the CPM determines that historical resources may be subject to substantial adverse changes in significance, the project owner shall ensure that the CRS provides the CPM with substantiated evaluations, based on archival and field research, on whether each such resource is eligible for listing in the CRHR and recommendations for the resolution of any potential significant effects.

For no longer than 15 days, the project owner, the CRS, and the CPM shall confer about the above evaluations and recommendations, and, upon the concurrence of the CPM with those evaluations and recommendations, the project owner shall ensure that the CRS proceeds to resolve any significant effects pursuant to the above recommendations prior to the use of the new additional project area lands.

The project owner shall ensure that the CRS reports on the methods and the results of all such work in the CRR (**CUL-7**).

Project owner shall submit confidential information to the CPM, only after receiving approval from the BLM.

CUL-4 Prior to the start of ground disturbance, the project owner shall develop, prepare, and implement a series of protocols the purposes of which will be to gather and analyze information to refine the assessments of the historical significance of the archaeological resources in the project area of analysis. The project owner shall prepare and submit, for the review and approval of the CPM and consistent with the guidance found in the February 1990 "Archaeological Resource Management Reports (ARMR): Recommended Contents and Format" and the February 1991 "Guidelines for Archaeological Research Designs," separate protocols for the CRHR evaluation of each archaeological site type or site type group in the CPM-approved, final archaeological resource taxonomy and for each archaeological district, landscape, or other large-scale archaeological resource in the subject taxonomy. A field methodology will be included in each protocol which outlines a representative sample of 20% of each of the site types which would be selected for further evaluation. Ground disturbance on or in the vicinity of sites selected for evaluation may not commence until the evaluation reports have been completed. Ground disturbance may begin on portions of the project area which do not contain sites selected for further evaluation, subject to the construction monitoring provisions of **CUL-9**. Among the large-scale resources that the project owner shall explicitly are a prehistoric archaeological landscape that encompasses the numerous and diverse individual prehistoric archaeological sites across the desert pavements in the southern portion of the project area, a potential historical archaeological gravel mining district over roughly the western to west-central portion of the project area, and the archaeological remnants of the segment of the National Trails Road in the project area that may be a contributing element to a National Trails Road historic district.

Each CRHR evaluation protocol shall include, at a minimum, the following elements:

1. A background research section which develops interpretive contexts germane to each protocol and which presents information on previous research in the vicinity of the project area, generally, and on previous research on the specific resource types under consideration in the respective protocols.

2. An evaluation phase research design which, in the case of protocols prepared for individual archaeological resource types or type groups, should include a rationalized 20% sample of the resources in a type or type group, rather than a protocol structured to sample 100 percent of the population of a type or type group,

and which explicitly takes into account extant information on the subject resources.

3. A detailed and explicit field methodology tailored to acquire the data necessary to address specific research questions.
4. Provisions for specialists to be present on site and specialized laboratory analyses of recovered cultural materials where feasible and if determined necessary to complete CRHR evaluation.
5. Provisions for laboratory analyses of chronometric samples, and organic remains and residues , where feasible and if determined necessary to complete CRHR evaluation .

Where defensible relative to archaeological theory, the project owner may submit documents that, within a single document, tier several separate evaluation protocols from common background research. In such documents, the project owner would develop and present germane prehistoric or historic contexts and present a general review of previous archaeological research in the project area vicinity before laying out the specific evaluation protocols for particular archaeological resources by reviewing previous archaeological research specific to a resource type, type group, or large-scale resource, and then developing and presenting custom research designs for those particular resources.

Subsequent to the completion of the implementation of each protocol, the project owner shall prepare and submit, for the review and approval of the CPM, separate reports on the results of the implementation of each protocol, on the analysis and interpretation of that data, and on the CRHR evaluation of the resource type, type group, or large-scale resource that a subject protocol addresses.

Each CRHR evaluation report shall include, unless otherwise determined by the CPM , the following elements:

1. Synopses of the background research section, evaluation phase research design, field methodology, and material culture, chronometric, and organic analyses as set out in the relevant original evaluation protocol.
2. A detailed, explicit, illustrated presentation of the results of the field and laboratory work done under the relevant protocol.
3. An analysis and behavioral interpretation of data from previous research and of field and laboratory data acquired as the result of the implementation of the relevant protocol.
4. Formal evaluation of the specific resource types relative to the CRHR program.

The project owner may lump the evaluation reports into report documents that reflect any prior approved protocol documents that contain more than one protocol.

Should an agreement document be executed in consideration of the proposed action pursuant to 36 CFR §§ 800.6 or 800.14(b) among the Bureau of Land Management or other Federal agencies, and the California State Historic Preservation Officer, with or without the participation of the Advisory Council on Historic Preservation, and should that document provide for the collection of factual evidence sufficient to substantiate the evaluation of the California Register of Historical Resources eligibility of those potentially effected archaeological resources, as determined by the CPM, then the applicant shall adhere to the executed agreement document to mitigate any significant effects. The requirements as set out in the executed agreement document shall supersede the requirements set out above and the requirements set out above would have no further force or effect.

Should the executed agreement document be amended in such a manner that it no longer can be reasonably judged to provide for the collection of factual evidence sufficient to substantiate the evaluation of the California Register of Historical Resources eligibility of those potentially effected archaeological resources, as determined by the CPM, or should the executed agreement document be terminated prior to the complete implementation of the mitigation measures set out in it, then the project owner shall implement the above requirements, in addition to any measures set out under the amended agreement document and in addition to any measures that may have been partially completed prior to the termination of said agreement.

Verification: At least 15 days prior to the start of ground disturbance, the project owner shall have submitted all CRHR evaluation protocols to the CPM for review and approval . CPM review will take no longer than 5 days.

At least 60 days prior to the start of ground disturbance, which would impact sites selected for further evaluation , the project owner shall have submitted all CRHR evaluation reports to the CPM for review and approval.

Project owner shall submit confidential information to the CPM, only after receiving approval from the BLM.

CUL-5 Prior to the start of ground disturbance, the project owner shall submit the CRMMP, as prepared by or under the direction of the CRS, to the CPM for review and approval. The CRMMP shall follow the content and organization of the draft model CRMMP, provided by the CPM, and the authors' name(s) shall appear on the title page of the CRMMP. The

CRMMP shall identify general and specific measures to minimize potential impacts to sensitive cultural resources. Implementation of the CRMMP shall be the responsibility of the CRS and the project owner. Copies of the CRMMP shall reside with the CRS, alternate CRS, each CRM, and the project owner's on-site construction manager. No ground disturbance shall occur prior to CPM approval of the CRMMP, unless such activities are specifically approved by the CPM.

The CRMMP shall include, but not be limited to, the following elements and measures:

1. The following statement included in the Introduction: "Any discussion, summary, or paraphrasing of the Conditions of Certification in this CRMMP is intended as general guidance and as an aid to the user in understanding the Conditions and their implementation. The conditions, as written in the Commission Decision, shall supersede any summarization, description, or interpretation of the conditions in the CRMMP. The Cultural Resources Conditions of Certification from the Commission Decision are contained in Appendix A."

2. A proposed general research design that includes a discussion of archaeological research questions and testable hypotheses specifically applicable to the project area, and a discussion of artifact collection, retention/disposal, and curation policies as related to the research questions formulated in the research design. The research design will specify that the preferred treatment strategy for any buried archaeological deposits is avoidance. Specific mitigation plans shall be prepared and submitted, for the review and approval of the CPM, for any unavoidable significant effects to archaeological resource types, type groups, or large-scale archaeological resources determined by the process in **CUL-4** to be eligible for listing in the CRHR. Specific mitigation plans shall also be prepared and submitted, pursuant to **CUL-6**, for the review and approval of the CPM, for the unmitigable significant effects that the project will have on U.S. Route 66, and for any other significant effects that the project may have on other significant built-environment resources. Prescriptive treatment plans for construction-related discoveries may also be included in the CRMMP for limited archaeological resource types.

3. Indication of how recovered materials and records will be disposed, taking into account the expressed wishes of the consulting Native Americans.

4. Inclusion of a schedule for providing the consulting Native Americans with periodic updates on implementation of the Treatment Plan.

5. Inclusion of a schedule for completing a final data recovery and discovery report and specify when and to whom this report will be distributed.

6. Inclusion of a curation agreement that ensures that all materials (other than Native American human remains and grave-associated materials) and records are maintained in accordance with 36 CFR Part 79. Materials recovered from privately owned lands, other than Native American human remains and grave-associated materials, that are to be returned to their owners, will be maintained in accordance with 36 CFR Part 79 until their analysis is completed.

7. Specification of the manner in which human remains and grave-associated artifacts recovered during data recovery or discovered during subsequent construction will be treated according to the applicable laws and regulations, and in consultation with the wishes of the consulting Native Americans.

8. Specification of the implementation sequence and the estimated time frames needed to accomplish all project-related tasks during the ground-disturbance and post-ground–disturbance analysis phases of the project.

9. Identification of the person(s) expected to perform each of the tasks, their responsibilities, and the reporting relationships between project construction management and the mitigation and monitoring team.

10 A description of the manner in which Native American observers or monitors will be included, the procedures to be used to select them, and their role and responsibilities.

11. A description of all impact-avoidance measures (such as flagging or fencing) to prohibit or otherwise restrict access to sensitive resource areas that are to be avoided during ground disturbance, construction, and/or operation, and identification of areas where these measures are to be implemented. The description shall address how these measures would be implemented prior to the start of ground disturbance and how long they would be needed to protect the resources from project-related effects.

12. A statement that all encountered cultural resources over 50 years old shall be recorded on Department of Parks and Recreation (DPR) 523 forms and mapped and photographed. In addition, all archaeological materials retained as a result of the archaeological investigations (survey, testing, data recovery) shall be curated in accordance with the California State Historical Resources Commission's *Guidelines for the Curation of Archaeological Collections*, into a retrievable storage collection in a public repository or museum.

13. A statement that the project owner will pay all curation fees for artifacts recovered and for related documentation produced during cultural resources investigations conducted for the project. The project owner shall identify three possible curation facilities that could accept cultural resources materials resulting from project activities.

14. A statement that the CRS has access to equipment and supplies necessary for site mapping, photography, and recovery of any cultural resource materials that are encountered during ground disturbance and cannot be treated prescriptively.

15. A description of the contents, format, and review and approval process of the final Cultural Resource Report (CRR), which shall be prepared according to ARMR guidelines.

Verification: Upon approval of the CRS proposed by the project owner, the CPM will provide to the project owner an electronic copy of the draft model CRMMP for the CRS.

At least 30 days prior to the start of ground disturbance, the project owner shall submit the CRMMP to the CPM for review and approval.

At least 30 days prior to the start of ground disturbance, in a letter to the CPM, the project owner shall agree to pay curation fees for any materials generated or collected as a result of the archaeological investigations (survey, testing, and data recovery).

Within 90 days after completion of ground disturbance (including landscaping), if cultural materials requiring curation were generated or collected, the project owner shall provide to the CPM a copy of an agreement with, or other written commitment from, a curation facility that meets the standards stated in the California State Historical Resources Commission's *Guidelines for the Curation of Archaeological Collections*, to accept the cultural materials from this project. Any agreements concerning curation will be retained and available for audit for the life of the project.

Project owner shall submit confidential information to the CPM, only after receiving approval from the BLM.

CUL-6 Prior to the start of ground disturbance the project owner shall complete Historic American Landscape Survey (HALS) large-format photographs (with negatives), and sketch plan(s) of the 9-mile long segment of U.S. Route 66, including its landscape, viewshed, and character-defining features within the project area visible from the roadway. In total, no more than fifteen negatives will be prepared. Photographs shall be keyed to a locational map, which shall also include any bridges or culverts associated with the road. The project owner shall also complete written HALS Level II documentation of the aforementioned segment of Route 66.

The project owner shall ensure that archivally stable original photographs and negatives (HALS Level III), and written documentation (HALS Level II) are submitted to the following repositories and agencies for archival storage and public use: California Historical Resources Information System (CHRIS) (to receive the original set), the County of San Bernardino, California Energy Commission, and the Bureau of Land Management. The project owner shall be responsible for any associated curation fees. Documentation may also be submitted to the HALS program for archival storage.

Documentation shall adhere to the established HALS recordation guidelines and be undertaken and completed by a person meeting the U.S. Secretary of Interior's Professional Qualifications Standards for historic landscape architecture, or history or architectural history with a demonstrated knowledge of the documentation and evaluation of historic landscapes, as published in Title 36, Code of Federal Regulations, part 61 (36 C.F.R., part 61) and a qualified architectural photographer. The resumes of the qualified personnel and architectural photographer shall include the names and telephone numbers of contacts familiar with their work on referenced projects and demonstrate to the satisfaction of the CPM that the qualified personnel and architectural photographer have the appropriate training and experience to effectively implement this condition.

The project owner shall submit the final HALS level-photographic and written documentation to the CPM for review and approval. The final written report shall be provided in the format specified by the HALS Level II guidelines and photographic documentation shall be provided in the format specified by HALS Level III guidelines. The project owner may undertake the HALS recordation activities prior to certification, at their own risk, as a means of advantaging the schedule.

The HALS documentation shall be submitted to a local repository, approved by the CPM, to be displayed in an area easily accessible by the public. The display shall include photographs of the project site and include a written history of Route 66 and its significance in the eastern Mojave, to be reviewed and approved by the CPM prior to submission.

Should an agreement document be executed in consideration of the proposed action pursuant to 36 CFR §§ 800.6 or 800.14(b) among the Bureau of Land Management or other Federal agencies, and the California State Historic Preservation Officer, with or without the participation of the Advisory Council on Historic Preservation, and should that document provide for equivalent or more intensive HALS Level I or II documentation than the requirements set out above, as determined by the CPM, then the applicant shall adhere to the more stringent requirements in the executed agreement document to mitigate the significant effects of the proposed action on US Route 66. Under

this scenario, the requirements as set out in the executed agreement document, as they apply to project-related impacts to US Route 66, would supersede any lesser requirements set out above and those lesser requirements would have no further force or effect. Should the executed agreement document be amended in such a manner that the mitigation measures for project-related impacts to US Route 66 become less stringent than those set out above, as determined by the CPM, or should the agreement document be terminated prior to the complete implementation of the project-related US Route 66 mitigation measures set out in it, then the project owner shall implement all of the above requirements, in addition to any measures set out under the amended agreement document and in addition to any measures that may have been partially completed prior to the termination of said agreement.

Verification: At least 25 days prior to the start of ground disturbance, the project owner shall submit the resume for the qualified personnel and architectural photographer to the CPM for review and approval. CPM review will take no longer than 5 working days .

Within 10 days after CPM approval of the HALS report, the project owner shall provide documentation to the CPM confirming that copies of the final report have been provided to CHRIS, County of San Bernardino, and Bureau of Land Management .

Within 90 days following initial ground disturbance, the project owner shall submit the Level III HALS large-format photographs (with negatives), sketch plan(s) and locational map to the CPM for review and approval.

Within 3 years following the start of ground disturbance, the project owner shall submit the final Level II HALS written report to the CPM for review and approval.

Within 60 days following CPM approval of the Level II HALS report, the project owner shall provide documentation to the CPM confirming that copies of the final report and copies of the photographs have been provided to CHRIS, County of San Bernardino, and the Bureau of Land Management.

CUL-7 The project owner shall submit the final Cultural Resources Report (CRR) to the CPM for approval. The final CRR shall be written by or under the direction of the CRS and shall be provided in the ARMR format. The final CRR shall report on all field activities including dates, times and locations, results, samplings, and analyses. All survey reports, Department of Parks and Recreation (DPR) 523 Series forms, data recovery reports, and any additional research reports not previously submitted to the California Historical Resource Information System (CHRIS) and the State Historic Preservation Officer (SHPO) shall be included as appendices to the final CRR.

If the project owner requests a suspension of ground disturbance and/or construction activities, then a draft CRR that covers all cultural resources activities associated with the project shall be prepared by the

CRS and submitted to the CPM for review and approval on the same day as the suspension/extension request. The draft CRR shall be retained at the project site in a secure facility until ground disturbance and/or construction resumes or the project is withdrawn. If the project is withdrawn, then a final CRR shall be submitted to the CPM for review and approval at the same time as the withdrawal request.

Verification: Within 30 days after requesting a suspension of construction activities, the project owner shall submit a draft CRR to the CPM for review and approval . Project owner shall submit confidential information to the CPM, only after receiving approval from the BLM .

Within 90 days after completion of ground disturbance (including landscaping), the project owner shall submit the final CRR to the CPM for review and approval. If any reports have previously been sent to the CHRIS, then receipt letters from the CHRIS or other verification of receipt shall be included in an appendix.

Within 10 days after CPM approval of the CRR, the project owner shall provide documentation to the CPM confirming that copies of the final CRR have been provided to the SHPO, the CHRIS, the curating institution, if archaeological materials were collected, and to the Tribal Chairpersons of any Native American groups requesting copies of project-related reports.

CUL-8 Prior to and for the duration of ground disturbance, the project owner shall provide Worker Environmental Awareness Program (WEAP) training to all new workers within their first week of employment at the project site, along the linear facilities routes, and at laydown areas, roads, and other ancillary areas. The training shall be prepared by the CRS, may be conducted by any member of the archaeological team, and may be presented in the form of a video. The CRS shall be available (by telephone or in person) to answer questions posed by employees. The training may be discontinued when ground disturbance is completed or suspended, but must be resumed when ground disturbance, such as landscaping, resumes.

The training shall include:

1. A discussion of applicable laws and penalties under the law;
2. Samples or visuals of artifacts that might be found in the project vicinity;
3. A discussion of what such artifacts may look like when partially buried, or wholly buried and then freshly exposed;
4. A discussion of what prehistoric and historical archaeological deposits look like at the surface and when exposed during construction, and the range of variation in the appearance of such deposits;
5. Instruction that the CRS, alternate CRS, and CRMs have the authority to halt ground disturbance in the area of a discovery to an

extent sufficient to ensure that the resource is protected from further impacts, as determined by the CRS;

6. Instruction that employees are to halt work on their own in the vicinity of a potential cultural resources discovery and shall contact their supervisor and the CRS or CRM, and that redirection of work would be determined by the construction supervisor and the CRS;
7. An informational brochure that identifies reporting procedures in the event of a discovery;
8. An acknowledgement form signed by each worker indicating that they have received the training; and
9. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

No ground disturbance shall occur prior to implementation of the WEAP program, unless such activities are specifically approved by the CPM.

Verification: At least 30 days prior to the beginning of ground disturbance, the CRS shall provide the training program draft text and graphics and the informational brochure to the CPM for review and approval.

At least 15 days prior to the beginning of ground disturbance, the CPM will provide to the project owner a WEAP Training Acknowledgement form for each WEAP-trained worker to sign.

Monthly, until ground disturbance is completed, the project owner shall provide in the Monthly Compliance Report (MCR) the WEAP Training Acknowledgement forms of workers who have completed the training in the prior month and a running total of all persons who have completed training to date.

CUL-9 The project owner shall ensure that the CRS, alternate CRS, or CRMs monitor full time all ground disturbance at the project site, along the linear facilities routes, and at laydown areas, roads, and other ancillary areas, to ensure there are no impacts to undiscovered resources and to ensure that known resources are not impacted in an unanticipated manner.

Full-time archaeological monitoring for this project shall be the archaeological monitoring of ground disturbance for as long as the activities are ongoing. An archaeological monitor shall be made available to observe both the active ground-disturbance/excavation of soils, as well as the disposal of any removed soils. The number of monitors required shall be determined by the CRS. It is anticipated that during the monitoring effort the archaeological monitors will be moving in and around the construction equipment in order to meaningfully inspect the soils. The archaeological monitors shall observe the ground-disturbance and/or soil disposal activities within a close enough distance to reasonably allow for the detection of cultural artifacts and/or

features that could potentially be unearthed during construction, no farther away than 50 feet, or as otherwise directed by the CPM.

A Native American monitor shall be invited to monitor ground disturbance, in the presence of an archaeological monitor, in areas where Native American artifacts may be discovered. Contact lists of interested Native Americans and guidelines for monitoring shall be obtained from the Native American Heritage Commission. Preference in selecting a monitor shall be given to Native Americans with traditional ties to the area that shall be monitored. If efforts to obtain the services of a qualified Native American monitor are unsuccessful, the project owner shall immediately inform the CPM. The CPM will either identify potential monitors or will allow ground disturbance to proceed without a Native American monitor.

The research design in the CRMMP shall govern the collection, treatment, retention/disposal, and curation of any archaeological materials encountered.

On forms provided by the CPM, CRMs shall keep a daily log of any monitoring and other cultural resources activities and any instances of non-compliance with the Conditions and/or applicable LORS. Copies of the daily monitoring logs shall be provided by the CRS to the CPM, if requested by the CPM. From these logs, the CRS shall compile a monthly monitoring summary report to be included in the MCR. If there are no monitoring activities, the summary report shall specify why monitoring has been suspended.

The CRS or alternate CRS shall report daily to the CPM on the status of the project's cultural resources-related activities, unless reducing or ending daily reporting is requested by the CRS and approved by the CPM.

In the event that the CRS believes that the current level of monitoring is not appropriate in certain locations, a letter or e-mail detailing the justification for changing the level of monitoring shall be provided to the CPM for review and approval prior to any change in the level of monitoring.

The CRS, at his or her discretion, or at the request of the CPM, may informally discuss cultural resources monitoring and mitigation activities with Energy Commission technical staff.

Cultural resources monitoring activities are the responsibility of the CRS. Any interference with monitoring activities, removal of a monitor from duties assigned by the CRS, or direction to a monitor to relocate monitoring activities by anyone other than the CRS shall be considered non-compliance with these Conditions.

Upon becoming aware of any incidents of non-compliance with the Conditions and/or applicable LORS, the CRS and/or the project owner

shall notify the CPM by telephone or e-mail within 24 hours. The CRS shall also recommend corrective action to resolve the problem or achieve compliance with the Conditions. When the issue is resolved, the CRS shall write a report describing the issue, the resolution of the issue, and the effectiveness of the resolution measures. This report shall be provided in the next MCR for the review of the CPM.

Verification: At least 15 days prior to the start of ground disturbance, the CPM will provide to the CRS an electronic copy of a form to be used as a daily monitoring log.

Monthly, while monitoring is on-going, the project owner shall include in each MCR a copy of the monthly summary report of cultural resources-related monitoring prepared by the CRS and shall attach any new DPR 523A forms completed for finds treated prescriptively, as specified in the CRMMP.

At least 24 hours prior to implementing a proposed change in monitoring level, the project owner shall submit to the CPM, for review and approval, a letter or e-mail (or some other form of communication acceptable to the CPM) detailing the CRS's justification for changing the monitoring level.

Daily, as long as no cultural resources are found, the CRS shall provide a statement that "no cultural resources over 50 years of age were discovered" to the CPM as an e-mail or in some other form of communication acceptable to the CPM.

At least 24 hours prior to reducing or ending daily reporting, the project owner shall submit to the CPM, for review and approval, a letter or e-mail (or some other form of communication acceptable to the CPM) detailing the CRS's justification for reducing or ending daily reporting.

No later than 30 days following the discovery of any Native American cultural materials, the project owner shall submit to the CPM copies of the information transmittal letters sent to the Chairpersons of the Native American tribes or groups who requested the information. Additionally, the project owner shall submit to the CPM copies of letters of transmittal for all subsequent responses to Native American requests for notification, consultation, and reports and records.

Within 15 days of receiving them, the project owner shall submit to the CPM copies of any comments or information provided by Native Americans in response to the project owner's transmittals of information.

Project owner shall submit confidential information to the CPM, only after receiving approval from the BLM.

CUL-10 The project owner shall grant authority to halt ground disturbance to the CRS, alternate CRS, and the CRMs in the event of a discovery. Redirection of ground disturbance shall be accomplished under the direction of the construction supervisor in consultation with the CRS.

In the event that a cultural resource over 50 years of age is found (or if younger, determined exceptionally significant by the CPM), or impacts

to such a resource can be anticipated, ground disturbance shall be halted or redirected in the immediate vicinity of the discovery sufficient to ensure that the resource is protected from further impacts. Monitoring and daily reporting, as provided in other conditions, shall continue during the project's ground-disturbing activities elsewhere. The halting or redirection of ground disturbance shall remain in effect until the CRS has visited the discovery, and all of the following have occurred:

1. The CRS has notified the project owner, and the CPM has been notified within 24 hours of the discovery, or by Monday morning if the cultural resources discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning, including a description of the discovery (or changes in character or attributes), the action taken (i.e., work stoppage or redirection), a recommendation of CRHR eligibility, and recommendations for data recovery from any cultural resources discoveries, whether or not a determination of CRHR eligibility has been made.
2. If the discovery would be of interest to Native Americans, the CRS has notified all Native American groups that expressed a desire to be notified in the event of such a discovery.
3. The CRS has completed field notes, measurements, and photography for a DPR 523 "Primary" form. Unless the find can be treated prescriptively, as specified in the CRMMP, the "Description" entry of the DPR 523 "Primary" form shall include a recommendation on the CRHR eligibility of the discovery. The project owner shall submit completed forms to the CPM.
4. The CRS, the project owner, and the CPM have conferred, and the CPM has concurred with the recommended eligibility of the discovery and approved the CRS's proposed data recovery, if any, including the curation of the artifacts, or other appropriate mitigation; and any necessary data recovery and mitigation have been completed.

Verification: At least 15 days prior to the start of ground disturbance, the project owner shall provide the CPM and CRS with a letter confirming that the CRS, alternate CRS, and CRMs have the authority to halt ground disturbance in the vicinity of a cultural resources discovery, and that the project owner shall ensure that the CRS notifies the CPM within 24 hours of a discovery, or by Monday morning if the cultural resources discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning.

Within 48 hours of the discovery of a resource of interest to Native Americans, the project owner shall ensure that the CRS notifies all Native American groups that expressed a desire to be notified in the event of such a discovery. Unless the discovery can be treated prescriptively, as specified in the CRMMP, completed DPR 523 forms for resources newly discovered during ground disturbance shall be submitted to the CPM for review and approval no later than

24 hours following the notification of the CPM, or 48 hours following the completion of data recordation/recovery, whichever the CRS decides is more appropriate for the subject cultural resource.

Project owner shall submit confidential information to the CPM, only after receiving approval from the BLM.

CUL-11: If human remains are encountered, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made necessary findings as to origin and disposition of the remains pursuant to Public Resources Code Section 5097.98. The following actions, or other equally protective actions provided for in the Native American Grave Protection and Repatriation Act or the Programmatic Agreement, must be taken in the event that human remains are discovered on Federal, private or State land:

1) Stop work immediately and contact the County Coroner must be notified immediately of the find and the BLM archaeologist shall be notified concurrently.

2) The Coroner has two working days to examine human remains after being notified by the responsible person. If the remains are determined to be prehistoric of Native American origin, the BLM will notify the Native American Heritage Commission,

3) The Native American Heritage Commission will immediately notify the person it believes to be the most likely descendent of the deceased Native American. With the permission of the landowner or agency or an authorized representative, the MLD may inspect the site of the discovery; and

4) The most likely descendent makes recommendations to the owner, or representative, for the treatment or disposition, with proper dignity, of the human remains and grave goods.

If the commission is unable to identify a descendent, or the descendent identified fails to make a recommendation, or the landowner rejects the recommendations of the descendent and the mediation provided for in subdivision (k) of Section 5097.94 fails to provide measures acceptable to the landowner, the landowner or his or her authorized representative shall reinter the human remains and items associated with the Native American burial(s) with appropriate dignity on the property in a location not subject to further subsurface disturbance.

D. GEOLOGICAL AND PALEONTOLOGICAL RESOURCES

This section summarizes the record concerning the project's potential effects on geological and paleontological resources. We evaluate whether project-related activities could result in exposure to geological hazards, as well as whether the facility can be designed and constructed so that any such hazard would not impair its proper functioning. Hazards include volcanic eruptions, faulting and seismicity, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, tsunamis, and seiches. Of these, dynamic compaction, hydrocompaction, subsidence, and expansive soils are geotechnical engineering issues but are not associated with public safety concerns. We also assess whether the project will impact any geologic or mineralogical resources. Finally, we examine whether fossilized remains or trace remnants of prehistoric plants or animals are likely to be present at the site and, if so, whether the project's potential impacts to these resources are adequately mitigated. (Ex. 300, pp. C.4-1 and C.4-2.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

1. Geologic Hazards

The proposed site is located in the central portion of the Mojave Desert. The Mojave Desert is a broad interior region of isolated mountain ranges, which separate vast expanses of desert plains and interior drainage basins. The potential site is located within the structurally defined Eastern California Shear Zone (ECSZ). The property lies on the southwest flank of the Cady Mountains on federal land managed by the BLM. Overall, the site slopes southwest toward the local topographic low at the normally dry Troy Lake. (Ex. 300, p. C.4-7.)

Surface cover at the site consists of Quaternary alluvium and fanglomerate composed of sediments washed down from the Cady Mountains to the northeast. Small outcrops of Tertiary basalt, andesite, and volcanic breccia occur in the northernmost portion of the site. A small outcrop of basalt flow from the geologically recent Pisgah Crater eruption is present along the southernmost site boundary. (Ex. 300, p. C.4-7.)

Earthquakes are the main geologic hazard at this site. (Ex. 300, p. C.4-7) Thirty-two type A and B faults and fault segments lie within 80 miles of the site.[1] Of these faults, the Lavic Lake and Pisgah-bullion fault zones are in close proximity to the proposed project site. Both of these faults are designated Alquist-Priolo Earthquake Fault Zones. These faults are subparallel Type B fault systems that extend beneath the southern portions of the site. Project site layouts do not show any occupied structures within 50 feet (the required minimum setback) of either fault. However, to address concerns about these faults, we adopt Condition of Certification **GEO-1** that requires evaluation of the Pisgah and Lavic Lake faults by a qualified geologist. (Ex. 300, p. C.4-11.)

Two earthquakes have recently been recorded in or near the project area. The Hector Mine M_w 7.1 earthquake (1999) occurred 18 miles south of the project site and caused no damage to the project area, but some minor damage at Interstate Highway 40. The unnamed M_w 5.1 earthquake (2008) occurred within the project boundaries. These earthquakes show the proposed site could be subject to intense levels of earthquake-related ground shaking in the future. (Ex. 300, p. C.4-11.)

The site soil class is seismic Class C, and Applicant's site-specific analysis indicates that the estimated peak horizontal ground acceleration for the power plant is 0.5 times the acceleration of gravity (0.5g) for bedrock acceleration based on a two percent probability of exceedance in 50 years. (Ex. 300, p. C.4-11.)

The evidence establishes that, assuming compliance with the required design standards set forth in the **Facility Design** section of this Decision, the potential is low for geologic hazards to impact the project during its practical design life. (Ex. 300, pp. C.4-1, C.4-7.) Proposed Condition of Certification **GEO-1** requires that the Pisgah and Lavic Lake faults be located and evaluated in the field so that proper setbacks can be assured for occupied structures. Further, the project owner will implement additional fault and geologic hazards measures as part of the final project design, as required by the California Building Code (CBC). (Ex. 300, p. C.4-7.) Therefore, we adopt Condition of Certification **GEO-1** to address the potential for geology related impacts.

[1] These are identified in Exhibit 300, **Table 2**, p. C.4-9. Type A faults have slip-rates of $\geq$5 millimeters per year (mm/year) and are capable of producing an earthquake of magnitude 7.0 or greater. Type B faults have slip-rates of 2 to 5 mm per year and are capable of producing an earthquake of magnitude 6.5 to 7.0.

The deep groundwater table (over 300 feet down) indicates no potential for liquefaction. Because the proposed Calico Solar Project site is not subject to liquefaction, there is no potential for lateral spreading during seismic events. (Ex. 300, p. C.4-12.) Site specific geotechnical investigation indicates that the site's underlying subsurface alluvial deposits are too dense to allow significant hydrocompaction or dynamic compaction. (Ex. 300, p. C.4-12.)

The dense alluvial deposits and the absence of petroleum, natural gas, or water withdrawals at the site minimize the possibility of subsidence. (Ex. 300, p. C.4-12.)

The alluvium and volcanic rocks that form the site subsurface are not considered to be expansive. However, expansive clays encountered at depth in soil borings can be mitigated by standard engineering design. (Ex. 300, p. C.4-13.)

Landslides, tsunamis, and seiches similarly pose insignificant risks. (Ex. 300, p. C.4-13.)

The project includes approximately 12 detention basins that will intercept stormwater on the north side of the site. The down-slope sides of the detention basins will require an engineered embankment up to approximately 15 feet high and a spillway. (Ex. 300, C.4-6.) Because the proposed site is topographically elevated above terrain to the south and west, the potential for flooding at the site is limited to infrequent high volume (flash flood) events due to heavy rainfall in the adjacent Cady Mountains. If flash flooding occurs it will primarily affect the drainages that cross the site (northeast to southwest), and the record indicates that overbank flow is not expected to occur. The proposed detention basins along the northern (upslope) site border will minimize the potential for flash flood damage to the project. Proposed Conditions of Certification **GEO-2** and **GEO-3** will ensure that detention basins and detention dams (as defined by DWR) are designed in accordance with current regulations and standards. Therefore, we find that the likelihood of catastrophic flooding at the proposed project site is low. Application of civil engineering design standards will minimize the potential for flash flood damage. (Ex. 300, p. C.4-13; see also, **Soil and Water Resources** section of this Decision.)

The proposed Calico Solar Project site is located immediately northwest of the Sleeping Beauty volcanic area. The Sleeping Beauty area is part of the regional Amboy Crater – Lavic Lake volcanic hazard area, an approximately 6,000 square mile area within the Mojave Desert. The proposed Calico Solar Project lies in an area, which has been and may again be subjected to ash and cinder falls associated with nearby vents. However, a recurrence of these eruptions from vents in the Amboy Crater – Lavic Lake hazard area has not been predicted, and

is estimated to be in the range of 1,000's of years or more. Therefore, based on the evidence in the record, we find that there is a low likelihood of volcanic activity that may affect operation of the proposed Calico Solar Project. Eruptive activity would likely be limited to ash fall, which would have a minor, short-lived affect on the project. This would involve having to shut down and probably cover the generators to prevent damage from the abrasive ash and having to clean the mirrors once the eruption was over. Mirrors will need to be cleaned periodically as part of normal plant operation and maintenance. (Ex. 300, p. C.4-13.)

Therefore, we find that the design-level geotechnical investigation, required for the project by the CBC (2007) and proposed Condition of Certification **GEN-1** will provide standard engineering design recommendations for mitigation of earthquake ground shaking and excessive settlement (see Proposed Conditions Of Certification, **Facility Design**).

2. Mineralogic and Paleontologic Impacts

The proposed Calico Solar Project is not located within an established Mineral Resource Zone and no economically viable mineral deposits are known to be present. Several operating and closed mines and mineral prospects are present within five miles of the proposed project boundaries. These have produced a number of industrial minerals, primarily manganese, borates, clay, and talc. No active mines are known to have existed within the proposed project boundaries (Ex. 300, p. C.4-14).

The evidence shows that Staff reviewed the Applicant's paleontological resources assessment and the confidential paleontological resources report. (Exs. 1, § 5.8 and Appen. H; 300, p. C.4-14.) Staff has also reviewed paleontological literature and records searches conducted by the Natural History Museum of Los Angeles County. These studies indicate the Quaternary alluvium, fanglomerate, and volcanic rocks within and near the proposed project site contain few fossils. Older Quaternary alluvium, which underlies the site at uncertain depth, may contain significant fossil vertebrates. (Ex. 300, p. C.4-15)

Construction will include grading, foundation excavation, and utility trenching. Unauthorized, unmonitored ground disturbances in these areas could potentially damage paleontologic resources. We adopt Conditions of Certification **PAL 1** to **PAL 7** to mitigate paleontological resource impacts. These Conditions require a worker education program in conjunction with the monitoring of earthwork activities by a professional paleontologist.

Based upon the literature and archives search, field surveys, and compliance documentation for the Calico Solar Project, the Applicant has proposed monitoring and mitigation measures to be followed during the construction of the project. We find that the facility can be designed and constructed to minimize the effect of geologic hazards and impacts to potential paleontological resources at the site during project design life. (Ex. 300, p. C.4-15.)

Construction and Operation of the proposed new solar energy generating facility will not have any adverse impact on geologic, mineralogic, or paleontological resources. In addition, the future decommissioning and closure of the proposed project will not negatively affect geologic, mineralogic, or paleontological resources since the ground disturbed during plant decommissioning and closure would have been already disturbed, and mitigated as required in this Decision. (*Id.*)

3. Cumulative Impacts

The Cumulative analysis includes other renewable energy projects and foreseeable future projects in the immediate Newberg Springs/Ludlow area. The geographic area considered for cumulative impacts on geology and paleontology is the central portion of the Mojave Desert, more specifically, San Bernardino and Riverside Counties. The potential impacts are limited to those involving paleontological resources since no geological or mineralogical resources have been identified within the boundaries of the proposed project. There are no geological hazards with potential cumulative effects, other than regional subsidence from ground water withdrawal. Significant ground water withdrawal is not part of the proposed project. (Ex. 300, p. C.4-26.)

Construction of the proposed Calico Solar Project would require localized excavation or ground disturbance over a very large area. Because the project area lies within geologic units with moderate to high paleontological sensitivity, the required excavation could, potentially, damage paleontological resources. Any damage could be cumulative to damage from other projects within the same geological formations. Implementation and enforcement of a properly designed Paleontological Resource Monitoring and Mitigation Plan (Condition of Certification **PAL-3)** will result in a net gain to the science of paleontology by allowing fossils that would not otherwise have been found to be recovered, identified, studied, and preserved. Therefore, the evidence indicates that cumulative impacts from the Calico Solar Project, in consideration with other

nearby similar projects, will be either neutral (no fossils encountered) or positive (fossils encountered, preserved, and identified). (Ex. 300, p. C.4-28.)

Operation of the Calico Solar Project will not affect paleontological resources, and will not increase potential cumulative effects on paleontological resources. The longer the plant operates, however, the more likely it is to be damaged by hazards, primarily earthquake-related ground shaking. Construction and operation of the plant does not increase the potential for geological hazards at the site. The decommissioning of the Calico Solar Project will also not result in adverse geology or paleontology impacts. (*Id.*)

4. Compliance with Laws, Ordinances, Regulations and Standards (LORS)

Federal, state, or local/county LORS applicable to this project or alternatives are detailed in **Appendix A** of this Decision. The evidence shows that the project will comply with applicable LORS.

5. Public and Agency Comments

One agency comment was received relating to Geology and Paleontology. The County of San Bernardino, Land Use Service Department, requested additional discussion of the Lavic Lake fault that partially underlies the project site. Additional descriptive information was added in the Staff Assessment to address this comment. To further address this comment, Condition of Certification **GEO-1** was identified to require detailed geologic and field evaluation of both the Pisgah and Lavic Lake faults.

FINDINGS OF FACT

Based on the uncontroverted evidence, we make the following findings:

1. The project is located in an active geologic area.

2. Ground shaking, flash flooding, and volcanic activity are the main geologic hazards, which could affect the Calico Solar Project.

3. Potential geologic hazards to the project are effectively mitigated by standard engineering design measures as specified in Conditions **GEN-1, GEN-5,** and **CIVIL-1** of the **Facility Design** section of this Decision. Hazards from volcanic activity would be short-term and limited to ashfall.

4. There is some potential for fault rupture along two mapped active faults that underlie the project site. Condition of Certification **GEO-1** requires that the faults be located and evaluated so that occupied structures can be properly setback from these faults and their splays.

5. The project includes detention basins to intercept stormwater on the north side of the project site. Conditions of Certification **GEO-2** and **GEO-3** ensure that the detention basins are designed in accordance with current regulations and standards.

6. Liquefaction, lateral spreading, dynamic compaction, hydrocompaction, ground subsidence, landslides, tsunamis, and seiches pose low or negligible project risks.

7. There is no evidence of existing or potential geological or mineralogical resources at the project site or along the linear alignments.

8. The evidence addresses the potential cumulative impacts of the project in conjunction with other renewable energy and foreseeable future projects identified in San Bernardino and Riverside Counties.

CONCLUSIONS OF LAW

1. The Conditions listed below ensure that project activities will not cause significant adverse direct or cumulative impacts to geological, mineralogical, or paleontological resources.

2. Compliance with the Conditions of Certification specified below will ensure that the Calico Solar Project conforms to all applicable laws, ordinances, regulations, and standards identified in **Appendix A** of this Decision.

CONDITIONS OF CERTIFICATION

GEO-1 The two Alquist-Priolo faults (Pisgah fault and the Lavic Lake fault) shall be located (if actually present) by trenching or suitable geophysical methods with sufficient accuracy and confidence to assure that no occupied structures are placed within 50 feet, either side, of an established fault trace or any identified splays. Other structures deemed critical to the project, by the owner, may also be set back, as practical, prudent and appropriate. [

Verification: At least 30 days prior to ground breaking (prior to final project design) the project owner shall submit a fault evaluation report signed and stamped by a geologist licensed in the state of California. The evaluation shall

include sufficient field exploration to establish whether or not either or both faults (or their splays) extend onto the project site. Surveyed locations shall be obtained for any faults encountered and a map showing the fault locations in relation to project structures shall be provided. Onsite faults shall be considered active unless conclusive field evidence shows otherwise.

GEO-2 Because of the embankments on the downhill side, the proposed storm water detention basins constitute detention dams, some of which may be large enough to be under the jurisdiction of the State of California, Department of Water Resources, Division of Safety of Dams. Each detention dam site shall be characterized in a geotechnical investigation to establish foundation conditions and assess geologic hazards that affect embankment design. Appropriate geotechnical recommendations shall be provided for use in design and construction of the embankments and the associated storage area. All dams must be designed by a California licensed geotechnical or civil engineer familiar with design of small dams.

Verification: At least 60 days prior to ground breaking for the detention basins, the project owner shall submit a geotechnical investigation report covering each proposed detention basin. Appropriate geotechnical recommendations and specifications shall be provided for use in design and construction of the embankments and the associated storage area. All detention facilities can be included in a single report or in the overall final project geotechnical report. One set of stamped design drawings, typical of the detention dams, must be submitted by the project owner, prior to starting detention dam construction.

GEO-3 The California Department of Water Resources, Division of Safety of Dams has jurisdiction over proposed and existing dams that impound 50 acre-feet of water or more. Embankments six feet high or less are excluded, regardless of storage capacity and embankments impounding less than 15 acre-feet of water are excluded, regardless of height. Any detention basin meeting the Division of Safety of Dams jurisdictional criteria for a dam shall be permitted through that agency.

Verification: If final detention basin design results in no jurisdictional dams, the project owner shall submit a letter of verification from the design engineer. If one or more detention basins fall within the jurisdiction of the Division of Safety of Dams, the project owner shall submit copies of the permit application(s) to the Division of Safety of Dams. Upon completion of construction of jurisdictional dams, the project owner shall submit copies of acceptance documents from the Division of Safety of Dams.

PAL-1 The project owner shall provide the Compliance Project Manager CPM with the resume and qualifications of its paleontological resource specialist (PRS) for review and approval. If the approved PRS is replaced prior to completion of project mitigation and submittal of the

Paleontological Resources Report, the project owner shall obtain CPM approval of the replacement PRS. The project owner shall keep resumes on file for qualified paleontological resource monitors (PRMs). If a PRM is replaced, the resume of the replacement PRM shall also be provided to the CPM.

The PRS resume shall include the names and phone numbers of references. The resume shall also demonstrate to the satisfaction of the CPM the appropriate education and experience to accomplish the required paleontological resource tasks.

As determined by the CPM, the PRS shall meet the minimum qualifications for a vertebrate paleontologist as described in the Society of Vertebrate Paleontology (SVP) guidelines of 1995. The experience of the PRS shall include the following:

1. Institutional affiliations, appropriate credentials, and college degree;
2. Ability to recognize and collect fossils in the field;
3. Local geological and biostratigraphic expertise;
4. Proficiency in identifying vertebrate and invertebrate fossils; and
5. At least three years of paleontological resource mitigation and field experience in California and at least one year of experience leading paleontological resource mitigation and field activities.

The project owner shall ensure that the PRS obtains qualified paleontological resource monitors to monitor as he or she deems necessary on the project. Paleontological resource monitors (PRM) shall have the equivalent of the following qualifications:

- BS or BA degree in geology or paleontology and one year of experience monitoring in California; or
- AS or AA in geology, paleontology, or biology and four years' experience monitoring in California; or
- Enrollment in upper division classes pursuing a degree in the fields of geology or paleontology and two years of monitoring experience in California.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit a resume and statement of availability of its designated PRS for on-site work.

At least 20 days prior to ground disturbance, the PRS or project owner shall provide a letter with resumes naming anticipated monitors for the project, stating that the identified monitors meet the minimum qualifications for paleontological resource monitoring required by the Condition. If additional monitors are obtained during the project, the PRS shall provide additional letters and resumes to the

CPM. The letter shall be provided to the CPM no later than one week prior to the monitor's beginning on-site duties.

Prior to the termination or release of a PRS, the project owner shall submit the resume of the proposed new PRS to the CPM for review and approval.

PAL-2 The project owner shall provide to the PRS and the CPM, for approval, maps and drawings showing the footprint of the power plant, construction lay-down areas, and all related facilities. Maps shall identify all areas of the project where ground disturbance is anticipated. If the PRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the PRS and CPM. The site grading plan and plan and profile drawings for the utility lines would be acceptable for this purpose. The plan drawings should show the location, depth, and extent of all ground disturbances and be at a scale between 1 inch = 40 feet and 1 inch = 100 feet. If the footprint of the project or its linear facilities changes, the project owner shall provide maps and drawings reflecting those changes to the PRS and CPM.

If construction of the project proceeds in phases, maps and drawings may be submitted prior to the start of each phase. A letter identifying the proposed schedule of each project phase shall be provided to the PRS and CPM. Before work commences on affected phases, the project owner shall notify the PRS and CPM of any construction phase scheduling changes.

At a minimum, the project owner shall ensure that the PRS or PRM consults weekly with the project superintendent or construction field manager to confirm area(s) to be worked the following week and until ground disturbance is completed.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall provide the maps and drawings to the PRS and CPM.

If there are changes to the footprint of the project, revised maps and drawings shall be provided to the PRS and CPM at least 15 days prior to the start of ground disturbance.

If there are changes to the scheduling of the construction phases, the project owner shall submit a letter to the CPM within 5 days of identifying the changes.

PAL-3 The project owner shall ensure that the PRS prepares, and the project owner submits to the CPM for review and approval, a PRMMP to identify general and specific measures to minimize potential impacts to significant paleontological resources. Approval of the PRMMP by the CPM shall occur prior to any ground disturbance. The PRMMP shall function as the formal guide for monitoring, collecting, and sampling activities and may be modified with CPM approval. This document shall be used as the basis of discussion when on-site decisions or

changes are proposed. Copies of the PRMMP shall reside with the PRS, each monitor, the project owner's on-site manager, and the CPM.

The PRMMP shall be developed in accordance with the guidelines of the SVP (1995) and shall include, but not be limited, to the following:

1. Assurance that the performance and sequence of project-related tasks, such as any literature searches, pre-construction surveys, worker environmental training, fieldwork, flagging or staking, construction monitoring, mapping and data recovery, fossil preparation and collection, identification and inventory, preparation of final reports, and transmittal of materials for curation will be performed according to PRMMP procedures;
2. Identification of the person(s) expected to assist with each of the tasks identified within the PRMMP and the Conditions of Certification;
3. A thorough discussion of the anticipated geologic units expected to be encountered, the location and depth of the units relative to the project when known, and the known sensitivity of those units based on the occurrence of fossils either in that unit or in correlative units;
4. An explanation of why, how, and how much sampling is expected to take place and in what units. Include descriptions of different sampling procedures that shall be used for fine-grained and coarse-grained units;
5. A discussion of the locations of where the monitoring of project construction activities is deemed necessary, and a proposed plan for monitoring and sampling;
6. A discussion of procedures to be followed in the event of a significant fossil discovery, halting construction, resuming construction, and how notifications will be performed;
7. A discussion of equipment and supplies necessary for collection of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;
8. Procedures for inventory, preparation, and delivery for curation into a retrievable storage collection in a public repository or museum, which meet the Society of Vertebrate Paleontology's standards and requirements for the curation of paleontological resources;
9. Identification of the institution that has agreed to receive data and fossil materials collected, requirements or specifications for materials delivered for curation and how they will be met, and the name and phone number of the contact person at the institution; and

10. A copy of the paleontological Conditions of Certification.

Verification: At least 30 days prior to ground disturbance, the project owner shall provide a copy of the PRMMP to the CPM. The PRMMP shall include an affidavit of authorship by the PRS and acceptance of the PRMMP by the project owner evidenced by a signature.

PAL-4 Prior to ground disturbance and for the duration of construction activities involving ground disturbance, the project owner and the PRS shall prepare and conduct weekly CPM-approved training for the following workers: project managers, construction supervisors, foremen, and general workers involved with or who operate ground-disturbing equipment or tools. Workers shall not excavate in sensitive units prior to receiving CPM-approved worker training. Worker training shall consist of an initial in-person PRS training during the project kick off for those mentioned above. Following initial training, a CPM-approved video or in-person training may be used for new employees. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or other areas of interest or concern. No ground disturbance shall occur prior to CPM approval of the Worker Environmental Awareness Program (WEAP), unless specifically approved by the CPM.

The WEAP shall address the possibility of encountering paleontological resources in the field, the sensitivity and importance of these resources, and legal obligations to preserve and protect those resources.

The training shall include:

1. A discussion of applicable laws and penalties under the law;
2. Good quality photographs or physical examples of vertebrate fossils for project sites containing units of high paleontological sensitivity;
3. Information that the PRS or PRM has the authority to halt or redirect construction in the event of a discovery or unanticipated impact to a paleontological resource;
4. Instruction that employees are to halt or redirect work in the vicinity of a find and to contact their supervisor and the PRS or PRM;
5. An informational brochure that identifies reporting procedures in the event of a discovery;
6. A WEAP certification of completion form signed by each worker indicating that he/she has received the training; and
7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

Verification: At least 30 days prior to ground disturbance, the project owner shall submit the proposed WEAP, including the brochure, with the set of reporting procedures for workers to follow.

At least 30 days prior to ground disturbance, the project owner shall submit the script and final video to the CPM for approval if the project owner is planning to use a video for interim training.

If the owner requests an alternate paleontological trainer, the resume and qualifications of the trainer shall be submitted to the CPM for review and approval prior to installation of an alternate trainer. Alternate trainers shall not conduct training prior to CPM authorization.

In the monthly compliance report (MCR), the project owner shall provide copies of the WEAP certification of completion forms with the names of those trained and the trainer or type of training (in-person or video) offered that month. The MCR shall also include a running total of all persons who have completed the training to date.

PAL-5 The project owner shall ensure that the PRS and PRM(s) monitor consistent with the PRMMP all construction-related grading, excavation, trenching, and augering in areas where potential fossil-bearing materials have been identified, both at the site and along any constructed linear facilities associated with the project. In the event that the PRS determines full-time monitoring is not necessary in locations that were identified as potentially fossil bearing in the PRMMP, the project owner shall notify and seek the concurrence of the CPM.

The project owner shall ensure that the PRS and PRM(s) have the authority to halt or redirect construction if paleontological resources are encountered. The project owner shall ensure that there is no interference with monitoring activities unless directed by the PRS. Monitoring activities shall be conducted as follows:

1. Any change of monitoring from the accepted schedule in the PRMMP shall be proposed in a letter or email from the PRS and the project owner to the CPM prior to the change in monitoring and will be included in the monthly compliance report. The letter or email shall include the justification for the change in monitoring and be submitted to the CPM for review and approval.
2. The project owner shall ensure that the PRM(s) keep a daily monitoring log of paleontological resource activities. The PRS may informally discuss paleontological resource monitoring and mitigation activities with the CPM at any time.
3. The project owner shall ensure that the PRS notifies the CPM within 24 hours of the occurrence of any incidents of non-compliance with any **Paleontological Resources** Conditions of

Certification. The PRS shall recommend corrective action to resolve the issues or achieve compliance with the conditions of certification.

4. For any significant paleontological resources encountered, either the project owner or the PRS shall notify the CPM within 24 hours, or Monday morning in the case of a weekend event, where construction has been halted because of a paleontological find.

The project owner shall ensure that the PRS prepares a summary of monitoring and other paleontological activities placed in the monthly compliance reports. The summary will include the name(s) of PRS or PRM(s) active during the month; general descriptions of training and monitored construction activities; and general locations of excavations, grading, and other activities. A section of the report shall include the geologic units or subunits encountered, descriptions of samplings within each unit, and a list of identified fossils. A final section of the report will address any issues or concerns about the project relating to paleontological monitoring, including any incidents of non-compliance or any changes to the monitoring plan that have been approved by the CPM. If no monitoring took place during the month, the report shall include an explanation in the summary as to why monitoring was not conducted.

Verification: The project owner shall ensure that the PRS submits the summary of monitoring and paleontological activities in the MCR. When feasible, the CPM shall be notified 10 days in advance of any proposed changes in monitoring different from the plan identified in the PRMMP. If there is any unforeseen change in monitoring, the notice shall be given as soon as possible prior to implementation of the change.

PAL-6 The project owner, through the designated PRS, shall ensure that all components of the PRMMP are adequately performed including collection of fossil materials, preparation of fossil materials for analysis, analysis of fossils, identification and inventory of fossils, the preparation of fossils for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during project construction.

Verification: The project owner shall maintain in his/her compliance file copies of signed contracts or agreements with the designated PRS and other qualified research specialists. The project owner shall maintain these files for a period of three years after project completion and approval of the CPM-approved paleontological resource report (see Condition of Certification **PAL-7**). The project owner shall be responsible for paying any curation fees charged by the museum for fossils collected and curated as a result of paleontological mitigation. A copy of the letter of transmittal submitting the fossils to the curating institution shall be provided to the CPM.

PAL-7 The project owner shall ensure preparation of a Paleontological Resources Report (PRR) by the designated PRS. The PRR shall be prepared following completion of the ground-disturbing activities. The PRR shall include an analysis of the collected fossil materials and related information and submit it to the CPM for review and approval.

The report shall include, but is not limited to, a description and inventory of recovered fossil materials; a map showing the location of paleontological resources encountered; determinations of sensitivity and significance; and a statement by the PRS that project impacts to paleontological resources have been mitigated below the level of significance.

Verification: Within 90 days after completion of ground-disturbing activities, including landscaping, the project owner shall submit the PRR under confidential cover to the CPM.

Certification of Completion
Worker Environmental Awareness Program
Calico Solar Project (08-AFC-13)

This is to certify these individuals have completed a mandatory California Energy Commission-approved Worker Environmental Awareness Program (WEAP). The WEAP includes pertinent information on cultural, paleontological, and biological resources for all personnel (that is, construction supervisors, crews, and plant operators) working on site or at related facilities. By signing below, the participant indicates that he/she understands and shall abide by the guidelines set forth in the program materials. Include this completed form in the Monthly Compliance Report.

No.	Employee Name	Title/Company	Signature
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Cultural Trainer: _____ Signature:_____ Date: ___/___/___

PaleoTrainer:_____ Signature:_____ Date: ___/___/___

Biological Trainer: _____ Signature:_____ Date:___/___/___

VII. LOCAL IMPACT ASSESSMENT

The effect of a power plant project on the local area depends upon the nature of the community and the extent of the associated impacts. Technical topics discussed in this portion of the Decision consider issues of local concern including **Land Use, Noise, Socioeconomics, Traffic and Transportation, and Visual Resources.**

A. LAND USE

SUMMARY AND DISCUSSION OF THE EVIDENCE

Because the Calico Solar Project is subject to meet the requirements of both NEPA and CEQA, the methodology used for determining environmental impacts of the proposed project includes a consideration of guidance provided by both laws and NEPA Implementing Regulations (40 CFR Parts 1500-1508). Thresholds for determining significance in this section are based on Appendix G of the CEQA Guidelines (CCR 2006) and performance standards or thresholds identified by Energy Commission staff. In addition, environmental effects of the proposed project on land uses (i.e., those listed below) includes an assessment of the context and intensity of the impacts, as defined in the CEQA and NEPA Regulations, 40 CFR Part 1508.27. Effects of the proposed project on the land uses and the environment (and in compliance with both CEQA and NEPA) have been determined using the thresholds listed below.

<u>Agricultural Lands and Rangeland Management</u>

- Conversion of Farmland or Rangeland.
- Conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.
- Conflict with existing zoning for agricultural use, or a Williamson Act contract.
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural uses.

Wilderness, Areas of Critical Environmental Concern (ACEC) and Recreation

- Directly or indirectly disrupt activities in established federal, state, or local recreation areas and/or wilderness areas.
- Substantially reduce the scenic, biological, cultural, geologic, or other important factors that contribute to the value of federal, state, local, or private recreational facilities or wilderness areas.

Horses and Burros

- Involve changes in the existing environment which, due to their nature or location, result in interference with BLM's management of Herd Management Areas (HMAs).

Land Use Compatibility and LORS Compliance

- Directly or indirectly divide an established community or disrupt an existing or recently approved land use.
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction, or that would normally have jurisdiction, over the project adopted for the purpose of avoiding or mitigating environmental effects.

Cumulative Land Use Effects

- Individual environmental effects, which, when considered with other impacts from the same project or in conjunction with impacts from other closely related past, present, and reasonably foreseeable future projects, are considerable, compound, or increase other environmental impacts.

The majority of the Calico Solar Project site is located within the "Moderate Use" category of the BLM's CDCA Plan, with some areas designated as "limited" (Class L). (Ex. 300, p. C.8-10.Z) **LAND USE Table 1** provides a general description of the land use LORS applicable to the proposed project.

Land Use Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
Federal	
Federal Land Policy and Management Act (FLPMA), 1976 – 43 CFR 1600	Establishes public land policy; guidelines for administration; and provides for the management, protection, development, and enhancement of public lands. In particular, the FLPMA's relevance to the proposed project is that Title V, Section 501 establishes BLM's authority to grant rights-of-way for generation, transmission, and distribution of electrical energy (FLPMA 2001).
Bureau of Land Management -California Desert Conservation Area (CDCA) Plan, 1980 as Amended (BLM 1980)	The 25 million-acre CDCA contains over 12 million acres of public lands spread within the area known as the California Desert, which includes the following three deserts: the Mojave, the Sonoran, and a small portion of the Great Basin. The 12 million acres of public lands administered by the BLM are half of the CDCA. The CDCA Plan is a comprehensive, long-range plan with goals and specific actions for the management, use, development, and protection of the resources and public lands within the CDCA, and it is based on the concepts of multiple use, sustained yield, and maintenance of environmental quality. The plan's goals and actions for each resource are established in its 12 elements. Each of the plan elements provides both a desert-wide perspective of the planning decisions for one major resource or issue of public concern as well as a more specific interpretation of multiple-use class guidelines for a given resource and its associated activities.
Public Rangelands Improvement Act (1978) (PRIA 1978)	Establishes and reaffirms the national policy and commitment to inventory and identify current public rangeland conditions and trends; manage, maintain and improve the condition of public rangelands so that they become as productive as feasible for all rangeland values in accordance with management objectives and the land use planning process; and continue the policy of protecting wild free-roaming horses and burros from capture, branding, harassment, or death, while at the same time facilitating the removal and disposal of excess wild free-roaming horses and burros which pose a threat to themselves and their habitat and to other rangeland values.
Wild and Free-Roaming Horse and Burro Act (1971) (BLM 2009j)	The BLM protects, manages, and controls wild horses and burros under the authority of the Wild Free-Roaming Horses and Burros Act of 1971 (Act) to ensure that healthy herds thrive on healthy rangelands. The BLM manages these animals as part of its multiple-use mission under the 1976 Federal Land Policy and Management Act. One of the BLM's key responsibilities under the Act is to determine the "appropriate management level" (AML) of wild horses and burros on the public rangelands.
State	
None	
Local	
County of San Bernardino 2007 General Plan (CSB 2007a)	The policies and programs of the County of San Bernardino General Plan, adopted March 13, 2007, are intended to serve as a blueprint for most land use decisions. Preparing, adopting, implementing, and maintaining a general plan serves to: identify the community's land use, transportation, environmental, economic, and social goals and policies as they relate to land use and development; form the basis for local government decision-making, including decisions on proposed development; provide residents with opportunities to participate in the planning and decision-making processes of their community; and inform residents, developers, decision makers, and other cities and counties of the ground rules that guide development within the community.
County of San Bernardino 2007 Development Code, Title 8 of the San Bernardino County Code	San Bernardino County has adopted a "one-map approach" for both the General Plan land use designations and zoning classifications to assure land use consistency between the General Plan and Development Code. The Development Code was adopted March 13, 2007, and amended August 20, 2009 and February

Applicable LORS	Description
(CSB 2007b; CSB 2010d)	2010. The purpose of this Development Code is to implement the San Bernardino County General Plan by classifying and regulating the uses of land and structures within unincorporated San Bernardino County. In particular, the purposes of the Development Code are as follows: to provide standards and guidelines for continuing orderly growth and development; to conserve and protect the County's important agriculture, cultural, natural, open space and scenic resources; to create a comprehensive and stable pattern of land uses upon which to plan transportation, water supply, sewerage, energy, drainage/flood control and other public facilities and utilities; to encourage the most appropriate uses of land in order to prevent overcrowding of land and avoid undue concentration of population, and maintain and protect the value of property; and to ensure compatibility between different types of development and land use. The Development Code was most recently amended on February 9, 2010, to include Chapter 84.29 (Renewable Energy Generation Facilities) for the purpose of establishing "...standards and permit procedures for the establishment, maintenance and decommissioning of renewable energy generation facilities" (CSB 2010).

(Ex. 300, pp. C.684 to C.8-5.)

1. The Site

The proposed Calico Solar site is approximately 4,613 acres and is located in San Bernardino County approximately 37 miles east of Barstow. The site consists primarily of public land administered by the BLM. The project site surrounds portions of private land under the jurisdiction of San Bernardino County which are not a part of the proposed project, with the exception of two private parcels that would be traversed by the proposed 0.51-mile water pipeline. This private land, as well as non-BLM lands within 1 mile of the project, is designated as Resource Conservation by county zoning. The southern boundary of the proposed project site is adjacent to Interstate Highway 40 (I-40), and the northern side of the project site borders the Cady Mountains. (Ex. 300, pp. C.8-6—C.8-7.)

The Calico Solar site primarily consists of undeveloped desert land. Existing onsite land uses include the Burlington Northern Santa Fe (BNSF) railroad right-of-way (ROW), which traverses the site from east to west; several underground high pressure gas pipelines generally parallel to I 40 and the railroad; Hector Road which enters the site from I 40 and traverses it for approximately 0.5 mile; and Southern California Edison's (SCE) Pisgah Substation and overhead transmission line which are adjacent to the southeast border of the project site. In addition, some Land Water Conservation Fund (LWCF) mitigation lands (southwest corner of Section 5), and donated lands (northwest corner of Section 17) are located within the revised project site boundary. These lands total approximately 96 acres. (Exs. 114; 125, ¶ 8; 300, p. C.8-6.; 317, p. C.8-1)

The proposed project would occur in two phases. Phase I would require approximately 1,876 acres of BLM land. Phase II would require approximately an additional 2,737 acres of BLM land. In addition to the proposed project site and construction areas, there are other features and facilities associated with the proposed project (the majority of which are located on the proposed project site or construction laydown areas), including:

- approximately 26,540_38-foot solar dish Stirling systems (i.e., SunCatchers) and associated equipment and infrastructure within a fenced boundary;
- a 220-kV substation in the center of the project site;
- approximately 1 mile within the project site of twelve to fifteen 220-kV transmission line structures (90 to 110 feet tall) from the proposed Calico Solar Substation to SCE's Pisgah Substation;
- a Main Services Complex including an administration building (30,000 sq. ft.) and a maintenance building (45,000 sq. ft.);
- two 175,000-gallon water storage tanks (40 feet in diameter) and two 17,000-gallon water storage tanks (18 feet in diameter);
- main roads with a combination of roadway dips and elevated sections across drainage features;
- a buried septic tank system with a dual sanitary leach field; and
- permanent access to the project site to be provided by a bridge over the BSNF railroad along Hector Road.

2. Potential Impacts

Agricultural Lands and Rangeland Management. The project site is located within the desert region of central San Bernardino County, which is not notable for productive agricultural land. The United States Department of Agriculture's (USDA) Natural Resource Conservation Service (NRCS) provides information on the designation of soils in areas with agricultural lands, including farmland classifications such as Prime Farmland and Farmland of Statewide Importance. However, data for the project site was not available through the NRCS's Web Soil Survey (WSS). Similarly, the California Department of Conservation's (DOC) Farmland Mapping and Monitoring Program (FMMP) provides designations and statistics on the conversion of farmland to non-agricultural uses throughout the State. However, the proposed project site is not within the survey boundaries of the FMMP. As such, no agricultural land is within the project boundaries. (Ex. 300, p. C.8-8.)

Rangeland allotments are designated BLM pastures for wildlife and livestock. The majority of the proposed project is located within the Cady Mountains rangeland allotment. According to BLM's online GIS mapping program (Geocommunicator), the southwest boundary of this allotment follows the BNSF railroad. As such, the entire 4,613 acres of the project site is within the Cady Mountains rangeland allotment. There is currently no grazing permit issued within the proposed project area. In addition, the northern boundary of the Ord Mountain allotment is approximately 0.75 mile south of the project site. (Ex. 300, p. C.8-8.)

Based on the lack of federal, state or local farmland/agricultural designations, the proposed project would not convert important farmland, would not conflict with agricultural zoning designations or Williamson Act contracts, and would not result in a change in the existing environment that would lead to a conversion of farmland. Therefore, the proposed project would not adversely impact agricultural land. (Ex. 300, p. C.8-11.)

The project would be located within the Cady Mountains grazing allotment. This allotment consists of 177,293 acres which is designated by BLM as available for grazing livestock. According to the West Mojave Plan, the allotment was identified as an area that would benefit from voluntary relinquishment. Therefore, grazing is not currently authorized on this allotment. The proposed project would convert approximately 4,613 acres of the Cady Mountains rangeland allotment to another use, which accounts for approximately 2.4 percent of the allotment. Therefore, the proposed project is not expected to result in an adverse impact to inactive livestock grazing. For discussion of impacts to the desert bighorn sheep, please see the **Biological Resources** section of this Decision. (Ex. 300, p. C.8-11.)

Wilderness and Recreation. Recreational activities, including camping and off-road vehicle use, are permitted in the Cady Mountains Wilderness Study Area (WSA) located just north of the project site. In addition, the project would be approximately 8 miles north of the closest wilderness area (the Rodman Mountains). As such, the proposed project would not directly disrupt wilderness or recreation activities. However, the proposed project could indirectly impact the recreational and wilderness values of the Cady Mountains WSA by changing the natural and undisturbed landscape; and construction and operation activities would have the potential to degrade the qualities of solitude and unconfined wilderness and recreation in this remote area of the Mojave Desert. The CDCA Plan amendment associated with the proposed project would not affect the wilderness characteristic values of the WSA since the proposed project site is not

located within the WSA area. The evidence shows that numerous wilderness and recreation areas are in the vicinity of the project site which provide alternative options for recreation and wilderness destinations. Therefore, potential indirect impacts from the proposed project would not be adverse from a land use perspective. Please refer to the **Biological Resources**, **Cultural Resources**, and **Visual Resources** sections of this Decision for detailed discussions of proposed project effects on scenic, biologic, and cultural amenities. (Ex. 300, p. C.8-11.)

Horses and Burros. The proposed project would not contain or traverse any established BLM Herd Areas (HAs) or Herd Management Areas (HMAs). The Granite-Providence HA is the closest HA, which is located approximately 32 miles east side of the proposed project site. Therefore, the proposed project would not result in an interference with BLM's management of an HMA or HA. (Ex. 300, pp. C.8-9 to C.8-10.)

Division of Existing Community. The proposed project site is located on undeveloped lands under the jurisdiction of the BLM, which is not located within or near an established community. Therefore, neither the size nor the nature of the project would result in a physical division or disruption of an established community. In addition, due to the temporary nature of construction activities, construction generated nuisances such as dust and noise are not expected to adversely affect existing land uses in the area. For a detailed analysis of construction-related nuisance impacts, please see the **Air Quality, Public Health, Traffic and Transportation,** and **Noise** sections of this Decision**.** (Ex. 300, p. C.8-12.)

3. Consistency with Land Use LORS.

As required by California Code of Regulations, Title 20, Section 1744, Energy Commission staff evaluates the information provided by the project owner in the AFC (and any amendments), project design, site location, and operational components to determine if elements of the proposed project would conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project, or that would normally have jurisdiction over the project except for the Energy Commission's exclusive authority.

The Applicant has submitted an application to the BLM requesting a ROW to construct the proposed project and its related facilities. Pursuant to the California Desert Conservation Area (CDCA) Plan, sites associated with power generation

or transmission not identified in the CDCA Plan are considered through the Plan Amendment process. Under Federal law, BLM is responsible for processing requests for ROWs to authorize such proposed projects and associated transmission lines and other appurtenant facilities on land it administers. The CDCA Plan, while recognizing the potential compatibility of solar generation facilities on public lands, requires that all sites associated with power generation or transmission not identified in the Plan be considered through the Plan Amendment process. BLM would use the following Planning Criteria during the Plan Amendment process:

- The plan amendment process would be completed in compliance with the Federal Land Policy and Management Act (FLPMA), NEPA, and all other relevant Federal law, executive orders, and management policies of the BLM;
- The plan amendment process would include an EIS to comply with NEPA standards;
- Where existing planning decisions are still valid, those decisions may remain unchanged and be incorporated into the new plan amendment;
- The plan amendment would recognize valid existing rights;
- Native American Tribal consultations would be conducted in accordance with policy, and Tribal concerns would be given due consideration. The plan amendment process would include the consideration of any impacts on Indian trust assets (please see the **Cultural Resources** section of this Decision);
- Normally, consultation with the State Office of Historic Preservation (SHPO) would be conducted throughout the plan amendment process. At the time of the writing of this SSA, it appears that the BLM may address cultural resources issues through the BLM's Statewide Protocol, whereby BLM does not conduct a public section 106 process or SHPO consultation (please see the **Cultural Resources** section of this Decision for details regarding this issue); and
- Consultation with the US Fish and Wildlife Service (USFWS) would be conducted throughout the plan amendment process (please see the **Biological Resources** section of this Decision). (Ex. 300, pp. C.8-12 to C.8-13.)

If the ROW and proposed land use plan amendment are approved by BLM, the proposed solar thermal power plant facility on public lands would be authorized in accordance with Title V of the FLMPA of 1976 and the Federal Regulations at 43 CFR Part 2800. The BLM's Environmental Impact Statement (EIS) acts as the mechanism for meeting NEPA requirements, and also provides the analysis

required to support a Plan Amendment identifying the site location within the Plan. (Ex. 300, p. C.8-13.)

An additional LORS compliance issue was raised by the public during the scoping process for this document. According to some private landowners, the public and private landowners have been using Hector Road at the railway crossing to access the land north of the BNSF railway for over fifty years. This includes the private properties in Section 1, Township 8 North, Range 5 East, and Section 36, Township 9 North, Range 5 East. However, according to these private landowners, recently-placed gates and barricades at the crossing have blocked access to these lands. Private landowners assert that Hector Road has been in use prior to the passage of the FLPMA, and therefore, is a county road, and blocking access is a violation of the Unlawful Enclosures of Public Lands Act of 1885 and the CDCA Plan, which classifies the project site as an “open area.” (Ex. 300, p. C.8-13.)

As the proposed project developer, Tessera Solar responded to the private landowners by explaining that due to additional safety requirements, BNSF requires gates to be installed at all crossings where an entity other than BNSF (i.e., the Applicant) would have access. The private crossing granted to Calico Solar/Tessera is for the purposes of establishing an access to the western side of the proposed project site. As such, in addition to installation of the gate and barricades, the Applicant had to acquire insurance for potential damage to BNSF property and attend a safety course. Tessera complied with these conditions and was granted access, which established the need for gates and barricades. In addition, BLM representatives stated that the crossing was established as a BNSF ROW for access to, and maintenance of, the rail line and, and therefore, the crossing is not a legal road with authorized access for the public. As such, the crossing is a physical access and not a legal access, and has been used in a passive and unauthorized manner. Therefore, the recent blockage of this crossing does not result in a conflict with any applicable LORS. The issue appears to be a private dispute, not amenable to resolution by this Commission. We note that the private landowners have not cited any authority under which the Energy Commission could act to resolve their dispute. (Ex. 300, p. C.8-13.)

4. Cumulative Impacts

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects,

and the effects of probable future projects [Cal. Code Regs., title 14, § 15065(a)(3)].

Agricultural Lands and Rangelands

Although, the proposed project by itself would not convert agricultural land to nonagricultural uses, the conversion of lands due to past and present projects, and the potential development of the approximately one million acres of land, would all combine to result in adverse effects on agricultural lands (one of the state's most important resources) and rangeland. Therefore, although the development of renewable resources in compliance with federal and State mandates is important and required, this conversion would contribute to a significant and unavoidable cumulative impact to agricultural resources. (Ex. 300, p. C.8-34.)

The proposed project would not convert agricultural land or rangeland to other uses, and therefore would make no contribution to cumulative loss of agricultural land and rangeland. Other past, present and reasonably foreseeable future projects, including renewable energy projects, are anticipated to cause significant cumulative effects to agricultural resources (one of the state's most important resources) and rangeland. (Ex. 300, pp. C.8-11, C.8-33 C.8-35.)

Wilderness and Recreation

In addition to the proposed Calico Solar facility, there are many past, present, or reasonably foreseeable future actions that contribute to impacts to recreation and wilderness areas. Regionally, there have been both positive and negative impacts to recreational and wilderness resources as a result of development projects within San Bernardino County. Development of highway access to the region has provided direct vehicular access to open desert scenery for residents throughout southern California. This increased access has improved the recreational experience for some users by making the area more accessible, but has also detracts from the recreational experience for other users who prefer remote camping, hiking, and hunting away from populated areas.

Presently, as noted above, numerous energy-related development projects, including the proposed project, would remove large acreages of land from potential recreational use, and would have adverse effects on the viewscape that would result in some users seeking out other areas of the desert for their activities (see the cumulative analysis in the **Visual Resources** section of this Decision). Similarly, within wilderness areas, the attraction of hiking, camping,

and other outdoor activities is likely to decrease due to the increased human activity in the region, and the consequent impact of development on the viewscape. The proposed project would permanently change the nature of land use at the proposed project site from Government Special Public Limited Use and Moderate Use to an intensive utility use for the generation of power. Therefore, the combined effect of the overall cumulative past, present, and proposed and reasonably foreseeable projects, including the proposed project, in the desert region of San Bernardino County would adversely affect recreation and wilderness resources, resulting in a significant and unavoidable impact under CEQA. (Ex. 300, pp. C.8-36 to C.8-37.)

Horses and Burros

Although the proposed Calico Solar facility would not adversely impact horses or burros, there are other present or reasonably foreseeable future actions that could contribute to impacts to HMAs within the region. Authorized and unauthorized vehicle use, and maintenance and construction of utility rights-of-way can have a slight impact to burros by removal of vegetation utilized for forage, and there is always a danger of vehicles colliding with burros. The impact of the proposed and probable development projects would cumulatively remove and isolate potential grazing sites for burros. However, in areas of close proximity to HMAs, development projects would be required to consider impacts related to wild horses and burros. Therefore, cumulative impacts would be less than significant. (Ex. 300, p. C.8-38.)

Land Use Compatibility and LORS Compliance

Proposed developments near the project site that would have the potential to induce cumulative impacts include solar and wind energy generation projects, and the expansion of the existing military base. In consideration of cumulative land use compatibility impacts, the implementation of renewable projects in southern California would occur mostly in undeveloped desert lands or areas of rural development and open space, and therefore, would not create physical divisions of established residential communities. Nonetheless, as noted above, approximately one million acres of land are proposed for solar and wind energy development in the southern California desert lands. The conversion of these lands would preclude numerous existing land uses including recreation, wilderness, rangeland, and open space, and therefore, would result in a significant cumulative land conversion impact. The proposed project's conversion of approximately 4,613 acres in an undeveloped portion of San Bernardino

County and on BLM lands in combination with the land conversion impacts of past, present, and reasonably foreseeable future projects in the area would be cumulatively considerable, and a significant and unavoidable impact under CEQA. (Ex. 300, p. C.8-39.)

5. Public Comment

Public comments made on August 4, 2010 on land use are listed below: (8/4/10 RT 214 – 216.)

Fred Stearn, Real Estate Agent representing landowners in Sections 1 and 36, expressed concern about landowners being landlocked by the proposed project and being subjected to potentially significant environmental impacts. His main concern was access to the landowner's properties, which we discuss above.

FINDINGS OF FACT

Based on the evidence, the Commission makes the following findings:

1. As the proposed project would be located wholly on BLM administered land, no state, regional, or local land use LORS would be applicable to the project.
2. No farmland or rangeland conversion impacts are expected as a result of the proposed project, and the project would not involve other changes in the existing environment which could result in conversion of farmland to non-agricultural uses.
3. The proposed project would indirectly impact the recreational and wilderness values of the Cady Mountains WSA. However, due to the numerous wilderness and recreation areas throughout the county and in the vicinity of the project site, this indirect impact would not be significant.
4. The proposed project would not contain or traverse any established BLM Herd Areas (HAs) or Herd Management Areas (HMAs).
5. The proposed project would not disrupt or divide the physical arrangement of an established community.
6. The proposed project, Scenario 5.5, would include approximately 96 acres of donated lands in the northwest corner of Section 17. In an October 7, 2010 memorandum regarding the Calico Solar Project and Donated Lands, the BLM State Director determined that the conservation values of the donated land affected by the proposed project are marginalized by the fact that they are encumbered by powerline easements, located in a designated

utility corridor and would be surrounded on two sides by the solar project. As such, the BLM State Director recommended the acceptance of the applicant's offer to compensate by replacing the donated lands in an area that is managed for conservation purposes, and to ensure that the replacement lands have equally protective status consistent with the BLM's policy of preserving the conservation value of donated lands. The BLM State Director is recommending proceeding with authorization of solar use of the donated lands within the Calico project site. Given this, the proposed project is consistent with a BLM Interim Policy regarding surface disturbing activities on lands donated to BLM or acquired with assistance from the federal Land and Water Conservation Fund (LWCF). (Ex. 317, p. C.8-1.)

7. The implementation of renewable projects in Southern California would occur mostly in undeveloped desert lands or areas of rural development, and therefore, would not create physical divisions of established residential communities. Nonetheless, approximately one million acres of land are proposed for solar and wind energy development in the Southern California desert lands. The proposed project would combine with other past and reasonably foreseeable future projects to substantially reduce scenic values of wilderness areas and recreational resources in the Mojave Desert and southern California desert region and therefore, would result in a significant and unavoidable cumulative land use impact in this regard.

CONCLUSIONS OF LAW

1. The record contains an adequate analysis of the land use laws, ordinances, regulations, and standards that are relevant to the project and establishes that the project will not create any unmitigated, significantly adverse direct land use impacts as defined under the California Environmental Quality Act.
2. The Calico Solar Project would combine with other past and reasonably foreseeable future projects to substantially reduce scenic values of wilderness areas and recreational resources in the Mojave Desert and southern California desert region and therefore, would result in a significant and unavoidable cumulative land use impact in this regard.
3. The project is consistent with all applicable LORS with the possible exception of BLM LM Interim Policy Memorandum (CA 2009 020) regarding lands donated to BLM or acquired with assistance from the federal Land and Water Conservation Fund. As a federal policy, it is not subject to override by the Energy Commission. The BLM, as the author of the policy, is best qualified to interpret and apply it to this project and will do so as part of its decision on the CSP's Right of Way application. Our decision to approve the CSP is therefore contingent upon the grant of the Right of Way application, which we will interpret as a BLM determination that the Policy is satisfied.

No Conditions of Certification are proposed.

Land Use Table 2
Project Compliance with Adopted Land Use LORS

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
Federal			
Federal Land Policy and Management Act, 1976 – 43 CFR 1600, Sec. 501. [43 U.S.C. 1761]	(a) The Secretary, with respect to the public lands … are authorized to grant, issue, or renew rights-of-way over, upon, under, or through such lands for: (4) systems for generation, transmission, and distribution of electric energy, except that the applicant shall also comply with all applicable requirements of the Federal Energy Regulatory Commission under the Federal Power Act, including part I thereof (41 Stat. 1063, 16 U.S.C. 791a-825r) [P.L. 102-486, 1992]	YES	The FLPMA authorizes the issuance of a right-of-way grant for electrical generation facilities and transmission lines. In addition, based on staff's review of the Federal Power Act, the requirements would not be applicable to the proposed project as they are not related to renewable resources, and are otherwise related to administrative procedures. Therefore, the proposed project would be in compliance with this policy.
Farmland Protection Policy Act, Section 658.1	As required by section 1541(b) of the [Farmland Protection Policy] Act, 7 U.S.C. 4202(b), Federal agencies are (a) to use the criteria to identify and take into account the adverse effects of their programs on the preservation of farmland, (b) to consider alternative actions, as appropriate, that could lessen adverse effects, and (c) to ensure that their programs, to the extent practicable, are compatible with State and units of local government and private programs and policies to protect farmland.	YES	As discussed above in detail in Section C.8.4.2 (under the subsection entitled "Agricultural Lands and Rangelands"), the farmland conversion impacts of the proposed project would not be adverse. In addition, construction of the proposed project and its onsite linear facilities would be temporary, and the project would not involve other changes in the existing environment that could result in conversion of farmland, to non-agricultural uses. Therefore, proposed project would be consistent with the FPPA.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
Bureau of Land Management – California Desert Conservation Area (CDCA) Plan (BLM 1980)	**Chapter 2 – Multiple-Use Classes** **MULTIPLE-USE CLASS GUIDELINES** **MULTIPLE-USE CLASS L (Limited Use)** 6. Electrical Generation Facilities – Electric generation may be allowed. (See wind/solar/ geothermal, below) – Wind/Solar May be allowed after NEPA requirements are met. 7. Transmission Facilities – New gas, electric, and water facilities and cables for interstate communication may be allowed only within designated corridors (see Energy Production and Utility Corridors Element). NEPA requirements will be met. [#5,85]	YES (with BLM's project-specific CDCA Plan Amendment)	The proposed project site is administered by the BLM and is managed under multiple use Class L (Limited Use) categories in conformance with the CDCA Plan (SES 2008a). The proposed project consists of an electrical generating facility, a substation, a transmission line, and ancillary facilities. As such, development of the proposed project is an allowed use under the Multiple-Use Class Guidelines. In addition, the CDCA Plan, while recognizing the potential compatibility of solar generation facilities on public lands, requires that all sites associated with power generation or transmission not identified in the Plan be considered through the Plan Amendment process. Therefore, the BLM would undertake a project-specific CDCA Plan amendment along with the ROW grant for the proposed Calico Solar Project. Upon BLM's amendment of the CDCA plan for the Calico Solar Project, the proposed project would be fully compliant with the CDCA Plan. The BLM's Environmental Impact Statement (EIS) acts as the mechanism for meeting NEPA requirements, and also provides the analysis required to support a Plan Amendment identifying the facility within the Plan.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	MULTIPLE-USE CLASS M (Moderate Use) 6. Electrical Generation Facilities All types of electrical generation plants may be allowed in accordance with State, Federal, and local laws. —Wind/Solar May be allowed after NEPA requirements are met. 7. Transmission Facilities — New gas, electric, and water facilities and cables for interstate communication may be allowed only within designated corridors (see Energy Production and Utility Corridors Element). NEPA requirements will be met. [#5,85]	YES (with BLM's project-specific CDCA Plan Amendment)	The proposed project site is on lands administered by the BLM, and is located within the "Moderate" (Class M) use category of the BLM's CDCA Plan, with some areas designated as "Limited" (Class L). These lands are managed under the Multiple-Use Class M and Class L categories in conformance with the CDCA Plan (SES 2008a). The proposed project consists of an electrical generating facility, a substation, a transmission line, and ancillary facilities. As such, development of the proposed project is an allowed use under the Multiple-Use Class Guidelines. In addition, The CDCA Plan, while recognizing the potential compatibility of solar generation facilities on public lands, requires that all sites associated with power generation or transmission not identified in the Plan be considered through the Plan Amendment process. Therefore, the BLM would undertake a project-specific CDCA Plan amendment along with the ROW grant for the proposed Calico Solar Project. Upon BLM's amendment of the CDCA plan for the Calico Solar Project, the proposed project would be fully compliant with the CDCA Plan. The BLM's Environmental Impact Statement (EIS) acts as the mechanism for meeting NEPA requirements, and also provides the analysis required to support a Plan Amendment identifying the facility within the Plan.
	Chapter 3 **Wild Horse and Burros Element** Goal 2. Protect wild horses and burros on public lands by conducting surveillance to prevent unauthorized removal or undue harassment of animals.	YES	As noted in the "Setting and Existing Conditions" subsection above, the proposed project site is not in the vicinity of an HA or HMA; therefore, the project site and surrounding area are not notable for the presence of wild horses or burros. As such, the proposed project would not result in any interference with BLM's management of an HMA, and would be consistent with this

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
			element of the CDCA Plan.
	Chapter 3 **Energy Production and Utility Element** Goal 1. Fully implement the network of joint-use planning corridors to meet projected utility needs to the year 2000. Specific electrical and natural gas right-of-way or power plant site applications made under the provisions of this element should be consistent with adopted California Energy Commission forecasts, which are reviewed biennially. Decision criteria are to: (1) Minimize the number of separate rights-of-way by utilizing existing rights-of-way as a basis for planning corridors; (2) Encourage joint use of corridors for transmission lines, canals, pipelines, and cables; (3) Provide alternative corridors to be considered during processing of applications; (4) Avoid sensitive resources wherever possible; (5) Conform to local plans whenever possible; (6) Consider wilderness values and be consistent with final wilderness recommendations; (7) Complete the delivery-systems network; (8) Consider ongoing projects for which decisions have been made, for example, the Intermountain Power Project; and (9) Consider corridor networks which take into account power needs and alternative fuel resources.	YES	The proposed project's linear facilities would be within the project site, and would interconnect at the SCE Pisgah Substation which is adjacent to the eastern boundary of the project site. Therefore, the proposed project would utilize existing ROWs, and would be consistent with this element of the CDCA Plan.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	Addendum B: Interim Management Guidelines Chapter III. Guidelines for Specific Activities Lands Actions – Disposal, Rights-of-Way, Access and Withdrawals 2. Rights-of-Way: Existing rights-of-way may be renewed if they are still being used for their authorized purpose. New rights-of-way may be approved only for temporary uses that satisfy the non-impairment criteria. 3. Right-of-Way Corridors: Right-of-way corridors may be designated on lands under wilderness review.	YES	The non-impairment standard, directs that "until Congress has determined otherwise" the lands under review be managed so as not to impair their suitability as wilderness (CRS 2004). As the proposed project would not traverse an established Wilderness Area or Wilderness Study Area, the project would be in compliance with this guideline of the CDCA Plan.
Federal Wilderness Act, 16 U.S.C. § 1131-1136	(a) Establishment; Congressional declaration of policy; wilderness areas; administration for public use and enjoyment, protection, preservation… provisions for designation as wilderness areas In order to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify all areas within the United States and its possessions, leaving no lands designated for preservation and protection in their natural condition, it is hereby declared to be the policy of the Congress to secure for the American people of present and future generations the benefits of an enduring resource of wilderness.	YES	As the proposed project would not traverse an established Wilderness Area, the project would be consistent with this guideline.
Public Rangelands Improvement Act	Establishes and reaffirms the national policy and commitment to inventory and identify current public rangeland conditions and trends; manage, maintain and improve the condition of public rangelands so that they become as productive as feasible for all rangeland values in accordance with management objectives and the land use planning process; and continue the policy of protecting wild free-roaming horses and burros.	YES	As noted in "Setting and Existing Conditions," the project site would be located within the Cady Mountains rangeland allotment. However, according the BLM's Rangeland Specialist from the Barstow Field Office, the land is currently permitted for grazing, and is identified in the West Mojave (WEMO) Plan, for voluntary relinquishment (BLM 2009n). Therefore, the proposed project would not interfere with the Cady Mountains rangeland allotment.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
Wild and Free-Roaming Horse and Burro Act	Establishes BLM's authority to protect, manage, and control wild horses and burros to ensure that healthy herds thrive on healthy rangelands. BLM determines the "appropriate management level" (AML) of wild horses and burros on the public rangelands.	YES	As discussed above in detail in Section C.8.4.2, the proposed project would not contain or traverse an established HMA. As such, the proposed project would be consistent with this Act.
LM Interim Policy Memorandum (CA-2009-020)	• Lands acquired by BLM under donation agreements, acquired for mitigation/ compensation purposes and with LWCF funds, are to be managed as avoidance/ exclusion areas for land use authorizations that could result in surface disturbing activities. • Should BLM–California managers have use authorizations applications pending, or receive new applications on lands that meet the above criteria, they are required to notify the State Director and set up a briefing to address how to respond to those applications. • Should managers have inquiries related to pre-application activities for any land use authorizations on lands that meet the above criteria, please notify applicants regarding the location of these lands as soon as possible and advise them to avoid these lands or provide details on how they would plan to operate or mitigate their project in a manner consistent with the values of the lands donated or acquired for conservation purposes.	INCONSISTENT (for the proposed project) CONSISTENT (for Reduced Acreage Alternative)	As noted in the "Setting and Existing Conditions," the proposed project site includes approximately 96 acres of lands that have been acquired for mitigation/compensation purposes by LWCF funds. In an Interim policy dated May 28, 2009, the State Director of the BLM issued an Instruction Memorandum regarding management of donated land and lands acquired by LWCF funds. As a result, LWCF lands are to be managed as avoidance/exclusion areas for land use authorizations that could result in surface disturbing activities. Subsequent to the publication of the PMPD which identified this issue as an area of potential inconsistency with Federal LORS, BLM staff determined that construction and operation of the proposed project is consistent with the interim policy. (Ex. 318.)
State			
None			
Local			
San Bernardino County General Plan (CSB 2007a)	**COUNTYWIDE GOALS AND POLICIES OF THE LAND USE ELEMENT** LU 1.2 The design and siting of new development will meet locational and development standards to ensure compatibility of the new development with adjacent land uses and community character.	YES	In May 2010, the applicant submitted a supplemental report for modifications to the primary water supply, which would require a pipeline that would traverse two private parcels (APNs 052928134 and 052928123) that were previously not within the project boundary. The private parcels are

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	COUNTYWIDE GOALS AND POLICIES OF THE CONSERVATION ELEMENT CO 10.2 The location of electric facilities should be consistent with the County's General Plan, and the General Plan should recognize and reflect the need for new and upgraded electric facilities. **DESERT REGION GOALS AND POLICIES OF THE OPEN SPACE ELEMENT** D/OS 1.3 Maintain Rural Living (RL) and Resource Conservation (RC) Land Use Zoning Districts or zoning on steep slopes and remote areas to minimize hillside grading and to protect the rural and natural environment.		undeveloped land located within the county's Resource Conservation (RC) zoning designation. The county has a "one-map approach" for both the General Plan land use designations and zoning classifications to assure land use consistency between the county's General Plan and its zoning code. As noted in **Land Use Table 1**, the county recently adopted Development Code Chapter 84.29 (Renewable Energy Generating Facilities); therefore, the county recognizes the need for renewable power generating facilities. Refer to the discussion below for the proposed project's consistency with Chapter 84.29. Given the allowances for development of solar power in the RC zone in the county's newly adopted Development Code Chapter 84.29 (Renewable Energy Generating Facilities), the proposed water pipeline would be consistent with these goals and policies.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	DESERT REGION GOALS AND POLICIES OF THE CONSERVATION ELEMENT GOAL D/CO 2. Encourage utilization of renewable energy resources. **COUNTYWIDE GOALS AND POLICIES OF THE CONSERVATION ELEMENT** CO 8.3 Assist in efforts to develop alternative energy technologies that have minimum adverse effect on the environment, and explore and promote newer opportunities for the use of alternative energy sources.	YES	The proposed water pipeline is a component for the development of a solar energy farm that would produce up to a nominal 500 MW net of power. The power generated by the proposed project would be conveyed into SCE's electric grid to provide electricity supply for the area's population. Because the proposed project makes use of a renewable resource (i.e., sun light), it is consistent with this goal of the General Plan. In addition, the county recently adopted Development Code Chapter 84.29 (Renewable Energy Generating Facilities). Therefore, the county recognizes the need for renewable power generating facilities and has adopted a code to support renewable energy development; and as a component of the proposed project, the water pipeline would be consistent with this goal and policy.

County of San Bernardino 2007 Development Code (CSB 2007b)	**CHAPTER 84.29 RENEWABLE ENERGY GENERATION FACILITIES** **84.29.020 Applicability and Land Use Zoning Districts** The Land Use Zoning Districts that allow renewable energy facilities are limited to the following: RC (Resource Conservation) AG (Agriculture) FW (Floodway) RL (Rural Living) Note: If a facility is proposed solely in the Rural Living land use zoning district, it must include a minimum of 20 acres in the development proposal.IR (Regional Industrial)	YES	This chapter of the county Development Code was recently adopted in February of 2010 in recognition of the State's need for Renewable Power Generating Facilities. The proposed water pipeline is within the RC zone, and as a facility associated with development of solar power is consistent with the county's Development Code.

B. TRAFFIC AND TRANSPORTATION

This section addresses the extent to which the proposed project will affect the local area's transportation network. The evidence includes an analysis of the roadways proposed for construction and operation; potential traffic-related problems associated with the use of these routes; and the anticipated encroachment upon public rights-of-way during the construction of the proposed project and associated facilities.

SUMMARY AND DISCUSSION OF THE EVIDENCE

The project site is located in San Bernardino County on approximately 4,613 acres of land owned by the United States government and managed by the US Department of Interior, Bureau of Land Management (BLM). (Ex. 1, B.1-2.) The Burlington Northern Santa Fe (BSNF) railroad bisects the site from west to east. The key roadways for this project include the following:

- **Interstate-40 (I-40)** – This is an east-west interstate freeway located south of the project site, and which would serve as a major access road to the project. I-40 is a four-lane highway with two lanes in each direction. The existing average daily traffic (ADT) near the vicinity of the Calico Solar Project site is 15,600 vehicles per day; 43 percent is truck traffic. (Ex. 300, p. C.11-6.)
- **National Trails Highway (Route 66)** – This east-west two-lane highway is located approximately 300 feet south of the proposed project site and runs parallel to the I-40. (Ex. 300, p. C.11-6.)
- **Hector Road** – This is the primary access road to the Calico Solar Project site. It is a local road running north-south and begins at Route 66 south of the I-40 and ends south of the BNSF railroad tracks. The existing ADT on Hector Road near the vicinity of the project site is 31 vehicles per day. (Ex. 300, p. C.11-6.)

Three airports were identified in the general project vicinity, but all of these airports were over 18 miles away from the project site. (Ex. 300, p. C.11-8.)

The BNSF provides long-haul freight service throughout the United States. Near and on the project site, BNSF operates a double-track railroad line through the project site from east to west. AMTRAK's Southwest Chief route from Los Angeles to Chicago travels on this rail line through the site. The BNSF rail lines are heavily used by freight trains. The trains, some of which are approximately 10,000 feet long, cross the tracks approximately every fifteen minutes from both directions.. (Ex. 300, pp. C.11-7 and C.11-9.)

The Levels of Service (LOS)[1] for street intersections in the project vicinity are shown below in **Traffic and Transportation Table 1**:

Traffic and Transportation Table 1
2011 Peak Hour Roadway Traffic Volumes
Design Capacities, and Levels of Service Without Project

2011 Existing Conditions without Calico			**Morning Peak Hour**		**Evening Peak Hour**	
Roadway Segment	**Traffic Volumes**	**LOS**	**Average Delay (sec/veh)**	**LOS**	**Average Delay (sec/veh)**	**LOS**
I-40 – West of Hector Road	15,660[1]	B[4]	8.8	A	8.8	A
I-40 – East of Hector Road	16,850[1]	B[4]	8.8	A	8.8	A
Hector Road – North of I-40	10/10[2]	A/A[5]	---	---	8.5	---
Hector Road – South of I-40	10/15[5]	A/A[5]	---		---	---
National Trails Highway – West of Hector Road	10/10[2]	A/A[5]	8.5	A	8.5	A
National Trails Highway – East of Hector Road	10/15[2]	A/A[5]	8.5	A	8.5	A
BLM Access Road – North of I-40	N/A	N/A	---	---	---	---

Notes and Sources: 2007 Traffic Volumes (Caltrans, 2008a); [2]AM/PM Volumes (Higher Volumes between Northbound and Southbound Direction), Source: National Data Services, 2008a; 2007 Truck Volumes (Caltrans, 2008b); 4 ADT LOS; 5 Peak Hour LOS; 6 Peak Hour LOS is based on **Table 5.11-3**, San Bernardino CMP, 2003 Update. Information not listed was not available; ADT = Average Daily Traffic; LOS = Level of Service. Source: URS Corporation; Ex. 300, C.11-14, **Table 1**.

1. Construction Traffic

The Applicant anticipates that construction will take approximately 44 months beginning in 2010 and ending in 2014. The construction work force will peak during month 16 at approximately 731 workers per day in month seven (2011) and average approximately 400 workers over the course of construction. The construction workforce will be drawn from San Bernardino and Riverside counties. Approximately 20 percent of the workers are expected to travel east on I-40; approximately 80 percent, west on I-40. (Ex. 300, pp. C.11-11 to C.11-12.)

To evaluate the worst-case scenario, the traffic analysis assumed no workers would carpool and all workers would arrive during the morning peak period (7 AM

[1] The operating conditions of a roadway (surface street) system, including intersections, are described using the term "level of service." Level of service (LOS) is a description of a driver's experience at an intersection or roadway based on the level of congestion (delay). LOS can range from "A," representing free-flow conditions with little or no delay to "F," representing saturated conditions with substantial delay.

to 9 AM) and depart during the evening peak period (4 PM to 6 PM). During peak construction, the daily round trips for workers would total 1,462 trips, 731 inbound in morning and 731 outbound in evening. (Ex. 300, p. C.11-11.)

Parking for workers will be provided in the 14-acre construction laydown area adjacent to the main services complex as well as the 26-acre laydown and staging areas south of the complex. Employees may travel to and from the site and/or the laydown parking areas in shuttles or other similar vehicles. We adopt Condition of Certification **TRANS-2** that requires the Applicant to develop a parking and staging plan for workforce and construction vehicles. This plan will include any impediments that may occur because of the need to cross the BNSF Railway tracks.. (Ex. 300, p. C.11-11.)

According to the Applicant, for the first ten months of construction temporary access for construction will be provided from an existing road off I-40, which will be designed to cross the railroad tracks. In October 2011, construction traffic will use a permanent access road designed to use the same exit off of Hector Road and, which will be designed with a new bridge over the BNSF railroad tracks. We adopt Condition of Certification **TRANS-1** that requires the Applicant to obtain an easement from BNSF Railway to construct the road on its right-of-way before construction begins. This Condition also requires the Applicant to construct a road using Soiltac or its equivalent so emergency vehicles have access to the site. (Ex. 300, p. C.11-6.)

The existing BSNF line could pose a safety hazard for construction workers and others visiting or making deliveries to the project site. The frequency of the trains (every fifteen minutes) could result in traffic backing up or stacking on I-40 as workers wait in vehicles for the train to pass and to cross the tracks. The same scenario could occur as workers leave the site. State and federal regulations require that a flag person be present at all times wherever workers, delivery persons, or visitors cross an unattended or open track. To address this issue, we adopt Condition of Certification **TRANS-2** to require implementation of measures that reduce traffic on I-40 during critical commute times and ensure safe crossing of the BSNF Railway tracks. This Condition requires a traffic control plan that will also address access by emergency service vehicles. (Ex. 300, p. C.11-10.)

During construction, most deliveries will occur between 7 AM and 5 PM on weekdays. Because delivery trucks will use the temporary intersection off I-40 to Hector Road controlled by a stop sign, we adopt Condition of Certification

TRANS-2 so that arrival and departure time of these trucks does not occur in peak traffic periods. (Ex. 300, p. C.11-15.)

To transport this equipment, the Applicant must obtain special permits from Caltrans to move oversized or overweight materials and address other issues such as routes used and delivery times. We adopt Condition of Certification **TRANS-3** to ensure the project owner complies with vehicle size and weight limitation requirements of Caltrans and other relevant jurisdictions; Condition of Certification **TRANS-4** to ensure the Applicant complies with Caltrans' and other relevant jurisdictions' limitations on encroachments into public rights of way; and **TRANS-5** to ensure that the project owner will restore all public roads, easements, and rights-of-way that have been damaged due to project-related construction activities. (Ex. 300, pp. C.11-15.to C.11-16.)

The evidence shows that vicinity roadways would continue to operate at LOS C or better during the morning and evening peak hours. **Table 2** below shows that construction would not cause any of the Levels of Service to deteriorate to a level that would have a significant impact. (Ex. 300, pp. C.11-14 and C.11-**15, Tables 4** and **6**.)

Traffic and Transportation Table 2
2011 Peak Hour Roadway Traffic Volumes
Design Capacities, and Levels of Service With Project

2011 Existing Conditions with Calico			**Morning Peak Hour**		**Evening Peak Hour**	
Roadway Segment	**Traffic Volumes**	**LOS**	**Average Delay (sec/veh)**	**LOS**	**Average Delay (sec/veh**	**LOS**
I-40 – West of Hector Road	17,000[1]	B[4]	15.5	C	13.1	B
I-40 – East of Hector Road	17,250[1]	B[4]	16.5	C	11.0	B
Hector Road – North of I-40	705/775[2]	B/C[5]	---	---	---	---
Hector Road – South of I-40	10/15[2]	A/A[5]	---	---	---	---
National Trails Highway – West of Hector Road	10/10[2]	A/A[5]	8.5	A	8.5	A
National Trails Highway – East of Hector Road	10/15[2]	A/A[5]	8.5	A	8.5	A
BLM Access Road – North of I-40	81/12[2]	A/A[5]	---	---	---	---

Notes and Sources: 2007 Traffic Volumes (Caltrans, 2008a); [2]AM/PM Volumes (Higher Volumes between Northbound and Southbound Direction), Source: National Data Services, 2008a; 2007 Truck Volumes (Caltrans, 2008b); 4 ADT LOS; 5 Peak Hour LOS; 6 Peak Hour LOS is based on Table 5.11-3, San Bernardino CMP, 2003 Update. Information not listed was not available; ADT = Average Daily Traffic; LOS = Level of Service. Source: URS Corporation 2008; Ex. 300, p. C.11-14.

2. Construction Phase Transport of Hazardous Materials and Waste

Approximately ten types of hazardous materials, including hydrogen gas, will be used at the site during construction. These materials will be transported to the site and removed from the site by trucks via I-40. We adopt Conditions of Certification **TRANS-2** that requires the traffic control plan to address the transport of hazardous materials and **TRANS-6** to ensure that the transporting of hazardous materials will comply with all applicable federal and state regulations. (Ex. 300, p. C.11-16.) The handling and disposal of hazardous substances is also addressed in the **Hazardous Materials Handling** discussion in this Decision.

3. Operation Impacts and Mitigation

Operation of the Calico Solar Project will result in a small amount of vehicular traffic. Operational workforce is estimated to be 164 workers. The arrival and departure time of those workers will be staggered in three 8-hour shifts over operations on a 24 hour, 7-day-a-week basis. Consequently, peak week-day traffic will be 53 vehicles even if every employee were to commute in his or her own vehicle. The surrounding roadways and intersections are projected to operate well below LOS capacity when the project is operational in 2016. (Ex. 300, p. C.11-17.)

The Applicant will build a permanent access road to the site directly from I-40. To ensure adequate access for emergency vehicles, we adopt Condition of Certification **TRANS-1** to ensure that the access road conforms with local, county, and State Fire Marshal Codes. (Ex. 300, p. C.11-17.)

Parking for workers would be provided on a 10-acre satellite services complex located in the eastern portion of the project site. When operational, the project would employ up to 164 workers, who would work in three 8-hour shifts. We adopt Condition of Certification **TRANS-2** that requires a traffic control plan to ensure adequate parking for workers. (Ex. 300, p. C.11-18.)

As noted earlier, the BNSF operates a double-track railroad line through the project site. The project includes construction of a bridge over the tracks that will be used for permanent access at the project site. Therefore, we find that no mitigation is necessary to address crossing of the tracks during operation. (Ex. 300, p. C.11-17.)

Similar to the discussion in construction, the project will use hazardous materials during operation. These materials will be delivered to and removed from the site by truck via the I-40. To address the transport of hazardous materials, we adopt Condition of Certification **TRANS-6** that will require compliance with all applicable federal and state regulations. (Ex. 300, p. C.11-16.)

The proposed Calico Solar Project will use SunCatchers— a 40-foot tall, 25 kilowatt-electrical (kWe) solar dish developed by Stirling Energy Systems. The SunCatcher system consists of a unique radial solar concentrator dish structure that supports an array of curved glass mirror facets. These mirrors are designed to automatically track the sun and collect and focus or concentrate its solar energy onto a patented power conversion unit (PCU).

The SunCatcher mirrors have the potential to pose a visual hazard (glare). The SunCatcher mirrors have the potential to move off-axis during cloud cover, and the reflection of the sun on the mirrors nearest the rail line or roadways may pose a hazard (temporary flash blindness) to motorists on Hector Road, I-40, and Route 66; and to train crews using the BNSF tracks. To address the potential for flash blindness, we adopt Condition of Certification **TRANS-7,** which requires the project owner to modify the normal and offset tracking position to specific specifications and ensures specific morning-stow and night-stow procedures are followed. This Condition also requires a 223-foot minimum distance from any SunCatcher reflector assembly to the BNSF ROW or any public roadway to reduce the possibility of temporary flash blindness. The project owner must also prepare an emergency glare response program that includes a monitoring plan; plan for reporting malfunctions and complaints; immediate repositioning of malfunctioning units; and a process of evaluating intrusive light conditions through video surveillance. (Ex. 300, p. C.11-19.)

BNSF Railway has communicated its concern about the effect of glint and glare on the railroad engineers' ability to clearly and accurately see signal lights. Staff has taken these comments into consideration. Because of the significance of the signal lights to the operational safety of the crews and trains, Staff has determined that any escaping glint and glare that may affect the railroad engineer's ability to clearly and accurately see signal lights will require shielding. Therefore, we adopt Condition of Certification **TRANS-7**, which requires the Applicant to work with the BNSF Railway to determine the appropriate size and design of shields to be affixed to signal lights as well as measures to increase the contrast of the signal light, including orienting the shield around the signal light;

ensuring the darkest background possible on the signal light; or use of current LED signal technology. (Ex. 300, p. C.11-19.)

The evidence shows that vicinity roadways will continue to operate at LOS C or better during the morning and evening peak hours. Operation will not cause any of these Levels of Service to deteriorate to a level that will have a significant adverse impact. In addition, the evidence shows that the Calico Solar Project has the potential to cause glint and glare in the project area. However, with the implementation of Condition of Certification **TRANS-7** the project will not have a significant adverse impact to motorists or to the BNSF Railway.

4. Cumulative impacts

A significant cumulative impact may be created as a result of the combination of the proposed project together with other projects causing impacts. The evidence shows that seven projects were identified in the general vicinity of the Calico Solar Project. The traffic-related impacts of these existing or proposed projects when combined with the traffic-related activities of the Calico Solar Project were considered in the cumulative impact evaluation. (Ex. 300, p. C.11-25.)
Eleven projects either exist or are projected to be constructed during the same time frame as the Calico Solar Project. There is no evidence in the record that the construction or operation of these other projects will result in cumulative impact to traffic flow during the construction or operation of the Calico Solar Project. We find that the Calico Solar Project will not contribute to cumulative impacts for the following reasons: (Ex. 300, pp. C.11-27 and C.11-28.)

- The number of workers needed for existing projects is minimal.
- The Calico Solar Project mitigation measures will result in acceptable levels of service on roads and highways.
- Even if all existing and proposed projects used the same roadways, which is not the case, the locations of the various projects, different start times, and direction of travel used by workers; and Conditions of Certifications imposed on the projects, including the Calico Solar Project, to keep traffic at acceptable LOS level, will help to ensure that affected roadways operate at acceptable levels.

Truck travel as well as other non-employee site visits will be very small and will typically occur during non-peak periods. Consequently, cumulative operational impacts will not be significant and will not require mitigation. (Ex. 300, p. C.11-27

5. Public and Agency Comments

Comments were received from the Applicant and from the BSNF Railway regarding the project. These comments are summarized below.

The Applicant contends that there is no potential for cumulative traffic impacts between the Calico Solar Project and the Abengoa Mojave Project because employee travel patterns will not overlap. The Calico Solar workforce is expected to originate almost entirely in Barstow and in the opposite direction of the Abengoa project. As such, the Applicant requested that Staff delete Condition of Certification **TRANS-2**. Staff considered the Applicant's comments, reviewed the documents filed, and modified Condition of Certification **TRANS-2** to address Applicant concerns. The revised Condition now provides the Applicant flexibility in determining its options for controlling traffic. (Ex. 300, p. C.11-31.)

On July 29, 2010, BSNF Railway submitted a comment letter that identified concerns with glint and glare and requested intervener status on the project. BNSF Railway also presented this letter/request at the Commission's Prehearing Conference on July 30, 2010. BNSF requested a site-specific glint and glare study prior to the first SunCatcher disc being mounted on a pedestal. (Ex. 300, p. C.11-31.)

Staff worked with BNSF representatives to resolve their concerns with glint and glare. A glint and glare study was prepared for the project, which was reviewed with BNSF Railway representatives. BNSF representatives also expressed concern with the effect of glare on the railroad engineer's ability to correctly perceive the color of the signal lights. Staff identified Condition of Certification **TRANS-7** to require the Applicant to work with BNSF Railway to fund and conduct a study to determine the specific measures needed, if any, to ensure that the correct signal color is visible to BNSF Railway engineers. Staff determined that measures such as hooding or increasing the intensity of the lights will ensure that BNSF Railway engineers can correctly perceive the color of the signal. This study and modifications to the signal, if required, are to be completed before operation of the Calico Solar Project. (Ex. 300, p. C.11-32.)

FINDINGS OF FACT

Based on the evidence, we find and conclude as follows:

1. The additional traffic associated with construction and operation of the Calico Solar Project will not have an adverse effect on existing levels of service for roads in the project vicinity with the implementation of Conditions of Certification **TRANS-1** to **TRANS-5**.

2. Development and implementation of a construction traffic control program will offset any temporary, short-term increases in congestion resulting from construction of the project.

3. The Suncatcher mirrors have the potential to produce glint and glare near public roads and the BNSF railroad right-of-way. Condition of Certification **TRANS-7** will reduce these impacts.

4. Potential adverse impacts associated with the transportation of hazardous materials during construction and operation of the project will be mitigated to insignificance by compliance with applicable federal and state laws and Condition of Certification **TRANS-6**.

5. The traffic associated with cumulative projects will not impact regional and local roadways with the implementation of the Conditions of Certification.

6. Implementation of the Conditions of Certification, below, ensure that both construction and operation of the project will comply with all applicable laws, ordinances, regulations, and standards regarding traffic and transportation as identified in the pertinent portion of **Appendix A** of this Decision.

CONCLUSION OF LAW

1. The Commission, therefore, concludes that construction and operation of the project, as mitigated herein, will not result in any significant, direct, indirect, or cumulative adverse impacts to the local or regional traffic and transportation system and will comply with all applicable LORS.

CONDITIONS OF CERTIFICATION

TRANS-1– Construction of All-Weather Roads and Bridge. If an easement is granted and the Applicant begins construction, the Applicant shall construct roads using Soiltac or its equivalent according to California State Fire Marshall specifications as outlined in California Fire Code

Section 902.2.1 et seq. These roads shall be constructed with appropriate materials so that they will be safe for use in crossing washes at the site.

In addition, the Applicant shall coordinate its activities with the BNSF Railway. Those activities include working with the Public Utilities Commission to ensure compliance with provisions of the California Public Utilities Code Sections 1201- 1220.

During construction of both the temporary and permanent road, temporary crossing of BNSF tracks, and permanent crossing of BNSF tracks, the Applicant shall prepare and coordinate with BNSF Railway; California Public Utilities Commission; and Federal Railroad Administration a safety plan for ensuring that all state and federal safety requirements for railroad crossings are followed.

That plan shall be reviewed and coordinated with BNSF Railway, appropriate regulatory agencies, and the CPM to ensure compliance with all state and federal requirements and approved by those agencies s well as the CPM.

Verification: At least 30-days prior to the start of mobilization, right-of-way easements shall be obtained and presented to the CPM. In addition to the BSNF easement, the project owner shall provide the CPM a copy of all documents pertaining to approvals from the Federal Railroad Administration (FRA); and the California Public Utilities Commission (CPUC). A courtesy copy shall be provided to the California Department of Transportation (Caltrans), District 8 Office. Within 30 days after the completion of each road and railroad crossing improvements, the project owner shall provide the CPM with a copy of written approvals from BNSF, FRA, and CPUC as to the adequacy and safety of the roads and bridge.

TRANS-2 – **Traffic Control Plan.** Prior to the start of construction for the Calico Solar Project, the project owner shall prepare and implement a traffic control plan (TPC) for the project's construction and operation traffic. The plan shall address the movement of workers, vehicles, and materials, including arrival and departure schedules and designated workforce and delivery routes.

For the project's construction period, the plan is to be designed to take into account any impediments that may or could occur because of the need to cross BNSF Railway tracks. In developing this plan the Applicant is required to consider off-site parking and staging in designated areas and the use of buses to transport workers to and from the construction site.

Once the bridge is constructed, the Applicant shall prepare a parking and staging plan to require all project-related parking to occur on-site or in designated off-site parking areas and that staging occurs on-site in a specifically-defined area.

The project owner shall consult with the BNSF Railway; County of San Bernardino; and the California Department of Transportation (Caltrans) District 8 office in the preparation and implementation of the plan and shall submit the proposed traffic control plan to the BNSF Railway; County of San Bernardino; and Department of Transportation (Caltrans) District 8 office in sufficient time for review and comment. The plan, along with any written comments from the BNSF Railway, County of San Bernardino; and Department of Transportation (Caltrans) District 8 office, shall then be submitted to the Energy Commission Compliance Program Manager (CPM) for review and approval prior to the proposed start of construction and implementation of the plan.

The traffic control plan shall include:

- A work schedule and end-of-shift departure plan designed to ensure that stacking does not occur on intersections necessary to enter and exit the project site. The project owner shall consider using one or more of the following measures designed to prevent stacking: (1) staggered work shifts; (2) off-peak work schedules; and (3) restricting travel to and departures from the project site to ten or fewer vehicles every three minutes during peak travel hours on Interstate 40.

- Provisions for at least two flaggers stationed at the BNSF Railway crossing during each day of construction until the proposed bridge is constructed and operating. Flaggers shall be present at the BNSF Railway crossing to ensure the safe crossing of workers, visitors, and delivery persons arriving and leaving the project site.
- Provisions for an incentive program such as an employer-sponsored Commuter Check Program to encourage construction workers to carpool or use van or bus service or both.
- Provisions for delivering and staging of heavy equipment and building material deliveries as well as for the movement of hazardous materials to the site.
- Limitation on truck deliveries to the project sites to only off-peak hours to ensure adequate exit and entry at appropriate intersections and railroad tracks.
- On I-40, provisions for direction and redirection of construction traffic with flag persons as necessary to ensure traffic safety and minimize interruptions to non-construction-related traffic flow.
- Placement of signage, lighting, and traffic control devices at the project construction site and laydown areas.

- Signage along eastbound and westbound appropriate roads and at the entrance of the Hector Road I-40 northbound and southbound off-ramps to notifying drivers of construction traffic throughout the duration of the construction period.
- A heavy-haul plan designed to address the transport and delivery of heavy and oversized loads requiring permits from Department of Transportation (Caltrans) or other state and federal agencies.
- Parking for workforce and construction vehicles, including consideration of off-site parking prior to opening of bridge across BNSF Railway tracks, to prevent stacking on I-40 roads and intersections and facilitate timely and safer crossing across tracks for workers, visitors, and delivery persons as well as for emergency access.

Verification: At least 30-days prior to the start of construction, including any grading or site remediation on the power plant site or its associated easements, the project owner shall submit the proposed traffic control plan to BNSF Railway; San Bernardino County; and the Department of Transportation (Caltrans) District 8 office for review and comment and to the CPM for review and approval. The project owner shall also provide the CPM with a copy of the transmittal letter to BNSF Railway; San Bernardino County; and the Department of Transportation (Caltrans) District 8 office requesting review and comment.

At least 30 calendar days prior to the start of construction, the project owner shall provide copies of any comment letters received from BNSF Railway; San Bernardino County; and the Department of Transportation (Caltrans) District 8 office along with any changes to the proposed traffic control plan for CPM review and approval.

TRANS-3 – Limitations on Vehicle Size and Weight. Due to the dynamic nature of the construction environment, at least 30 days prior to the start of construction, the project owner shall consult with the BNSF Railway, San Bernardino County, and the Caltrans District 8 office to coordinate procedures for obtaining required and necessary easement and permits on an as-needed basis.

After consultation with BNSF Railway, San Bernardino County, and the Caltrans Office District 8 office, the project owner shall prepare a coordination plan designed to comply with limitations imposed by California Department of Transportation (Caltrans) District 8 office and other relevant jurisdictions including San Bernardino County on vehicle sizes and weights. In addition, the project owner or its contractor shall obtain necessary transportation permits from Caltrans and all relevant jurisdictions for use of roadways.

Verification: At least 30 calendar days prior to construction, a copy of the coordination plan shall be provided to the CPM for review and comment. In addition, the project owner shall provide copies of easements and permits

obtained from BNSF Railway; San Bernardino County; and the Caltrans District 8 office to the CPM.

In the Monthly Compliance Reports (MCRs), the project owner shall submit copies of any easements or permits or both received during that reporting period. In addition, the project owner shall retain copies of these permits and supporting documentation in its compliance file for at least six months after the start of commercial operation. The project owner shall retain copies of BNSF Railway easements for the life of the project.

TRANS-4 – Encroachment into Public Rights of Way. The project owner and its contractor shall comply with Caltrans and other relevant jurisdictions limitations for encroachment into public rights-of-way and shall obtain necessary encroachment permits from Caltrans and all relevant jurisdictions.

Verification: In the monthly compliance reports (MCRs), the project owner shall submit copies of permits received during the reporting period. In addition, the project owner shall retain copies of these permits and supporting documentation in its compliance file for at least six months after the start of commercial operation.

TRANS 5 – Restoration of All Public Roads, Easements, and Rights-of-Way. The project owner shall restore all public roads, easements, and rights-of-way that have been damaged due to project-related construction activities to original or near-original condition in a timely manner, as directed by the CPM. Repairs and restoration of access roads may be required at any time during the construction phase of the project to assure safe ingress and egress.

Verification: At least 30 days prior to the start of mobilization, the project owner shall photograph or videotape all affected public roads, easements, and right-of-way segments and/or intersections and shall provide the CPM, the affected local jurisdictions, and Caltrans (if applicable) with a copy of these images. The project owner shall rebuild, repair and maintain all public roads, easements, rights-of-way in a usable condition throughout the construction phase of the project.

In addition, the project owner shall consult with the County of San Bernardino and California Department of Transportation (Caltrans) District 8 and notify them of the proposed schedule for project construction. The purpose of this notification is to request that San Bernardino County and Caltrans consider postponement of public right-of-way repair or improvement activities in areas affected by project construction until construction is completed and to coordinate with the project owner regarding any concurrent construction-related activities that are planned or in progress and cannot be postponed. The purpose of this requirement is to help ensure cooperation from San Bernardino County and Caltrans so that the Applicant's construction work is accommodated and the project can be completed in a timely and safe manner.

TRANS 6 – Permits/Licenses to Transport Hazardous Materials. The project owner shall ensure that permits and/or licenses are secured from the California Highway Patrol and Caltrans for the transport of hazardous materials.

Verification: The project owner shall include in its monthly compliance reports (MCRs), copies of all permits and licenses acquired by the project owner or contractors or both concerning the transport of hazardous substances.

TRANS-7 – Prevention of Glare from SunCatchers to BNSF Train Crews and Motorists on Hector Road; Route 66; and Interstate 40

This Condition of Certification is divided into two sections. Section One concerns the testing of signals to ensure that they are easily visible to train engineers. Section Two concerns general location, operating, and reporting procedures pertaining to the SunCatcher mirrors.

I. Signal Light Modifications

Immediately after the installation of the first SunCatcher mirrors near the BNSF Railway right-of-way but before operation of the mirrors, the Applicant will work with BNSF Railway to ensure that the operation of the SunCatcher mirrors will not interfere with the railroad engineers' ability to accurately see and respond to appropriate signal lights.

The Applicant will work with BNSF Railway to determine the appropriate size and design of shields to be affixed to signal lights as well as measures to increase the contrast of the signal light, including orienting the appropriately sized shield around the signal light and increasing the brightness of the signal light emitter over historic light levels using current LED signal technology.

In addition, the Applicant will work with BNSF Railway to determine emergency reporting procedures to immediately identify, report, and repair any malfunctioning or missing shield.

Verification: Signal Light Modifications. At least 45 days before the first SunCatchers are operated, the Applicant shall consult with BNSF to prepare a plan to design, develop, and manufacture the appropriate shields to ensure that railroad engineers can accurately identify and respond properly to signal lights. As part of the development process, the Applicant shall coordinate the development of the plan as well as the manufacture and installation of these shields with BNSF Railway, California Public Utilities Commission, and the CPM. The completed plan shall be submitted to the CPM for review and approval at least 30 days prior to the start of operations.

At least 30 days before the first SunCatchers are operated, the Applicant shall consult with BNSF Railway to test the shielded signal lights to ensure that the railroad engineers can accurately identify and respond to the appropriate signal. The CPM shall also be notified when testing shall occur.

Once BNSF Railway, California Public Utilities Commission has accepted the modified shield and verified that it allows the railroad engineers to accurately identify and respond to the proper signal, the Applicant, along with BNSF Railway, shall coordinate methods and reporting procedures to ensure their safe and effective use.

The Applicant shall develop, with BNSF Railway's input and approval, a monitoring plan that shall provide for the immediate reporting of any defective shield as well as its immediate replacement. This plan shall include methods for coordinating and implementing these reporting procedures with all necessary federal, state, and local agencies as well as BNSF Railway. This monitoring plan shall be submitted to the CPM for review and approval.

In addition, the project owner shall provide the CPM a monthly report that includes the date, time, location, response, and response time of any malfunction, public complaint, or video detection covered by the emergency glare response program; any determinations made by the project owner as to cause of the problem; and methods taken to resolve the problem. A copy of these reports shall be kept by the project owner for at least five years.

II. General Location, Operating, and Reporting Procedures

The project owner shall accomplish the following:

1. Modify the offset tracking procedure to use a 25-degree offset instead of the proposed 10-degree offset.

2. Ensure the morning stow position-to-offset position transitions occur at least 30 minutes before sunrise and end in the 25 percent offset tracking position.

3. Ensure that the "Night Stow" should occur 30 minutes after sunset to avoid any intrusive light effects.

4. Ensure that the minimum distance from any SunCatcher reflector assembly to the BNSF right-of-way (ROW) or any public roadway shall be a minimum of 223 feet to reduce the possibility of temporary flash blindness. In addition, during the normal tracking and offset tracking positions, the project operator shall adhere to the following procedures and specifications:

5. Develop and implement an emergency glare response program that includes all of the following:

    a. Monitoring plan that requires (1) the use of video surveillance trucks to identify and document intrusive light conditions, covering all hours of operation on a weekly basis for five years; and (2) monitoring of the status of individual SunCatchers during all hours of operation to immediately

identify any malfunctioning units with the potential to create glare within the BNSF Railway right-of-way; or on I-40, Route 66, or Hector Road.

b. Procedures that allow motorists and train operators, including AMTRAK and BNSF, to report to the project owner, as well as to Caltrans, California Highway Patrol (CHP), and the County of San Bernardino. In the case of complaints from motorists, any problems with glint or glare resulting from the operation or malfunction of SunCatchers. The procedures developed by the Applicant for public reporting of glare problems shall be developed in consultation with BNSF Railway, California Department of Transportation (Caltrans) District 8 office, California Highway Patrol (CHP), and San Bernardino County. These procedures shall include a toll-free number for reporting problems as well as a process for written notification to the project owner and to California Department of Transportation (Caltrans, District 8) and San Bernardino County, in the case of complaints from motorists; or to AMTRAK or BNSF Railway, or both, in the case of complaints from train operators or passengers.

c. Procedures for the immediate (1) repositioning of any malfunctioning units to avoid potential glare within the BNSF Railway right-of-way or on I-40, Route 66, or Hector Road; investigation and resolution of complaints received from train operators or motorists or both.

d. Process for evaluating intrusive light conditions identified by the video surveillance and determining, in consultation with the CPM, what operational or other changes may be warranted to reduce or eliminate the identified intrusion.

e. Procedures for documenting instances when malfunctioning units with the potential to create glare are identified, or when train operators or motorists complain of glare, and the actions taken in response to those instances or complaints.

f. Period reports to the Project CPM detailing instances of SunCatcher malfunction, public complaints about glare, or video-detected problems that are covered by the emergency glare response program.

Verification: General Location, Operating, and Reporting. At least 30 days before the first SunCatchers are tested or operated, the project owner shall submit documentation to the CPM necessary to verify that the operational measures and setback requirements included in this Condition of Certification will be implemented and achieved.

At least 15 days before the SunCatchers are tested or operated, the project owner shall .submit to the CPM, for the CPM's review and approval, a copy of the project owner's draft emergency glare response program, including methods for coordinating and implementing the program with all state, county, and local agencies as well as BNFS Railway and AMTRAK.

Beginning no more than 30 days after the first SunCatchers are tested or operated and continuing for the duration of project operations, the project owner shall develop a procedure for any motorist, passenger, worker, train personnel, or visitor to report a malfunctioning unit and make those procedures known and available to those groups. The project owner shall provide the CPM a monthly report that includes the date, time, location, response, and response time of any malfunction, public complaint, or video detection covered by the emergency glare response program; any determinations made by the project owner as to cause of the problem; and methods taken to resolve the problem. A copy of these reports shall be kept by the project owner for at least five years.

C. SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

The socioeconomic and environmental justice analysis reviewed the demographic characteristics of the project site to evaluate the potential impacts of project-induced population increases and the fiscal and physical capacities of local communities to accommodate population increases. The project's economic benefits, including local project-related expenditures, property and sales tax revenues, as well as school impact fees, are also discussed. Additionally, an environmental justice screening analysis is included to determine whether the project will result in disproportionate impacts on minority and/or low-income populations and, if so, whether mitigation is required.

The evidence for this topic was uncontested. (Ex. 300, p. C.10-1 et seq.)

SUMMARY AND DISCUSSION OF THE EVIDENCE

Under the CEQA Guidelines, a project may have a significant effect on socioeconomics if it would:

- Induce substantial population growth in an area, either directly or indirectly;
- Displace substantial numbers of people and/or existing housing, necessitating the construction of replacement housing elsewhere; or
- Adversely impact acceptable levels of service for fire and police protection, schools, parks and recreation, and other public facilities. (Ex. 300, p. C.10-2.)

The Applicant will construct the Calico Solar Project in two phases over an approximate 41-month period. The project site will be located on undeveloped land in San Bernardino County, primarily on BLM-administered land. The proposed project site is approximately 37 miles east of the City of Barstow. This assessment used San Bernardino County and Riverside County labor markets to evaluate construction worker availability. To determine if a project would have any significant impacts, Staff analyzed whether community services and capacities could absorb the project- related impacts. The project's property taxes, sales tax, local school impact fees, or development fees can help local governments augment public services. If the project's impacts could appreciably strain or degrade these services, then the impact would be significant adverse. (Exs. 1, p. 5.10-2; 300, p. C.10-2 and C.10-4.)

1. Potential Impacts

An increased demand for labor could result in an influx of non-local workers and their dependents, resulting in a strain on housing, schools, parks and recreation, law enforcement, and medical services. (Ex. 300, p. C.10-2 to C.10-3.)

During the 41-month construction period for the Calico Solar Project, the project owner will employ an average of 400 construction workers a month, with a peak of 700 workers in the seventh month. The types of construction workers sought by the project will include laborers, craftspeople, technicians, supervisory, support, and management personnel. The construction trades include occupations that will assemble the proposed SunCatcher units; workers engaged in these occupations will require on-site training. (Exs. 1, p. 5.10.16; 300, p. C.10-7.) Construction employee estimates remain the same for the 633.5 as for the 850 MW facility since the quantity of people will not change although the timeframe may be shorter for these people to be employed on-site doing construction. The Applicant assumes, however, that the construction period is the same length to build in some additional flexibility on commissioning of the power plant.

The evidentiary record indicates that the total labor by skill in the Riverside-San Bernardino-Ontario and Los Angeles County Metropolitan Statistical Areas (MSA) is more than adequate to provide construction labor for the Calico Solar Project. Because the majority of the construction workforce resides within San Bernardino and Riverside Counties, we find that construction of the project will not adversely induce substantial population growth. (Ex. 300, pp. C.10-6 to C.10-7.)

The record indicates that power plant construction workers will typically commute up to two hours from their homes to a project site rather than permanently relocating to the site. (Exs. 1. p. 5.10-16; 300. p. C.10-2.) Because of the large labor force within commuting distance of the project, the majority of construction and operations workers will commute to the project daily from their existing residences. Some workers may stay in local motels or other rental properties during the workweek but return to their homes on weekends for the duration of their job assignments. The evidence shows that an adequate supply of motels and rental properties is available in the City of Barstow, and San Bernardino and Riverside Counties to accommodate weekly commuters and/or temporary residents. (Exs. 1, p. 5.10.22; 300, p. C.10-8.)

The project would have 180 full-time employees, the same as for the 850 MW facility. Maintenance needs do not increase or decrease on a linear basis depending on the number of SunCatchers, and a certain number of people is required to operate a facility regardless of the size within certain parameters. The majority of these employees are expected to already reside in the area or within a one hour commute of the project site. The Applicant expects to recruit 20 operational jobs from outside the immediate project area. Some workers may relocate with their families to the Barstow area with no expected adverse impacts on the local infrastructure or community services. (Exs. 1, § 5.10.2.2; 300, p. C.10-8.)

The Calico Solar Project will be located primarily on BLM-administered land in a relatively remote and largely uninhabited area. Therefore, we find that construction and operation of the project will not adversely impact existing housing supply or require new housing construction. (Exs. 1, § 5.10.2.2: 300, p. C.10-8 to C.10-9.)

Since project-induced population changes will be minimal, construction and operation of the project will not result in significant adverse impacts on schools, parks and recreation, law enforcement, hospitals, or emergency services in the local communities. (Exs. 1, §§ 5.10.2.2 and 5.10.2.3; 300, pp. C.10-9 to C.-10-12.) See further discussion in the **Worker Safety and Fire Protection** section of this Decision regarding fire safety services.

The Calico Solar Project site is located within the Silver Valley Unified School District. The Barstow Unified School District is also located within the vicinity of the project site. Section 17620 of the California Education Code allows school districts to levy school development fees for new commercial or industrial construction within school district boundaries. (See also Govt. Code, §§ 65996-65997.) These fees are based on the project's square feet of habitable space. Because the main services complex of the Calico Solar Project (considered "habitable space") will be constructed entirely on BLM land, no private land would be affected and therefore, the provisions of Education Code Section 17620 would not apply to this project. In addition, the Silver Valley Unified School District indicated that the proposed project will be exempt from the school impact fees because it would be developed on federal lands. (Ex. 1. p. 5.10 13; Ex. 300, p. C.10-12.)

2. Section 25523(h) Public Benefit Findings

Public Resources Code section 25523(h) requires discussion of the project's economic benefits. The project's fiscal benefits, based on property value, payroll, local purchases of equipment, supplies, and associated expenses, include the following estimates:

Property Taxes. Under existing state law, the Calico Solar Project is exempt from property taxes as a qualifying solar energy project.[1] If the property tax exemption should lapse, the estimated tax would be $220,000 based on the local tax rate of 1.1 percent applied to the solar project components (storage, power conditioning equipment, transfer equipment, and parts relating to functioning of these items). (Ex. 1, p 5.10-30.)

Capital Costs and Payroll. The total capital cost of the Calico Solar Project is estimated at $1 billion for the final build-out of both phases of development. The total construction payroll over 41 months is estimated at $159 million. The construction payroll, local purchases of materials and supplies, and sales tax revenues generated by the expenditures will have a temporary beneficial impact on the San Bernardino County economy. (Exs. 1, p 5.10-24; 300. P. C.10-19.)

The annual operations and management (O&M) budget for the project is estimated at $8.4 million for goods and supplies. The project will have an annual payroll of approximately $10.1 million, which would include all salaries, overtime, benefits, and incentives. The payroll, local purchases, and sales tax revenues generated by the expenditures will likely have long-term beneficial effects on the San Bernardino County economy. (Exs. 1. p. 5.10-29; 300, p. C.10-19.)

Indirect and Induced Benefits. The project will also create indirect economic benefits and induced short-term employment in the study area. The Applicant used an Impact Analysis for Planning (IMPLAN) input-output model of the study area to estimate the project's multiplier effects associated with construction and operation. The IMPLAN results show that purchases by construction workers and permanent employees as well as project expenditures for materials and supplies will generate quantifiable secondary economic benefits that are likely to occur if the project is developed.

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[1] California Revenue and Taxation Code, Section 73.

3. Environmental Justice Screening Analysis

Executive Order 12898, "Federal Actions to address environmental justice in Minority Populations and Low-Income Populations" requires state and federal agencies to incorporate environmental justice concerns in their environmental reports. The agencies are required to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations.

In energy siting cases, Commission staff uses a demographic screening analysis to determine whether a low-income and/or minority population exists within the potentially affected area of the proposed site. The potentially affected area consists of a six-mile radius of the site and is consistent with air quality modeling of the range of a project's air quality impacts. The demographic screening is based on information contained in two documents: "*Environmental Justice: Guidance Under the National Environmental Policy Act"* (Council on Environmental Quality, December, 1997) and "*Guidance for Incorporating Environmental Justice Concerns in EPA's Compliance Analyses"* (U.S. Environmental Protection Agency, April, 1998). The screening process relied on Year 2000 U.S. Census data to determine the presence of minority and below-poverty-level populations. (Ex. 300, p. C.10-5.)

The assessment included mapping the minority populations within the six-mile radius of the project site and reviewing the analysis for all of the technical issue areas addressed in the Calico Solar Project SA/DEIS. If minority populations are identified then the analysis also considers all potential impacts and mitigation measures and whether there would be a significant impact on a minority or low-income population. (Ex. 300, pp. C.10-4 and C.10-5.)

According to existing federal guidance, minority individuals are defined as members of the following groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. A minority population, for the purposes of environmental justice, is identified when the minority population of the potentially affected area is greater than 50 percent or meaningfully greater than the percentage of the minority population in the general population or other appropriate unit of geographical analysis. (Ex. 300, p. C-10-5.)

The total population within the six-mile radius of the proposed site is 83 persons and the total minority population is 20 persons, or about 24 percent of the total

population. (Ex. 300, p. C.10-5.) Therefore, we find that there are no environmental justice impacts related to the Calico Solar Project. (Ex. 300, pp. C.10-5 to C.10-6 and C.10-21.)

4. Cumulative Impacts

Cumulative socioeconomic impacts could occur when more than one project in the same area has an overlapping construction schedule, thus creating a demand for workers that cannot be met locally. An increased demand for labor could result in an influx of non-local workers and their dependents, resulting in a strain on housing, schools, parks and recreation, law enforcement, and medical services. (Ex. 300, p. C-10-17.)

The evidence shows that the total construction labor force by MSA for the region is more than sufficient to accommodate the labor needs for construction of power generation facilities and other large industrial projects. Because of the robust local and regional construction labor force, the record concluded that there would be no influx of non-local workers and their dependents to the project area and no significant and adverse impacts on housing, schools, parks and recreation, law enforcement, and emergency medical services. Therefore, we find that construction and operation of the Calico Solar Project will not contribute to any significant adverse cumulative socioeconomic impacts. (Ex. 300, p. C-10-18.)

5. Facility Closure and Decommissioning

The solar generating facility is expected to have a lifespan of 40 years. Temporary closure would be a result of necessary maintenance, hazardous weather conditions, or damage due to a natural disaster. Permanent closure would be a result of damage that is beyond repair, adverse economic conditions, or other significant reasons. Both temporary and permanent closures would require the Applicant to submit and receive approval for a contingency plan or a decommissioning plan. (Exs.1, § 3.12; 300, p. C.10-20.)

Upon closure of the facility or decommissioning, the Applicant would be required to restore lands affected by the project to their pre-project state. The proposed project site is located on undeveloped land with current evidence of high levels of disturbance (due to OHV use). Given the temporary nature of decommissioning activities and the eventual return of the lands to their current state, we find that decommissioning would not adversely impact the socioeconomic characteristics of the project area.

6. Mitigation Measures/Proposed Conditions of Certification

Based on the evidence provided for the Calico Solar Project, we find that the project does not need Conditions of Certification for Socioeconomics and Environmental Justice. The project owner will comply with all applicable regulations.

FINDINGS OF FACT

Based on the uncontroverted evidence of record, we make the following findings:

1. A large, skilled labor pool in San Bernardino and Riverside Counties is available for construction and operation of the project.

2. Over the 44-month construction period, an average of approximately 400 construction workers a month, with a peak workforce of about 700 for month seven, will be needed.

3. The project will hire approximately 180 permanent, full-time employees mostly from the local area for project operations.

4. The project will not cause an influx of a significant number of construction or operation workers to permanently relocate to the local area because most of the workers would reside within commuting distance of the site. However, during operation, he Applicant does estimate that 20 workers may permanently relocate to the project area.

5. There is an adequate supply of motels and rental properties within the project vicinity to accommodate workers who stay in the area temporarily during their work assignments and return to their homes on hiatus.

6. The project will not result in significant adverse effects on local employment, housing, schools, parks and recreation, law enforcement, or emergency services.

7. The total capital cost of Calico Solar Project is estimated at $1 billion.

8. The total construction payroll for both phases of Calico Solar Project is estimated at over $159 million.

9. The anticipated construction payrolls, the local purchases of materials and supplies, and the sales tax revenues generated by the expenditures will have a temporary beneficial impact on the San Bernardino economy.

10. When both phases of Calico Solar Project are completed, the project will provide an annual operations payroll of approximately $10 million and an annual operations and maintenance budget estimated at over $8.4 million.

11. The project owner will not be required to pay the school development fee to the Silver Valley Unified School District because the main services complex would be constructed entirely on BLM land, and no private land will be affected.

12. The project will provide direct, indirect, and induced economic benefits to, San Bernardino County.

13. No minority population or low-income population within a six-mile radius of the project site exceeds the 50 percent threshold established in environmental justice guidance.

14. The project will not create disproportionate impacts on minority and/or low-income populations because the project did not result in any significant health or environmental impacts to any population in the project vicinity.

15. Construction and operation of the project will not result in any direct, indirect, or cumulative significant adverse socioeconomic impacts.

CONCLUSIONS OF LAW

1. We therefore conclude that implementation of all Conditions of Certification in this Decision ensures that the project will comply with all applicable laws, ordinances, regulations, and standards relating to socioeconomic factors as identified in the pertinent portions of **Appendix A**.

2. The project will not create any significant socioeconomic effects as defined under the National Environmental Policy Act or the California Environmental Quality Act.

3. The project will not create any disproportionate adverse effects on minority or low-income populations.

No Conditions of Certification are required.

D. NOISE AND VIBRATION

The construction and operation of any power plant create noise. A combination of factors such as loudness, time of day, and proximity to sensitive receptors determines whether the source of noise will cause significant adverse impacts. In some cases, vibration may be produced as a result of construction activities, such as blasting or pile driving, which may cause structural damage and annoyance. The discussion below summarizes the noise and vibration potentially produced by the construction and operation of the Calico Solar Project, and presents the recommended mitigation to reduce significant environmental impacts and comply with applicable law.

SUMMARY AND DISCUSSION OF THE EVIDENCE

The Calico Solar Project (Calico Solar) would be constructed on a 4,613 acre site located in San Bernardino County, approximately 37 miles east of the City of Barstow, California. The site is on undisturbed public land managed by the BLM. (Ex. 300, p. C.9-6.)

Noise sources in the project vicinity include train traffic, highway traffic, aircraft traffic, wind, and wildlife. Two sensitive receptors (two residences) were identified in the vicinity of the project site. The closest one is a single residence (SR1) located approximately 1,200 feet from the project's southwest border. A second residence (SR2) is located approximately 7,800 feet east of the project boundaries. (Exs. 1, §5.12.1.1, Figure 5.12 1; 300, p. C.9-6.)

The baseline used to compare predicted project noise to existing ambient noise was based on an applicant-prepared ambient noise survey (Exs. 1, §5.12.1.4; 300, p. C.9-7.) The survey was conducted from November 2 to November 7, 2008, and monitored existing noise levels at two locations near SR1. Existing ambient noise measurements were not taken at the second sensitive receptor because one of the measurements taken for SR1 was considered to be representative of the noise levels that could occur at SR2. (Ex. 300, p. C.9-7.) **Noise Table 1** provides the results of the ambient noise measurements.

Noise Table 1
Summary of Measured Ambient Noise Levels

Measurement Location	Measured Noise Levels, dBA		
	L_{eq} – Daytime[1]	L_{eq} – Nighttime[2]	L_{90} – Nighttime[3]
LT3/SR1	65	63	47
LT4/SR2	41	38	35

Source: Ex. 300, p. C-9-7
[1] Staff calculations of average of 10 daytime hours (Ex. 200, p. C-9-7.)
[2] Staff calculations of average of 8 nighttime hours (*Id.*)
[3] Staff calculations of average of 4 consecutive quietest hours of the nighttime (*Id.*)

1. Construction Noise

Construction noise is usually considered to be temporary. The Calico Solar Project will be constructed in two phases over a period of 41 months. (Exs.1, § 5.12.2.1; 300, p. C.9-8.) This construction timeframe is significantly longer than for a typical gas-fired power plant. However, the Applicant will construct the project in modular units. Each module will take approximately four months to construct. Thus, maximum construction noise would occur during the construction of the module closest to the receptor for a duration of four months and would decrease as construction activity moved on to other modules, further from the receptor. (Ex. 300, p. C.9-9.)

Aggregate construction noise may be expected to reach levels as high as 62 dBA L_{eq} at the sensitive receptor east of the project, SR2, for a period of approximately four months; an increase of 21 dBA during daytime hours (see **Noise Table 5**, above). At SR1 it would be even higher—74dBA. Such increases are substantial enough to be perceived as annoying at SR1 and SR2 and would generally be considered a significant impact. (Ex. 300, p. C.9-9.) However, construction noise levels at the sensitive receptors will diminish as modules are completed. The highest construction noise levels at those receptors will be for a period of four months. In addition, the San Bernardino County Development Code prohibits noisy construction activities at all times except from 7:00 a.m. to 7:00 p.m. Monday through Friday and altogether on Sundays and federal holidays. To ensure that these hours are enforced, we adopt Condition of Certification **Noise-6**, which requires compliance with this time restriction. (Ex. 300, p. C.9-9.)

In addition, we adopt Conditions of Certification **Noise-1** and **Noise-2** to require a notification process to alert residents to proposed project activities and a complaint process that requires the Applicant to resolve problems caused by project-related noise.

Linear facilities include two miles of new electrical transmission lines interconnecting a proposed new on-site substation to the transmission system on the project's eastern boundary. The transmission lines would not pass any sensitive receptors. While construction noise levels for these facilities will be noticeable, no particular area is exposed to noise for more than a few days. Further, construction activities would be limited to daytime hours. (Ex. 300, p. C.9-10.)

The only construction activity likely to produce vibration that could be perceived off-site would be pile driving. Although the Applicant did not identify pile driving as part of its application, noise associated with pile driving was evaluated. We adopt Condition of Certification **Noise-6** to ensure that pile driving will be limited to daytime hours. (Ex. 300, p. C.9-10.)

The Applicant acknowledges the need to protect construction workers from noise hazards and has recognized applicable LORS that would provide this protection to workers. (Ex. 1, § 5.12.2.1.) To ensure that construction workers are adequately protected, we adopt Condition of Certification **Noise-3**. (Ex. 300, p. C.9-10.)

With the implementation of the Conditions of Certification described above, we find that temporary noise impacts from construction of the Calico Solar Project would be less than significant.

2. Operational Noise

A power plant operates as a steady, continuous noise source. As such, power plant noise contributes to, and becomes part of, the background noise level. Where power plant noise is audible, it will tend to define the background noise. The primary noise sources of the project include the Stirling Engines (including generator, cooling fan, and air compressor), step-up transformers, and the new substation. (Ex. 300, p. C.9-11.)

The Applicant performed noise modeling to determine the project's noise impacts on sensitive receptors. **Noise Table 2** summarizes the results of this modeling.

Noise Table 2
Power Plant Operational Noise Impacts at Nearest Sensitive Receptors

Location	Power Plant Noise Level, dBA L_{eq}	Ambient Noise Level, dBA L_{eq}	Cumulative Noise Level, dBA	Change from Ambient Level dBA
SR1	57	65	66	+1
SR2	52	41	52	+11

Source: Ex. 300, p. C.9-12

As a solar thermal generating facility, the Calico Solar Project would operate only during daytime hours, typically 15 hours per day during the summer (with fewer hours during the fall, winter, and spring), when sufficient solar insolation is available. (Ex. 300, p. C.9-12.)

Power plant noise levels are predicted to be no greater than 57 dBA L_{eq} and 52 dBA L_{eq} at receptors SR1 and SR2, respectively, during daytime operation. When projected plant noise is added to the daytime ambient value, the cumulative level is higher than the ambient value at location SR1 by an inaudible amount (see **Noise Table 2**). The cumulative level at location SR2 is considerably higher, more than 10 dBA, than the ambient value. At night, no change in ambient noise at any sensitive receptor would result from plant operation. (Ex. 300, p. C.9-12.)

Daytime project-operating noise increases of up to 10 dBA are considered below the level of significance. In order for the cumulative level to be no more than 10 dBA over ambient at SR2, the project noise alone must not exceed 51 dBA at location SR2. Thus, we find that the Applicant's predicted noise level of 52 dBA must be reduced to 51 dBA, at SR2. We adopt Condition of Certification **Noise-4** to ensure that the project does not increase operational noise levels more than 10 dBA. (Ex. 300, p. C.9-12.)

Another source of disturbance would be strong tonal noises. Tonal noises are individual sounds (such as pure tones) that, while not louder than permissible levels, stand out in sound quality. The Applicant can avoid the creation of annoying tonal (pure-tone) noises by balancing the noise emissions of various power plant features during plant design. To ensure that tonal noises do not cause annoyance, we adopt Condition of Certification **Noise-4**. (Ex. 300, p. C.9-12.)

Noise effects from the electrical interconnection line typically do not extend beyond the right-of-way easement of the line. Therefore, we find that noise from the electrical interconnection would be inaudible to receptors. (Ex. 300, p. C.9-12.)

Vibration from an operating power plant could be transmitted by two chief means; through the ground (groundborne vibration) and through the air (airborne vibration). The operating components include a reciprocating engine, cooling fans, and air compressor. All of these pieces of equipment must be carefully balanced in order to operate. Given the distributive layout of the project, we find that the ground borne vibration from the Calico Solar Project would be undetectable by any likely receptor. (Ex. 300, p. C.9-13.)

Airborne vibration (low frequency noise) can rattle windows and objects on shelves and can rattle the walls of lightweight structures. None of the project equipment is likely to produce low frequency noise; this makes it highly unlikely that the Calico Solar Project would cause perceptible airborne vibration effects. (Ex. 300, p. C.9-13.)

The Applicant acknowledges the need to protect plant operating and maintenance workers from noise hazards and has committed to comply with applicable LORS. (Ex. 1, § 5.12.2.2.) To ensure that plant operation and maintenance workers are adequately protected, we adopt Condition of Certification **Noise-5**. (Ex. 300, p. C.9-13.)

3. Cumulative Impacts

Section 15130 of the CEQA guidelines (Cal. Code Regs., tit. 14) requires a discussion of cumulative environmental impacts. Cumulative impacts are two or more individual impacts that, when considered together, compound or increase the impact.

The Applicant identified two potential projects in the vicinity of Calico Solar that might cause cumulative noise impacts. The Applicant originally planned to propose an additional solar project (SES Solar Three) northwest of the Calico Solar project site. Subsequent to the AFC filing, the Applicant withdrew the Plan of Development for the SES Solar Three Project with the BLM and does not intend to develop the site. Another development is proposed west of the Calico Solar Project. The proposed solar project would be located on the opposite side of the Calico Solar Project site and the identified residences, and no significant

cumulative impact is expected. There is also a wind power facility that has been proposed to the east of the Calico Solar project site. Noise data from the proposed wind power facility is not available for the cumulative impact assessment. Additional projects outside the immediate vicinity of Calico Solar would not pose a potential for cumulative noise impacts. (Exs. 1, § 5.12.3; 300, p. C.9-19.) There is no evidence in the record that there are any other projects which, when combined with the Calico Solar Project, would have a cumulatively considerable effect on noise impacts in the project area.

4. Closure and Decommissioning

Upon closure of the Calico Solar Project, all operational noise from the project would stop, and no further adverse noise impact from its operation would be possible. The remaining potential temporary noise source would be the dismantling of the solar structures and equipment and any site restoration work that may be performed. Since this noise would be similar to that caused by the original construction, it can be similarly treated, that is, noisy work could be performed during daytime hours, with machinery and equipment properly equipped with noise-reducing devices. Any noise LORS that were in existence at that time would apply. Applicable Conditions of Certification included in the Energy Commission Decision would also apply unless modified. (Ex. 300, p. C.9-19.)

With the implementation of the Conditions of Certification described above, we find that noise impacts from decommissioning of the Calico Solar Project would be less than significant.

5. Compliance with Laws, Ordinances, Regulations and Standards (LORS)

In this section we discuss the project's compliance with applicable noise-related LORS. The applicable federal, state and local LORS are set forth in **Appendix A** of this Decision.

Construction of an industrial facility such as a power plant is typically noisier than permissible under usual noise ordinances. In order to allow the construction of new facilities, construction noise during certain hours of the day is commonly exempt from enforcement by local ordinances.

The Applicant has predicted the noise impacts of project construction on the nearest sensitive receptors. A comparison of construction noise estimates to measured ambient conditions is summarized in **Noise Table 3**.

Noise Table 3
Predicted Power Plant Construction Noise Impacts

Receptor	Highest Construction Noise Level[1] (dBA L_{eq})	Measured Existing Ambient[2] (dBA L_{eq})	Cumulative (dBA L_{eq})	Change (dBA)
SR1 – South Residence	74	65 daytime	75 daytime	+10 daytime
		63 nighttime	74 nighttime	+11 nighttime
SR2 – East Residence	62	41 daytime	62 daytime	+21 daytime
		38 nighttime	62 nighttime	+24 nighttime

Source: Ex. 300, p. C.9-8.

The San Bernardino County Development Code exempts construction noise from established limits during the daytime hours of 7:00 a.m. to 7:00 p.m. except Sundays and federal holidays. To ensure that these hours are, in fact, enforced, we have adopted Condition of Certification **NOISE-6**.

Compliance with **NOISE-6** would insure that the noise impacts of Calico Solar Project construction activities would comply with the local noise LORS.

The Applicant performed noise modeling to determine the project's operational noise impacts on sensitive receptors. As seen in **Noise Table 4**, the project's operational noise level at the nearest sensitive receptor would be no more than 57 dBA L_{eq}. While this value exceeds the noise level limits specified in the San Bernardino County Development Code (55 dBA L_{eq} for residential receptors), it follows the stipulated allowable increase in noise level given that the measured daytime ambient level at that receptor (65 dBA L_{eq}) is greater than the stated limit, and is thus in compliance. The project's operational noise at the second sensitive receptor is below the specified LORS limit. The project's operational noise levels therefore comply with applicable LORS.

Noise Table 4
Plant Operating Noise LORS Compliance

Receptor	LORS	LORS Limit	Projected Noise Level (CNEL)
SR1	San Bernardino County Development Code	65 dBA L_{eq}, Existing Daytime Ambient	57 dBA
SR2		55 dBA L_{eq}, LORS Daytime Requirement	52 dBA

Source: Ex. 300, p. C.9-11.

The Applicant has committed to comply with applicable noise LORS intended to protect workers during construction and operation of the facility. We discuss these fully in the **WORKER SAFETY** section of this Decision.

6. Public and Agency Comments

Comments were received from the Applicant on the Noise and Vibration section. The Applicant provided text to clarify Conditions of Certification and to correct a reference in **Noise Table 1** of this Decision. Staff concluded that all clarifying text was appropriate and the corresponding changes were made. All of the comments were minor and did not change the original conclusions of the analysis. (Ex. 300, pp. C.9-19 to C.9-21.)

Based on the evidence, the Commission makes the following findings and reaches the following conclusions:

FINDINGS OF FACT

1. Construction and operation of the Calico Solar Project will not significantly increase noise levels above existing ambient levels in the surrounding project area.

2. Construction noise levels are temporary and transitory in nature and will be mitigated to the extent feasible by employing measures such as sound reduction devices and limiting construction to daytime hours in accordance with local noise control laws and ordinances.

3. Measures contained in the Conditions of Certification and compliance with local LORS will assure that noise from construction and operation is mitigated to below the level of significance.

4. Operational noise will not cause significant impacts to nearby residences.

5. The project owner will implement measures to protect workers from injury due to excessive noise levels.

6. The Calico Solar Project will not create ground or airborne vibrations, which cause significant off-site impacts.

7. Implementation of the Conditions of Certification identified below, ensure that project-related noise emissions will not cause significant impacts to sensitive noise receptors.

CONCLUSION OF LAW

1. The Commission concludes that implementation of the following Conditions of Certification ensure that the Calico Solar Project will comply with the applicable laws, ordinances, regulations, and standards on noise and vibration as set forth in the pertinent portion of **Appendix A** of this Decision, and that the project will not cause indirect, direct, or cumulative significant noise impacts.

CONDITIONS OF CERTIFICATION

NOTIFICATION OF NOISE COMPLAINT PROCESS

NOISE-1 At least 15 days prior to the start of ground disturbance, the project owner shall notify all residents within two miles of the site, by mail or other effective means, of the commencement of project construction. At the same time, the project owner shall establish a telephone number for use by the public to report any undesirable noise conditions associated with the construction and operation of the project and include that telephone number in the above notice. If the telephone is not staffed 24 hours per day, the project owner shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This telephone number shall be posted at the project site during construction in a manner visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

Verification: Prior to ground disturbance, the project owner shall transmit to the Compliance Project Manager (CPM) a statement, signed by the project owner's project manager, stating that the above notification has been performed and describing the method of that notification, verifying that the telephone number has been established and posted at the site, and giving that telephone number.

NOISE COMPLAINT PROCESS

NOISE-2 Throughout the construction and operation of the project, the project owner shall document, investigate, evaluate, and attempt to resolve all project-related noise complaints. The project owner or authorized agent shall:

- Use the Noise Complaint Resolution Form (below), or a functionally equivalent procedure acceptable to the CPM, to document and respond to each noise complaint;
- Attempt to contact the person(s) making the noise complaint within 24 hours;
- Conduct an investigation to determine the source of noise related to the complaint;
- Take all feasible measures to reduce the noise at its source if the noise is project related; and
- Submit a report documenting the complaint and the actions taken. The report shall include: a complaint summary, including final results of noise reduction efforts, and if obtainable, a signed statement by the complainant stating that the noise problem is resolved to the complainant's satisfaction.

Verification: Within five days of receiving a noise complaint, the project owner shall file a copy of the Noise Complaint Resolution Form with the CPM, documenting the resolution of the complaint. If mitigation is required to resolve a complaint, and the complaint is not resolved within a three-day period, the project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is implemented.

NOISE CONTROL PROGRAM

NOISE-3 The project owner shall submit to the CPM for review and approval a noise control program and a statement, signed by the project owner's project manager, verifying that the noise control program will be implemented throughout construction of the project. The noise control program shall be used to reduce employee exposure to high noise levels during construction and also to comply with applicable OSHA and Cal/OSHA standards.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit to the CPM the noise control program and the project owner's project manager's signed statement. The project owner shall make the program available to Cal/OSHA upon request.

NOISE RESTRICTIONS

NOISE-4 The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that the operation of the

project will not cause the noise levels due to plant operation alone to exceed an average of 51 dBA L_{eq} measured at or near monitoring location SR2, and an average of 57 dBA L_{eq} measured at or near monitoring location SR1.

No new pure-tone components shall be caused by the project. "Pure-tone" shall be understood to mean, for purposes of this Condition, a prominent one-third octave band with prominence evaluated between adjacent one-third octave band project operation sound levels and using frequency-dependent prominence ratio criteria values similar to those as defined by ANSI S1.13-2005 A.8.6. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints.

A. When the project first achieves a sustained output of 85 percent or greater of rated capacity, the project owner shall conduct a 25-hour community noise survey at monitoring location SR2, or at a closer location acceptable to the CPM. This survey shall also include measurement of one-third octave band sound pressure levels to ensure that no new pure-tone noise components have been caused by the project.

B. During the period of this survey, the project owner shall also conduct a short-term survey of noise at monitoring location SL1 or at a closer location acceptable to the CPM. The short-term noise measurements at this location shall be conducted during morning, early afternoon, and evening hours.

C. The measurement of power plant noise for the purposes of demonstrating compliance with this Condition of Certification may alternatively be made at a location, acceptable to the CPM, closer to the plant (e.g., 400 feet from the plant boundary) and this measured level then mathematically extrapolated to determine the plant noise contribution at the affected residence. The character of the plant noise shall be evaluated at the affected receptor locations to determine the presence of pure tones or other dominant sources of plant noise.

D. If the results from the noise survey indicate that the power plant noise at the affected receptor sites exceeds the above specified values, mitigation measures shall be implemented to reduce noise to a level of compliance with these limits.

E. If the results from the noise survey indicate that pure tones are present, mitigation measures shall be implemented to eliminate the pure tones.

Verification: The survey shall take place within 30 days of the project first achieving a sustained output of 85 percent or greater of rated capacity. Within 15 days after completing the survey, the project owner shall submit a summary

report of the survey to the CPM. Included in the survey report will be a description of any additional mitigation measures necessary to achieve compliance with the above listed noise limit, and a schedule, subject to CPM approval, for implementing these measures. When these measures are in place, the project owner shall repeat the noise survey.

Within 15 days of completion of the new survey, the project owner shall submit to the CPM a summary report of the new noise survey, performed as described above and showing compliance with this Condition.

OCCUPATIONAL NOISE SURVEY

NOISE-5 Following the project's first achieving a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct an occupational noise survey to identify the noise hazardous areas in the facility.

The survey shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations sections 5095–5099 and Title 29, Code of Federal Regulations section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure.

The project owner shall prepare a report of the survey results and, if necessary, identify proposed mitigation measures that will be employed to comply with the applicable California and federal regulations.

Verification: Within 30 days after completing the survey, the project owner shall submit the noise survey report to the CPM. The project owner shall make the report available to OSHA and Cal/OSHA upon request.

CONSTRUCTION TIME RESTRICTIONS

NOISE-6 Heavy equipment operation, including pile driving, and noisy construction[1] work relating to any project features shall be restricted to the times of day delineated below, unless:

- the project owner obtains the consent of the homeowners at SR1 and SR2; or
- the CPM determines that the noise will not exceed the daytime ambient noise levels at SR1 and SR2 (as shown in

[1] Noisy Construction: "Noise that can potentially draw legitimate complaints."

Legitimate Complaint: "A legitimate noise complaint refers to a complaint about noise that is confirmed by the CPM to be disturbing, and that is caused by the Calico project as opposed to another source. A legitimate complaint constitutes a violation by the project of any noise condition of certification (as confirmed by the CPM), which is documented by an individual or entity affected by such noise."

Noise Table 5) by more than 10 dBA and the nighttime ambient noise levels at SR1 and SR2 (as shown in **Noise Table 5**) by more than 5 dBA; or

- construction that is expected to increase those daytime ambient noise levels at those locations by more than 10 dBA continues no longer than four consecutive weekends or construction that is expected to increase nighttime ambient noise levels at those locations by more than 5 dBA continues no longer than five consecutive nights.

Mondays through Saturdays:	7:00 a.m. to 7:00 p.m.
Sundays and Holidays:	No Construction Allowed

Haul trucks and other engine-powered equipment shall be equipped with mufflers that meet all applicable regulations. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

Verification: Prior to ground disturbance, the project owner shall transmit to the CPM a statement acknowledging that the above restrictions will be observed throughout the construction of the project.

At least 20 days prior to the start of construction activities to occur outside the above required schedule restrictions, the project owner shall submit to the CPM a letter showing the affected homeowner's consent. If the consent cannot be obtained, at least 15 days prior to the start of those activities, the project owner shall submit to the CPM documentation showing the expected construction noise levels at SR1 and SR2, the nature of the work, the time of day/night that work will occur, and the duration of the work.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Calico Solar Project (08-AFC-13)
NOISE COMPLAINT LOG NUMBER _____ Complainant's name and address: Phone number: _____
Date complaint received: _____ Time complaint received: _____
Nature of noise complaint:
Definition of problem after investigation by plant personnel: Date complainant first contacted: _____
Initial noise levels at 3 feet from noise source _____ dBA Date: _____ Initial noise levels at complainant's property: _____ dBA Date: _____ Final noise levels at 3 feet from noise source: _____ dBA Date: _____ Final noise levels at complainant's property: _____ dBA Date: _____
Description of corrective measures taken: Complainant's signature: _____ Date: _____
Approximate installed cost of corrective measures: $ _____ Date installation completed: _____ Date first letter sent to complainant: _____ (copy attached) Date final letter sent to complainant: _____ (copy attached)
This information is certified to be correct: Plant Manager's Signature: _____

(Attach additional pages and supporting documentation, as required).

E. VISUAL RESOURCES

Visual resources are the features of the landscape that contribute to the visual character or quality of the environment. CEQA requires an examination of a project's visual impacts in order to determine whether the project has the potential to cause substantial degradation to the existing visual character of the site and its surroundings, substantially affect a scenic vista or damage scenic resources, or create a new source of substantial light or glare affecting day or nighttime views in the area. (Cal. Code Regs., tit. 14 § 15382, Appen. G.)

CEQA Guidelines Appendix G Environmental Checklist pertaining to "Aesthetics include the following:

1. Would the project have a substantial adverse effect on a scenic vista?
2. Would the project substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?
3. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?
4. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

In addition, we have evaluated potential impacts in relation to standard criteria described in detail in Appendix VR-1 of the Supplemental Staff Assessment. (Ex. 300, pp. C.13-46 to C. 13-48.) The evidence includes Staff evaluations of both the existing visible physical environmental setting, and the anticipated visual change introduced by the proposed project to the view from representative, fixed vantage points called "Key Observation Points" (KOPs). KOPs are selected to be representative of the most characteristic and most critical viewing groups and locations from which the project would be seen.

Staff experts testified regarding the likelihood of a visual impact exceeding Criterion C. of the CEQA Guidelines, above, by two fundamental factors: (1) the susceptibility of the setting to cause an impact as a result of its existing characteristics (reflected in its current level of visual quality, the potential visibility of the project, and the sensitivity to scenic values of its viewers); and, (2) the degree of visual change anticipated as a result of the project. These two factors are summarized respectively as *visual sensitivity* (of the setting and viewers), and *visual change* (due to the project) in the discussions below. KOPs with high sensitivity (due to outstanding scenic quality, high levels of viewer concern, etc.)

that experience high levels of visual change from a project are more likely to experience significant adverse impacts.

The National Environmental Policy Act (NEPA) requires that the federal government use “all practicable means to ensure all Americans safe, healthful, productive, and *aesthetically* (emphasis added) and culturally pleasing surroundings” (42 U.S. Code 4331[b][2]).

Typically, U.S. Bureau of Land Management (BLM) evaluates visual effects of actions with the use of its Visual Resource Management (VRM) system. However, in the case of the area managed under the California Desert Conservation Area (CDCA) Plan (including this project), VRM classes were not assigned under that management plan. In the case of the Calico Solar Project (CSP) site, no current visual inventories by BLM are available, and no Interim VRM Classes have been assigned. The BLM is currently in the process of beginning visual inventories of areas within the CDCA that have not yet been inventoried, including this site. However, the results of those studies are not anticipated within the time frame of this project application, and delineations of scenic quality rating units or visual resource inventory classes are not available. Therefore, it was agreed by Staff for the Energy Commission and BLM that the analysis for the Calico Solar Project would be conducted using the Energy Commission’s standard visual assessment methodology.

Commission staff experts testified that, in their professional opinion, despite certain differences in approach and emphasis between the two methodologies, the assessment framework and impact thresholds of the Energy Commission method used in this study are substantially consistent with those typically applied by BLM under its own procedures. Staff thus considers that the conclusions of its analysis are substantially equivalent to those that would be reached by applying BLM-specific methods of visual assessment.

In addition, we have reviewed federal, state, and local LORS and their policies or guidelines for aesthetics or preservation and protection of sensitive visual resources that may be applicable to the project site and surrounding area. These LORS include local government land use planning documents (e.g., General Plan, zoning ordinance) and can be found in **Appendix A** of this Decision.

SUMMARY AND DISCUSSION OF THE EVIDENCE

1. Background Visual Features

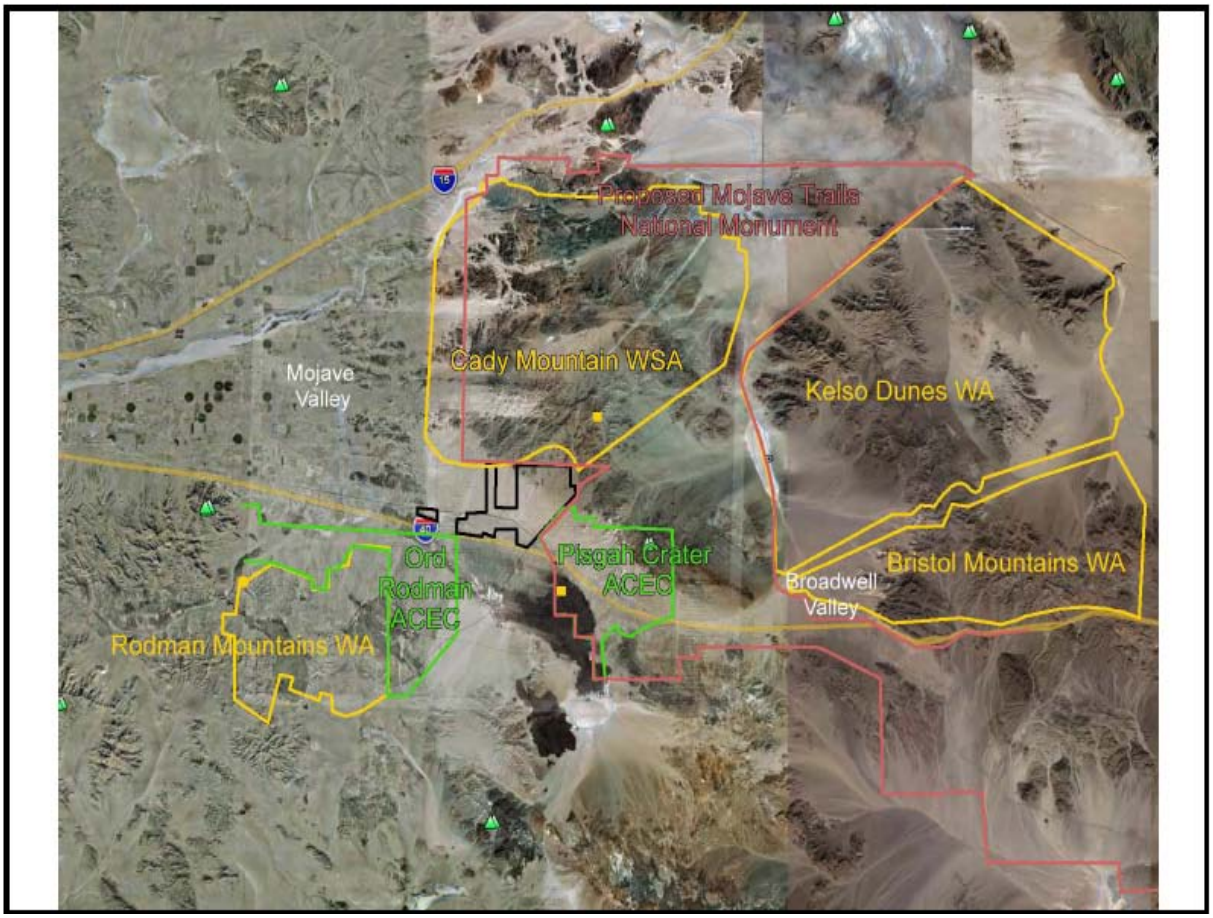
The proposed CSP would be built in the Mojave Desert in San Bernardino County. The site is roughly 37 miles east of the town of Barstow and 17 miles east of Newberry Springs. It is adjacent to the north side of Interstate 40 (I-40) and near the historic Route 66/National Trails Highway that generally parallels I-40 on the south in this area. The site is on BLM-administered land and is largely bounded by BLM-administered land, although private tracts abut some portions of the site and a Burlington Northern Santa Fe (BNSF) Railroad line traverses the site. (Ex. 300, p. C.13-3.)

The 84,400-acre Cady Mountain Wilderness Study Area borders the site on the north and the Pisgah Area of Critical Environmental Concern (ACEC) is adjacent to the site's eastern/southeastern boundary. The Kelso Dunes Wilderness and Bristol Mountains Wilderness are approximately 10 miles east of the site. Much of the Cady Mountain WSA and all of the Pisgah ACEC would be within in the Mojave Trails National Monument proposed as part of the proposed 2010 California Desert Protection Act legislation. The proposed monument would extend from the site's east boundary to near Needles. I-40 forms the southern boundary of the site. Three miles south of I-40 is the northern boundary of a closed live-fire training area on Twenty-nine Palms Marine Corps Base. Also south of I-40 and immediately southwest of the project site is the Ord-Rodman Desert Wildlife Management Area (DWMA). The Rodman Mountains Wilderness is three miles distant, also to the southwest. The west side of the site is bounded by undesignated BLM-administered land. **Visual Resources Figure 1,** Project Setting, depicts the project site in its immediate regional context in relation to these various protected areas. (Ex. 300, pp. C.13-3 to C.13-4.)

The site lies within the east-west trending Mojave Valley, a broad desert valley resting between the Cady and Bristol Mountains to the north and northeast and the Bullion, Lava Bed, Rodman, and Newberry Mountains to the south and southwest. The valley floor ranges from approximately 1,800 feet to 2,200 feet in elevation; the mountains rise to between 3,000 feet and 4,400 feet in elevation. (Ex. 300, p. C.13-4.)

Native vegetation cover of the region consists of sparse, low-growing green-to-tan Mojave creosote bush scrub typical of the western Mojave Desert.

Visual Resources – Figure 1
Calico Project – Project Setting



Source: Exhibit 300

The project site comprises approximately 4,613 acres of public land administered by the BLM. It does not include any private land except the site of the project's water well, adjacent to the BLM lands. Although not part of the project, three adjacent tracts of private land are each surrounded on three sides by the proposed project. The most prominent man-made features at or near the site are I-40, which abuts the site on the south, and the BNSF Railroad traversing the site. These features, though evident, remain visually subordinate to the vast open expanse of the site and surroundings. (Ex. 300, p. C.13-4.)

The site occupies a band of *bajadas*, or alluvial fans typical of the Mojave Desert landscape, which slope gently but noticeably southward toward the railroad and highway, from the feet of the prominently visible Cady Mountains immediately north of the site. The site is largely undisturbed and is currently managed by BLM as Multiple-Use Class (MUC) M (Moderate Use), except for a very small

portion along the northern boundary of the project, which is classified as MUC Class L (Limited Use). (Ex. 300, p. C.13-4.)

No communities lie within the project viewshed, which extends five miles from the site boundaries.[1] The project would be visible from various locations within the five-mile radius with the exception of mountainous areas to the north and east where terrain encloses views near the site boundary. The nearest rural residence is located about two miles east of the site. (Ex. 300, p. C.13-4.)

Visually, the primary CSP features to be introduced to the site are:

- 26,540 40-foot solar dish Stirling systems (SunCatchers);
- Main Services Complex located generally in the center of the site for administration and maintenance activities, which would include buildings up to 78 feet in height, parking facilities, and access roads;
- Construction Staging/Laydown Area adjacent to the Main Services Complex for use during construction;
- Construction Staging/ Laydown Area adjacent to the eastern site boundary, near the existing power line and railroad;
- 220-kV Substation located generally in the center of the site, south of the Main Services Complex;

Linear facilities will include:

- 1.7-mile 220-kV transmission line connecting to the existing Southern California Edison (SCE) Pisgah Substation located at the southeast boundary of the project site;
- Three overhead 34.5-kV collection circuits to convey power to the substation within the project; and
- Approximately 25.2 miles of surface-treated roadways, approximately 168 miles of north-south access routes, and approximately 102 miles of east-west access routes. The access routes would be surface-treated to reduce fugitive dust while allowing full access to all dishes and infrastructure. (Ex. 300, pp. B.1-8; C.13-11.)

[1] A "viewshed" can be defined as the area from which the project can be seen, or which can be visually impacted by the project, and upon which the visual impacts analysis is based. KOPs will fall within the viewshed. An annotated map of the viewshed used for the Staff analysis is found in the Supplemental Staff Assessment. (Ex. 300, Visual Resources Figure 3.)

2. Direct/Indirect Impacts and Mitigation

a. Construction Impacts

Construction activities will occur over approximately 44 months. In addition to the facilities that will be constructed, there will be a temporary 14-acre construction staging/lay-down area adjacent to the Main Services Complex. (Ex, 300, p. B.1-8.)

Site grading would cause a significant visual impact during construction. Surface disturbance of the proposed site, as in most desert landscapes of the region, would result in high contrast between the disturbed area and surroundings, due to high contrast between the disturbed soil color and solar reflection (albedo), and the color and albedo of the existing undisturbed, vegetated surface. Mitigation of this impact is not feasible, because effectiveness of revegetation in this arid environment is difficult, of limited effectiveness, and capable of recovery only over a very long-term time frame. (Ex. 300, p. C.13-11.)

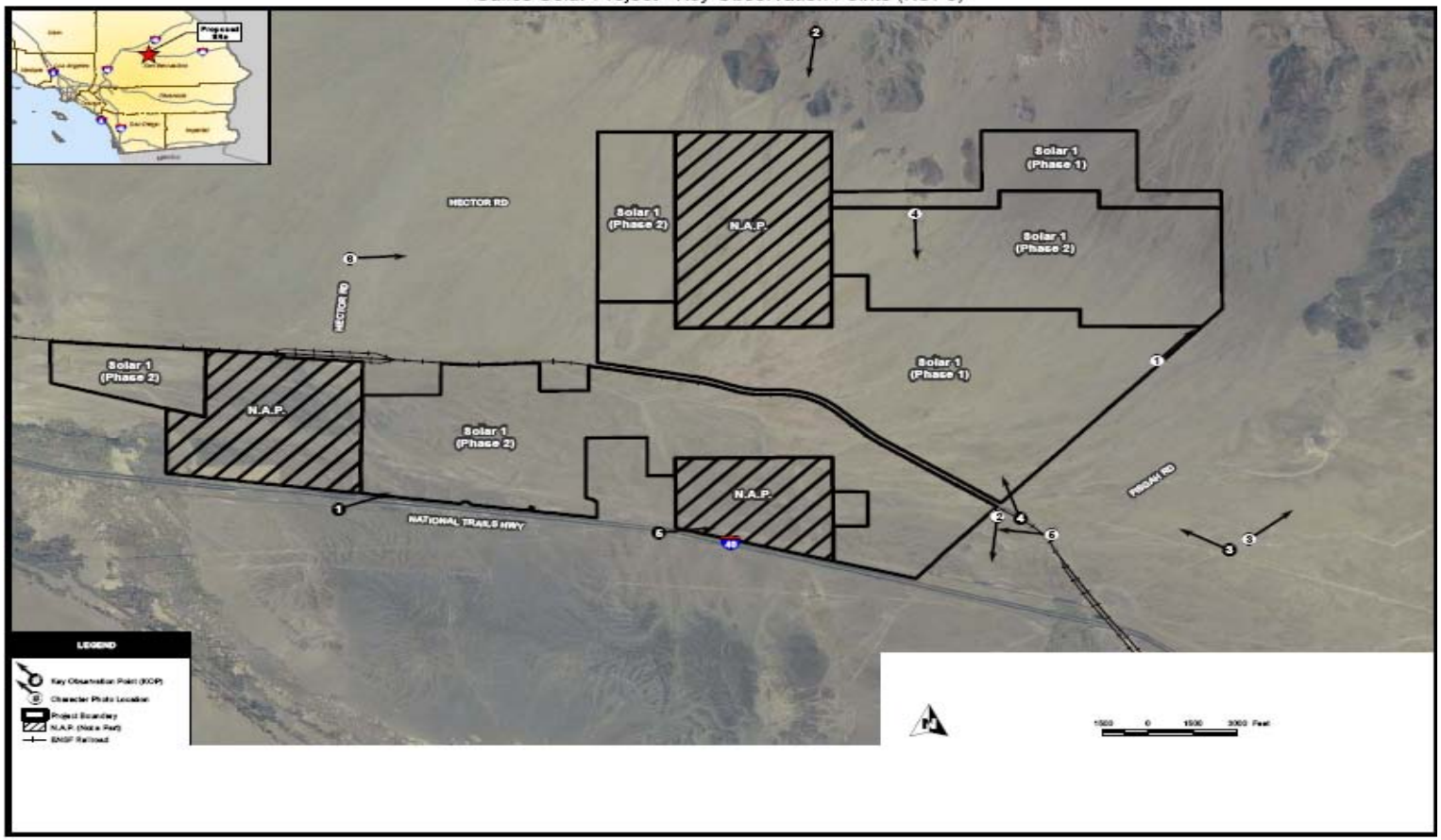
b. Operation Impacts

Visual Resources Figure 2 depicts the locations of the five KOPs selected for visual analysis:

- ***KOP 1*** – looking from a point along Route 66 looking generally northeast into the site across I-40.
- ***KOP 2*** – looking south into the site, from an elevated position just inside the Cady Mountain WSA.
- ***KOP 3*** – looking northwest toward the site from the vicinity of the nearest residence to the project.
- ***KOP 4*** – looking north into the site from where the BNSF Railroad crosses under an existing electric transmission line about 800 feet from the eastern edge of the site.
- ***KOP 5*** - view from I-40 eastbound, looking east-northeast across westbound I-40 into the site.

VISUAL RESOURCES FIGURE 2

Calico Solar Project - Key Observation Points (KOPs)



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: AFC Figure 5.13-2

Before considering individual KOPs, we consider generally whether the project will cause substantial degradation to the existing visual character of the site and its surroundings, substantially affect a scenic vista or damage scenic resources, or create a new source of substantial light or glare affecting day or nighttime views in the area [Cal. Code Regs., tit. 14, Appen. G, § I, subds. (a), (b) and (d)]. .(Ex. 300, p. C.13-21.)

A high level of viewer concern for scenic values was associated with the project viewshed as seen from the highway due to the eligible State Scenic Highway status of I-40 and the historic interest of Route 66. Views of the background mountains are the most scenic element of views from the highways in the project area, and these could potentially be blocked by the project, if the mirror units are sited sufficiently close to the highway. With recommended Condition of Certification **VIS-3,** those views would be preserved, though the foreground would be strongly altered by the vast array of mirror units, strongly attracting attention. With this measure, views would not be blocked, but the project's effect on the quality of those views would be strongly adverse and significant. (Ex. 300, pp. C.13-21 to C.13-22.) We judge this to be a significant, unmitigable visual impact.

The primary threat that Calico Solar Project poses to the visual environment is whether the project will substantially degrade the existing visual character or quality of the site and its surroundings [Cal. Code Regs., tit. 14, Appen. G, § I, subd. (c)]. The Commission's analysis of this issue involves examining the project from several Key Observation Points, or KOPs.

KOP 1 – Route 66/Interstate 40 (Figures 3A and 3B)

In the Energy Commission assessment approach, KOPs are rated according to the visual quality of their setting, and an assessment of their level of viewer concern and viewer exposure. Those three primary attributes are summarized in a KOP's *overall visual sensitivity* rating, which reflects an assessment of the overall susceptibility to visual impact of the viewer group/receptors it represents. These sensitivity ratings serve as the environmental baseline against which potential project impacts, measured in terms of level of *visual change*, are evaluated. KOP photos are selected to represent key sensitive viewer groups who would potentially be affected by the project. Project simulations are then imposed on these views to illustrate how the same view would appear with the project in place. In the discussion that follows, the reader is referred to these 'before project' photos.

KOP 1 is taken from Route 66 (National Old Trails Highway), which parallels I-40 slightly to the south in this segment. It receives relatively high levels of traffic (15,600 vehicles per day) (Ex. 1, p. 5.13-5). The KOP is fairly representative of motorists on both of these roadways, though it differs from typical views from I-40 in that the project is seen from Route 66 at a greater distance. The visual sensitivity of this KOP is moderately high. Existing scenic quality of this landscape is moderate. Although some visually compromising elements (including the highway, low-voltage utility lines, the BNSF rail line, and disturbance from a pipeline right-of-way) are present, these remain visually subordinate and the bajadas comprising the project site, descending from the intact and visually vivid Cady Mountains nearby, appear predominantly undisturbed and intact. However, viewer concern is moderately high since the focus of many Route 66/National Trails Highway users would be on the historic nature of this roadway and the encompassing landscape which earlier travelers would have experienced. Viewer concern[2] is also elevated by the I-40's state eligible scenic highway status. Viewer exposure[3] is high. (Ex. 300, p. C.13-12.)

Visual Resources Figures 3A and 3B depict a "before and after" view northward from Route 66 (National Trail Highway), at a foreground distance of less than 1,000 feet to the site. **Figure 3B** shows project simulations imposed on the existing view to illustrate how the same view would appear with the project in place. However, as discussed further below, the nearest SunCatcher units depicted in this simulation are located over 1,700 feet away. The range of actual view of the project would extend from foreground, throughout the middle-ground, to the background five miles distant. The project would appear very prominent, dominating the view from foreground locations on Route 66 and I-40. From such viewpoints near the project site, the project would strongly dominate the vista. (Ex. 300, p. C.13-13.)

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[2] "Viewer concern" represents the reaction of a viewer to visible changes in the viewshed — an area of land visible from a fixed vantage point. For example, viewers have a high expectation for views formally designated as a scenic area or travel corridor as well as for recreational and residential areas. Viewers generally expect that those views will be preserved.

[3] "Viewer exposure" is a function of three elements previously listed, *visibility*, *number of viewers*, and *duration of view*. Viewer exposure can range from a *low* to *high*. A partially obscured and brief background view for a few motorists represents a low value; and unobstructed foreground view from a large number of residences represents a high value.

Visual Resources – Figures 3A

Calico Solar Project – Existing view of project site from KOP 1 – Route 66/I-40

Source: Exhibit 300

Visual Resources – Figure 3B

Calico Solar Project – Simulated view of project site from KOP 1 – Route 66/I-40

Source: Exhibit 300

Project visual contrast[4] would be very strong. Texture and form contrast with the existing landscape of the vast rows of SunCatchers at this distance would be strong, lending a distinctly man-made, industrial character to the location. Color contrast with the existing natural environment would also be strong, and although the field could at times resemble a vast lake surface, reflecting the sky, at other times the mirrors are expected to appear very bright, to the point of representing a strong nuisance or distraction, though not a hazard to navigation. In addition, the long, linear, bright SunCatcher rows, which are oriented perpendicularly to the highway, would rapidly alternate with the darker-colored land between each row, introducing a large-scale flickering effect at the highway frontage that would compound the nuisance and distraction of glare for some viewers.

From some viewpoints, the taller buildings of the Main Services Complex (up to 77 feet tall) could be visible in the middle of the site, exhibiting some vertical form and line contrast and attracting attention, although at this distance they appear relatively inconspicuous. Likewise, poles for the electric collection system, though not depicted in the simulation of **KOP 1**, would be visible throughout the site and introduce vertical and horizontal elements of visual complexity that would detract from the visual unity of the scene and add to the overall industrial character. However, these features generally would be dwarfed by the vast scale and dominance of the SunCatcher fields. (Ex. 300, p. C.13-13.)

The project would exert extraordinary horizontal scale and spatial dominance, occupying a vast expanse of the landscape along nearly five miles of highway frontage. As depicted in the simulation, the overall proportion of the view occupied by the project would be extensive compared to the foreground terrain, background mountains, and sky, due to the sloping terrain and resulting site exposure. (Ex. 300, p. C.13-13.)

As depicted in the simulation of **KOP 1** (**Figure 3B**), the project does not physically block scenic views of the Cady Mountains in the distance from viewpoints along the highway. This feature of the simulation is discussed further, below. Nevertheless, overall visual change to viewers from Route 66 is high.

[4] "Contrast" concerns the degree to which a project's visual characteristics or elements —form, line, color, and texture — differ from the same visual elements in the existing landscape. The degree of contrast can range from *low* to *high*. A landscape with forms, lines, colors, and textures similar to those of a proposed energy facility is more visually absorbent; that is, more capable of accepting those characteristics than a landscape in which those elements are absent[4]. Generally, visual absorption is inversely proportional to visual contrast. (Ex. 300, p. C.13-48.)

This is because the project would demand attention, could not be overlooked, and would be dominant in the landscape. (Ex. 300, pp. C.13-13 to C.13-14.)

In the context of moderately high overall visual sensitivity[5], the high level of visual change experienced by the majority of Route 66 and I-40 viewers – those looking toward the project from **KOP-1** within foreground and near-middle-ground distance from the project – the impacts are significant. (Ex. 300, p. C.13-14.)

Condition of Certification **VIS-3**, Set-Back of SunCatchers from Highway I-40, would require siting of the SunCatchers to the north of the existing pipeline ROW, with a minimum set-back of the SunCatchers from the highway of 223 feet. With this measure, as depicted in **Figure 3B**, project effects would still remain substantial and continue to dominate the landscape. However, they would be considerably less than a project without these set-backs, because they would allow views of mountains from Highway I-40 and would reduce nuisance glare impacts. In addition, in order to reduce the contrast of non-mirror project features as seen from all off-site viewpoints, we required Condition of Certification **VIS-1,** Surface Treatment of Non-Mirror Project Structures[6]. With these measures, visual contrast and dominance of the project would be considerably reduced. However, visual contrast and dominance[7] of the projects would remain strong, and impacts would remain significant due to the project's high contrast with the natural dessert surroundings and its dominance of the surroundings for many viewers. (Ex. 300, p. C.13-15.)

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[5] "Visual sensitivity" is comprised of three elements previous listed, *visual quality*, *viewer concern*, and *viewer exposure*. Viewer sensitivity tends to be higher for homeowners or people driving for pleasure or engaged in recreational activities and lower for people driving to and from work or as part of their work. (Ex. 300, p. C.13-47.)

[6] Applicant argued that Condition **VIS-1** would be infeasible as applied to SunCatchers, since dark colors would allow excess heat buildup. However, Applicant states that other light colors are being investigated. If light colors that would blend with the background landscape are feasible, Applicant shall use light, non-white colors on the backs of SunCatchers in order to reduce visual contrast.

[7] *Dominance* is a measure of (a) the proportion of the total field of view occupied by the field; (b) a feature's apparent size relative to other visible landscape features; and (c) the conspicuousness of the feature due to its location in the view. A feature's level of dominance is higher if it is (1) near the center of the view; (2) elevated relative to the viewer; or (3) has the sky as a backdrop. As the distance between a viewer and a feature increases, its apparent size decreases; and consequently, its dominance decreases. The level of dominance ranges from *low* to *high*.

KOP 2 – Cady Mountains WSA (Figures 4A and 4B)

Visual Resources Figure 4A represents a view of the project site from **KOP 2** within the Cady Mountains WSA, as viewed from slightly over one-fourth mile from the northern boundary of the site, at an elevation of roughly 300 feet above the base of the nearest SunCatchers, and 500 feet above the BNSF rail line visible in the view. (Ex. 300, p. C.13-15.)

As represented in **Visual Resources Figure 4B** from **KOP 2**, project contrast at this distance would generally be moderate. Color and texture contrast with the existing landscape at this distance would be strong, lending a conspicuous, distinctly man-made character to the view. Form and line contrast, however, would be relatively weak, blending with the broad horizontal lines of the level terrain. (Ex. 300, p. C.13-16.)

In general, at this distance the project would exert strong horizontal scale and spatial dominance, occupying a vast extent of the landscape. Due to the viewshed characteristics in the Cady Mountains described above, however, visual dominance would vary considerably, as a function of visual exposure due to terrain. In the most exposed conditions, for example in the areas north of the proposed project area, viewers could overlook a panorama of up to eight square miles of SunCatchers or four times the area depicted in the simulation, with the nearest of these seen at foreground distance. From such viewpoints, project dominance would be very strong, occupying the largest part of the overall view and overshadowing all other elements. In other cases, as in the simulated view, where the preponderance of the project is hidden by terrain, contrast and dominance could be moderate, and the project would appear to be visually co-dominant with the background mountains. (Ex. 300, p. C.13-16.)

The project would not block scenic views, occupying the visual foreground of the background mountains, although it would block view of the natural valley floor. (Ex. 300, p. C.13-16.)

Visual Resources – Figure 4A

Calico Solar Project – Existing View of Project Site from KOP 2 – Cady Mountains WSA

Source: Exhibit 300

Visual Resources – Figure 4B

Calico Solar Project – Existing View of Project Site from KOP 2 – Cady Mountains WSA

Source: Exhibit 300

Visual change from **KOP 2** and similar middle-ground viewpoints would thus range from moderate to strong depending on location and distance. However, according to viewshed mapping, from the majority of locations at distances approaching a mile or more, visual exposure would decline due to intervening terrain, as would visual dominance due to distance. In view of the very scattered and intermittent visibility of the project predicted by viewshed mapping within the one- and two mile distance zones, the relatively low levels of visitation, the small proportion of the WSA that would be affected, and correspondingly limited view durations, overall visual change from the Cady Mountains is considered to be moderate. (Ex. 300, pp. C.13-16 to C.13-17.)

In the context of moderately high overall visual sensitivity, the moderate level of visual change experienced by visitors to Cady Mountains WSA at distances of over roughly one mile would be somewhat adverse. However, in view of the small proportion of the Cady Mountains WSA potentially affected at closer distances, overall impacts to viewers in the WSA are less than significant. (Ex. 300, p. C.13-17.)

No mitigation measures are considered necessary at distances of over roughly one mile. No measures are available for nearer viewpoints. Those nearer viewpoints are sufficiently intermittent and represent so small a proportion of the WSA, however, as not to require mitigation. (Ex. 300, p. C.13-17.)

KOP 3 - Eastside View of Project Site, Visual Resources (Figures 5A and 5B)

KOP 3 represents the view from the nearest residence to the project, situated approximately 1.5 miles to the east of the site (**Visual Resources Figure 5A)**. Based on the evidence, this viewpoint may be the only residence within the project viewshed and may thus be unique, and not representative of a larger viewer group. It is, however, informative of the appearance of the project at this distance. Staff testified that this simulation does not accurately convey the level of brightness expected from the face of the mirrors under typical conditions. (Ex. 300, p. C.13-17.)

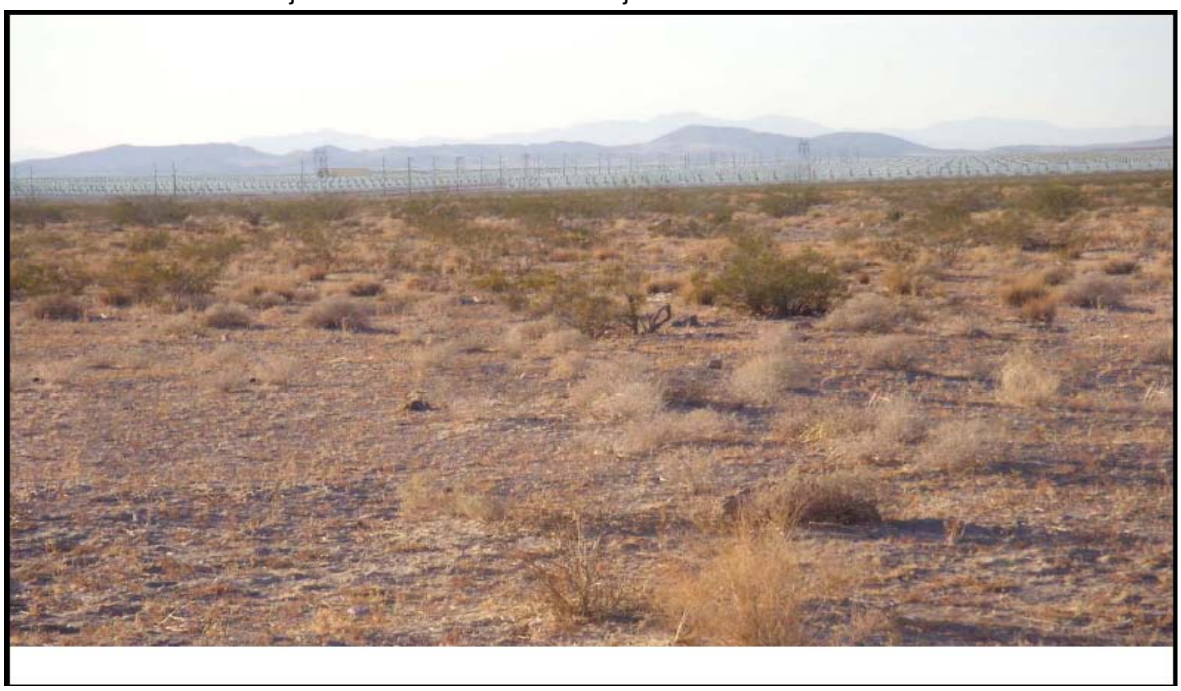
Visual Resources – Figure 5A

Calico Solar Project – Existing View of Project Site from KOP 3 – Eastside View

Source: Exhibit 300

Visual Resources – Figure 5B

Calico Solar Project – Simulated View of Project Site from KOP 3 – Eastside View



Source: Exhibit 300

As illustrated in **Visual Resources Figure 5B**, at this distance the existing SCE 500-kV and 230-kV transmission line towers and poles are evident, though visually subordinate within the view. The line and towers do not intrude into the skyline due to the mountains in the background. The project would begin at the transmission line and extend away from the viewer. However, numerous towers and poles required by the project internal to the site would increase the degree of vertical form and line contrast with the horizontal landscape. The contrast of the combined transmission lines could attract attention and begin to dominate the characteristic landscape. Due to the relatively level grade/elevation relationship between the project and viewpoint, at this distance the project occupies a narrow portion of the overall field of view due to the oblique viewing angle. The reduced dominance due to oblique viewing angle is somewhat off-set however by the vast horizontal extent of the project from viewpoints at this distance, resulting in high spatial dominance; and by high contrast of anticipated mirror brightness under many extended, typical conditions. Although not obstructing views of the distant background, the extensive array of regularly spaced solar units along the project boundary would completely dominate the middle-ground. Accounting for the anticipated brightness of the mirror field for extended periods, and the strong horizontal spatial dominance of the project, overall visual change at this distance would be strong. The project would demand attention, could not be overlooked, and would be dominant in the landscape. (Ex. 300, p. C.13-17.)

In the context of moderate overall visual sensitivity from this and similar locations, due to low visual magnitude and very low viewer numbers, the moderately high level of anticipated visual change of the project is considered adverse but less than significant. (Ex. 300, pp. C.13-17 to C.13-18.)

No mitigation measures are considered necessary from **KOP 3**. (Ex. 300, p. C.13-18.)

KOP 4 - BNSF Railroad/I-40 West (Visual Resources Figures 6A and 6B)

Based on the evidence that Amtrak passengers service occurs only after dark, Amtrak passengers on the BNSF rail line were determined not to be sensitive receptors. However, **KOP 4** is retained to help convey the appearance of the project at foreground distance from similar viewpoints on I-40. (Ex. 300, p. C.13-18.)

Visual Resources – Figure 6A

Calico Solar Project – Existing View of Project Site from KOP 4 – BNSF and I-40 West

Source: Exhibit 300

Visual Resources – Figure 6B

Calico Solar Project – Simulated View of Project Site from KOP 4 – BNSF and I-40 West

Source: Exhibit 300

According to the photo location, the camera position is very roughly 700 - 800 feet from the project boundary. When compared to other simulations in which the SunCatchers are located at distances of one half mile or more, the difference in level of impact as a function of distance is apparent. In addition, **KOP 4** illustrates the effect of foreground views where grade relationships are relatively level. In such situations, the mirror units are likely to block and enclose views, as suggested by the simulation. (Ex. 300, p. C.13-18.) However, even with their mitigation, the visual impact from **KOP-4** is significant.

For most of the frontage of the project, I-40 is elevated in relation to the adjoining ground. However, that amount of elevation is not sufficient by itself to prevent the 38-foot-tall mirror units from blocking views and being highly dominant. Based on USGS topographic maps, however, elevations of the adjoining plain northward from the road edge tend to decrease along much of the highway frontage until the point of the BNSF rail line, which generally represents a low point. Thus, as indicated in simulations of **KOP 1** (**Visual Resources Figure 3B)** above, and **KOP 5** (**Visual Resources Figure 7B)**, below, sufficient set-backs from the highway are a critical factor in reducing the visual height and magnitude of the mirror units, and for preventing view blockage or enclosure from the highway by the mirror units. Condition of Certification **VIS-3** proposes siting of the SunCatchers to the north of the existing pipeline ROW, with a minimum set-back of the SunCatchers from the highway of 500 feet. (Ex. 300, p. C.13-18.)

KOP 5 – Interstate 40 Eastbound (**Visual Resources Figures 7A and 7B)**

KOP 5 represents near-middleground views of the project by motorists on I-40 eastbound. Because this view looks across foreground that is not a part of the project, it is not fully representative of what a viewer would experience while travelling on I-40, but depicts views along the roughly one mile section of excluded highway frontage. The viewpoint appears from **Visual Resources Figure 2** to be roughly one mile from the site. The simulation of **KOP 5** (**Visual Resources Figure 7B)** primarily depicts the south-easternmost corner of project Phase 2, covering an area of roughly two sections (square miles). (Ex. 300, p. C.13-18.)

At this set-back distance, the contrast and dominance of the project is substantially reduced when compared to **KOP 1** and, especially, to **KOP 4**. Similarly, the spatial dominance of the project appears much less than in **KOP 1** because the area depicted is considerably smaller. Based solely on this image one could conclude that the project could appear co-dominant with the surrounding landscape. (Ex. 300, p. C.13-18.)

Visual Resources – Figure 7A

Calico Solar Project – Existing View of Project Site from KOP 5 – Interstate 40 Eastbound

Source: Exhibit 300

Visual Resources – Figure 7B

Calico Solar Project – Simulated View of Project Site from KOP 5 – Interstate 40 Eastbound

Source: Exhibit 300

However, in order to fully understand the visual effect of the project from this or other viewpoints on I-40, it is important to recall that for approximately five miles the project fronts on I-40. In addition, the project would be visible for roughly three miles to the east of the project and for roughly five miles to the west of the project, particularly during morning and afternoon hours when diffuse reflection could be strongest. (**KOP 3** depicts the appearance of the project from a distance of roughly two miles). The view in the **KOP 5** simulation represents the greatest distance between the highway and the project at any point in the five miles of frontage. Over 80 percent of the frontage on I-40 could be as little as a few yards from the highway right-of-way. Thus, based on the evidence, a closer approximation of the I-40 experience is provided in KOPs 1 and 4, although as discussed, this would only be true assuming adoption of recommended Condition of Certification **VIS-3**. Without that measure, the project could potentially appear more prominent than depicted in **KOP 4** for a considerable portion of the I-40 frontage, because it could be located at a closer distance.

Similarly, although spatial dominance of the project in this image appears moderate, a rotation to the left from this same viewpoint would depict a view of most of the eight square miles of the proposed project behind the BNSF rail line, where the project would extend to its highest elevations at the foot of the Cady Mountains (up to an elevation of approximately 2,200 feet). At that angle, or in views from locations throughout the I-40 frontage directed toward the project, the view would resemble the simulation of **KOP 1**. Although the simulation is not necessarily inaccurate, the diffuse reflective brightness of the mirror fields would be substantially greater than depicted in this view for a substantial proportion of the day, increasing overall contrast accordingly.

Based on the evidence, the simulations of **KOPs 1** and **4** are more representative of the I-40 motorist's experience than **KOP 5** and together, more representative of the salient aspects of the project's visual characteristics. That is, with sufficient set-backs from the highway, most views from I-40 would resemble **KOP 1**, exposing the vast area of the mirror fields due to the sloping topography and exhibiting a highly unusual level of character contrast and spatial dominance. Without sufficient set-backs from the highway, the project would resemble the simulation of **KOP 4**. That is, visual height and magnitude of the individual SunCatchers would be great, collective diffuse glare could be strong, and there would be a potential for scenic view blockage and enclosure by the tall mirror units. That is, overall visual change to viewers from Route 66 is considered high. The project would demand attention, could not be overlooked, and would be dominant in the landscape.

In the context of moderately high overall visual sensitivity, the high level of visual change experienced by the majority of Route 66 and I-40 viewers – those within foreground and near-middle-ground distance from the project – project impacts are significant.

3. Impacts/Night Lighting[8]

Nuisance glare is a major issue of concern for the Calico Solar Project, primarily for aesthetic and comfort reasons. Affected receptors would be motorists on the highways; and hikers, climbers and other visitors in Cady Mountains WSA and associated open trails. Staff conducted an independent review of potential glare impacts based on field data of the SunCatcher test site in Maricopa, Arizona provided by the Applicant (refer to the **Transportation** section of this Decision for a detailed discussion on glare). With recommended Condition of Certification **VIS- 3** (set back of SunCatchers locations from I-40) and **TRANS-9**, impacts would be glaringly adverse, but would be reduced to less-than-significant levels for motorists in I-40. (Ex. 300, p. C.13-21.)

The project viewshed is now largely dark at night. The pristine, unlit night sky is an important part of the desert experience for many visitors to remote areas such as this. Unmitigated night lighting of the project is an adverse impact to the experience of campers in the nearby WSAs and other visitors to the area at night.

Night lighting of the Main Services Complex would consist of 400-watt high-pressure sodium lights, with illumination falling to 0.0 foot-candles on the ground a short distance from the facility. Parking and roadway lighting would consist of full cut-off luminaires to minimize night sky light pollution. Preliminary photometric studies depict illumination from these fixtures falling to 0.0 foot-candles a short distance from each roadway. (Ex. 300, p. C.13-20.)

However, night roadway lighting from tall light standards could be reflected into the SunCatchers in stow position at night, reflecting bright illumination skyward and causing night light pollution. (Ex. 300, p. C.13-20.) To reduce the impacts of nighttime glare from the project while also meeting safety and security lighting requirements, including construction lighting, Condition of Certification **VIS-2,**

[8] Please refer to the **Transportation** section of this Decision for a detailed discussion on glare impacts.

Temporary and Permanent Exterior Lighting requires design of project lighting to minimize skyward light reflection.

4. Cumulative Impacts and Mitigation

A project may result in a significant cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects. (Cal. Code Regs., tit. 14, § 15130.)

There is the potential for substantial future development in the Mojave Desert area and throughout the southern California Mojave desert region. Known past, current and foreseeable future projects are summarized in the Cumulative Scenarios Section of the Staff's Analysis. (Ex. 300, pp. B.3-4 to B.3-13.)

Cumulative impacts occur if implementation of the CSP project would combine with those of other local or regional projects. The CSP project would have two types of cumulative impacts:

- cumulative impacts within the immediate project view shed, essentially comprising foreseeable future projects in the Mojave Desert area of San Bernardino County; and
- cumulative impacts of foreseeable future solar and other renewable energy projects within the southern California Desert, or other broad basin of the project's affected landscape type. The widest applicable basin of cumulative effect would include all of southern California Desert landscapes extending into neighboring states.

Past and present projects occurring in the viewshed of the proposed project site and affecting its existing visual quality consist of recreational activities managed by the BLM, SCE transmission lines, the Pisgah substation, utility lines, and the I-40 and Route 66 highways. (Ex. 300, p. C.13-30.)

The locations of existing and reasonably foreseeable developments in the vicinity of the CSP are presented in the Cumulative Scenario section of Exhibit 300 (pp.B.3-4 to B.3-13) listing foreseeable future projects within the project vicinity. The setting of the CSP is situated within a fairly limited local viewshed, enclosed by nearby mountains. Potential projects with the greatest potential for having cumulative visual impacts with the project are listed in **Figure 3** of Exhibit 300 and include the Pisgah-Lugo transmission upgrade, the Pisgah Substation Expansion, the renewable project next in line for the withdrawn SES Solar 3, Oak

Creek Wind Energy, and possibly the Power Partners wind project. These are the projects that appear to have the potential to directly interact with the Calico Solar Project visually. (Ex. 300, p. C.13-31.)

Because the evidence shows that the effects of the Calico Solar Project alone would have substantial visual impacts; cumulative impacts would also be significant. Even with the mitigation measures contained in the Conditions of Certification, the project would still contribute to a significant cumulative visual impact. Staff's Supplemental Staff Assessment Cumulative Impacts **Table 1** identifies 72 solar projects and 61 wind project applications with a total overall area of over one million acres within the CDCA. This figure does not include renewable projects within the Nevada and Arizona portions of the Mojave Desert. With this very high number of renewable energy applications currently filed with BLM, the potential for profound widespread cumulative impacts to scenic resources within the southern California is clear.

These cumulative impacts could include a substantial decline in the overall number and extent of scenically intact, undisturbed desert landscapes, and a substantially more urbanized character in the overall southern California desert landscape. In particular, the number of current renewable applications before the BLM and Energy Commission that could potentially be prominently visible from the desert region's major highways is proportionally high, and the proportion of those highways that could be affected is also high.. (Ex. 300, p. C.13-31.)

Within the broad Newberry Springs-Ludlow area of potential cumulative effect, the project in combination with foreseeable projects would have the effect of substantially degrading the overall visual quality of a slightly broader segment of Highway I-40. The segment of I-40 west of the CSP site is already considered to be visually compromised by development. However, the listed projects have the potential to further degrade a currently intact segment of I-40, which is listed as an eligible State Scenic Highway, from the CSP site eastward. This effect would be cumulatively significant, depending upon the details of the specific projects. (Ex. 300, p. C.13-31.)

5. Regional Projects

Staff asserts that cumulative viewed impacts across the entire Mojave Desert must be considered and concludes that the CSP project, when combined with past and foreseeable future projects will have significant visual impacts in the California portion of the Mojave Desert. (Ex. 300 pp. C.13-30 to C.13-32.)

We decline to cast such a wide net in our cumulative impact analysis. Staff's analysis demonstrates that is not possible to do more than speculate in general terms about the nature of regional impacts. (Ex. 300, pp. C.13-31 to C.13-32.) We find it appropriate to define a single area for the cumulative analysis, not the broader, regional areas as Staff suggests. That more localized area, for this topic is the project viewshed, which is discussed above. The concern over the denigration of viewsheds is adequately addressed by our analysis of direct and cumulative impacts to the project's viewshed.

6. LORS compliance

As is discussed in the LORS section of this Decision, the project will conform to all applicable laws, ordinances, regulations and standards relating to Visual Resources.

FINDINGS OF FACT

1. Construction will occur over approximately 44 months.
2. We have applied the Commission's standard visual assessment methodology to analyze visual impacts of the CSP. This approach was supported by experts for both the Commission staff and BLM.
3. CSP's new source of substantial light to nighttime views will be less than significant with the effective implementation of the Applicant's specified mitigation measures and Condition of Certification **VIS-2**.
4. As required by Condition of Certification **VIS-1,** all CSP equipment other than the solar arrays will have non-reflective surfaces and neutral colors such that the project structures will not be a source of substantial glare that could adversely affect daytime views.
5. The project's potential impacts on visual resources were analyzed from five defined key observation points (KOPs) at different locations surrounding the project site.
6. From **KOP-1**, taken at Route 66 (National Old Trails Highway), there will be a moderately high overall visual sensitivity, viewer exposure is high, and there is a high level of visual change and contrast against the natural setting experienced by the majority of Route 66 and I-40 viewers – those looking toward the project from **KOP-1** - within foreground and near-middle-ground distance from the project. Views of the project will dominate the surroundings.

7. Since the focus of many Route 66.Historic Trails Highway users is on the historic nature of the roadway environs, the expansive landscape, and the integrity of the view, the impacts of the project are significant.

8. From **KOP-1** the project will create a strong, adverse, unmitigable and significant visual impact.

9. All feasible mitigation measures have been adopted and other mitigation steps, such as a reduced-size project alternative, fail to mitigate visual impacts to a level of less than significant. The visual impacts that remain after applying all feasible mitigation, are those described in **Finding 6** and **7** above. We find these impacts are significant.

10. For **KOP-2**, which looks south across the project area from within the Cady Mountains WSA, visual change would range from moderate to strong depending on location and distance. In the most exposed views of the project, viewers would overlook a panorama of up to eight square miles of SunCatchers, with the nearest of these in the foreground, creating a strong visual impact. However, in view of the small proportion of the Cady Mountains WSA potentially affected at closer distances, overall impacts to viewers in the WSA are less than significant.

11. **KOP-3** represents the view from the nearest residence to the project but may be unique. Due to low visual magnitude and very low viewer numbers, the moderately high level of anticipated visual change of the project is considered adverse but less than significant.

12. **KOP-4** depicts the view from the BNSF rail line, looking northwest into the project's eastern boundary at a distance of roughly 800 feet. **KOP-4** closely resembles viewing conditions of I-40 motorists in close proximity to the project boundaries and, particularly, the SunCatcher units, along much of the I-40 project frontage. The visual intrusion is high profile, high contrast and interferes with distant views. We determine the visual impact to be significant.

13. **KOP-5** is a view northeastward from eastbound I-40 across the opposite lanes of I-40. Viewer concern is moderately high, due to an elevated level of concern with scenic values within the CDCA in general, and a high proportion of motorists on I-40 concerned with those scenic values. Viewer exposure is high; views are predominantly open and unobstructed over an extensive area, and the project site is viewed at foreground and middle-ground distance, along a highway frontage of roughly four miles. We determine the visual impact to be significant.

14. The project's impacts on views from the Cady Mountains Wilderness Study Area are less-than-significant.

15. Implementation of the CSP would substantially degrade the existing visual character and quality of the site and its surroundings, resulting in damage to scenic vistas and significant impacts to motorists on Highway Interstate 40 and National Trails Highway/Route 66.

16. Project impacts will be significant over an area of almost 10 square miles, including approximately five miles of frontage on I-40. Visual impacts to motorists on Highway I-40 are therefore significant.

17. The record contains mitigation measures which would greatly reduce, but not eliminate, impacts which would remain significant and unavoidable.

18. The record contains an analysis of a Reduced Acreage Alternative. While impacts of this alternative would be substantially less than those of the proposed project, the impacts would nevertheless remain significant.

19. The anticipated visual impacts, of both the Calico Solar Project and the Reduced Acreage Alternative, in combination with past and foreseeable future local projects in the immediate project viewshed, are cumulatively considerable, significant, and unavoidable.

20. We have limited our cumulative impacts analysis of the project to the localized area surrounding the CSP and the project viewshed. Our cumulative impacts analysis does not take in the entire Mojave Dessert.

CONCLUSIONS OF LAW

1. All feasible mitigation has been applied to the visual impacts of the project. Such mitigation reduces, but does not eliminate the project's significant visual impacts.
2. Feasible alternatives examined in the record would reduce, but not eliminate, significant visual impacts of the CSP project.
3. The evidence establishes that the project will substantially degrade the existing visual character and quality of the site and its surroundings
4. Based on expert testimony and the visual simulations imposing the project on **KOPs 1**, **3** and **5**, we conclude that significant, unmitigated visual impacts will remain after implementation of the Conditions of Certification.
5. The project will comply with all applicable laws, ordinances, regulations and standards regarding project design, architecture, landscaping, signage, and other requirements related to Visual Resources.

CONDITIONS OF CERTIFICATION

SURFACE TREATMENT OF NON-MIRROR PROJECT STRUCTURES AND BUILDINGS

VIS-1 To the extent feasible, the project owner shall treat all non-mirror surfaces of all project structures and buildings visible to the public such

that a) their colors minimize visual intrusion and contrast by blending with the existing tan and brown color of the surrounding landscape; b) their colors and finishes do not create excessive glare; and c) their colors and finishes are consistent with local policies and ordinances. The transmission line conductors shall be non-specular and non-reflective, and the insulators shall be non-reflective and non-refractive. This measure shall include coloring of security fencing with vinyl or other non-reflective coating; or with slats or similar semi-opaque, non-reflective material, to blend to the greatest feasible extent with the background soil.

The project owner shall submit for CPM review and approval, a specific Surface Treatment Plan that will satisfy these requirements. The treatment plan shall include:

A. A description of the overall rationale for the proposed surface treatment, including the selection of the proposed color(s) and finishes;

B. A list of each major project structure, building, tank, pipe, and wall; the transmission line towers and/or poles; and fencing, specifying the color(s) and finish proposed for each. Colors must be identified by vendor, name, and number; or according to a universal designation system;

C. One set of color brochures or color chips showing each proposed color and finish;

D. A specific schedule for completion of the treatment; and

E. A procedure to ensure proper treatment maintenance for the life of the project.

The project owner shall not specify to the vendors the treatment of any buildings or structures treated during manufacture, or perform the final treatment on any buildings or structures treated in the field, until the project owner receives notification of approval of the treatment plan by the CPM. Subsequent modifications to the treatment plan are prohibited without CPM approval.

Verification: At least 90 days prior to specifying to the vendor the colors and finishes of the first structures or buildings that are surface treated during manufacture, the project owner shall submit the proposed treatment plan to the CPM for review and approval and simultaneously to San Bernardino County for review and comment. If the CPM determines that the plan requires revision, the project owner shall provide to the CPM a plan with the specified revision(s) for review and approval by the CPM before any treatment is applied. Any modifications to the treatment plan must be submitted to the CPM for review and approval.

Prior to the start of commercial operation, the project owner shall notify the CPM that surface treatment of all listed structures and buildings has been completed

and they are ready for inspection and shall submit to each one set of electronic color photographs from the same key observation points identified in (d) above. The project owner shall provide a status report regarding surface treatment maintenance in the Annual Compliance Report. The report shall specify a): the condition of the surfaces of all structures and buildings at the end of the reporting year; b) maintenance activities that occurred during the reporting year; and c) the schedule of maintenance activities for the next year.

TEMPORARY AND PERMANENT EXTERIOR LIGHTING

VIS-2 To the extent feasible and consistent with safety and security considerations, the project owner shall design and install all temporary and permanent exterior lighting so that:

a) lighting does not cause excessive reflected glare;

b) lighting does not illuminate the nighttime sky;

c) mounting heights and locations of all lighting fixtures, including roadway lighting, will not allow light to fall on the mirror surfaces of the SunCatchers in the stowed position,

d) illumination of the project and its immediate vicinity is minimized as to times of use and extent, and;

e) lighting on the exhaust stacks shall be the minimum needed to satisfy safety and security concerns.

Permanent night lighting shall comply with all applicable standards, practices, and regulations including, and specifically, the following Illuminating Engineering Society documents:

- RP-33-99 Lighting for Exterior Environments
- DG-13-99 Outdoor Lighting
- TM-1 0-00 Addressing Obtrusive Light (Urban Sky Glow and Light Trespass) in Conjunction with Roadway Lighting
- TM-1 5-07 Luminaire Classification System for Outdoor Luminaires

Verification: At least 30 days prior to ordering any exterior lighting, the project owner shall contact the CPM to show compliance with all of the above requirements. This shall include, but not be limited to, final lighting plans, fixture and control schedules, fixture and control cut sheets and specifications, a photometric plan showing vertical and horizontal footcandles at all property lines to a height of 20 feet, and the proposed time clock schedule.

Prior to construction and prior to commercial operation, the project owner shall notify the CPM that the installation of the temporary and permanent lighting has been completed and is ready for inspection. If after inspection the CPM notifies the project owner that modifications to the lighting are needed, within 30 days

after receiving the notification the project owner shall implement the modifications and notify the CPM when the modifications are competed and ready for inspection.

Within 48 hours of receiving a lighting complaint, the project owner shall provide the CPM with a complaint resolution form as specified in the Compliance General Conditions, including a proposal to resolve the complaint, and a schedule for implementation of the proposed resolution. The project owner shall notify the CPM within 48 hours after completing the resolution of the complaint. A copy of the complaint resolution form report shall be submitted to the CPM within 30 days and included in the Annual Report.

SETBACK OF SUNCATCHERS FROM HIGHWAY I-40

VIS-3 To reduce the visual dominance and glare effects of the SunCatchers to motorists on Highway I-40, the Applicant shall set back the nearest units to a minimum distance of 223 feet from the edge of the roadway.

Verification: At least 30 days prior to start of construction, the project owner shall present to BLM's Authorized Officer and the CPM a revised plan depicting how the proposed SunCatchers will be set back from the highway. If the CPM determines that the plan requires revision, the project owner shall provide to the CPM a revised plan for review and approval by the CPM.

The project owner shall not begin construction until receiving CPM approval of the revised plan.

VIII. OVERRIDE FINDINGS

Based on our analysis of the evidence in this proceeding, we find that the Calico Solar Project (CSP) will have significant direct and cumulative unmitigated environmental impacts, which are described in detail below.

The California Environmental Quality Act (CEQA) requires that we make certain findings before approving a project. We address the requirement as follows:

CEQA prohibits a public agency from approving a project which identifies one or more significant effects on the environment unless both of the following occur:

> "(a) The public agency makes one or more of the following findings with respect to each significant effect:
>
> > (1) Changes or alterations have been required in, or incorporated into, the project which mitigate or avoid the significant effects on the environment.
> >
> > (2) Those changes or alterations are within the responsibility and jurisdiction of another public agency and have been, or can and should be, adopted by that other agency.
> >
> > (3) Specific economic, legal, social, technological, or other considerations, including considerations for the provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or alternatives identified in the environmental impact report.
>
> (b) With respect to significant effects which were subject to a finding under paragraph (3) of subdivision (a), the public agency finds that specific overriding economic, legal, social, technological, or other benefits of the project outweigh the significant effects on the environment."
> (Pub. Res. Code § 21081.)

1. Significant Project Impacts

In the Cultural Resources, Land Use, and Visual Resources sections of this Decision, we discuss in detail our findings that CSP will have the following significant environmental impacts:

- **Cultural Resources**. The CSP cumulative contribution to permanent long term, potentially unmitigable, adverse impacts to historic Route 66 in the project vicinity as a result of the physical degradation of and visual

intrusion on significant cultural resources on those sites and an overall net reduction in cultural resources in the area

- **Land Use**. The CSP project would permanently change the nature of land use at the project site from Government Special Public Limited Use and Moderate Use to an intensive utility use for the generation of power. Therefore, the combined effect of the overall cumulative past, present, and proposed and reasonably foreseeable projects, including the proposed project, in the desert region of San Bernardino County would adversely affect recreation and wilderness resources, resulting in a significant and unavoidable impact under CEQA

- **Visual Resources**. The CSP project will result in the installation of a large, industrial facility on a presently undeveloped (although partially disturbed) landscape. It will have significant unmitigable impacts to visual vistas from three of five vantage points used in our analysis. In addition it will, in combination with the other renewable energy projects proposed in the project's viewshed, make a cumulatively considerable contribution to significant cumulative visual impacts.

2. Project Benefits

The CSP, if constructed and operated as set forth in this Decision, will provide the following benefits to California and its residents:

- CSP will provide 663.5 MW of renewable energy power, which will assist in meeting California's Renewable Portfolio Standard, which specifies that retail sellers of electricity serve 20 percent of their load with renewable energy by 2010. (Pub. Util. Code, § 399.11 et seq.) Governor's Executive Order S-14-08 increased the requirement to 33 percent by 2020. We recognize that the electrical output of the CSP may be reduced in order to set aside portions of the project site to serve as detention basins. If so, the output could be reduced from 663.5 MW to as low as 560 MW, depending on the amount of land that must be repurposed from power generation to drainage control. Our findings that the project benefits outweigh the unmitigated significant impacts of the project would not be affected by such a reduction in electrical output.

- Producing electricity from renewable resources provides a number of significant benefits to California's environment and economy, including improving local air quality and public health, reducing global warming emissions, developing local energy sources and diversifying our energy supply, improving energy security, enhancing economic development and creating jobs. (2009 CEC Integrated Energy Policy Report, page 231.)

- Scientific studies quantify the negative impacts of global climate change to California's and the world's population, environment, food supplies, flora

and fauna, coastal regions, and public health. In order to reduce the impact, the State has adopted goals to reduce greenhouse gas (GHG) emissions through, among other things, renewable energy development.

- CSP will assist the state in meeting its ambitious GHG reduction targets by generating up to 663.5 MW of electricity with substantially lower greenhouse gas emissions than existing fossil fuel burning generating facilities.

- In its June 2010, Staff Report on California's Renewable Electricity Standard, Initial Statement of Reasons, the California Air Resources Board CARB) estimates that the environmental benefits resulting from a 20 percent renewable energy goal in 2020 are as follows:

    a. GHG reductions from California's electricity sector by at least 12 million metric tons of carbon dioxide equivalent ($MMTCO_2E$) in 2020, making renewable energy development one of California's largest GHG emission reduction strategies.

    b. The overall GHG emission benefit from adding wind and solar generation is 830 lbs CO_2e per MWh (GHG emissions from displaced or avoided fossil fuel generation) minus emissions from combustion turbines used to backup wind and solar generation.

    c. Reductions in statewide criteria pollutant emissions by five to 10 percent. These criteria pollutants under the Clean Air Act include reactive organic gas (ROG), NO_x, SO_x, CO, and $PM_{2.5}$. Most of the pollutant reductions result from decreased generation by existing natural gas plants. These reductions, in turn, should lead to reductions in the incidence of a variety of adverse health impacts.

    d. Decreased statewide emission of toxic air contaminants (TACs) as fossil-fuel power generation - including coal, once-through cooled, and natural gas generation - is displaced by renewable generation.

- By generating electricity through the use of solar energy, CSP will reduce California's dependence on fossil fuels.

- CSP will provide construction jobs for an average and peak workforce of 400 and 700, respectively, and approximately 180 jobs during operations. Most of those jobs will require highly trained workers.

- Construction and operation of CSP will add to the economy a $159 million construction payroll over 44 months and a local annual operation payroll of $10.1 million. Sales and use taxes during construction and operation are estimated to total $93 million over the life of the project. An estimated $8.4 million would be spent annually for local operations and

maintenance. Possessory taxes are estimated at $950,000 per year and property tax on power plant equipment is estimated at $1,000,000 per year.

- Additional indirect economic benefits, such as employment in local service industry jobs and induced employment, will result from these expenditures associated with the construction and operation of CSP.

3. Comparison of Project Alternatives

As discussed in the Alternatives section, the Reduced Acreage Alternative would reduce many of the impacts of the proposed project, but in doing so would reduce the project's benefits of replacing fossil fuel fired generation and reducing associated criteria pollutant and greenhouse gas emissions. The Private Lands alternative, while reducing the biological, cultural, and visual impacts of the proposed project, would have greater land use and noise impacts and be difficult to implement in the time desired due to the need to assemble upwards of 100 separate parcels with nearly 50 separate owners. The No Project alternative, while the environmentally superior alternative, fails to achieve any of the project objectives. Distributed solar energy (photovoltaic or thermal) generation and other renewable technologies are required *in addition to* large scale projects such as this in order to meet our renewable energy and GHG policy goals; the two complement, rather than compete with, each other.

4. Site Characteristics

The CSP project will be constructed on an approximate 4,613-acre site located in San Bernardino County, California. The project site is approximately 37 miles east of Barstow, 17 miles east of Newberry Springs, 57 miles northeast of Victorville, and approximately 115 miles east of Los Angeles. The project location includes several linear development features including I-40, BNSF railway, and SCE transmission lines. Additionally, the area between the BNSF railroad and I 40 is isolated by the highway and railroad and portions of the site have been subject to repeated disturbance from pipeline development. Besides these features, the project area is primarily open land ranging in elevation from approximately 1,925 to 3,050 feet (587 to 930 m) above mean sea level.

5. Official Notice

In arriving at the following findings, we have taken official notice of the following documents:

- The California Renewables Portfolio Standard (RPS) was created in 2002 under Senate Bill 1078 and further accelerated in 2006 under Senate Bill 107. The RPS program requires electric corporations to increase procurement from eligible renewable energy resources by at least 1 percent of their retail sales annually, until they reach 20 percent by 2010.

- EXECUTIVE ORDER S-21-09 was signed by Governor Arnold Schwarzenegger establishing the 33 percent Renewable Electricity Standard.

- Climate Action Team Report to Governor Schwarzenegger and the Legislature. CalEPA, March 2006.

- AB 32 Scoping Plan. CARB, December 2008.

- Integration of Renewable Resources. CAISO, Nov. 2007.

- 2007 Integrated Energy Policy Report. CEC, Nov. 2007.

- 2009 Integrated Energy Policy Report. CEC. Nov. 2009.

- California Air Resources Board Staff Report on California's Renewable Electricity Standard, Initial Statement of Reasons, June 2010.

- Draft Final Opinion on Greenhouse Gas Regulatory Strategies:

    - Joint Agency Proposed Final Opinion. CPUC/CEC 2008.

- Framework for Evaluating Greenhouse Gas Implications of Natural Gas-Fired Power Plants in California. CEC (MRW and Associates). May 2009.

Based upon the above documents, evidence and Staff recommendations, we find that overriding considerations warrant the approval of the project as mitigated through the Conditions of Certification we adopt herein. We further find that the project is required for public convenience and necessity and that there are no more prudent and feasible means of achieving such public convenience and necessity.

FINDINGS OF FACT

Based on the evidence and the conclusions drawn in other sections of this Decision, we make the following findings and conclusions:

1. Climate change poses a serious threat to the economic well-being, public health, natural resources, and the environment of California.

2. The proposed project will have the following impacts which cannot be mitigated to insignificant levels:

   a. A cumulative contribution to permanent long term, potentially unmitigable, adverse impacts to historic Route 66 in the project vicinity as a result of the physical degradation of and visual intrusion on significant cultural resources on those sites and an overall net reduction in cultural resources in the area

   b. A permanent change the nature of land use at the project site from Government Special Public Limited Use and Moderate Use to an intensive utility use for the generation of power. The combined effect of the overall cumulative past, present, and proposed and reasonably foreseeable projects, including the proposed project, in the desert region of San Bernardino County would significantly impact recreation and wilderness resources.

   c. The installation of a large, industrial facility on a presently undeveloped (although partially disturbed) landscape will have significant unmitigable impacts to visual vistas in the project vicinity. In addition it will, in combination with the other renewable energy projects proposed in the project's viewshed, make a cumulatively considerable contribution to significant cumulative visual impacts to the viewshed.

3. This Decision will result in mitigation of all direct project impacts for CSP, except to Land Use and Visual and Cultural Resources, as noted above, and imposes all feasible mitigation measures to reduce the significant direct impacts of the project below a level of significance.

4. This Decision will result in mitigation of all cumulative project impacts for CSP, except to Land Use and Visual and Cultural Resources, as noted above, and imposes all feasible mitigation measures to reduce the project's contribution to cumulative impacts to insignificant levels.

5. The project will provide the following benefits:

   a. Contribution of 663.5 MW of renewable energy power toward meeting California's Renewables Portfolio Standard and California's adopted renewable energy and GHG policy goals.

   b. A significant reduction in greenhouse gas emissions when compared with existing fossil fuel-burning generating facilities.

c. Other important benefits to California's environment and economy include improving local air quality and public health, developing local energy sources, and diversifying our energy supply.

d. Reduction of California's dependence on fossil fuels.

e. Boost the economy due to the purchase of major equipment, payroll, and supplies, and increased sales tax revenue. Additional indirect economic benefits, such as indirect employment, and induced employment, will result from these expenditures as well.

f. CSP will provide construction jobs for an average and peak workforce of 400 and 700, respectively, and approximately 180 jobs during operations. Most of those jobs will require highly trained workers.

6. The CSP is in the vicinity of existing development including Interstate 40, BNSF Railway, and existing electricity infrastructure including major transmission lines.

CONCLUSIONS OF LAW

1. The CSP project benefits outweigh the significant direct and cumulative impacts identified above.

2. It is appropriate to approve the CSP despite its remaining significant environmental impacts.

3. As shown in the record, much of the debate over the CSP project was over the impacts to biological resources, specifically the federally-listed threatened species, desert tortoise and special-status plants found on the project site. There was general agreement by wildlife, botanical, and ecology experts that testified at the evidentiary hearings that there is a combination of both natural and manmade processes that are affecting the global climate; and that these special-status species are not immune to the effects of climate change, but it is possible that they could adapt and survive if given enough time. There was also general agreement that the exact impacts of climate change to the biological resources are unknown – various models predict varying temperature changes and precipitation amounts for California's desert region – resulting in potential detriment or benefit to biological resources, depending on the habitat needs of the species. It is the intent of this Commission to take all reasonable measures to preserve the continued existence of the desert special-status species. This Commission believes that this project, and other renewable energy projects, will result in the reduction of greenhouse gases which will help

curb or reduce the impact of climate change to California, thereby allowing for the continued existence of the desert special-status species.

4. Therefore, this decision overrides the remaining significant unavoidable impacts that may result from this project, even with the implementation of the required mitigation measures described in this Decision.

Appendix A: *Laws, Ordinances, Regulations, and Standards*

Appendix B: *Exhibit List*

Appendix C: *Proof of Service List*

APPENDICES

AIR QUALITY

Applicable LORS	Description
Federal	
40 Code of Federal Regulations (CFR) Part 52	Nonattainment New Source Review (NSR) requires a permit and requires Best Available Control Technology (BACT) and Offsets. Permitting and enforcement delegated to Mojave Desert Air Quality Management District (MDAQMD). Prevention of Significant Deterioration (PSD) requires major sources or major modifications to major sources to obtain permits for attainment pollutants. The Calico Solar Project is a new source that does not have a rule listed emission source thus the PSD trigger levels are 250 tons per year for NOx, VOC, SOx, PM10, PM2.5 and CO.
40 CFR Part 60	New Source Performance Standards (NSPS), Subpart IIII Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. Establishes emission standards for compressions ignition internal combustion engines, including emergency fire water pump engines.
40 CFR Part 93 General Conformity	Requires determination of conformity with State Implementation Plan for Projects requiring federal approvals if project annual emissions are above specified levels.
State	
Health and Safety Code (HSC) Section 40910-40930	Permitting of source needs to be consistent with Air Resource Board (ARB) approved Clean Air Plans.
HSC Section 41700	Restricts emissions that would cause nuisance or injury.
California Code of Regulations (CCR) Section 93115	Airborne Toxics Control Measure for Stationary Compression Ignition Engines. Limits the types of fuels allowed, established maximum emission rates, establishes recordkeeping requirements on stationary compression ignition engines, including emergency fire water pump engines.
Local (Mojave Desert Air Quality Management District, MDAQMD)	
Rule 201 and 203 Permits Required	Requires a Permit to Construct before construction of an emission source occurs. Prohibits operation of any equipment that emits or controls air pollutant without first obtaining a permit to operate.
Rules 401, 402, 403, and 403.2 Nuisance, Visible Emissions, Fugitive Dust	Limits the visible, nuisance, and fugitive dust emissions and would be applicable to the construction period of the project.
Rule 404 Particulate Matter - Concentration	Limits the particulate matter concentration from stationary source exhausts.
Rule 406 Specific Contaminants	The rule prohibits sulfur compound emissions in excess of 500 ppmv.
Rule 407 Liquid and Gaseous Air Contaminants	The rule prohibits carbon monoxide emissions in excess of 2,000 ppmv.
Rule 409 Combustion Contaminants	Limits the emissions from fossil fuel combustion.

Applicable LORS	Description
Rule 431 Sulfur Content of Fuels	Limits the sulfur content of liquid fuels to no more than 0.5% by weight.
Rule 461 Gasoline Transfer and Dispensing	This rule specifies the vapor recovery requirement for gasoline tank filling (Phase I) and vehicle refueling (Phase II) for gasoline storage and refueling facilities.
Rule 900 Standard of Performance for New Stationary Source	Incorporates the Federal NSPS (40 CFR 60) rules by reference.
Rule 1303 New Source Review	Specifies BACT/Offsets technology and requirements for a new emissions unit that has potential to emit any affected pollutants.
Rule 1306 Electric Energy Generating Facilities	Describes actions to be taken for permitting of power plants that are within the jurisdiction of the Energy Commission.

GREENHOUSE GAS

Applicable LORS	Description
Federal	
40 Code of Federal Regulations (CFR) Part 98	This rule requires mandatory reporting of GHG emissions for facilities that emit more than 25,000 metric tons of CO_2 equivalent emissions per year.
State	
California Global Warming Solutions Act of 2006, AB 32 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.)	This act requires the California Air Resources Board (ARB) to enact standards that will reduce GHG emission to 1990 levels by 2020. Electricity production facilities will be regulated by the ARB.
California Code of Regulations, tit. 17, Subchapter 10, Article 2, sections 95100 et. seq.	These ARB regulations implement mandatory GHG emissions reporting as part of the California Global Warming Solutions Act of 2006 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.)
Title 20, California Code of Regulations, section 2900 et seq.; CPUC Decision D0701039 in proceeding R0604009	The regulations prohibit utilities from entering into long-term contracts with any base load facility that does not meet a greenhouse gas emission standard of 0.5 metric tonnes carbon dioxide per megawatt-hour (0.5 $MTCO_2$/MWh) or 1,100 pounds carbon dioxide per megawatt-hour (1,100 lbs CO_2/MWh).

ALTERNATIVES

California Environmental Quality Act (CEQA)

Energy Commission staff is required by agency regulations to examine the "feasibility of available site and facility alternatives to the Applicant's proposal which substantially lessen the significant adverse impacts of the proposal on the environment." (Cal. Code Regs., tit. 20, § 1765.)

The "Guidelines for Implementation of the California Environmental Quality Act," Title 14, California Code of Regulations, Section 15126.6(a), requires an evaluation of the comparative merits of "a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project."

In addition, the analysis must address the No Project Alternative. (Cal. Code Regs., tit. 14, § 15126.6[e].) The analysis should identify and compare the impacts of the various alternatives, but analysis of alternatives need not be in as much detail as the analysis of the proposed project.

The range of alternatives is governed by the "rule of reason," which requires consideration only of those alternatives necessary to permit informed decision making and public participation. CEQA states that an environmental document does not have to consider an alternative if its effect cannot be reasonably ascertained and if its implementation is remote and speculative. (Cal. Code Regs., tit. 14, §15126.6[f][3].) However, if the range of alternatives is defined too narrowly, the analysis may be inadequate (*City of Santee v. County of San Diego* [4th District, 1989] 214 Cal. App. 3d 1438).

BIOLOGICAL RESOURCES

Applicable LORS	Description
FEDERAL	
Federal Endangered Species Act (Title 16, United States Code, section 1531 et seq., and Title 50, Code of Federal Regulations, part 17.1 et seq.)	Designates and provides for protection of threatened and endangered plant and animal species and their critical habitat. “Take” of a federally-listed species is prohibited without an incidental take permit, which may be obtained through Section 7 consultation (between federal agencies) or a Section 10 Habitat Conservation Plan.
Migratory Bird Treaty Act (Title 16, United States Code, sections 703 through 711)	Makes it unlawful to take or possess any migratory bird (or any part of such migratory bird including active nests) as designated in the Migratory Bird Treaty Act unless permitted by regulation (e.g., duck hunting).
Clean Water Act (Title 33, United States Code, sections 1251 through 1376, and Code of Federal Regulations, part 30, section 330.5(a)(26))	Requires the permitting and monitoring of all discharges to surface water bodies. Section 404 requires a permit from the U.S. Army Corps of Engineers (USACE) for a discharge from dredged or fill materials into waters of the U.S., including wetlands. Section 401 requires a permit from a regional water quality control board (RWQCB) for the discharge of pollutants. By federal law, every applicant for a federal permit or license for an activity that may result in a discharge into a California water body, including wetlands, must request State certification that the proposed activity will not violate State and federal water quality standards.
Bald and Golden Eagle Protection Act (Title 16, United States Code section 668)	Provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the take, possession, and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the act.
California Desert Conservation Area Plan 1980, as amended (reprinted in 1999)	Administered by the BLM, the CDCA Plan requires that proposed development projects are compatible with policies that provide for the protection, enhancement, and sustainability of fish and wildlife species, wildlife corridors, riparian and wetland habitats, and native vegetation resources.
California Desert Protection Act of 1994	An Act of Congress which established 69 wilderness areas, the Mojave National Preserve, expanded Joshua Tree and Death Valley National Monuments and redefined them as National Parks. Lands transferred to the National Park Service were formerly administered by the BLM and included significant portions of grazing allotments, wild horse and burro Herd Management Areas, and Herd Areas.
West Mojave Plan	As an amendment to the CDCA Plan, the BLM produced the West Mojave Plan (WEMO) (BLM 2006). The WEMO is a federal land use plan amendment that (1) presents a comprehensive strategy to conserve and protect the desert tortoise, the Mohave ground squirrel (MGS) and nearly 100 other plants and animals and the natural communities of which they are part, and (2) provides a streamlined program for complying with the requirements of the California and federal Endangered Species Acts” (BLM et al. 2005).

Applicable LORS	Description
STATE	
California Endangered Species Act of 1984 (Fish and Game Code, sections 2050 through 2098)	Protects California's rare, threatened, and endangered species. "Take" of a State-listed species is prohibited without an Incidental Take Permit.
California Code of Regulations (Title 14, sections 670.2 and 670.5)	Lists the plants and animals of California that are declared rare, threatened, or endangered.
Fully Protected Species (Fish and Game Code, sections 3511, 4700, 5050, and 5515)	Designates certain species as fully protected and prohibits the take of such species or their habitat unless for scientific purposes (see also California Code of Regulations, Title 14, section 670.7).
Nest or Eggs (Fish and Game Code section 3503)	Protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird.
Birds of prey (Fish and Game Code section 3503.5)	Birds of prey are protected in California making it "unlawful to take, possess, or destroy any birds of prey (in the order Falconiformes or Strigiformes)."
Migratory Birds (Fish and Game Code section 3513)	Protects California's migratory birds by making it unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame birds.
Significant Natural Areas (Fish and Game Code section 1930 et seq.)	Designates certain areas such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitat.
California Environmental Quality Act (CEQA), CEQA Guidelines section 15380	CEQA defines rare species more broadly than the definitions for species listed under the State and federal Endangered Species Acts. Under section 15830, species not protected through State or federal listing but nonetheless demonstrable as "endangered" or "rare" under CEQA should also receive consideration in environmental analyses. Included in this category are many plants considered rare by the California Native Plant Society (CNPS) and some animals on the CDFG's Special Animals List.
Streambed Alteration Agreement (Fish and Game Code sections 1600 et seq.)	Regulates activities that may divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake in California designated by CDFG in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit. Impacts to vegetation and wildlife resulting from disturbances to waterways are also reviewed and regulated during the permitting process.
California Native Plant Protection Act of 1977 (Fish and Game Code section 1900 et seq.)	Designates State rare, threatened, and endangered plants.
California Desert Native Plants Act of 1981 (Food and Agricultural Code section 80001 et seq. and California Fish and Game Code sections 1925-1926)	Protects non-listed California desert native plants from unlawful harvesting on both public and private lands in Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego counties. Unless issued a valid permit, wood receipt, tag, and seal by the commissioner or sheriff, harvesting, transporting, selling, or possessing specific desert plants is prohibited.

Applicable LORS	Description
Local	
San Bernardino County General Plan: Conservation/Open Space Element of the County General Plan (County of San Bernardino 2007)	Includes objectives to preserve water quality and open space to benefit biological resources, and specific policies and goals for protecting areas of sensitive plant, soils and wildlife habitat and for assuring compatibility between natural areas and development. Although the Calico Solar Project is not located on lands under county jurisdiction, the general plan provides objectives which are consistent with some of the LORS listed above.

Biological Resources
Summary of Compliance with LORS

Applicable Law	Description	Rationale for Compliance
FEDERAL		
Federal Endangered Species Act (Title 16, United States Code, section 1531 et seq., and Title 50, Code of Federal Regulations, part 17.1 et seq.)	Designates and provides for protection of threatened and endangered plant and animal species and their critical habitat. "Take" of a federally-listed species is prohibited without an incidental take permit, which may be obtained through Section 7 consultation (between federal agencies) or a Section 10 Habitat Conservation Plan.	The applicant is currently undergoing consultation with the USFWS for project impacts to desert tortoise and a Biological Opinion will be issued for the proposed project. In addition, staff's proposed Conditions of Certification BIO-1 through BIO-9 and BIO-15 through BIO-18 include measures to minimize and compensate for impacts to the federally listed desert tortoise.
Migratory Bird Treaty (Title 16, United States Code, sections 703 through 711)	Makes it unlawful to take or possess any migratory nongame bird (or any part of such migratory nongame bird) as designated in the Migratory Bird Treaty Act unless permitted by regulation (e.g., duck hunting).	Staff's proposed Condition of Certification BIO-19 includes preconstruction nest surveys, no-disturbance buffers around active nests, and monitoring of nests to minimize impacts to nesting birds covered under the Migratory Bird Treaty Act.
Clean Water Act (Title 33, United States Code, sections 1251 through 1376, and Code of Federal Regulations, part 30, section 330.5(a)(26))	Requires the permitting and monitoring of all discharges to surface water bodies. Section 404 requires a permit from the U.S. Army Corps of Engineers (USACE) for a discharge from dredged or fill materials into waters of the U.S., including wetlands. Section 401 requires a permit from a regional water quality control board (RWQCB) for the discharge of pollutants. By federal law, every applicant for a federal permit or license for an activity that may result in a discharge into a California water body, including wetlands, must request State certification that the proposed activity will not violate State and federal water quality standards.	Waters of the U.S. do not occur within the project area.
Bald and Golden Eagle Protection Act (Title 16, United States Code section 668)	Provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the take, possession, and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the act.	A recently issued Final Rule (September 2009) provides for a regulatory mechanism under the BGPA to permit take of bald or golden eagles comparable to incidental take permits under the ESA. This rule adds a new section at 50 CFR 22.26 to authorize the issuance of permits to take bald eagles and golden eagles on a limited basis. The BGPA defines the ''take'' of an eagle to include a broad range of actions, including disturbance. ''Disturb'' is defined in regulations at 50 CFR 22.3 as: ''to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding,

Applicable Law	Description	Rationale for Compliance
		or sheltering behavior.'' The proposed project may result in "take" of the golden eagle from disturbance to nesting pairs as well as loss of foraging habitat, which may result loss of productivity for this species. Golden eagles are known to nest within a 10-mile radius of the project and at least three pairs occur within 5-miles. Results of golden eagle nesting surveys and foraging habitat assessment are required to determine whether construction of the proposed project would result in take of the species and therefore require a permit. The USFWS Migratory Bird Division is in the process of developing guidance regarding implementation of this final rule, including establishing take thresholds within each Bird Conservation Region that must not be exceeded. If it is ultimately determined that take of golden eagle would occur as a result of the proposed project, an individual (non-programmatic) permit would be required. Permit issuance will be conditioned on various criteria, the most important of which is that the permitted take is compatible with the preservation of the bald eagle and the golden eagle (i.e., consistent with the goal of stable or increasing breeding populations). Staff encourages the applicant to coordinate closely with USFWS as guidance becomes available regarding implementation of the revised BGPA. At this time, staff is unable to determine whether the proposed project would be in compliance with the BGPA. Staff's proposed Condition of Certification BIO-20 includes preconstruction nest surveys, no-disturbance buffers around active nests, and monitoring of nests to minimize impacts to nesting golden eagles. Staff's proposed Condition of Certification BIO-21 requires documentation of compliance with the Bald and Golden Eagle Protection Act.
California Desert Conservation Area Plan 1980, as amended (reprinted in 1999)	Administered by the BLM, the CDCA Plan requires that proposed development projects are compatible with policies that provide for the protection, enhancement, and sustainability of fish and wildlife species, wildlife corridors, riparian and wetland habitats, and native vegetation resources.	Staff's proposed Conditions of Certification BIO-1 through BIO-30 minimize, avoid, and compensate for impacts to various biological resources covered by the CDCA Plan.

Applicable Law	Description	Rationale for Compliance
California Desert Protection Act of 1994	An Act of Congress which established 69 wilderness areas, the Mojave National Preserve, expanded Joshua Tree and Death Valley National Monuments and redefined them as National Parks. Lands transferred to the National Park Service were formerly administered by the BLM and included significant portions of grazing allotments, wild horse and burro Herd Management Areas, and Herd Areas.	Staff's proposed Conditions of Certification BIO-1 through BIO-30 minimize, avoid, and compensate for impacts to various biological resources covered by the California Desert Protection Act of 1994.
West Mojave Plan	As an amendment to the CDCA Plan, the BLM produced the West Mojave Plan (WEMO) (BLM 2006). The WEMO is a federal land use plan amendment that (1) presents a comprehensive strategy to conserve and protect the desert tortoise, the Mohave ground squirrel (MGS) and nearly 100 other plants and animals and the natural communities of which they are part, and (2) provides a streamlined program for complying with the requirements of the California and federal Endangered Species Acts (BLM et al. 2005).	Staff's proposed Conditions of Certification BIO-1 through BIO-30 minimize, avoid, and compensate for impacts to various biological resources covered by the West Mojave Plan.
STATE		
California Endangered Species Act of 1984 (Fish and Game Code, sections 2050 through 2098)	Protects California's rare, threatened, and endangered species. "Take" of a State-listed species is prohibited without an Incidental Take Permit.	Staff's proposed Conditions of Certification BIO-1 through BIO-9 and BIO-15 through BIO-19 would ensure that the project is not likely to jeopardize the continued existence of desert tortoise or Swainson's hawk or result in the degradation of occupied habitat for any State-listed species.
California Code of Regulations (Title 14, sections 670.2 and 670.5)	Lists the plants and animals of California that are declared rare, threatened, or endangered.	Analysis of potential project impacts to rare, threatened, or endangered species is provided above, and Conditions of Certification are proposed that would minimize impacts to these species.
Fully Protected Species (Fish and Game Code, sections 3511, 4700, 5050, and 5515)	Designates certain species as fully protected and prohibits the take of such species or their habitat unless for scientific purposes (see also California Code of Regulations, Title 14, section 670.7).	Golden eagle is designated as fully protected and has been observed in the project area. However, Staff's proposed Condition of Certification BIO-20 includes preconstruction nest surveys, no-disturbance buffers around active nests, and monitoring of nests to minimize impacts to golden eagles. Staff's proposed Condition of Certification BIO-21 requires documentation of compliance with the Bald and Golden Eagle Protection Act.

Applicable Law	Description	Rationale for Compliance
Nest or Eggs (Fish and Game Code section 3503 and 3503.5)	Protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird.	Staff's proposed Condition of Certification BIO-19 includes preconstruction nest surveys, no-disturbance buffers around active nests, and monitoring of nests to minimize impacts to nesting birds. Staff's proposed Condition of Certification BIO-6 includes a Worker Environmental Awareness Program to educate workers about compliance with environmental regulations, including Fish and Game Code section 3503.
Migratory Birds (Fish and Game Code section 3513)	Protects California's migratory birds by making it unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame birds.	Staff's proposed Condition of Certification BIO-19 includes preconstruction nest surveys, no-disturbance buffers around active nests, and monitoring of nests to minimize impacts to nesting birds. Staff's proposed Condition of Certification BIO-6 includes a Worker Environmental Awareness Program to educate workers about compliance with environmental regulations, including Fish and Game Code section 3513.
Significant Natural Areas (Fish and Game Code section 1930 et seq.)	Designates certain areas such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitat.	Refuges, natural sloughs, riparian areas, and vernal pools do not occur on the project site.
California Environmental Quality Act (CEQA), CEQA Guidelines section 15380	CEQA defines rare species more broadly than the definitions for species listed under the State and federal Endangered Species Acts. Under section 15830, species not protected through State or federal listing but nonetheless demonstrable as "endangered" or "rare" under CEQA should also receive consideration in environmental analyses. Included in this category are many plants considered rare by the California Native Plant Society (CNPS) and some animals on the CDFG's Special Animals List.	Implementation of Staff's proposed Conditions of Certification BIO-1 through BIO-30 would ensure that the project remains in compliance with CEQA.
Streambed Alteration Agreement (Fish and Game Code sections 1600 et seq.)	Regulates activities that may divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake in California designated by CDFG in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit. Impacts to vegetation and wildlife resulting from disturbances to waterways are also reviewed and regulated during the permitting process.	Staff's proposed Condition of Certification BIO-27 includes measures to minimize and avoid impacts to jurisdictional waters of the State.
California Native Plant Protection Act of 1977 (Fish and Game Code section 1900 et seq.)	Designates State rare, threatened, and endangered plants.	Staff's proposed Conditions of Certification BIO-10 through BIO-12 include restoration and compensation for impacts to native plant communities, a Weed Management Plan, special-status plant surveys, and minimization and avoidance measures to minimize impacts to special-status plants.

Applicable Law	Description	Rationale for Compliance
California Desert Native Plants Act of 1981 (Food and Agricultural Code section 80001 et seq. and California Fish and Game Code sections 1925-1926)	Protects non-listed California desert native plants from unlawful harvesting on both public and private lands in Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego counties. Unless issued a valid permit, wood receipt, tag, and seal by the commissioner or sheriff, harvesting, transporting, selling, or possessing specific desert plants is prohibited.	Staff's proposed Condition of Certification BIO-12 includes a Protected Plant Salvage Plan, which would minimize impacts to specific native desert plants.
LOCAL		
San Bernardino County General Plan: Conservation/Open Space Element of the County General Plan (County of San Bernardino 2007)	Includes objectives to preserve water quality and open space to benefit biological resources, and specific policies and goals for protecting areas of sensitive plant, soils and wildlife habitat and for assuring compatibility between natural areas and development. Although the Calico Solar Project is not located on lands under county jurisdiction, the general plan provides objectives which are consistent with some of the LORS listed above.	Implementation of Staff's proposed Conditions of Certification BIO-1 through BIO-30 would ensure that the project remains in compliance with the San Bernardino County General Plan.

CULTURAL RESOURCES

Applicable LORS	Description
Federal	
National Historic Preservation Act of 1966, as amended, 16 USC 470(f)	Section 106 of the Act requires Federal agencies to take into account the effects of a proposed action on cultural resources (historic properties) and afford the Advisory Council on Historic Preservation the opportunity to comment.
36 CFR Part 800 (as amended August 5, 2004),	Implementing regulations of Section 106 of the National Historic Preservation Act
National Environmental Policy Act (NEPA): Title 42, USC, section 4321-et seq.	This statute requires Federal agencies to consider potential environmental impacts of projects with Federal involvement and to consider appropriate mitigation measures.
Federal Land Policy and Management Act (FLPMA): Title 43, USC, section 1701 et seq.	This statute requires the Secretary of the Interior to retain and maintain public lands in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric water resource, and archaeological values [Section 1701(a)(8)]; the Secretary, with respect to the public lands, shall promulgate rules and regulations to carry out the purposes of this Act and of other laws applicable to public lands [Section 1740].
Federal Guidelines for Historic Preservation Projects, Federal Register 44739-44738, 190 (September 30, 1983)	The Secretary of the Interior has published a set of Standards and Guidelines for Archaeology and Historic Preservation. These are considered to be the appropriate professional methods and techniques for the preservation of archaeological and historic properties. The Secretary's standards and guidelines are used by Federal agencies, such as the Forest Service, the Bureau of Land Management, and the National Park Service. The California Office of Historic Preservation refers to these standards in its requirements for selection of qualified personnel and in the mitigation of potential impacts to cultural resources on public lands in California.
Executive Order 11593 May 13, 1971 (36 Federal Register 8921)	This order mandates the protection and enhancement of the cultural environment through providing leadership, establishing state offices of historic preservation, and developing criteria for assessing resource values.
American Indian Religious Freedom Act; Title 42, USC, Section 1996	Protects Native American religious practices, ethnic heritage sites, and land uses.
Native American Graves Protection and Repatriation Act (1990); Title 25, USC Section 3001, et seq.,	The stature defines "cultural items," "sacred objects," and "objects of cultural patrimony;" establishes an ownership hierarchy; provides for review; allows excavation of human remains, but stipulates return of the remains according to ownership; sets penalties; calls for inventories; and provides for the return of specified cultural items.
U.S. Dept. of the Interior, Bureau of Land Management (BLM), the California Desert Conservation Area	1. Broaden the archaeological and historical knowledge of the CDCA through continuing efforts and the use of existing data. Continue the effort to identify the full array of the CDCA's cultural resources.
	2. Preserve and protect representative sample of the full array of the CDCA's cultural resources.

Applicable LORS	Description
(CDCA) Plan 1980 as amended – Cultural Resources Element Goals	3. Ensure that cultural resources are given full consideration in land use planning and management decisions, and ensure that BLM-authorized actions avoid inadvertent impacts.
	4. Ensure proper data recovery of significant (National Register of Historic Places-quality) cultural resources where adverse impacts can be avoided.
State	
California Environmental Quality Act (CEQA), Sections 21000 et seq. of the Public Resources Code (PRC) with Guidelines for implementation codified in the California Code of Regulations (CCR), Title 14, Chapter 3, Sections 15000 et seq.	CEQA requires that state and local public agencies to identify the environmental impacts of the proposed discretionary activities or projects, determine if the impacts will be significant, and identify alternatives and mitigation measures that will substantially reduce or eliminate significant impacts to the environment. Historical resources are considered a part of the environment and a project that may cause a substantial adverse effect on the significance of a historical resource is a project that may have a significant effect on the environment. The definition of “historical resources” is contained in Section 15064.5 of the CEQA Guidelines.
AB 4239, 1976	Established the Native American Heritage Commission (NAHC) as the primary government agency responsible for identifying and cataloging Native American cultural resources. The bill authorized the Commission to act in order to prevent damage to and insure Native American access to sacred sites and authorized the commission to prepare an inventory of Native American sacred sites located on public lands.
Public Resources Code 5097.97	No public agency, and no private party using or occupying public property, or operating on public property, under a public license, permit, grant, lease, or contract made on or after July 1, 1977, shall in any manner whatsoever interfere with the free expression or exercise of Native American religion as provided in the United States Constitution and the California Constitution; nor shall any such agency or party cause severe or irreparable damage to any Native American sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine located on public property, except on a clear and convincing showing that the public interest and necessity so require.
Public Resources Code 5097.98 (b) and (e)	Requires a landowner on whose property Native American human remains are found to limit further development activity in the vicinity until he/she confers with the Native American Heritage Commission-identified Most Likely Descendents (MLDs) to consider treatment options. In the absence of MLDs or of a treatment acceptable to all parties, the landowner is required to reinter the remains elsewhere on the property in a location not subject to further disturbance.
California Health and Safety Code, Section 7050.5	This code makes it a misdemeanor to disturb or remove human remains found outside a cemetery. This code also requires a project owner to halt construction if human remains are discovered and to contact the county coroner.

Applicable LORS	Description
Local	
County of San Bernardino 2007 General Plan, C. Countywide Goals and Policies of the Conservation Element	GOAL CO 1. The County will maintain to the greatest extent possible natural resources that contribute to the quality of life within the County. GOAL CO 3. The County will preserve and promote its historic and prehistoric cultural heritage. POLICIES CO 3.1 Identify and protect important archaeological and historic cultural resources in areas of the County that have been determined to have known cultural resource sensitivity. CO 3.2 Identify and protect important archaeological and historic cultural resources in all lands that involves disturbance of previously undisturbed ground. CO 3.3 Establish programs to preserve the information and heritage value of cultural and historical resources. CO 3.4 The County will comply with Government Code Section 65352.2 (SB18) by consulting with tribes as identified by the California Native American Heritage Commission on all General Plan and specific plan actions. CO 3.5 Ensure that important cultural resources are avoided or minimized to protect Native American beliefs and traditions.
County of San Bernardino 2007 Development Code	82.12.010 Purpose (a) Many of the resources are unique and non-renewable; and (b) The preservation of cultural resources provides a greater knowledge of County history, thus promoting County identity and conserving historic and scientific amenities for the benefit of future generations. 82.12.040 Development Standards Archaeological and historical resources determined by qualified professionals to be extremely important should be preserved as open space or dedicated to a public institution when possible.

FACILITY DESIGN

Applicable LORS	Description
Federal	Title 29 Code of Federal Regulations (CFR), Part 1910, Occupational Safety and Health standards
State	2007 California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations)
Local	San Bernardino County regulations and ordinances
General	American National Standards Institute (ANSI) American Society of Mechanical Engineers (ASME) American Welding Society (AWS) American Society for Testing and Materials (ASTM)

GEOLOGY AND PALEONTOLOGY

Applicable LORS	Description
Federal	
Antiquities Act of 1906 (16 United States Code [USC], 431-433	The proposed Calico Solar Project is located entirely on federal (Bureau of Land Management) land. Although there is no specific mention of natural or paleontological resources in the Act itself, or in the Act's uniform rules and regulations (Title 43 Part 3, Code of Federal Regulations [43 CFR Part 3], 'objects of antiquity' has been interpreted to include fossils by the Federal Highways Act of 1956, the National Park Service (NPS), the Bureau of Land Management (BLM), the Forest Service (USFS), and other Federal agencies. All design will also need to adhere to any applicable BLM design standards.
Antiquities Act of 1906 (16 United States Code [USC], 431-433)	The proposed Calico Solar Project facility site is located entirely on land currently administered by the Bureau of Land Management (BLM). Although there is no specific mention of natural or paleontological resources in the Act itself, or in the Act's uniform rules and regulations (Title 43 Part 3, Code of Federal Regulations [43 CFR Part 3], 'objects of antiquity' has been interpreted to include fossils by the Federal Highways Act of 1956, the National Park Service (NPS), the BLM, the Forest Service (USFS), and other Federal agencies.
National Environmental Policy Act (NEPA) of 1970 (42 USC 4321, et. seq.)	Established the Council on Environmental Quality (CEQ), which is charged with preserving 'important historic, cultural, and natural aspects of our national heritage'.
Federal Land Policy and Management Act (FLPMA) of 1976 (43 USC 1701-1784)	Authorizes the BLM to manage public lands to protect the quality scientific, scenic, historical, archeological, and other values, and to develop 'regulations and plans for the protection of public land areas of critical environmental concern', which include 'important historic, cultural or scenic values'. Also charged with the protection of 'life and safety from natural hazards'.
Paleontological Resources Preservation Act (PRPA) (Public Law [PL] 111-011)	Authorizes Departments of Interior and Agriculture Secretaries to manage the protection of paleontological resources on Federal lands.
State	
California Building Code (CBC), 2007	The CBC (2007) includes a series of standards that are used in project investigation, design, and construction (including grading and erosion control).
Alquist-Priolo Earthquake Fault Zoning Act, Public Resources Code (PRC), Section 2621–2630	Mitigates against surface fault rupture of known active faults beneath occupied structures. Requires disclosure to potential buyers of existing real estate and a 50-foot setback for new occupied buildings. Portions of the site and proposed ancillary facilities are located within designated Alquist-Priolo Fault Zones. The proposed site layout places occupied structures outside of the 50-foot setback zone.

Applicable LORS	Description
The Seismic Hazards Mapping Act, PRC Section 2690–2699	Areas are identified that are subject to the effects of strong ground shaking, such as liquefaction, landslides, tsunamis, and seiches.
PRC, Chapter 1.7, Sections 5097.5 and 30244	Regulates removal of paleontological resources from state lands, defines unauthorized removal of fossil resources as a misdemeanor, and requires mitigation of disturbed sites.
Warren-Alquist Act, PRC, Sections 25527 and 25550.5(i)	The Warren-Alquist Act requires the Energy Commission to "give the greatest consideration to the need for protecting areas of critical environmental concern, including, but not limited to, unique and irreplaceable scientific, scenic, and educational wildlife habitats; unique historical, archaeological, and cultural sites…" With respect to paleontological resources, the Energy Commission relies on guidelines from the Society of Vertebrate Paleontology, indicated below.
California Environmental Quality Act (CEQA), PRC sections 15000 et seq., Appendix G	Mandates that public and private entities identify the potential impacts on the environment during proposed activities. Appendix G outlines the requirements for compliance with CEQA and provides a definition of significant impacts on a fossil site.
Society of Vertebrate Paleontology (SVP), 1995	The "Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontological Resources: Standard Procedures" is a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources. The measures were adopted in October 1995 by the SVP, a national organization of professional scientists.
Local	
San Bernardino County 2007 Development Code, Chapters 82.15, 82.20 and Safety Element	Chapter 82.15 requires that a geological study will be undertaken where roads and structures are to be constructed. Also requires that roads and utilities will be perpendicular to faults. Chapter 82.20 defines criteria for site evaluation for paleontological resources in the county, including preliminary field surveys, monitoring during construction, and specimen recovery; also defines qualifications for professional paleontologists. The Safety Element requires compliance with geological/geotechnical reports, the CBC, and other state agencies and regulations.

HAZARDOUS MATERIALS MANAGEMENT

Applicable LORS	Description
Federal	
The Superfund Amendments and Reauthorization Act of 1986 (42 USC §9601 et seq.)	Contains the Emergency Planning and Community Right To Know Act (also known as SARA Title III).
The Clean Air Act (CAA) of 1990 (42 USC 7401 et seq. as amended)	Establishes a nationwide emergency planning and response program, and imposes reporting requirements for businesses that store, handle, or produce significant quantities of extremely hazardous materials.
The CAA Section on Risk Management Plans (42 USC §112(r)	Requires states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of both SARA Title III and the CAA are reflected in the California Health and Safety Code, section 25531, et seq.
49 CFR 172.800	Requires that the suppliers of hazardous materials prepare and implement security plans in accordance with U.S. Department of Transportation (DOT) regulations.
49 CFR Part 1572, Subparts A and B	Requires that suppliers of hazardous materials ensure that their hazardous material drivers comply with personnel background security checks.
The Clean Water Act (CWA) (40 CFR 112)	Aims to prevent the discharge or threat of discharge of oil into navigable waters or adjoining shorelines. Requires a written spill prevention, control, and countermeasures (SPCC) plan to be prepared for facilities that store oil that could leak into navigable waters.
Title 49, Code of Federal Regulations, Part 190	Outlines gas pipeline safety program procedures.
Title 49, Code of Federal Regulations, Part 191	Addresses the transportation of natural and other gases by pipeline. Requires preparation of annual reports, incident reports, and safety-related condition reports. Also requires operators of pipeline systems to notify the U.S. Department of Transportation DOT) of any reportable incident by telephone and submit a follow-up written report within 30 days.

Applicable LORS	Description
Title 49, Code of Federal Regulations, Part 192	Addresses transportation of natural and other gases by pipeline: Requires minimum federal safety standards, specifies minimum safety requirements for pipelines, and includes material selection, design requirements, and corrosion protection. The safety requirements for pipeline construction vary according to the population density and land use that characterize the surrounding land. This part also contains regulations governing pipeline construction, which must be followed for Class 2 and Class 3 pipelines, and requirements for preparing a pipeline integrity management program.
6 CFR Part 27	The CFATS (Chemical Facility Anti-Terrorism Standard) regulation of the U.S. Department of Homeland Security (DHS) that requires facilities that use or store certain hazardous materials to submit information to the DHS so that a vulnerability assessment can be conducted to determine what certain specified security measures shall be implemented.
State	
California Health and Safety Code, section 25531 to 25543.4	The California Accidental Release Program (Cal-ARP) requires the preparation of a Risk Management Plan (RMP) and Off-site Consequence Analysis (OCA) and submittal to the local Certified Unified Program Agency (CUPA) for approval.
Title 8, California Code of Regulations, Section 5189	Requires facility owners to develop and implement effective safety management plans to ensure that large quantities of hazardous materials are handled safely. While these requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the RMP process.
Title 8, California Code of Regulations, Section 5189	Sets forth requirements for design, construction, and operation of the vessels and equipment used to store and transfer ammonia. These sections generally codify the requirements of several industry codes including the American Society for Material Engineering (ASME) Pressure Vessel Code, the American National Standards Institute (ANSI) K61.1, and the National Boiler and Pressure Vessel Inspection Code. These codes apply to anhydrous ammonia but are also used to design storage facilities for aqueous ammonia.

Applicable LORS	Description
California Health and Safety Code, Section 41700	Requires that “No person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property.”
California HSC Sections 25270 through 25270.13	Requires the preparation of a Spill Prevention, Control, and Countermeasures (SPCC) Plan if 10,000 gallons or more of petroleum is stored on-site. The above regulations would also require the immediate reporting of a spill or release of 42 gallons or more to the California Office of Emergency Services and the Certified Unified Program Agency (CUPA).
California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)	Prevents certain chemicals that cause cancer and reproductive toxicity from being discharged into sources of drinking water.
Local	
2007 California Fire Code Title 24, Part 9	Adopts the California Fire Code, 2007 Edition, into San Bernardino County regulations.

LAND USE

Applicable LORS	Description
Federal	
Federal Land Policy and Management Act (FLPMA), 1976 – 43 CFR 1600	Establishes public land policy; guidelines for administration; and provides for the management, protection, development, and enhancement of public lands. In particular, the FLPMA's relevance to the proposed project is that Title V, Section 501 establishes BLM's authority to grant rights-of-way for generation, transmission, and distribution of electrical energy (FLPMA 2001).
Bureau of Land Management - California Desert Conservation Area (CDCA) Plan, 1980 as Amended (BLM 1980)	The 25 million-acre CDCA contains over 12 million acres of public lands spread within the area known as the California Desert, which includes the following three deserts: the Mojave, the Sonoran, and a small portion of the Great Basin. The 12 million acres of public lands administered by the BLM are half of the CDCA. The CDCA Plan is a comprehensive, long-range plan with goals and specific actions for the management, use, development, and protection of the resources and public lands within the CDCA, and it is based on the concepts of multiple use, sustained yield, and maintenance of environmental quality. The plan's goals and actions for each resource are established in its 12 elements. Each of the plan elements provides both a desert-wide perspective of the planning decisions for one major resource or issue of public concern as well as a more specific interpretation of multiple-use class guidelines for a given resource and its associated activities.
Public Rangelands Improvement Act (1978) (PRIA 1978)	Establishes and reaffirms the national policy and commitment to inventory and identify current public rangeland conditions and trends; manage, maintain and improve the condition of public rangelands so that they become as productive as feasible for all rangeland values in accordance with management objectives and the land use planning process; and continue the policy of protecting wild free-roaming horses and burros from capture, branding, harassment, or death, while at the same time facilitating the removal and disposal of excess wild free-roaming horses and burros which pose a threat to themselves and their habitat and to other rangeland values.

Applicable LORS	Description
Wild and Free-Roaming Horse and Burro Act (1971) (BLM 2009j)	The BLM protects, manages, and controls wild horses and burros under the authority of the Wild Free-Roaming Horses and Burros Act of 1971 (Act) to ensure that healthy herds thrive on healthy rangelands. The BLM manages these animals as part of its multiple-use mission under the 1976 Federal Land Policy and Management Act. One of the BLM's key responsibilities under the Act is to determine the "appropriate management level" (AML) of wild horses and burros on the public rangelands.
State	
None	
Local	
None	

NOISE AND VIBRATION

Applicable LORS	Description
Federal (OSHA): 29 U.S.C. § 651 et seq.	Protects workers from the effects of occupational noise exposure.
State (Cal/OSHA): Cal. Code Regs., tit. 8, §§ 5095–5099	Protects workers from the effects of occupational noise exposure.
Local San Bernardino County General Plan Noise Element San Bernardino County Development Code, Ch. 83.01	 Establishes noise limits as specified in the Development Code (below) Establishes property line noise limits for various receiving uses. Exempts construction noise during certain hours. Establishes vibration limits.

POWER PLANT EFFICIENCY

No federal, state, local, or county laws, ordinances, regulations and standards (LORS) apply to the efficiency of this project.

POWER PLANT RELIABILITY

No federal, state, local, or county laws, ordinances, regulations and standards (LORS) pertain to the reliability of this project.

PUBLIC HEALTH

Applicable LORS	Description
Federal	
Clean Air Act section 112 (Title 42, U.S. Code section 7412)	This act requires new sources that emit more than 10 tons per year of any specified Hazardous Air Pollutant (HAP) or more than 25 tons per year of any combination of HAPs to apply Maximum Achievable Control Technology.
State	
California Health and Safety Code section 25249.5 et seq. (Proposition 65)	These sections establish thresholds of exposure to carcinogenic substances above which Prop 65 exposure warnings are required.
California Health and Safety Code section 41700	This section states that “no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property.”
California Public Resource Code section 25523(a); Title 20 California Code of Regulations (CCR) section 1752.5, 2300–2309 and Division 2 Chapter 5, Article 1, Appendix B, Part (1); California Clean Air Act, Health and Safety Code section 39650, et seq.	These regulations require a quantitative health risk assessment for new or modified sources, including power plants that emit one or more toxic air contaminants (TACs).
Local	
Mojave Desert Air Quality Management District (MDAQMD) Rule 1302	New Source Review for Toxic Air Contaminants.

SOCIOECONOMICS

Applicable LORS	Description
Federal	
Emergency Economic Stabilization Act of 2008 (P.L. 110-343) Business Solar Investment Tax Credit (IR Code	Extends the 30% investment tax credit (ITC) for solar energy property for eight years through December 31, 2016. The bill allows the ITC to be used to offset both regular and alternative minimum tax (AMT) and waives the public utility exception of current law (i.e., permits utilities to directly invest in solar facilities and claim the ITC). The five-year accelerated depreciation allowance for solar property is permanent and unaffected by passage of the eight-year extension of the solar ITC.
State	
California Education Code, Section 17620	The governing board of any school district is authorized to levy a fee, charge, dedication, or other requirement for the purpose of funding the construction or reconstruction of school facilities.
California Government Code, Sections 65996-65997	Except for a fee, charge, dedication, or other requirement authorized under Section 17620 of the Education Code**,** state and local public agencies may not impose fees, charges, or other financial requirements to offset the cost for school facilities.
California Revenue and Taxation Code Section 70-74.7	Property taxes are not assessed on solar facilities. Assembly Bill 1451 extended the current property tax exclusion for new construction of solar energy systems to January 1, 2017.

SOIL & WATER RESOURCES

Applicable LORS	Description
Federal	
Clean Water Act (33 U.S.C. Section 1257 et seq.)	The Clean Water Act (CWA) (33 USC § 1257 et seq.) requires states to set standards to protect water quality, which includes regulation of storm water and wastewater discharges during construction and operation of a facility. California established its regulations to comply with the CWA under the Porter-Cologne Water Quality Control Act of 1967. The CWA also establishes protection of navigable waters through Section 401 and 404. Section 404 permitting and. Section 401 certification through the Army Corps of Engineers and Regional Water Quality Control Board (RWQCB) is required if there are potential impacts to surface waters of the State and/or Waters of the United States, such as perennial and ephemeral drainages, streams, washes, ponds, pools, and wetlands. The Army Corps and RWQCB can require impacts to these waters to be quantified and mitigated.
Resource Conservation and Recovery Act, 40 CFR Part 260 et seq.	The Resource Conservation Recovery Act (RCRA) is a comprehensive body of regulations that give U.S. EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also sets forth a framework for the management of non-hazardous solid wastes.
State	
California Constitution, Article X, Section 2	This section requires that the water resources of the State be put to beneficial use to the fullest extent possible and states that the waste, unreasonable use or unreasonable method of use of water is prohibited.
The Porter-Cologne Water Quality Control Act of 1967, Water Code Sec 13000 et seq.	Requires the State Water Resources Control Board (SWRCB) and the nine RWQCBs to adopt water quality criteria to protect state waters. Those regulations require that the RWQCBs issue Waste Discharge Requirements specifying conditions for protection of water quality as applicable. Section 13000 also states that the State must be prepared to exercise its full power and jurisdiction to protect the quality of the waters of the State from degradation.
California Water Code Section 13050	Defines “waters of the State.”
California Water Code Section 13240, 13241, 13242, 13243, & Water Quality Control Plan for the Lahontan Region (Basin Plan)	The Basin Plan establishes water quality objectives that protect the beneficial uses of surface water and groundwater in the Region. The Basin Plan describes implementation plans and other control measures designed to ensure compliance with statewide plans and policies and provides comprehensive water quality planning. The following chapters are applicable to determining appropriate control measures and cleanup levels to protect beneficial uses and to meet the water quality objectives: Chapter 2, Present and Potential Beneficial Uses; Chapter 3, Water Quality Objectives, and the sections of Chapter 4, Implementation, entitled “Requirements for Site Investigation and Remediation,” “Cleanup Levels,” “Risk Assessment,” “Stormwater Problems and Control Measures,” Erosion and Sedimentation,” “Solid and Liquid Waste Disposal to Land,” and “Groundwater Protection and Management.”

Applicable LORS	Description
California Water Code Section 13260	Requires filing, with the appropriate RWQCB, a report of waste discharge that could affect the water quality of the state unless the requirement is waived pursuant to Water Code section 13269.
California Code of Regulations, Title 23, Division 3, Chapter 30	This chapter requires the submission of analytical test results and other monitoring information electronically over the internet to the SWRCB's Geotracker database.
State Water Resources Control Board General Permit CAS000002.	The SWRCB regulates storm water discharges associated with construction projects affecting areas greater than or equal to 1 acre to protect state waters. Under General Permit CAS000002, the SWRCB has issued a National Pollutant Discharge Elimination System (NPDES) General Permit for storm water discharges associated with construction activity. Projects can qualify under this permit if specific criteria are met and an acceptable Storm Water Pollution Prevention Plan (SWPPP) is prepared and implemented after notifying the SWRCB with a Notice of Intent.
State Water Resources Control Board 2003-003-DWQ	This general permit applies to the discharge of water to land that has a low threat to water quality. Categories of low threat discharges include piping hydrostatic test water.
California Code of Regulations, Title 22	Title 22, Division 4, Chapter 15 specifies Primary and Secondary Drinking Water Standards in terms of Maximum Contaminant Levels (MCLs). These MCLs include total dissolved solids (TDS) ranging from a recommended level of 500 milligrams per liter (mg/l), an upper level of 1,000 mg/l and a short term level of 1,500 mg/l. Other water quality MCLs are also specified, in addition to MCLS specified for heavy metals and chemical compounds.
California Code of Regulations, Title 23	Title 23, Division 3, Chapter 15 applies to waste discharges to land and requires the Regional Board issue Waste Discharge Requirements specifying conditions for protection of water quality as applicable.
Local	
County of San Bernardino General Plan and Development Code	Grading in San Bernardino County is subject to terms and conditions of San Bernardino County's General Plan, Development Code and California Building Code, based upon the 2006 International Building Code. Although the proposed site is located on federal land, county regulations for public health and safety are considered to be applicable to the project. If a county grading permit is required, the grading plan would need to be completed in compliance with San Bernardino County's General Plan and Development Code.

Applicable LORS	Description
California Safe Drinking Water Act and San Bernardino County Code Title 3, Division 3, Chapter 6, Public Water Supply Systems	Requires public water systems to obtain a Domestic Water Supply Permit. The California Safe Drinking Water Act requires public water systems to obtain a Domestic Water Supply Permit. Public water systems are defined as a system for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves at least 25 individuals daily at least 60 days out the year. California Department of Public Health (CDPH) administers the Domestic Water Supply Permit program, and has delegated issuance of Domestic Water Supply Permits for smaller public water systems in San Bernardino County to the County. Under the San Bernardino County Code Title 3, 5.15-6 Division 3, Chapter 6, Public Water Supply Systems, the County Department of Environmental Services monitors and enforces all applicable laws and orders for public water systems with less than 200 service connections. The proposed project would likely be considered a non-transient, non-community water system.
San Bernardino County Title 3, Division 3, Chapter 6,Article 5, Desert Groundwater Management	To help protect water resources in unregulated portions of the desert while not precluding its use, the County adopted this article. This article requires a permit to locate, construct, operate, or maintain a new groundwater well within the unincorporated, unadjudicated desert region of San Bernardino County. California Environmental Quality Act (CEQA) compliance must be completed prior to issuance of a permit, and groundwater management, mitigation, and monitoring may be required as a condition of the permit. The ordinance states that it does not apply to “groundwater wells located on Federal lands unless otherwise specified by inter-agency agreement.” The BLM and County entered into a Memorandum of understanding (MOU) that provides that the BLM will require conformance with this code for all projects proposing to use groundwater from beneath public lands.
San Bernardino County Development Code Section 82.13.080, Soil Erosion and Sediment Control Plans/Permits	Section 82.13.080 establishes regulations and procedures to control human existing and potential induced accelerated erosion. Elements of this ordinance include project planning, preparation of Soil Erosion and Sediment Control Plans, runoff control, land clearing, and winter operations.
San Bernardino County Municipal Stormwater Permit	The current Permit, Order No. R8-2010-0036 adopted January 29, 2010,, outlines a schedule of monitoring requirements, best management practices, and conditions designed to promote the reduction of pollutants in stormwater discharges.
San Bernardino County Ordinance Code, Title 3, Division 3, Chapter 8, Waste Management, Article 5, Liquid Waste Disposal	This ordinance requires the following compliance for all liquid waste disposal systems: (1) compliance with applicable portions of the Uniform Plumbing Code and the San Bernardino County Department of Environmental Health (DEHS) standards; (2) approval by the DEHS and building authority with jurisdiction over the system; or (3) for alternative systems, approval by the DEHS, the appropriate building official of this jurisdiction, and the appropriate California RWQCB.
San Bernardino County Ordinance Code, Title 6, Division 3, Chapter 3, Uniform Plumbing Code	This ordinance describes the installation and inspection requirements for locating disposal/leach fields and seepage pits.

Applicable LORS	Description
State Policies and Guidance	
Integrated Energy Policy Report (Public Resources Code, Div. 15, Section 25300 et seq.)	In the 2003 Integrated Energy Policy Report (IEPR), consistent with SWRCB Policy 75-58 and the Warren-Alquist Act, the Energy Commission adopted a policy stating they will approve the use of fresh water for cooling purposes by power plants only where alternative water supply sources and alternative cooling technologies are shown to be "environmentally undesirable" or "economically unsound."
State Water Resources Control Board Res. No. 68-16	The "Antidegradation Policy" mandates that: 1) existing high quality waters of the State are maintained until it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the State, will not unreasonable affect present and anticipated beneficial uses, and will not result in waste quality less than adopted policies; and 2) requires that any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters, must meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that: a) a pollution or nuisance will not occur and b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.
State Water Resources Control Board Res. 75-58	The principal policy of the SWRCB that addresses the specific siting of energy facilities is the Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling (adopted by the Board on June 19, 1976, by Resolution 75-58). This policy states that use of fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound.
State Water Resources Control Board Res. No. 88-63	States that all groundwater and surface water of the State are considered to be suitable for municipal or domestic water supply with the exception of those waters that meet specified conditions.
State Water Resources Control Board Res. 2005-0006	Adopts the concept of sustainability as a core value for State Water Board programs and directs its incorporation in all future policies, guidelines, and regulatory actions.
State Water Resources Control Board Res. 2008-0030	Requires sustainable water resources management such as low impact development (LID) and climate change considerations, in all future policies, guidelines, and regulatory actions. Directs Regional Water Boards to "aggressively promote measures such as recycled water, conservation and LID Best Management Practices where appropriate and work with Dischargers to ensure proposed compliance documents include appropriate, sustainable water management strategies."
The California Safe Drinking Water and Toxic Enforcement Act	The California Health & Safety Code Section 25249.5 et seq. prohibits actions contaminating drinking water with chemicals known to cause cancer or possessing reproductive toxicity. The RWQCB administers the requirements of the Act.

TRAFFIC AND TRANSPORTATION

Applicable LORS	Description
Federal	
Code of Federal Regulations (CFR), Title 14, Aeronautics and Space; Part 77, Objects Affecting Navigable Airspace (14 CFR 77)	Includes standards for determining physical obstructions to navigable airspace; information about requirements for notices, hearings, and requirements for aeronautical studies to determine the effect of physical obstructions to the safe and efficient use of airspace.
*Code of Federal Regulations (*CFR*)*, Title 49, Subtitle B, Sections 171-177; Sections 350-399; Appendices A-G Other Regulations Relating to Transportation	Includes procedures and regulations pertaining to interstate and intrastate transport (including hazardous materials program procedures) and as well as safety measures for motor carriers and motor vehicles operating on public highways.
State	
California Vehicle Code (CVC), Division 2, Chapter 2.5, Div. 6; Chap. 7, Div. 13; Chap. 5, Div. 14.1; Chap. 1 and 2, Div. 14.8, Div. 15	Pertain to licensing, size, weight, and load of vehicles operated on highways; safe operation of vehicles; and transporting hazardous materials.
California Streets and Highway Code, Section 117; Section 660-695; Section 700-711; Section 1450; 1460 et seq.; and 1480 et. Seq.	Pertain to regulating rights-of-way encroachments and granting permits for encroachment on state highways and freeways and on county roads.
California Health and Safety Code; Section 25160 et seq.	Pertain to operators of vehicles transporting hazardous materials
Local	
San Bernardino General Plan, Circulation and Infrastructure Element, Desert Region	Pertains to public policies and strategies for the transportation system in San Bernardino County, including those pertaining to transportation routes, terminals, and facilities; construction of extensions of existing streets; and levels of services (LOS).
San Bernardino Traffic Code, Section 52.0125	Pertains to requirements for oversize and overweight vehicles.

TRANSMISSION LINE SAFETY AND NUISANCE

Applicable LORS	Description
Aviation Safety	
Federal	
Title 14, Part 77 of the Code of Federal Regulations (CFR),"Objects Affecting the Navigable Air Space"	Describes the criteria used to determine the need for a Federal Aviation Administration (FAA) "Notice of Proposed Construction or Alteration" in cases of potential obstruction hazards.
FAA Advisory Circular No. 70/7460-1G, "Proposed Construction and/or Alteration of Objects that May Affect the Navigation Space"	Addresses the need to file the "Notice of Proposed Construction or Alteration" (Form 7640) with the FAA in cases of potential for an obstruction hazard.
FAA Advisory Circular 70/460-1G, "Obstruction Marking and Lighting"	Describes the FAA standards for marking and lighting objects that may pose a navigation hazard as established using the criteria in Title 14, Part 77 of the CFR.
Interference with Radio Frequency Communication	
Federal	
Title 47, CFR, section 15.2524, Federal Communications Commission (FCC)	Prohibits operation of devices that can interfere with radio-frequency communication.
State	
California Public Utilities Commission (CPUC) General Order 52 (GO-52)	Governs the construction and operation of power and communications lines to prevent or mitigate interference.
Audible Noise	
Local	
San Bernardino County General Plan, Noise Element	References the county's Ordinance Code for noise limits.
San Bernardino County Noise Ordinance	Establishes performance standards for planned residential or other noise-sensitive land uses.
Hazardous and Nuisance Shocks	
State	
CPUC GO-95, "Rules for Overhead Electric Line Construction"	Governs clearance requirements to prevent hazardous shocks, grounding techniques to minimize nuisance shocks, and maintenance and inspection requirements.
Title 8, California Code of Regulations (CCR) section 2700 et seq. "High Voltage Safety Orders"	Specifies requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment.

Applicable LORS	Description
National Electrical Safety Code	Specifies grounding procedures to limit nuisance shocks. Also specifies minimum conductor ground clearances.
Industry Standards	
Institute of Electrical and Electronics Engineers (IEEE) 1119, “IEEE Guide for Fence Safety Clearances in Electric-Supply Stations”	Specifies the guidelines for grounding-related practices within the right-of-way and substations.
Electric and Magnetic Fields	
State	
GO-131-D, CPUC ”Rules for Planning and Construction of Electric Generation Line and Substation Facilities in California”	Specifies application and noticing requirements for new line construction including EMF reduction.
CPUC Decision 93-11-013	Specifies CPUC requirements for reducing power frequency electric and magnetic fields.
Industry Standards	
American National Standards Institute (ANSI/IEEE) 644-1944 Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines	Specifies standard procedures for measuring electric and magnetic fields from an operating electric line.
Fire Hazards	
State	
14 CCR sections 1250-1258, “Fire Prevention Standards for Electric Utilities”	Provides specific exemptions from electric pole and tower firebreak and conductor clearance standards and specifies when and where standards apply.

TRANSMISSION SYSTEM ENGINEERING

Applicable LORS	Description
The North American Electric Reliability Corporation (NERC)	North American Reliability Council (NERC) Reliability Standards for the Bulk Electric Systems of North America provide national policies, standards, principles and guidelines to assure the adequacy and security of the electric transmission system. The NERC Reliability Standards provide for system performance levels under normal and contingency conditions. With regard to power flow and stability simulations, while these Reliability Standards are similar to NERC/WECC Standards, certain aspects of the NERC/WECC Standards are either more stringent or more specific than the NERC Standards for Transmission System Contingency Performance. The NERC Reliability Standards apply not only to interconnected system operation but also to individual service areas (NERC 2006).
Western Electricity Coordinating Council's (WECC)	The Western Electricity Coordinating Council (WECC) Planning Standards are merged with the North American Electric Reliability Council (NERC) Planning Standards and provide the system performance standards used in assessing the reliability of the interconnected system. These standards require the continuity of service to loads as the first priority and preservation of interconnected operation as a secondary priority. Certain aspects of the NERC/WECC standards are either more stringent or more specific than the NERC standards alone. These standards provide planning for electric systems so as to withstand the more probable forced and maintenance outage system contingencies at projected customer demand and anticipated electricity transfer levels, while continuing to operate reliably within equipment and electric system thermal, voltage and stability limits. These standards include the reliability criteria for system adequacy and security, system modeling data requirements, system protection and control, and system restoration. Analysis of the WECC system is based to a large degree on Section I.A of the standards, "NERC and WECC Planning Standards with Table I and WECC Disturbance-Performance Table" and on Section I.D, "NERC and WECC Standards for Voltage Support and Reactive Power". These standards require that the results of power

	flow and stability simulations verify defined performance levels. Performance levels are defined by specifying the allowable variations in thermal loading, voltage and frequency, and loss of load that may occur on systems during various disturbances. Performance levels range from no significant adverse effects inside and outside a system area during a minor disturbance (loss of load or a single transmission element out of service) to a level that seeks to prevent system cascading and the subsequent blackout of islanded areas during a major disturbance (such as loss of multiple 500 kV lines along a common right of way, and/or multiple generators). While controlled loss of generation or load or system separation is permitted in certain circumstances, their uncontrolled loss is not permitted (WECC 2006).
California Public Utilities Commission (CPUC) General Order 95 (GO-95*), Rules for Overhead Electric Line Construction*	Specifies uniform requirements for the construction of overhead electric lines. Compliance with this order ensures both reliable service and a safe working environment for those working in the construction, maintenance, operation, or use of overhead electric lines, and for the safety of the general public.
CPUC General Order 128 (GO-128), *Rules for Underground Electric Line Construction*	Establishes uniform requirements for the construction of underground electric lines. Compliance with this order also ensures both reliable service and a safe working environment for those working in the construction, maintenance, operation, or use of underground electric lines, and for the safety of the general public.
National Electric Safety Code 1999	Provides electrical, mechanical, civil, and structural requirements for overhead electric line construction and operation.
California Independent System Operator (CAISO)	California ISO Planning Standards also provide standards, and guidelines to assure the adequacy, security and reliability in the planning of the California ISO transmission grid facilities. The California ISO Grid Planning Standards incorporate the NERC/WECC and NERC Reliability Planning Standards. With regard to power flow and stability simulations, these Planning Standards are similar

	to the NERC/WECC or NERC Reliability Planning Standards for Transmission System Contingency Performance. However, the California ISO Standards also provide some additional requirements that are not found in the WECC/NERC or NERC Standards. The California ISO Standards apply to all participating transmission owners interconnecting to the California ISO controlled grid. They also apply when there are any impacts to the California ISO grid due to facilities interconnecting to adjacent controlled grids not operated by the California ISO (California ISO 2002a). California ISO/FERC Electric Tariff provides guidelines for construction of all transmission additions/upgrades (projects) within the California ISO controlled grid. The California ISO determines the “Need” for the proposed project where it will promote economic efficiency or maintain system reliability. The California ISO also determines the Cost Responsibility of the proposed project and provides an Operational Review of all facilities that are to be connected to the California ISO grid (California ISO 2007a).

VISUAL RESOURCES

Applicable LORS	Definition
Federal	
National Environmental Policy Act (NEPA)	As discussed above, applicable federal requirements for visual impact assessment are enacted through application of the BLM VRM methodology, discussed below.
Federal Land Policy and Management Act of 1976 (FLPMA)	Section 102 (a) of the Federal Land Policy and Management Act of 1976 (FLPMA) states that " . . . the public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values …. " Section 103 (c) identifies "scenic values" as one of the resources for which public land should be managed. Section 201 (a) states that "The Secretary shall prepare and maintain on a continuing basis an inventory of all public lands and their resources and other values (including ... scenic values) ...." Section 505 (a) requires that "Each right-of-way shall contain terms and conditions which will... minimize damage to the scenic and esthetic values...."
California Desert Conservation Area Plan (CDCA Plan)	The CDCA Plan represents the Resource Management Plan (RMP) for the area required under FLPMA. The CDCA Plan did not contain VRM mapping as in most RMPs. The Calico site is classified in the CDCA Plan as Multiple-Use Class (MUC) M (Moderate Use). MUC M lands are managed to provide a wider variety of uses such as mining, grazing, recreation, utilities, and energy development, while conserving desert resources and mitigating damages permitted uses may cause. Under the CDCA Plan Electrical Power Generation Facilities, including Wind/Solar facilities, may be allowed within MUC Class M if NEPA requirements are met.
National Historic Preservation Act (NHPA)	Under regulations of the NHPA, visual impacts to a listed or eligible National Register property that may diminish the integrity of the property's ". . . setting . . .(or) feeling . . . ." in a way that affects the property's eligibility for listing, may result in a potentially significant adverse effect. "Examples of adverse effects . . . include . . .:

Applicable LORS	Definition
	Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features . . . . " (36 CFR Part 800.5)
State	
State Scenic Highway Program (CA. Streets and Highways Code, Section 260 et seq.)	The State Scenic Highway Program promotes protection of designated State scenic highways through certification and adoption of local scenic corridor protection programs that conform to requirements of the State program.
Local	
San Bernardino County General Plan (2007) Applicable Conservation Element Goals, Objectives, Programs	***CONSERVATION ELEMENT*** *GOAL CO 1*. The County will maintain to the greatest extent possible natural resources that contribute to the quality of life within the County. Policy CO 1.2 The preservation of some natural resources requires the establishment of a buffer area between the resource and developed areas. The County will continue the review of the Land Use Designations for unincorporated areas within one mile of any state or federally designated scenic area, national forest, national monument, or similar area, to ensure that sufficiently low development densities and building controls are applied to protect the visual and natural qualities of these areas. Policy CO 8.1 Maximize the beneficial effects and minimize the adverse effects associated with the siting of major energy facilities. The County will site energy facilities equitably in order to minimize net energy use and consumption of natural resources, and avoid inappropriately burdening certain communities. Energy planning should conserve energy and reduce peak load demands, reduce natural resource consumption, minimize environmental impacts, and treat local communities fairly. The County will consult with electric utilities during the construction of their major transmission line towers to ensure that they are aesthetically compatible with the surrounding environment.

Applicable LORS	Definition
San Bernardino County General Plan (2007) Applicable Conservation Element Goals, Objectives, Programs (continued)	The County shall consult with electric utilities during the planning construction of their major transmission lines towers to ensure that they are aesthetically compatible with the surrounding environment. ***OPEN SPACE ELEMENT*** *GOAL OS 4.* The County will preserve and protect cultural resources throughout the County, including parks, areas of regional significance, and scenic, cultural and historic sites that contribute to a distinctive visual experience *GOAL OS 5*. The County will maintain and enhance the visual character of scenic routes in the County. Scenic Route: Interstate 40 from Ludlow northeast to Needles. (p. 223) ***LAND USE ELEMENT*** GOAL D/LU 1. Maintain land use patterns in the Desert Region that enhance the rural environment and preserve the quality of life of the residents of the region. ***CONSERVATION ELEMENT*** GOAL D/CO 3. Preserve the dark night sky as a natural resource in the Desert Region communities. POLICIES D/CO 3.1 Protect the Night Sky by providing information about and enforcing existing ordinances: a. Provide information about the Night Sky ordinance and lighting restrictions with each land use or building permit application. b. Review exterior lighting as part of the design review process. D/CO 3.2 All outdoor lighting, including street lighting, shall be provided in accordance with the Night Sky Protection Ordinance and shall only be provided as necessary to meet safety standards. D/CO 3.3 Allow for desert communities' input on the need for, and placement of, new street lights.

Applicable LORS	Definition
San Bernardino County General Plan (2007) Applicable Conservation Element Goals, Objectives, Programs (continued)	
San Bernardino Development Code Chapter 83.07.040 Glare and Outdoor Lighting - Mountain and Desert Regions.	Sets various standards and conditions for external lighting in residential and commercial situations. Exempts facilities on Federal Property

WASTE MANAGEMENT

Applicable LORS	Description
Federal	
Title 42, United States Code (U.S.C.), §6901, et seq. Solid Waste Disposal Act of 1965 (as amended and revised by the Resource Conservation and Recovery Act of 1976, et al.)	The Solid Waste Disposal Act, as amended and revised by the Resource Conservation and Recovery Act (RCRA) et al., establishes requirements for the management of solid wastes (including hazardous wastes), landfills, underground storage tanks, and certain medical wastes. The statute also addresses program administration, implementation and delegation to states, enforcement provisions, and responsibilities, as well as research, training, and grant funding provisions. RCRA Subtitle C establishes provisions for the generation, storage, treatment, and disposal of hazardous waste, including requirements addressing: • Generator record keeping practices that identify quantities of hazardous wastes generated and their disposition; • Waste labeling practices and use of appropriate containers; • Use of a manifest when transporting wastes; • Submission of periodic reports to the United States Environmental Protection Agency (U.S. EPA) or other authorized agency; and • Corrective action to remediate releases of hazardous waste and contamination associated with RCRA-regulated facilities. RCRA Subtitle D establishes provisions for the design and operation of solid waste landfills. RCRA is administered at the federal level by U.S. EPA and its 10 regional offices. The Pacific Southwest regional office (Region 9) implements U.S. EPA programs in California, Nevada, Arizona, and Hawaii.

Applicable LORS	Description
Title 42, U.S.C., §9601, et seq. Comprehensive Environmental Response, Compensation and Liability Act	The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), also known as *Superfund*, establishes authority and funding mechanisms for cleanup of uncontrolled or abandoned hazardous waste sites, as well as cleanup of accidents, spills, or emergency releases of pollutants and contaminants into the environment. Among other things, the statute addresses: • Reporting requirements for releases of hazardous substances; • Requirements for remedial action at closed or abandoned hazardous waste sites, and brownfields; • Liability of persons responsible for releases of hazardous substances or waste; and • Requirements for property owners/potential buyers to conduct "all appropriate inquiries" into previous ownership and uses of the property to 1) determine if hazardous substances have been or may have been released at the site, and 2) establish that the owner/buyer did not cause or contribute to the release. A Phase I Environmental Site Assessment is commonly used to satisfy CERCLA "all appropriate inquiries" requirements.
Title 40, Code of Federal Regulations (CFR), Subchapter I – Solid Wastes	These regulations were established by U.S. EPA to implement the provisions of the Solid Waste Disposal Act and RCRA (described above). Among other things, the regulations establish the criteria for classification of solid waste disposal facilities (landfills), hazardous waste characteristic criteria and regulatory thresholds, hazardous waste generator requirements, and requirements for management of used oil and universal wastes. • Part 257 addresses the criteria for classification of solid waste disposal facilities and practices. • Part 258 addresses the criteria for municipal solid waste landfills. • Parts 260 through 279 address management of hazardous wastes, used oil, and universal wastes (i.e., batteries, mercury-containing equipment, and lamps). U.S. EPA implements the regulations at the federal level. However, California is an RCRA-authorized state, so most of the solid and hazardous waste regulations are implemented by state agencies and authorized local agencies in lieu of U.S. EPA.
Title 49, CFR, Parts 172 and 173. Hazardous Materials Regulations	These regulations address the United States Department of Transportation (DOT) established standards for transport of hazardous materials and hazardous wastes. The standards include requirements for labeling, packaging, and shipping of hazardous materials and hazardous wastes, as well as training requirements for personnel completing shipping papers and manifests. Section 172.205 specifically addresses use and preparation of hazardous waste manifests in accordance with Title 40, CFR, section 262.20.

Applicable LORS	Description
Federal CWA, 33 USC § 1251 *et seq.*	The Clean Water Act controls discharge of wastewater to the surface waters of the U.S.
Title 40 CFR Section 112	This establishes procedures, methods, equipment, and other requirements to prevent the discharge of oil from non-transportation-related onshore and offshore facilities into or upon the navigable waters of the United States or adjoining shorelines, or into or upon the waters of the contiguous zone, or in connection with activities under the Outer Continental Shelf Lands Act or the Deepwater Port Act of 1974. Subpart B - The Spill Prevention, Control and Countermeasures (SPCC) Plan includes procedures, methods, and equipment at the facility to prevent discharges of petroleum from reaching navigable waters.
State	
California Health and Safety Code (HSC), Chapter 6.5, §25100, et seq. Hazardous Waste Control Act of 1972, as amended	This California law creates the framework under which hazardous wastes must be managed in California. The law provides for the development of a state hazardous waste program that administers and implements the provisions of the federal RCRA program. It also provides for the designation of California-only hazardous wastes and development of standards (regulations) that are equal to or, in some cases, more stringent than federal requirements. The California Environmental Protection Agency (Cal/EPA), Department of Toxic Substances Control (DTSC) administers and implements the provisions of the law at the state level. Certified Unified Program Agencies (CUPAs) implement some elements of the law at the local level.
Title 22, California Code of Regulations (CCR), Division 4.5. Environmental Health Standards for the Management of Hazardous Waste	These regulations establish requirements for the management and disposal of hazardous waste in accordance with the provisions of the California Hazardous Waste Control Act and federal RCRA. As with the federal requirements, waste generators must determine if their wastes are hazardous according to specified characteristics or lists of wastes. Hazardous waste generators must obtain identification numbers; prepare manifests before transporting the waste off site; and use only permitted treatment, storage, and disposal facilities. Generator standards also include requirements for record keeping, reporting, packaging, and labeling. Additionally, while not a federal requirement, California requires that hazardous waste be transported by registered hazardous waste transporters. The standards addressed by Title 22, CCR include: • Identification and Listing of Hazardous Waste (Chapter 11, §66261.1, et seq.). • Standards Applicable to Generator of Hazardous Waste (Chapter 12, §66262.10, et seq.). • Standards Applicable to Transporters of Hazardous Waste (Chapter 13, §66263.10, et seq.). • Standards for Universal Waste Management (Chapter 23, §66273.1, et seq.).

Applicable LORS	Description
	• Standards for the Management of Used Oil (Chapter 29, §66279.1, et seq.). • Requirements for Units and Facilities Deemed to Have a Permit by Rule (Chapter 45, §67450.1, et seq.). The Title 22 regulations are established and enforced at the state level by DTSC. Some generator and waste treatment standards are also enforced at the local level by CUPAs.
HSC, Chapter 6.11 §§25404 – 25404.9 Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program)	The Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of the six environmental and emergency response programs listed below. • Aboveground Petroleum Storage Act requirements for Spill Prevention, Control, and Countermeasure (SPCC) Plans. • Hazardous Materials Release and Response Plans and Inventories (Business Plans). • California Accidental Release Prevention (CalARP) Program. • Hazardous Materials Management Plan / Hazardous Materials Inventory Statements. • Hazardous Waste Generator / Tiered Permitting Program. • Underground Storage Tank Program. The state agencies responsible for these programs set the standards for their programs while local governments implement the standards. The local agencies implementing the Unified Program are known as CUPAs. The DTSC's Calexico Field Office is the CUPA for the Calico Solar Project. Note: The Waste Management analysis only considers application of the Hazardous Waste Generator/Tiered Permitting element of the Unified Program.
Title 27, CCR, Division 1, Subdivision 4, Chapter 1, §15100, et seq. Unified Hazardous Waste and Hazardous Materials Management Regulatory Program	While these regulations primarily address certification and implementation of the program by the local CUPAs, the regulations do contain specific reporting requirements for businesses. • Article 9 – Unified Program Standardized Forms and Formats (§§ 15400–15410). • Article 10 – Business Reporting to CUPAs (§§15600–15620).
Public Resources Code, Division 30, §40000, et seq. California Integrated Waste Management Act of 1989	The California Integrated Waste Management Act (CIWMA) establishes mandates and standards for management of solid waste in California. The law addresses solid waste landfill diversion requirements; establishes the preferred waste management hierarchy (source reduction first, then recycling and reuse, and treatment and disposal last); sets standards for design and

Applicable LORS	Description
	construction of municipal landfills; and addresses programs for county waste management plans and local implementation of solid waste requirements.
Title 14, CCR, Division 7, §17200, et seq. California Integrated Waste Management Board	These regulations implement the provisions of the California Integrated Waste Management Act and set forth minimum standards for solid waste handling and disposal. The regulations include standards for solid waste management, as well as enforcement and program administration provisions. • Chapter 3 – Minimum Standards for Solid Waste Handling and Disposal. • Chapter 3.5 – Standards for Handling and Disposal of Asbestos Containing Waste. • Chapter 7 – Special Waste Standards. • Chapter 8 – Used Oil Recycling Program. • Chapter 8.2 – Electronic Waste Recovery and Recycling.
HSC, Division 20, Chapter 6.5, Article 11.9, §25244.12, et seq. Hazardous Waste Source Reduction and Management Review Act of 1989	This law was enacted to expand the state's hazardous waste source reduction activities. Among other things, it establishes hazardous waste source reduction review, planning, and reporting requirements for businesses that routinely generate more than 12,000 kilograms (approximately 26,400 pounds) of hazardous waste in a designated reporting year. The review and planning elements are required to be done on a 4-year cycle, with a summary progress report due to DTSC every fourth year.
Title 22, CCR, §67100.1 et seq. Hazardous Waste Source Reduction and Management Review	These regulations further clarify and implement the provisions of the Hazardous Waste Source Reduction and Management Review Act of 1989 (noted above). The regulations establish the specific review elements and reporting requirements to be completed by generators subject to the act.
Title 23, CCR Division 3, Chapters 16 and 18	These regulations relate to hazardous material storage and petroleum UST cleanup, as well as hazardous waste generator permitting, handling, and storage. The DTSC San Bernardino County CUPA is responsible for local enforcement.
Local	
County of San Bernardino General Plan	The General Plan ensures all new development complies with applicable provisions of the County Integrated Solid Waste Management Plan.
San Bernardino County, Countywide Integrated Waste Management Plan	This document sets forth the county's goals, policies, and programs for reducing dependence on landfilling solid wastes and increasing source reduction, recycling, and reuse of products and waste, in compliance with the CIWMA. The plan also addresses the siting and development of recycling and disposal facilities and programs within the county.

WORKER SAFETY AND FIRE PROTECTION

Applicable LORS	Description
Federal	
29 U.S. Code sections 651 et seq. (Occupational Safety and Health Act of 1970)	This Act mandates safety requirements in the workplace, with the purpose of "[assuring] so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources" (29 USC § 651).
29 CFR sections 1910.1 to 1910.1500 (Occupational Safety and Health Administration Safety and Health Regulations)	These sections define the procedures for promulgating regulations and conducting inspections to implement and enforce safety and health procedures to protect workers, particularly in the industrial sector.
29 CFR sections 1952.170 to 1952.175	These sections provide federal approval of California's plan for enforcement of its own safety and health requirements, in lieu of most of the federal requirements found in 29 CFR §1910.1 to 1910.1500.
State	
2007 Edition of California Fire Code and all applicable NFPA standards (24 CCR Part 9)	NFPA standards are incorporated into the California State Fire Code. The fire code contains general provisions for fire safety, including road and building access, water supplies, fire protection and life safety systems, fire-resistive construction, storage of combustible materials, exits and emergency escapes, and fire alarm systems.
Title 24, California Code of Regulations (24 CCR § 3, et seq.)	The California Building Code is comprised of 11 parts containing building design and construction requirements as they relate to fire, life, and structural safety. It incorporates current editions of the International Building Code, including the electrical, mechanical, energy, and fire codes applicable to the project.
8 CCR all applicable sections (Cal/OSHA regulations)	Requires that all employers follow these regulations as they pertain to the work involved. This includes regulations pertaining to safety matters during the construction, commissioning, and operation of power plants, as well as safety around electrical components, fire safety, and hazardous materials usage, storage, and handling.
24 CCR section 3, et seq.	Incorporates the current edition of the International Building Code.
Health and Safety Code sections 25500 to 25541	Requires a Hazardous Materials Business plan detailing emergency response plans for hazardous materials emergencies at a facility.

Applicable LORS	Description
Local (or locally enforced)	
Fire and Hazardous Materials: San Bernardino County Code, Title 2, Division 3, Chapter 1 et seq.	Includes California Fire Code and specific codes to regulate permits activities and administrative penalties. Adopts the 2007 California Fire Code and adopts State requirements and guidelines as governing hazardous materials release response plans and inventories.
Health and Safety: San Bernardino County Code Title 3, Division 1, et seq.	Includes specific codes to regulate permits, activities (e.g., solid waste management), and administrative penalties.
Building and Construction: San Bernardino County Code, Title 6, Division 3, Chapter 1 et seq.	Adopts national standards such as Uniform Building Code and National Electrical Code.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

Docket Number: ***08-AFC-13*** Date: ***October 28, 2010***

Project Name: **Application for Certification for the *CALICO SOLAR Project***

FINAL EXHIBIT LIST

Applicant's Exhibits

Exhibit	Brief Description	Admitted
1.	Application for Certification, dated December 1, 2008, docketed December 2, 2008	8/25/10
a.	1.0 Executive Summary	8/25/10
b.	2.0 Project Objectives/Need	8/25/10
c.	App A MOU	8/25/10
d.	App C Property Owners	8/25/10
e.	App D Burlington Northern Santa Fe Railroad ROW	8/25/10
f.	3.0 Project Description and Location	8/25/10
g.	App B Solar Stirling Engine	8/25/10
h.	App F Mechanical and Fire Protection Design Criteria	8/25/10
i.	App G USGS Project Maps	8/25/10
j.	App H System Impact Study	8/25/10
k.	App I Electric and Magnetic Field calculations	8/25/10
l.	App J Water Balance Flow Diagrams	8/25/10
m.	App K Hydrogen System Design	8/25/10
n.	App L Hazardous Materials Handling	8/25/10
o.	App M Structural Engineering Design Criteria	8/25/10
p.	App N Initial Drainage Report	8/25/10
q.	App O Civil Engineering Design Criteria	8/25/10
r.	App P Electrical Engineering Criteria	8/25/10
s.	App Q Control Systems Design Criteria	8/25/10
t.	App R Fuel handling Design Criteria	8/25/10

Exhibit	Brief Description	Admitted
u.	App S Materials Safety/Equipment	8/25/10
v.	App T Phase I Environmental Site Assessment	8/25/10
w.	App EE Environmental Summary Lugo-Pisgah	8/25/10
x.	4.0 Alternatives	8/25/10
y.	5.1 Introduction	8/25/10
z.	5.2 Air Quality	8/25/10
aa.	App V – Air Quality Data	8/25/10
bb.	5.3 Geologic Hazards	8/25/10
cc.	App E Preliminary Geotechnical and Geologic Hazards Evaluation	8/25/10
dd.	5.4 Soils	8/25/10
ee.	App W Soil loss calculations	8/25/10
ff.	5.5 Water Resources	8/25/10
gg.	5.6 Biological Resources	8/25/10
hh.	App Y – Biological Technical Report	8/25/10
ii.	5.7 Cultural Resources	8/25/10
jj.	App Z Cultural Tech Report	8/25/10
kk.	5.8 Paleontological Resources	8/25/10
ll.	App AA Paleontological Resources Tech Report	8/25/10
mm.	5.9 Land Use	8/25/10
nn.	5.10 Socioeconomics	8/25/10
oo.	5.11 Traffic and Transportation	8/25/10
pp.	App BB Traffic Counts	8/25/10
qq.	5.12 Noise	8/25/10
rr.	App CC Noise Measurements	8/25/10
ss.	5.13 Visual Resources	8/25/10
tt.	5.14 Waste Management	8/25/10
uu.	5.15 Haz Mat Handling	8/25/10
av.	5.16 Public Health and Safety	8/25/10
ww.	App DD Public Health and Safety Data	8/25/10
xx.	5.17 Worker Safety	8/25/10
yy.	5.18 Cumulative Impacts	8/25/10
zz.	6.0 Financial Information	8/25/10
aaa.	7.0 List of Preparers	8/25/10

Exhibit	Brief Description	Admitted
2.	Application to MDAQMD, dated January 28, 2009, docketed January 28, 2009	8/25/10
3.	Data Adequacy Supplement, dated April 6, 2009, docketed April 6, 2009	8/25/10
a.	Responses 1-5 Air Quality	8/25/10
b.	Response 6 Economic benefits of alternate site	8/25/10
c.	Responses 7-11 Biology	8/25/10
d.	Responses 12-23 Cultural	8/25/10
e.	Responses 24-26 Land Use	8/25/10
f.	Responses 27-28 Noise	8/25/10
g.	Responses 29 Project Overview	8/25/10
h.	Response 30-32 Site ownership	8/25/10
i.	Response 33 Transmission Line Route	8/25/10
j.	Response 34-36 Socioeconomics	8/25/10
k.	Response 37 Fill disposal location	8/25/10
l.	Response 38 Soils	8/25/10
m.	Responses 39 Traffic	8/25/10
n.	Response 40-41 Agency contacts and other permits	8/25/10
o.	Response 42-44 One-lines and agencies	8/25/10
p.	Response 45-46 Visual	8/25/10
q.	Response 47 Waste Management	8/25/10
r.	Responses 48, 53-55 Surface Water	8/25/10
s.	Responses 49-52 Groundwater	8/25/10
t.	Response 50 Back-up water supply	8/25/10
4.	Additional Information, dated April 29, 2009, docketed April 29, 2009, Pump Test Data	8/25/10
5.	CEC/BLM Data Responses 49-70, 74, 75, 80, 82-84, 88-91, dated July 17, 2009, docketed July 17, 2009	8/25/10
a.	Response 49 Alternate site map	8/25/10
b.	Responses 50-52, Biology, U.S. and State Waters 54-56, 82-84	8/25/10
c.	Response 53 Evaporation Pond	8/25/10
d.	Responses 57-60 Hydrogen system	8/25/10
e.	Response 61 Paleontology	8/25/10
f.	Responses 62-63 Project boundary	8/25/10
g.	Responses 64-67 Land use	8/25/10
h.	Response 68 Noise	8/25/10

Exhibit	Brief Description	Admitted
i.	Responses 69-70 Groundwater	8/25/10
j.	Responses 74,75, Water requirements 80	8/25/10
k.	Responses 86-87 Waste management and ore processing	8/25/10
6.	CEC/BLM Response 55 – Raven Monitoring and Control Plan, dated July 17, 2009, docketed July 17, 2009	8/25/10
7.	CEC/BLM response 50 – Report to Map Federal and State Waters, dated July 17, 2009, docketed July 17, 2009	8/25/10
8.	CURE Data Request Responses 1-228, dated July 27, 2009, docketed July 27, 2009	8/25/10
a.	Responses 1-162, 165, Biology 224-228	8/25/10
b.	Responses 163, 164 SunCatcher washing	8/25/10
9.	Response to Public Comments, dated July 30, 2009, docketed July 30, 2009	8/25/10
a.	Response 4 Aquifer recharge	8/25/10
b.	Responses 5, 6, 17 Public Information	8/25/10
c.	Response 13 Land Purchases	8/25/10
d.	Response 14 Siting	8/25/10
e.	Responses 8-12, 16, 18 Biology	8/25/10
f.	Response 15 Cumulative Impacts	8/25/10
g.	Responses 19, 20, Phasing, POD, Access 23-26	8/25/10
h.	Responses 21, 22, 24 Technology	8/25/10
10.	CURE data request responses 229-275, dated August 13, 2009, docketed August 13, 2009	8/25/10
	Responses 229-275 Interconnection, Overloads, Mitigation	8/25/10
11.	CEC/BLM Responses 113-127, dated August 20, 2009, docketed August 20, 2009	8/25/10
a.	Responses 113, 114 Economics and fire funding	8/25/10
b.	Responses 115, 117, Access, site spacing 123,127	8/25/10
c.	Responses 120, Visual 124-125	8/25/10
d.	Responses 116, 118, ROW 119, 121, 122,124,126	8/25/10
12.	CEC/BLM Responses 1-48, 81, 109-112, dated August 31, 2009, docketed August 28, 2009	8/25/10
a.	Responses 1-8, 10, 11, Air 13, 19, 22-29, 31-43, 45-48	8/25/10
b.	Responses 9, 12, Engineering 14-18, 20, 21, 30, 44	8/25/10
c.	Responses 109-112 Public Health	8/25/10
13.	CEC/BLM Response 81, dated August 31, 2009, docketed August 31, 2009 Response 81 DESCP	8/25/10

Exhibit	Brief Description	Admitted
14.	CEC/BLM Info Request Responses (9/16/09 workshop), dated October 15, 2009, docketed October 15, 2009	8/25/10
a.	Soil stabilizer and County contacts	8/25/10
b.	Use of private parcels	8/25/10
15.	CURE DR Responses 276-380, dated November 13, 2009, docketed November 12, 2009	8/25/10
a.	Responses 276-282 Hydrogen	8/25/10
b.	Response 283-285 BNSF water	8/25/10
c.	Response 286 Soil testing	8/25/10
d.	Response 287 Worker Safety	8/25/10
e.	Responses 288-295 BNSF water	8/25/10
f.	Responses 296-297, MTBF, emergencies283-285	8/25/10
g.	Responses 298-303 SunCatcher testing	8/25/10
h.	Responses 304-306 Delay	8/25/10
i.	Responses 307-309 Funding	8/25/10
k.	Responses 310-312 Land Use	8/25/10
l.	Responses 313-359, Biology361-374, 377-379	8/25/10
m.	Response 360	8/25/10
n.	Responses 375, 376, Project description 380	8/25/10
16.	CEC/BLM DR Responses, Set 1, part 2, dated November 19, 2009, docketed November 19, 2009	8/25/10
a.	Response 92, 93 Geomorphology	8/25/10
b.	Response 94-108 Cultural	8/25/10
17.	CEC/BLM DR Responses 71-73, 76-79, 85, 128-141, dated November 23, 2009, docketed November 23, 2009	8/25/10
a.	Responses 71-73, Groundwater and aquifer data 77-79, 85	8/25/10
b.	Response 76, 137, Well location 138, 139	8/25/10
c.	Responses 128 Geotextile	8/25/10
d.	Response 129-131, Road assumptions 136, 140	8/25/10
e.	Response 132-134 Alternatives	8/25/10
f.	Response 135 Biology impacts	8/25/10
g.	Response 141 Traffic	8/25/10
18.	CURE DR Responses 378-402, dated December 2, 2009, docketed December 3, 2009	8/25/10
a.	Response 378-394 Biology	8/25/10
b.	Response 395-402 DWMA ACEC Upper Johnson Valley	8/25/10

Exhibit	Brief Description	Admitted
19.	DOW and BRW DR Responses, dated December 4, 2009, docketed December 4, 2009	8/25/10
	DOW Responses 6-8, Alternative sites 11	8/25/10
a.	DOW Responses 9, 10 Alternatives	8/25/10
b.	DOW Responses 1-5 Biology	8/25/10
c.	BRW Responses 1-3 Biology	8/25/10
20.	CEC/BLM DR Responses, Set 2, dated December 4, 2009, docketed December 4, 2009	8/25/10
a.	Response 142 Channel grading	8/25/10
b.	Response 143 Research overview	8/25/10
c.	Response 144-153 Groundwater	8/25/10
d.	Response 154-161 Sediment, culverts	8/25/10
e.	Response 162-166 PCU luminance/mirror visibility	8/25/10
	Response 167-174 Oil storage, SPCC, waste streams	8/25/10
21.	Updated project map, dated December 21, 2009, docketed December 21, 2009	8/25/10
	Project Map Biology	8/25/10
22.	Donated Parcel Study, dated December 17, 2009, docketed December 17, 2009	8/25/10
a.	Biology	8/25/10
b.	Cultural Resources	8/25/10
c.	Geology	8/25/10
d.	Soils	8/25/10
e.	Land Use	8/25/10
f.	Noise	8/25/10
g.	Public Health	8/25/10
h.	Visual Resources	8/25/10
23.	Project Description for 275 MW Interconnection, dated December 23, 2009, docketed December 23, 2009	8/25/10
	SCE Description for 275 Interconnection	8/25/10
24.	Biological Resources Technical Report, Biological Resources Baseline Study, and Noxious Weed Management Plan, dated December 23, 2009, docketed December 23, 2009	8/25/10
25.	Geotech Engineering Report, dated January 6, 2010, docketed January 8, 2010	8/25/10
26.	Responses to CURE letter, dated January 7, 2010, docketed January 7, 2010	8/25/10
	DR 10, 379, 380, 382	8/25/10
27.	CAISO, Corridor Conflict Analysis, dated January 6, 2010, docketed January 8, 2010	8/25/10
	Corridor Conflict & BLM letter	8/25/10

Exhibit	Brief Description	Admitted
28.	Response to CEC transmission questions, dated January 8, 2010, docketed January 8, 2010	8/25/10
a.	Items 1-3, 7 Biology	8/25/10
b.	Items 4, 9 SCE transmission and 11	8/25/10
c.	Items 5-6 Cultural	8/25/10
d.	Items 8 & 10, Flood zones 12, 14	8/25/10
e.	Item 13 BMPs for Erosion	8/25/10
29.	Additional Alternatives Analysis, dated January 7, 2010, docketed January 8, 2010	8/25/10
a.	Introduction, Land Use	8/25/10
b.	Biological Resources	8/25/10
c.	Cultural Resources	8/25/10
d.	Water Resources	8/25/10
30.	Additional Information on Water Supply, dated January 15, 2010, docketed January 15, 2010	8/25/10
	Field efforts and back-up water supply	8/25/10
31.	MDAQMD Final Decision, dated January 27, 2010, docketed January 27, 2010	8/25/10
32.	Supplemental Information, dated January 27, 2010, docketed February 3, 2010	8/25/10
a.	Sections 1.0 & 1.2 Cadiz water supply	8/25/10
b.	Section 2.1 Introduction	8/25/10
c.	Section 2.2 Air Quality	8/25/10
d.	Section 2.3 Geology	8/25/10
e.	Section 2.4 Soils	8/25/10
f.	Section 2.5 Water	8/25/10
g.	Section 2.6 Biology	8/25/10
h.	Section 2.7 Cultural	8/25/10
i.	Section 2.8 Paleontology	8/25/10
j.	Section 2.9 Land Use	8/25/10
k.	Section 2.10 Socioeconomics	8/25/10
l.	Section 2.11 Traffic	8/25/10
m.	Section 2.12 Noise	8/25/10
n.	Section 2.13 Visual	8/25/10
o.	Section 2.14 Waste Management	8/25/10
p.	Section 2.15 Hazardous Materials	8/25/10
q.	Section 2.16 Public Health	8/25/10

Exhibit	Brief Description	Admitted
r.	Section 2.17 Worker Safety	8/25/10
s.	Section 2.18 Cumulative	8/25/10
33.	Response to January 5, 2010 workshop items, dated January 29, 2010, docketed January 29, 2010	8/25/10
a.	Items 1-4, 6-21, Biology 23-34	8/25/10
b.	Item 5, 22 Evaporation ponds	8/25/10
34.	Drainage Layout, dated February 12, 2010, docketed February 12, 2010	8/25/10
	Drainage Layout	8/25/10
35.	Construction Milestone Schedule, dated February 12, 2010, docketed February 12, 2010	8/25/10
	Construction milestones	8/25/10
36.	Burrowing Owl Survey, dated February 19, 2010, docketed February 13, 2010	8/25/10
37.	CEC/BLM Responses, dated February 24, 2010, docketed February 24, 2010	8/25/10
	Response 102 and 103	8/25/10
38.	LGIA, dated February 26, 2010, docketed February 26, 2010	8/25/10
39.	Clean Water Act 401 Application and Notification of Lake or Streambed Alteration, dated March 4, 2010, docketed March 4, 2010	8/25/10
40.	Revised Project Layout, dated March 8, 2010, docketed March 8, 2010	8/25/10
41.	Existing and Future Access Roads, dated March 8, 2010, docketed March 8, 2010	8/25/10
42.	Use of Rail to Transport Water, dated March 26, 2010, docketed March 26, 2010	8/25/10
43.	2010 Burrowing Owl survey results, dated March 26, 2010, docketed March 26, 2010	8/25/10
44.	Biological Assessment, dated April 1, 2010, docketed April 1, 2010	8/25/10
45.	Comments on SA/DEIS, dated April 14, 2010, docketed April 14, 2010	8/25/10
46.	Construction Schedule, dated April 21, 2010, docketed April 21, 2010	8/25/10
47.	Additional information from April workshop, dated April 20, 2010, docketed April 20, 2010	8/25/10
a.	Soils	8/25/10
b.	Access	8/25/10
c.	Worker Safety	8/25/10
d.	Efficiency	8/25/10
e.	Traffic	8/25/10
48.	Suggested Revised Biological Conditions, dated April 27, 2010, docketed April 27, 2010	8/25/10
49.	Federal NO2 1-hour Modeling Analysis, dated April 30, 2010, docketed April 30, 2010	8/25/10
50.	Results from Helicopter Surveys for Golden Eagle Nests/Bighorn Sheep, dated April 30, 2010, docketed April 30, 2010	8/25/10
51.	Letter pertaining to Glint & Glare, dated April 30, 2010, docketed April 30, 2010	8/25/10

Exhibit	Brief Description	Admitted
52.	Additional information, dated May 4, 2010, docketed May 4, 2010	8/25/10
53.	Department of Army Permit, dated May 6, 2010, docketed May 6, 2010	8/25/10
54.	2010 Early Spring Botany Survey Results, dated May 20, 2010, docketed May 20, 2010	8/25/10
55.	2010 Desert Tortoise Survey Results, dated May 18, 2010, docketed May 18, 2010	8/25/10
56.	Supplement to AFC, dated May 14, 2010, docketed May 14, 2010	8/25/10
a.	Site boundary	8/25/10
b.	Hydrogen system	8/25/10
c.	Water Supply	8/25/10
57.	Site Layout Alternative #2, dated June 2, 2010, docketed June 2, 2010	8/25/10
58.	Maricopa Construction and Operation, dated June 11, 2010, docketed June 11, 2010	8/25/10
59.	Information in Response to 6/4/2010 CEC email, dated June 11, 2010, docketed June 11, 2010	8/25/10
60.	Additional Information in Response to 6/4/2010 CEC email, dated June 16, 2010, docketed June 16, 2010	8/25/10
61.	2010 Late Spring Botany Survey Results, dated June 16, 2010, docketed June 16, 2010	8/25/10
62.	Submittal of Microphyllus Species Distribution, dated June 22, 2010, docketed June 22, 2010	8/25/10
63.	Opening Direct Testimony for Felicia Bellows	8/4/10
64.	Opening Direct Testimony for Sean Gallagher	8/4/10
65.	Opening Direct Testimony for Mike Alhalabi	8/25/10
66.	Opening Direct Testimony for Robert Byall	8/25/10
67.	Opening Direct Testimony for Noel Casil	8/25/10
68.	Opening Direct Testimony for Matt Dadswell	8/25/10
69.	Opening Direct Testimony for Michael Hatch	8/25/10
70.	Opening Direct Testimony for Shawn Johnston	8/25/10
71.	Opening Direct Testimony for Angela Leiba	8/25/10
72.	Opening Direct Testimony for Julie Mitchell	8/25/10
73.	Opening Direct Testimony for Patrick Mock	8/25/10
74.	Opening Direct Testimony for Matt Moore	8/25/10
75.	Opening Direct Testimony for Rachael Nixon	8/25/10
76.	Opening Direct Testimony for Rick Reiff	8/25/10
77.	Opening Direct Testimony for Robert Scott	8/25/10
78.	Opening Direct Testimony for Joe Stewart	8/25/10
79.	Opening Direct Testimony for Mark Storm	8/25/10

Exhibit	Brief Description	Admitted
80.	Opening Direct Testimony for Waymon Votaw	8/25/10
81.	Opening Direct Testimony for Tricia Winterbauer	8/25/10
82.	Rebuttal Testimony for Felicia Bellows	8/4/10
82-A.	Applicant's Requested Changes to Conditions	8/4/10
82-B.	Maps of Pre- and Post-Project Public Access Routes	8/4/10
82-C.	Map of Biological Resources Avoided by Project Boundary Modification	8/4/10
82-D.	Revised Project Base Map	8/4/10
82-E.	July 1, 2010 BNSF letter	8/4/10
83.	Rebuttal Testimony for Julie Mitchell	8/25/10
84.	Rebuttal Testimony for Robert Scott	8/25/10
84- A.	Map of Wells in the Vicinity of the Calico Solar Project	8/25/10
85.	Rebuttal Testimony for Joe Liles	8/25/10
86.	Rebuttal Testimony for Robert Byall	8/25/10
87.	Rebuttal Testimony for Patrick Mock	8/25/10
88.	Rebuttal Testimony for Theresa Miller	8/25/10
89.	Rebuttal Testimony for Waymon Votaw	8/25/10
90.	Rebuttal Testimony for Tariq Hussain	8/25/10
90-A.	Map of Offsite Consequences Analysis for Two Independent Centralized Hydrogen Systems	8/25/10
91.	Rebuttal Testimony for Noel Casil	8/25/10
92	Proposed changes to conditions Bio 12, Bio 13, and Bio 17.	8/25/10
93	Desert Tortoise Relocation plan dated July 28, 2010	8/25/10
94	Revised version of Exhibit 90-A	8/25/10
95	Final Environmental Impact Statement dated August 2010	8/25/10
96	Additonal Air Quality Analysis for NO2 (8/4)	8/25/10
97	Hydrogen Compressor Map	8/25/10
98	Data sheets for Desert Tortoise translocation plan	8/25/10
99	Phase 1A Plan and narrative	8/25/10
100	Revegetation acreage calculation	8/25/10
101	Updated detention basin specifications and figures	8/25/10
102	Abstract of Study of Ft. Irwin Tortoise Relocation Project	No
103	Proposed revisions to Cultural Conditions	8/25/10
104	Proposed revisions to Biological Conditions	8/25/10

Exhibit	Brief Description	Admitted
105	Imperial Valley Solar Glint and Glare report	No
106	Nixon/Hollanes testimony and resume	8/25/10
107	Lange testimony and resume	8/25/10
108	Calico Revised Conditions	8/25/10
109	Map: Phase 1 fencing information	8/25/10
110	Response to Staff request for Road information	8/25/10
111	BLM route maps from West Mojave Plan	8/25/10
112	Applicant's response to Committee questions	8/25/10
113	Revised conditions compilation submitted August 26, 2010	9/20/10
114	Declaration of Felicia Bellows dated 9/13/10	9/20/10
115	Declaration of Patrick J. Mock, PhD dated 9/13/10	9/20/10
116	Declaration of Theresa Miller dated 9/13/10	9/20/10
117	Declaration of Howard H. Chang PhD dated 9/13/10	9/20/10
118	Declaration of Robert Byall dated 9/13/10	9/20/10
119	Declaration of Matt Moore dated 9/13/10	9/20/10
120	Declaration of Rachael Nixon dated 9/13/10	9/20/10
121	Declaration of Noel Casil dated 9/13/10	9/20/10
122	Declaration of Matt Dadswell dated 9/13/10	9/20/10
123	Declaration of Michael Hatch dated 9/13/10	9/20/10
124	Declaration of Tariq Hussain dated 9/13/10	9/20/10
125	Declaration of Angela Leiba dated 9/13/10	9/20/10
126	Declaration of Julie Mitchell dated 9/13/10	9/20/10
127	Declaration of Joe Stewart dated 9/13/10	9/20/10
128	Declaration of Mark Storm dated 9/13/10	9/20/10
129	Scenario 5.5 Tortoise Sightings and Burrows 2007 – February 2010 Map	9/20/10

Staff's Exhibits

Exhibit	Brief Description	Admitted
300	Supplemental Staff Assessment	8/25/10
301	Final Determination of Compliance	8/25/10
302	"Estimated Location of Fire Facility Cost to Proposed Solar Energy Installations," June 3, 2010, Stanley R. Hoffman Associates (for San Bernardino County Fire Department)	8/25/10
303	Staff Rebuttal Testimony and first Errata (updating the Biological Resources Section of the	8/25/10

Exhibit	Brief Description	Admitted
	SSA and Conditions of Certification BIO 17 and BIO 18), July 29, 2010.	
304	[Identification of future transmission system upgrades.]	8/25/10
305	Appendix A, Biological Resources	8/25/10
306	Soil and Water Figures 5A and 5B	8/25/10
307	Staff proposed revisions to Condition AQ-SC9	8/25/10
308	Staff proposed revision to Conditions Noise-1, etc.	8/25/10
309	Supplemental Staff Assessment, Part 2, dated August 9, 2010	8/25/10
310	Second errata to Supplemental Staff Assessment	8/25/10
311	8/25/10 letter from Wayne Donaldson to Roxie Trost	8/25/10
312	Cultural-4 Condition insert	8/25/10
313	Staff response to Committee questions	8/25/10
314	Tonya Moore email to Chris Huntley	8/25/10
315	Revisions to Worker Safety-6	8/25/10
316	Revisions to Haz-8	9/20/10
317	Supplemental Staff Assessment Addendum dated September, 2010	9/20/10
318	Bureau of Land Management (BLM) Memorandum about Use of Donated Lands, 10/14/10.	10/22/10

Intervenor CURE

Exhibit	Brief Description	Admitted
400	Opening Testimony of David Marcus on Behalf of California Unions for Reliable Energy on Transmission for the Calico Solar Project	8/25/10
401	Marcus Declaration	8/25/10
402	Marcus c.v.	8/25/10
403	131 FERC 61,071, Docket ER10-796, order issued April 26, 2010	8/25/10
404	(No Exhibit)	8/25/10
405	Rebuttal Testimony of Boris Poff on Behalf of California Unions for Reliable Energy on Soil and Water for the Calico Solar Project	8/25/10
406	Poff c.v.	8/25/10
407	McFadden, Wells, Jercinovich, Department of Geology, Univ. of New Mexico, Influences of eolian and pedogenic processes on the origin and evolution of desert pavements	8/25/10
408	Seager, Ting, Held, Kushnir, et al., Model Projections of an Imminent Transition to a More Arid Climate in Southwestern North America Soil/Water Boris Poff	8/25/10
409	Okin, Murray, Schlesinger, Degradation of sandy arid shrubland environments:	8/25/10

Exhibit	Brief Description	Admitted
	observations, process modeling, and management implications	
410	Okin, Gillette, Herrick, Multi-scale controls on and consequences of Aeolian processes in landscape change in arid and semi-arid Environments	8/25/10
411	Angel, Palecki, Hollinger, Storm Precipitation in the United States. Part II: Soil Erosion Characteristics	8/25/10
412	Anderson, Wells, Graham, Pedogenesis of Vesicular Horizons, Cima Volcanic Field, Mojave Desert, California	8/25/10
413	Rebuttal Testimony of Vernon C. Bleich on Biological for the Calico Solar Project	8/25/10
414	Bleich c.v.	8/25/10
415	Bleich, Wejaisem. Ramey, Rechel: Metapopulation Theory and Mountain Sheep: Implications for Conservation	8/25/10
416	Epps, Wehausen, Bleich, Torres, Brashares: Optimizing dispersal and corridor models using landscape genetics	8/25/10
417	Wehausen: Nutrient predictability, birthing seasons, and lamb recruitment for desert bighorn sheep	8/25/10
418	Oehler, Bleich, Bowyer, Nicholson: Mountain Sheep and Mining: Implications for Conservation and Management	8/25/10
419	Schwartz, Bleich, Holl: Genetics and the Conservation of Mountain Sheep	8/25/10
420	Belich, Wehausen, Holl: Desert-dwelling Mountain Sheep: Conservation Implications of a Naturally Fragmented Distribution	8/25/10
421	Bleich, Bowyer, Wehausen: Sexual Segregation in Mountain Sheep: Resources or Predation?	8/25/10
422	Epps, Wehausen, Palsoboll, McCullough: Using Genetic Tools to Track Desert Bighorn Sheep Colonizations	8/25/10
423	Torres, Mulchahy, Gonzales, Pauli, Andrew: Human Induced Migration and Homing Behavior of a Desert Bighorn Ram in the Whipple Mountains, California: Or Herman the Trailer Park Ram	8/25/10
424	Rebuttal Testimony of Scott Cashen on Biology for the Calico Solar Project	8/25/10
425	Cashen c.v.	8/25/10
426	Belnap, Webb, Miller, et al.: Monitoring Ecosystem Quality and Function in Arid Settings of the Mojave Desert	8/25/10
427	California Partners in Flight and PRBO Conservation Science: The Desert Bird Conservation Plan, a Strategy for Protecting and Managing Desert Habitats and Associated Bids in the Mojave and Colorado Deserts	8/25/10
428	U.S. Department of the Interior, USGS: Threats to Desert Tortoise Populations: A Critical Review of the Literature	8/25/10

Exhibit	Brief Description	Admitted
429	U.S. Department of the Interior, USGS: Modeling Habitat of the Desert Tortoise (Gopherus agassizii) in the Mojave and Parts of Biology Scott Cashen 2309-080a 12 the Sonoran Deserts of California, Nevada, Utah and Arizona	8/25/10
430	Pagel, Whittington, Allen: Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations	8/25/10
431	Marzluff, Knick, Vekasky, Schuek, Zarriello: Spatial Use and Habitat Selection of Golden Eagles in Southwestern Idaho	8/25/10
432	Survey Protocols Required for NEPA/ESA Compliance for BLM Special Status Plant Species	8/25/10
433	Okin, Murray, Schlesinger: Degradation of sandy arid shrubland environments: observations, process modeling, and management implications	8/25/10
434	Record of Decision, West Mojave Plan, Amendment to the California Desert Conservation Area Plan	8/25/10
435	U.S. Dept. of Interior: Effects of the International Boundary Pedestrian Fence in the Vicinity of Lukeville, Arizona, on Drainage Systems and Infrastructure, Organ Pipe Cactus National Monument, Arizon	8/25/10
436	U.S. Fish and Wildlife Service: Final Environmental Assessment, Proposal to permit Take as provided Under the Bald and Golden Eagle Protection Act	8/25/10
437	Southern California Edison act three overview map for the Calico Solar Project.	8/4/10
438	Memorandum from Christopher Meyer to Felicia Bellows and Bob Therkelsen re: SES Solar One Project—Transmission Line Upgrades	8/25/10
439	2008 and 2009 Annual Reports for the Fort Irwin Translocation Project. [authors], undated	8/25/10
440	Bighorn Habitat Connectivity Map	8/25/10
441	8/16/10 Rebuttal Testimony of David S. Whitley on Behalf of the California Unions for Reliable Energy on Cultural Resources forthe Calico Solar Project (c.v. and declaration)	8/25/10
442	2001 Desert Pavement and Buried Archaeological Feature in the Arid West: A Case Study from Southern Arizona	8/25/10
443	Testimony of Scott Cashen on the Desert Tortoise Translocation Plan or the Calico Solar Project dated August 17, 2010.	8/25/10
444	Desert Tortoise Council Abstracts 33 **1d** Annual Meeting and Symposium Biology Scott Cashen	8/25/10
445	Desert Tortoise Council Abstracts 34th Annual Meeting and Symposium Biology Scott Cashen	8/25/10

Exhibit	Brief Description	Admitted
446	2/2010 Desert Tortoise Council Abstracts 35 th Annual Meeting and Symposium Biology Scott Cashen	8/25/10
447	4/2/09 US Dept. of the Army, Memorandum for Desert Tortoise Recovery Coordinator, re Fort Irwin FISS Depredation Biology Scott Cashen	8/25/10
448	7/29/05 T. Esque, K. Nussear, P. Medica, Desert Tortoise Translocation Plan for Fort Irwin's Land Expansion Program at the U.S. Army National Training Center (NTC) & Fort Irwin - Biology Scott Cashen	8/25/10
449	5/1/09 T. Esque, K. Nussear, K. Drake, K. Berry, P. Medica, J.Heaton, Amendment to Desert Tortoise Translocation Plan for Fort Irwin's Land Expansion Program at the U.S. Army National Training Center (NTC) & Fort Irwin Biology Scott Cashen	8/25/10
450	Spring 2010 - Calico Solar Desert Tortoise Translocation Plan Recipient Site Photograph; Photograph #4: Long Distance DWMA Translocation Area Biology Scott Cashen	8/25/10
451	K.H. Berry, Draft Decision for Short-Distance Translocation of Desert Tortoises Biology Scott Cashen	8/25/10
452	Single Factor ANOVA Model and Tests, Control Treatment Biology Scott Cashen	8/25/10
453	K. Berry, M. Christopher, Guidelines for the Field Evaluation of Desert Tortoise Health and Disease Biology Scott Cashen	8/25/10
454	812540 —TestimonyS-cooftto-Cn-aDsheensert-Tortoise-Impacts-in--Staffs —Scott Cashen Errata #2 Biology	8/25/10
455	K.E. Nussear, T.C. Esque, D.F. Haines, C.R. Tracy, Desert•Tortoise Hibernation: Temperatures, Timing and Environment Biology Scott Cashen	8/25/10
456	C.H. Ernst, J.E. Lovich, Turtles of the United States and Canada	8/25/10
457	J.M. Germano, P.J. Bishop, Suitability of Amphibians	8/25/10
458	J.S. Heaton, et al., Spatially explicit decision support for selecting translocation areas for Mojave desert tortoises	8/25/10
459	9/14/04 Redlands Institute Decision Support Team, Habitat Potential Knowledge Base (cover and pp. 30-32)	8/25/10
460	Adaptive Management Working Group, The U.S. Dept. of the Interior Technical Guide, 2009 ed., Chapter 1	8/25/10
461	9/17/10 Additional Rebuttal Testimony of Scott Cashen on Behalf of the California Unions for Reliable Energy on the Applicant's Proposed Scenarios 5.5 and 6 for the Calico Solar Project (c.v.) Biology Scott Cashen	9/20/10

Exhibit	Brief Description	Admitted
462	2007 K.E. Nussear, T.C. Esque, D.F. Haines, C.R. Tracy, Desert Tortoise Hibernation: Temperatures, Timing, and EnvironmentBiology Scott Cashen	9/20/10
463	8/2008 Public Review Draft Recommendations of Independent Science Advisors for The California Desert Renewable Energy Conservation Plan (DRECP)	9/20/10
464	2007 K.E. Nussear, C.R. Tracy, Can Modeling Improve Estimation of Desert Tortoise Population Densities? (Ecological Applicationspp.579-586)	9/20/10
465	9/17/10 Additional Rebuttal Testimony of David S. Whitley on Behalf of the California Unions for Reliable Energy on Cultural Resources for the Calico Solar Project	9/20/10

Intervenor Defenders of Wildlife

Exhibit	Brief Description	Admitted
600	Rebuttal Testimony of James M. Andre 7/29/2010	8/25/10
601	Rebuttal Testimony of Jeff Aardahl 7/29/2010	8/25/10
602	Revision of Disease Testing Requirements Based on Translocation Distance, Desert Tortoise Recovery Office 7/2010	8/25/10
603	Spencer, W.D., P. Beier, K. Penrod, K. Winters, C. Paulman, H. Rustigian-Romsos, J. Strittholt, M. Parisi, and A. Pettler. 2010. California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California. Prepared for California Department of Transportation, California Department of Fish and Game, and Federal Highways Administration.	8/25/10
604	Habitat Use and Food Preferences of the Desert Tortoise, *Gopherus agassizii*, in the Western Mojave Desert and Impacts of Off-Road Vehicles. Proceedings of the New York Turtle and Tortoise Society: Conservation, Restoration, and Management of Tortoises and turtles - An International Conference, pp. 42–45.	8/25/10
605	Applicant's Responses to Defenders of Wildlife Data Requests Set 1. 12/4/2009	8/25/10
606	Zitzer, S., King, J., and Etyemezian, V., 2008. *Unveiling the mysterious ecology of a rare relict Mojave Desert forb (Penstemon albomarginatus): Will ecological knowledge put a damper on exponential growth in Southern Nevada?* Report for 93rd Ecological Society of American Annual Meeting.	8/25/10

Exhibit	Brief Description	Admitted
607	Scogin, R. 1989. Studies of *Penstemon albomarginatus* in California. Report for Rancho Santa Ana Botanic Garden, Claremont, California.	8/25/10
608	CPUC Phase I direct testimony of Dr. Barry Butler, CPUC Application 06-08-010 6/1/2007	8/25/10
609	T. Mancini, P. Heller, B. Butler, B. Osborn, W. Schiel, V. Goldberg, R. Buck, R. Diver, C. Andraka, J. Moreno, *Dish-Stirling Systems: An Overview of Development and Status*, Journal of Solar Energy Engineering, Vol. 125, pp. 135-151, May 2003.	8/25/10
610	**Schwartz**, O.A., V.C. Bleich, and S.A. Holl. 1986. **Genetics and the conservation of mountain sheep Ovis canadensis nelsoni**. Biol. **Conserv.** 37:179-190.	8/25/10
611	Epps, C. W., P. J. Palsbøll, J. D. Wehausen, G. K. Roderick, R. R.Ramey, D. R. McCullough, 2005. Highways block gene flow and cause a rapid decline in genetic diversity of desert bighorn sheep. Ecology Letters, (2005) 8: 1029–1038.	8/25/10
612	Fish and Wildlife Service. 1994. Desert tortoise (Mojave population) Recovery Plan. U.S. Fish and Wildlife Service, Portland, Oregon. 73 pages plus appendices	8/25/10
613	Abstracts, Thirty-fifth Annual Meeting and Symposium, The Desert Tortoise Council, February 25-28, 2010.	8/25/10
614	Picture of Desert Tortoise observed on site by DOW staff.	8/25/10
615	Bureau of Land Management, 2005. West Mojave Plan: A Habitat Conservation Plan and California Desert Conservation Area Plan Amendment. California Desert District, Moreno Valley, CA. Page 2-116.	8/25/10
616	Palen Connectivity Study for CEC	9/20/10
617	Culvert Photograph #1.JPG	9/20/10
618	Culvert Photograph #2.JPG	9/20/10
619	Ram Skeleton Photograph	9/20/10
620	Testimony of Jeff Aardahl	9/20/10

Intervenor Basin and Range Watch

Exhibit	Brief Description	Admitted
800	Informal survey tracks and photographs at Calico Solar Project site, San Bernardino County, California.	8/25/10
801	Mojave fringe-toed lizard habitat at Ford Dry Lake area, Riverside County, California.	8/25/10
802	Satellite imagery of sand in the Calico Project Site area.	8/25/10

Exhibit	Brief Description	Admitted
803	Visual summary of Impacts from the Calico Project.	8/25/10
804	Supplemental Testimony by Kevin Emmerich.	8/25/10

Intervenor Sierra Club

Exhibit	Brief Description	Admitted
1000	Photo of Nelson's Bighorn Sheep	8/25/10
1001	Photo of Nelson's Bighorn Sheep	8/25/10
1002	Photo of Golden Eagle	8/25/10
1003	Photo of Golden Eagle	8/25/10
1004	Photo of Desert Tortoise	8/25/10
1005	Photo of Desert Tortoise	8/25/10
1007	Photo of White-margined beardtongue	8/25/10
1008	Photo of Mojave fringe-toed lizard	8/25/10
1009	Photo of Mojave fringe-toed lizard	8/25/10
1010	Calico Project Site Map	8/25/10
1011	Photograph	8/25/10
1012	Photograph	8/25/10
1013	Photograph	8/25/10
1014	Photograph	8/25/10
1015	Photograph	8/25/10
1016	Photograph	8/25/10
1017	Photograph	8/25/10
1018	Photograph	8/25/10
1019	Photograph	8/25/10
1020	Untitled map	8/25/10
1021	Letter from Raymond Lee, Field Manager, BLM to Todd Stewart, Brightsource Energy dated April 8, 2008 with attachment: Comments/Observations on Ivanpah SEGS Sormwater Manaement	9/20/10
1022	Live Tortoise Encounter Form dated 4/4/10; URS Corp. Calico Solar 2010 Desert Tortoise Protocol Transect Survey dated 3/30/10	9/20/10
1023	Calico Solar Tortoise Burrow Data, April 2010	9/20/10

Intervenor Newberry Community Services District

Exhibit	Brief Description	Admitted
1100	Rebuttal Testimony – Newberry CSD	8/25/10
1101	San Bernardino County LAFCO Fire Districts Map	8/25/10
1102	San Bernardino County LAFCO Newberry CSD Boundary Map	8/25/10
1103	Location Reference Map Newberry CSD & Project Site Western Boundary	8/25/10
1104	SB County Fire – North Desert Division Site Map	8/25/10
1105	Newberry Springs Fire Department Incident Response Statistics	8/25/10

Intervenor BNSF Railway Company

Exhibit	Brief Description	Admitted
1200	Prepared Direct Testimony of Dennis Skeel	8/25/10
1201	Prepared Direct Testimony of Edward P. Phillips	8/25/10
1202	Prepared Direct Testimony of Thomas Schmidt	8/25/10
1203	Prepared Direct Testimony of Joseph Schnell	8/25/10
1204	Prepared Direct Testimony of Dennis Skeels	8/25/10
1205	Prepared Direct Testimony of Dr. David Krauss	8/25/10
1206	Prepared Direct Testimony of Edward P. Phillips dated 8/17/10	8/25/10
1207	7/1/2010 letter comments to BLM and CEC	8/25/10
1208	7/29/2010 letter comments to BLM and CEC	8/25/10
1209	Proposed changes to Conditions TLSN-5, etc.	8/25/10
1210	General Code of (Railway) Operating Rules	8/25/10
1211	Prepared Direct Testimony of Douglas Hamilton and Exhibits (Attachments 1 – 7)	9/20/10
1212	Prepared Direct Testimony of Steven Metro	9/20/10
1213	Prepared Direct Testimony of David Miller	9/20/10
1214	Individual Suncatcher locations imposed on terrain map showing washes by Mr. Metro	9/20/10

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
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APPLICATION FOR CERTIFICATION
For the CALICO SOLAR (Formerly SES Solar One)

Docket No. 08-AFC-13

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DECLARATION OF SERVICE

I, _____, declare that on _____ , 2010, I served and filed copies of the attached _____, dated _____, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [www.energy.ca.gov/sitingcases/solarone].

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(*Check all that Apply*)

FOR SERVICE TO ALL OTHER PARTIES:

____ sent electronically to all email addresses on the Proof of Service list;

____ by personal delivery;

____ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses NOT marked "email preferred."

AND

FOR FILING WITH THE ENERGY COMMISSION:

____ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

OR

____ depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 08-AFC-13
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

_____