

January 7, 2010

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08-AFC-13

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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 Submittal of Additional Alternatives Analysis

Dear Mr. Meyer and Mr. Stobaugh:

Tessera Solar hereby submits an Additional Alternatives Analysis for the Solar One Project. I certify under penalty of perjury that the foregoing is true, correct, and complete to the best of my knowledge.

Sincerely,



Camille Champion
Project Manager

SES SOLAR ONE

Applicant's Submittal of Additional Alternatives Analysis

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
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ADDITIONAL ALTERNATIVES ANALYSIS FOR SOLAR ONE

Prepared for

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

And

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P.O. Box 12000
Reno, NV 89520

URS Project No. 27658189.60001

December 2009

URS

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List of Acronyms and Abbreviations

ACEC	Area of Environmental Concern
ACOE	Army Corps of Engineers
af	acre-feet
BLM	Bureau of Land Management
BNSF	Burlington Northern Santa Fe
BO	Biological Opinion
CDCA	California Desert Conservation Area
CDFG	California Department of Fish and Game
CESA	California Endangered Species Act
CHL	California Historical Landmarks
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
DCH	Designated Critical Habitat
DWMA	Desert Wildlife Management Areas
DWR	Department of Water Resources
ESRI	Environmental Systems Research Institute
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FIRM	Flood Insurance Rate Map
HCP	Habitat Conservation Plan (
LWCF	Land and Water Conservation Fund
MSL	above mean sea level
MW	Megawatt
MWA	Mojave Water Agency
OHV	Off Highway Vehicle
PPA	Power Purchase Agreement
RC	Resource Conservation
ROW	Right-of-Way
SBAIC	San Bernardino Archaeological Information Center
TDS	Total Dissolved Solids
TIGER	Topologically Integrated Geographic Encoding and Referencing
USFWS	United States Fish and Wildlife Service
USGS	United States Geologic Service
WSA	Wilderness Study Areas

SECTION 1 INTRODUCTION

1.1 BACKGROUND

The purpose of this report is to provide the Bureau of Land Management (BLM), California Energy Commission (CEC), and relevant agencies and public additional information regarding the alternative sites that were given consideration in determining the current location of the Solar One Project. The eight different alternatives presented in this report have been previously identified by the applicant and analyzed in the Application for Certification (AFC) and subsequent data responses. It was determined that further analysis would elucidate the justification for the determination of the Solar One Project Site.

Each of the following sections analyzes biological, cultural, land use, and water resources considerations for each of the eight alternative sites. The location of each site is given in the overview map (Figure 1-1). Additionally a topographical map, aerial photograph, and environmental constraints map is provided in each section for further detail of each respective site.

1.2 METHODOLOGY

Biological Resources

Based on a desktop inventory of the current and planned land uses, locations of special management areas, and habitats located within each Alternative Site area, analyses were conducted to determine the compatibility of solar facilities at each Alternative Site with biological resources. Queries were run within a 10-mile radius from the Site using data from several databases, including Environmental Systems Research Institute (ESRI, overview), BLM (Land Ownership 2008, wilderness area 2006, Area of Environmental Concern (ACEC) 2009, Off Highway Vehicle (OHV) 2008, donated land 2009), TIGER (Topologically Integrated Geographic Encoding and Referencing, railroad 2000), United States Geologic Service (USGS 7.5' quads), POWERmap (SCE transmission lines 2009), Huitt-Zollars, Inc. (Project site July 2009), California Native Plant Society Inventory of Rare and Endangered Plants (CNPS 2009), and California Natural Diversity Database (CNDDDB, Special-status Species 9-2009). Additionally, some of the alternative sites have been surveyed by the Applicant and results are contained herein.

Cultural Resources

For purposes of the cultural resources review, fatal flaws were defined as highly sensitive cultural resources that could represent major conflicts with development of a solar generating facility. High-sensitivity resources include properties listed in the National Register of Historic Places (National Register) or California Historical Landmarks (CHL) database, and other properties developed for public interpretation or for which there is substantial agency, tribal, or public sentiment for preservation in place.

A preliminary review of each Alternative Site in San Bernardino County, California, consisted of consulting topographic maps, researching available online archaeological studies, and accessing federal and state listings of significant historic properties. In addition, an archaeological records search and literature review at the San Bernardino Archaeological Information Center (SBAIC) was conducted as a part of the analysis; therefore, information is available regarding whether the Site has been previously

surveyed for cultural resources or if it contains any recorded prehistoric or historic resources. Results of the SBAIC record search are summarized below. URS recommends that a more extensive literature review be conducted to determine whether other sources of cultural resource information exist for the Site area. Additionally, pedestrian cultural resource surveys were conducted by the Applicant for portions of the Site 7 site and results are contained herein.

Land Use

URS completed a desktop inventory of the current and planned land uses, locations of special management areas, and jurisdictional boundaries and zones within each Alternative Site area. Investigations also consisted of consulting topographic maps, researching available online resources, and accessing federal state and local land use plans. Resources used in the analysis included the San Bernardino General Plan, the California Desert Conservation Area Plan, the Western Mojave Plan, as well as relevant Laws, Ordinances, Regulations, and Standards. In addition, agency representatives have been consulted to clarify understanding of relevant plans and policies for the project areas.

Water Resources

The project site was assessed using USGS topographic maps and Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) panels which encompass the sites have been reviewed, along with the surface and ground water basins as presented in the Department of Water Resources (DWR) Groundwater bulletins. These references were used to conduct an overview of surface water hydrology, groundwater, potential water use rates and potential water supply sources.

1.3 SUMMARY OF FINDINGS

Fatal flaws were identified on sites 1, 2, 3, 4, 5, 7, and 8. Additionally, securing water is likely to be an obstacle on any of the alternative sites. All of the sites contain public lands administered by the BLM, and will require NEPA and CEQA analysis. The following are summaries of potential fatal flaws for each of the eight Alternative Sites.

Site 1 (Camp Rock Road)

There are fatal flaws identified for Site 1 related to Biological, Land Use, and Water Resources. The location of the Alternative Site 1 is within desert tortoise Designated Critical Habitat (DCH) and a BLM ACEC. This is considered a fatal flaw. Additionally, surface water supplies from direct storm water runoff cannot be relied upon to provide a steady, predictable source of water. This Site is not likely to be able to obtain or secure an adequate groundwater water supply for the project. This is a fatal flaw due to the potential impediment of groundwater flow toward the site due to the mountainous terrain. The size of the Site precludes it from being able to meet the Project power purchase agreement (PPA). Development of this Site would most likely not be approved by the agencies and it is recommended that other alternative sites be considered.

Site 2 (Upper Johnson Valley)

Fatal flaws were identified for Site 2 related to water resources. Surface water supplies from direct stormwater runoff cannot be relied upon to provide a steady, predictable source of water. This Site is not likely to be able to obtain or secure an adequate groundwater water supply for the project. This is a fatal flaw due to the non-water bearing nature of the groundwater basin. This analysis does not include field verification of existing conditions and inventory of biological and cultural resources or consultation with the United States Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), and BLM to determine the need for any special-status species surveys. The size of the Site precludes it from meeting the Project's PPA.

Site 3 (West of Twenty-Nine Palms Military Base)

This Site is not likely to be able to obtain or secure an adequate groundwater water supply for the project. This is a fatal flaw due to the adjudicated nature of the groundwater basin. This desktop analysis does not include field verification of existing conditions and inventory of biological resources on the Site. In addition, consultation with the USFWS, CDFG, and BLM to determine the need for any special-status species surveys is highly recommended. The size of the Site precludes it from meeting the Project's PPA.

Site 4 (Interstate 40 South)

Fatal flaws were identified for this site. Eighty percent of the site is included within the DCH for desert tortoise and the BLM ACEC. URS would not recommend development of Alternative Site 4 as the Project may not be permitted and/or the permitting process would be too costly and time consuming. This Site is not likely to be able to obtain or secure an adequate groundwater water supply for the project. This is a fatal flaw due to the adjudicated nature of the groundwater basin.

Site 5 (Broadwell Lake)

The potential inability of groundwater depths, supply rates or quality to meet demands for the Project is a fatal flaw for this site. This analysis does not include field verification of existing biological conditions and an inventory of biological resources and consultation with the USFWS, CDFG, and BLM is needed to determine the need for any special-status species surveys. The size of the Site precludes it from meeting the Project's PPA.

Site 6 (275 MW Option of Solar One)

The presence, size, age and significance of prehistoric sites in the Project area have been determined as a part of the larger cultural resource survey for Solar One as described above. The highest concentration of cultural resources is within this alternative. The Site would not be capable of meeting the Project's PPA. Therefore this alternative is considered to be less desirable than the Solar One Project.

Site facilities must be designed to convey surface stormwater flows and be adequately protected from potential scour and sedimentation. Surface water supplies from direct stormwater runoff cannot be relied upon to provide a steady, predictable source of water. The most likely source of water supply for the Site is from groundwater within the Lavic Lake Groundwater Basin or neighboring basins.

Site 7 (Solar 3)

No fatal flaws were identified in this analysis for Site 7 related to Biological, Cultural or Land Use Resources; however, this analysis does not include field verification of the abundance of listed species observed on and in the immediate vicinity of the Site or consultation with the USFWS, CDFG, and BLM concerning these issues.

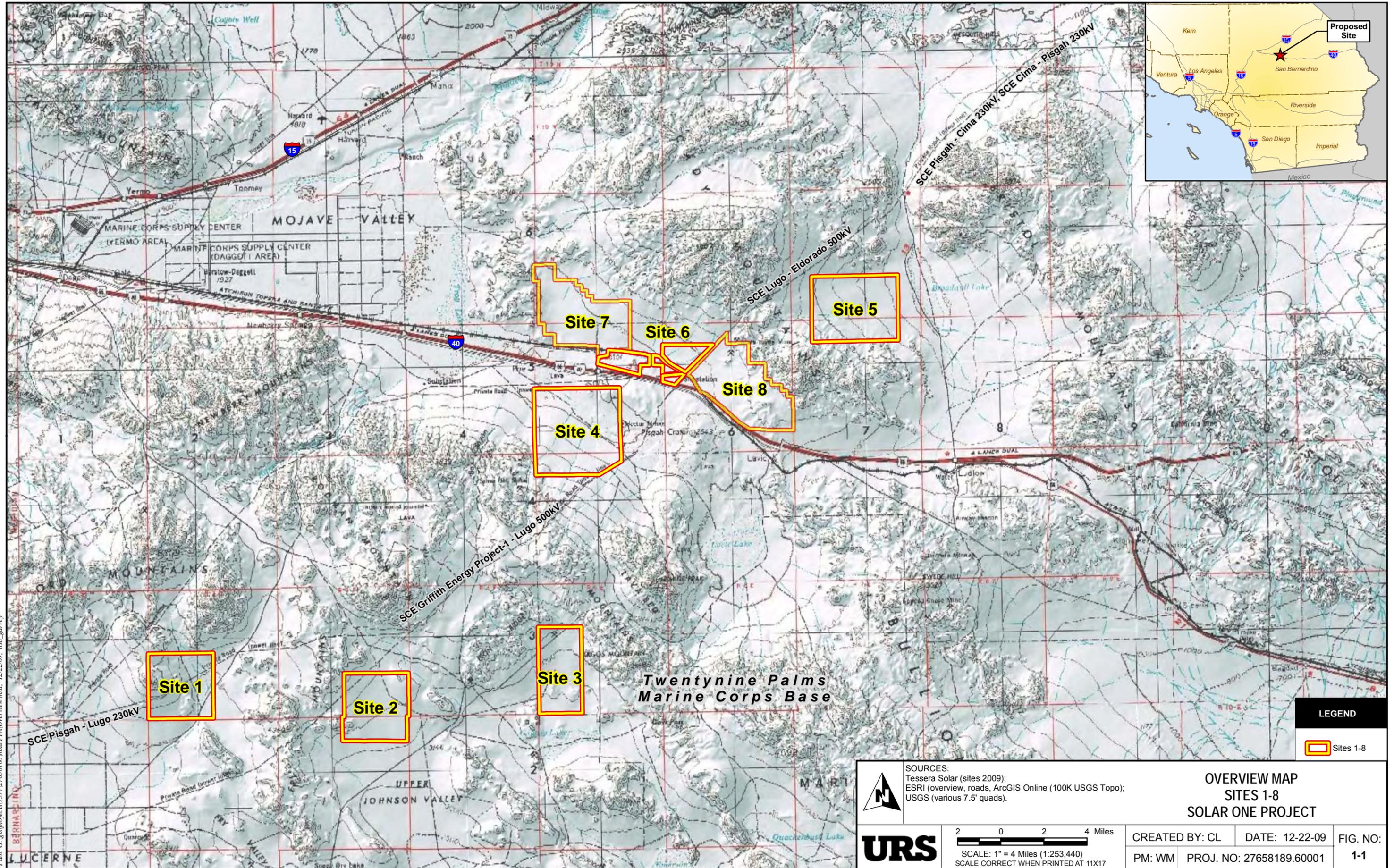
Site facilities must be designed to convey surface stormwater flows and be adequately protected from potential scour and sedimentation. Surface water supplies from direct storm water runoff cannot be relied upon to provide a steady, predictable source of water. The most likely source of water supply for the Site is from groundwater within the Lavic Lake Groundwater Basin or neighboring basins. However, because any water that is drawn from groundwater may infringe of the adjudicated Lower Mojave groundwater basin, a potential fatal flaw is identified for this site. Additionally, the size of the Site precludes it from meeting the Project's PPA.

Site 8 (Solar 6)

The location of Alternative Site 8 within a BLM ACEC is considered a fatal flaw. This Site is also expected to occur, at least in part, within the proposed Mother Road National Monument. Development of this Site would most likely not be approved by the agencies and it is recommended that other alternative sites be considered.

This analysis does not include additional archaeological literature reviews of the Site and surrounding area to determine whether other unrecorded cultural resources may exist on the property. In addition, a Class III field survey of the Project area would evaluate potential Project impacts to cultural resources.

Site facilities must be designed to convey surface stormwater flows and be adequately protected from potential scour and sedimentation. Surface water supplies from direct storm water runoff cannot be relied upon to provide a steady, predictable source of water. The most likely source of water supply for the Site is from groundwater within the Lavic Lake Groundwater Basin or neighboring basins.



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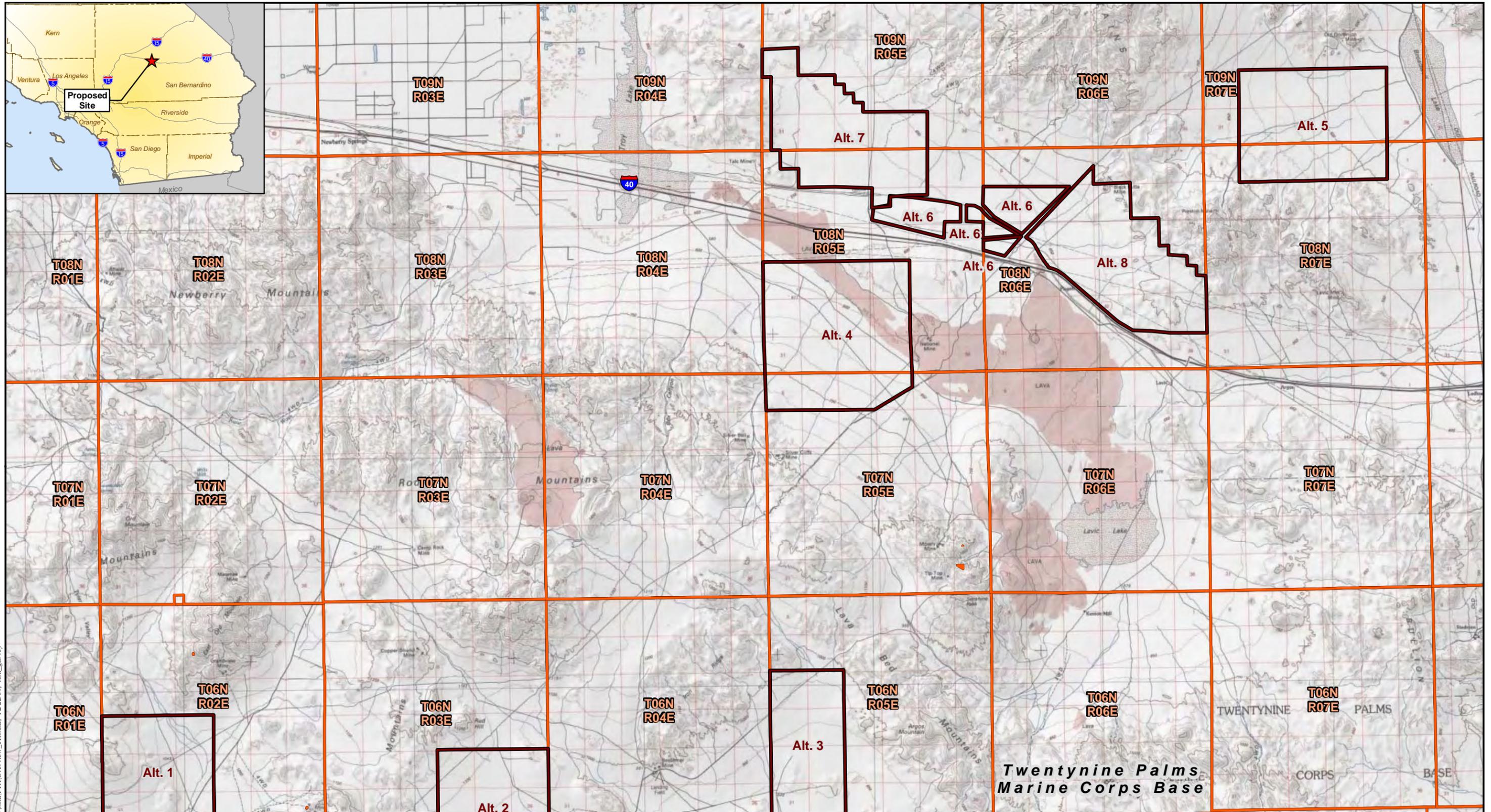
SOURCES:
 Tessera Solar (sites 2009);
 ESRI (overview, roads, ArcGIS Online (100K USGS Topo));
 USGS (various 7.5' quads).



2 0 2 4 Miles
 SCALE: 1" = 4 Miles (1:253,440)
 SCALE CORRECT WHEN PRINTED AT 11X17

**OVERVIEW MAP
 SITES 1-8
 SOLAR ONE PROJECT**

CREATED BY: CL	DATE: 12-22-09	FIG. NO:
PM: WM	PROJ. NO: 27658189.60001	1-1



 	<p>SOURCES: Tessera Solar (sites 2009); BLM (township/range); ESRI (overview, roads); USGS (various 7.5' quads).</p>		<p>OVERVIEW TOPOGRAPHIC MAP SOLAR ONE PROJECT</p>	
	<p>1.25 0 1.25 2.5 Miles SCALE: 1" = 2.5 Miles (1:158,400) SCALE CORRECT WHEN PRINTED AT 11X17</p>		<p>CREATED BY: CL</p>	<p>DATE: 12-22-09</p>
		<p>PM: AL</p>	<p>PROJ. NO: 27658189.60001</p>	

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SECTION 2 SITE 1 – ENVIRONMENTAL ANALYSIS

Alternative Site 1 (Site) is located within San Bernardino County, approximately 11 miles northeast of Lucerne Valley, and 17 miles west of Twenty-nine Palms Marine Corps Base (Figure 1-1). The site consists of approximately 5,795 acres of desert scrub located on BLM and Land and Water Conservation Fund (LWCF) Acquisition land. The elevation ranges from approximately 4,400 feet above mean sea level (MSL) in the northwest to approximately 3,300 feet above MSL in the southeast (Figure 2-1). The Southern California Edison (SCE) Lugo-Eldorado 500kV and SCE Pisgah-Lugo 230kV transmission lines bisect the site from southwest to northeast. The southeast portion of the site is located within an “open” OHV Area.

2.1 SITE 1 – BIOLOGICAL RESOURCES

Alternative Site 1 occurs within desert tortoise DCH and a BLM ACEC (Figure 2-2). The site falls within the West Mojave Plan (BLM 2006, as amended). The Western Mojave Plan functions as a Habitat Conservation Plan (HCP) that provides guidance for the protection of listed species and the issuance of incidental take permits from the USFWS and the CDFG for any federally- or state-listed species within the Plan boundaries.

The West Mojave Plan also designates a total of four Desert Wildlife Management Areas (DWMA) that focus on the protection and conservation of desert tortoise (*Gopherus agassizii*), Mojave ground squirrel (*Spermophilus mohavensis*), and other state- or federally listed special-status species that share their habitats. No Wilderness Study Areas (WSA), or DWMA occur onsite or in the immediate vicinity of Alternative Site 1 (Figure 2-2).

2.1.1 Sensitive Species and Their Habitats

The site occurs within desert tortoise DCH and a BLM ACEC. The Rodman Mountains WSA occurs approximately eight miles to the northeast. No other DCH or PCH occurs within the vicinity of Alternative Site 1 (Figure 2-2).

A list of USFWS and CDFG special-status species within San Bernardino County was obtained from the CNDDDB (2009). According to the CNDDDB, no special-status species have been historically recorded on Alternative Site 1. The closest known occurrences of special-status wildlife species are two records of desert tortoise, located less than one mile south and six miles northeast of the site, and one record of Le Conte’s thrasher (*Toxostoma lecontei*) located approximately 4.5 miles southwest of the Site (Figure 2-2). No additional CNDDDB special-status wildlife or plant occurrences are recorded within a 10-mile radius of Alternative Site 1; however, the potential exists for additional, un-recorded special-status plant and wildlife species occurrences on-site. Rare plant surveys would need to be conducted during plant blooming periods, and standard vegetation mapping, jurisdictional waters delineation, and general plant and animal surveys would be required as part of the environmental review process.

The occurrence of the Site within desert tortoise DCH and the presence of two records of desert tortoise within a 10-mile radius of Alternative Site 1 would require a habitat assessment and presence/absence surveys to be conducted. USFWS desert tortoise survey guidelines require one diurnal survey consisting

of 30-foot belt transects within the impact footprint to be conducted when tortoises are active from April through May or from September through October (USFWS 2009).

Birds of prey, which are, as a group, listed by CDFG as Protected Species, likely use the Site as foraging habitat. Any large trees or transmission line towers that may be present are potential raptor nest sites. Removal of any potential raptor nests during the non-breeding season prior to construction would be required.

2.1.2 Wildlife Movement Corridors

The Site is located in the southern-most portion of desert tortoise DCH. Although there is an open OHV area to the southeast and development to the southwest, the Site itself is surrounded by undeveloped land and could part of a wildlife corridor. Development of the Site within the currently proposed boundaries would potentially impede local wildlife movement through this corridor. Regionally, there are other opportunities for wildlife movement in the vicinity.

2.1.3 Potential Jurisdictional Waters

Based on aerial and topographical maps, the Site contains several intermittent blue-line drainages that flow from northwest to southeast and an extensive wash system along the eastern side of the Site. These drainages are potentially Army Corps of Engineers (ACOE)- and CDFG-jurisdictional washes that would require a permitting process prior to development.

2.1.4 Conclusions

The location of the Alternative Site 1 within desert tortoise DCH and a BLM ACEC is considered a fatal flaw. Development of this site would most likely not be approved by the agencies and it is recommended that other alternative sites be considered.

2.1.5 References

Bureau of Land Management. 2006. West Mojave Plan/EIS.

http://www.blm.gov/ca/news/2005/03/nr/CDD34_westmojaveplan.html

California Natural Diversity Database. Biogeographic Data Branch. California Department of Fish and Game. November 24, 2009.

California Native Plant Society. 2009. Inventory of Rare and Endangered Plants (online edition, v7-08c-interim). California Native Plant Society. Sacramento, CA. Accessed on November 30, 2009 from <http://www.cnps.org/inventory>.

United States Fish and Wildlife Service. 2009. Preparing for any Action that may occur within the Range of the Mojave Desert Tortoise (*Gopherus agassizii*). April 2009.

2.2 SITE 1 – CULTURAL RESOURCES

2.2.1 Findings

Alternative Site 1 is situated in San Bernardino County in the Mojave Desert, in an area that is relatively uninhabited (Figure 2-3). Although the area is arid desert, prehistorically a large number of archaeological resources are known to exist in the Mohave Desert. A number of lake beds, now dry, formed during prehistoric times and provided sufficient resources for native populations to exploit. As a result, there is a moderate to high potential that this area could contain prehistoric habitation sites. Based on a review of terrain maps and available archaeological literature, the Site may contain undocumented prehistoric or historic-period cultural resources. In addition to habitation sites, prehistoric logistical strategies also may produce a wide variety of other site types associated with hunting, gathering and other resource procurement activities. Common types of such “limited activity” sites include artifact scatters, temporary campsites and individual (isolated) artifacts. Historic cultural resource types may reflect activities related to mining and transportation.

The records search conducted at the SBAIC included specific information about previously recorded sites in the area as well as previous surveys that had been conducted. Two previously recorded cultural resource sites are located within the boundaries of Alternative Site 1: P36-061199, also known as Sheep Horn, and CA-SBR-4593H, a historic site. There are also known rock shelter sites and rock art sites in Sections 17 & 18 in the project vicinity. Site P36-061199 is a bighorn sheep horn that was found cached in a small niche in a boulder almost at the top of a ridge on a mountainside that does not appear to have been placed by an animal, but it is unknown if it is prehistoric or historic in origin. Site CA-SBR-4593H is a historic structure with piles of rocks, tin cans, and metal fragments.

Four previous surveys have been conducted within the Site boundaries, but these surveys cover very little surface area of the entire parcel. The surveys include:

1. Survey #1060123, was an area that was initially surveyed in 1972, with an update in 1988. Two prehistoric sites were identified: CA-SBR-554 and CA-SBR-2846. Among artifacts found were flaked lithics, projectile points, pottery, cordage, and a rock shelter site.
2. Survey #1060874 was a transmission line survey conducted in 1979 and later updated in 1989. A large number of cultural resources were recorded along the corridor, but none within Alternative Site 1.
3. Survey #1060701 was first surveyed in 1978 (Stumpf) and was later updated in 1988. It was a linear survey with no resources encountered on the property.
4. Survey #1062257 was a survey conducted by the BLM of many parcels in the Mojave Desert, including a small portion of the Project area. Site specific results are not available for the parcel surveyed within Alternative Site 1 and it appears that no resources were found as nothing is mapped within the parcel that was surveyed.

A review of the National Register of Historic Places (NRHP) Listed Properties, National Register Eligible Properties, CHL, and California Points of Historic Interest (CPHI) database indicated no listed cultural resources in or within the vicinity of the Site area.

Because the entire parcel has not been surveyed for cultural resources, additional undocumented prehistoric or historic-period cultural resources of unknown significance are possible in the Project site. Although portions of the Site may have undergone disturbances significant surface or subsurface cultural resources could still be present on the property.

2.2.3 Conclusions

No obvious fatal flaws for Alternative Site 1 were evident as a result of the initial research. Although the presence, size, age and significance of prehistoric sites in the Site cannot be determined with the limited data on hand, the available information suggests that the Site has the potential to contain prehistoric or historic habitation sites, as well as evidence of limited activity sites such as prehistoric lithic scatters and ephemeral camp sites. URS recommends conducting additional archaeological literature reviews of the Site and surrounding area to determine whether other unrecorded cultural resources may exist on the property. In addition, a Class III field survey of the Site area would need to be conducted based on the record search to evaluate potential impacts to cultural resources.

2.2.4 References

- Barker, James P., Carol H. Rector, and Philip J. Wilke, 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. Archaeological Research Unit, UCR. Submitted to Southern California Edison Company. Unpublished report located at the SBAIC.
- BLM, 1978. Archaeological Sites of the California Desert Area (Calico, Kramer, Stoddard, Johnson, Morongo, Twentynine Palms) Transect Forms. Unpublished report located at the SBAIC.
- King, Thomas F., 1972. Preliminary Report: Archaeological Research in the Cinnamonroll Hills, San Bernardino County, California. UCR Archaeological Research Unit, Submitted to Mojave River Museum Association. Unpublished report located at the SBAIC.
- Stumpf, Gary, 1978. Archaeological Reconnaissance Report: Checkers Motorcycle Race. Submitted to American Motorcycle Association. Unpublished report located at the SBAIC.

2.3 SITE 1 – LAND USE

Alternative Site 1 is located approximately 11 miles northeast of Lucerne Valley, and 17 miles west of Twenty-nine Palms Marine Corps Base (Figure 2-2). The Project is located in an undeveloped area of San Bernardino County, California, approximately 40 miles east of Barstow, California and south of Interstate 40 (I-40). Site 1 is approximately 5,795 acres located on BLM and LWCF Acquisition land.

The lead agency for the environmental review process for Alternative Site 1 would be the BLM. Approval of the Project Right-of-Way (ROW) Grant Application would result in the issuance of a ROW Grant Permit for use of federal lands administered by the BLM.

2.3.1 Findings

Site 1 is on lands managed by the BLM and is designated by the BLM for Limited Use. This multiple-use class protects sensitive natural, scenic, ecological, and cultural resource values. These lands are managed to provide for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished. According to this use class, solar development may be allowed once NEPA requirements are met. However, the entire area is within a desert tortoise DCH and a BLM ACEC. The Rodman Mountains WSA occurs approximately eight miles to the northeast. Additionally the southeast portion of Site 1 is currently an OHV recreation area.

The Site is located within a designated utility corridor. The SCE Lugo-Eldorado 500kV and SCE Pisgah-Lugo 230kV transmission lines bisect the site from southwest to northeast.

Site 1 is designated Resource Conservation (RC) zoning district by the County of San Bernardino. The intent of the RC District category is to designate areas suitable for conservation, open space and recreational uses, and to prevent the encroachment of incompatible uses and the premature conversion of such lands to intensive or urban uses. Uses in the RC District are limited primarily to recreational uses, open space, and other activities compatible with these uses. This category identifies areas of the County that are appropriate for conservation, rural residences, recreational areas, and related uses that support open space and rural communities. Since the project is on BLM lands wholly however, this zoning information is provided for background information only.

2.3.2 Conclusions

On BLM lands, solar energy generation facilities are placed according to discretionary review of compatibility issues on a case-by-case basis. Because Project land is currently utilized for purposes of preservation, recreation and utility corridors, the determination of compatibility of the Project with surrounding land uses would be problematic.

There appears to be direct fatal flaws identified for Site 1 due to current BLM ACEC land use restrictions. Additionally, at this Site, the Project would require a plan amendment to the 1980 California Desert Conservation Area (CDCA) Plan.

2.3.3 References

County of San Bernardino Department of Planning Website: <http://www.sbcounty.gov/landuseservices/>

California Department of Conservation Division of Land Resource Protection: 2005 data.

California Department of Conservation Division of Land Resource Protection Website: <http://www.conservation.ca.gov/dlrp/lca/Pages/Index.aspx>

California Desert Conservation Area Plan, Bureau of Land Management, California Desert District, 1980.

2.4 SITE 1 – WATER RESOURCES

This section summarizes water resources in the vicinity of Alternative Site 1, located within San Bernardino County, approximately 11 miles northeast of Lucerne Valley, and 17 miles west of Twenty-nine Palms Marine Corps Base. The site is approximately 5,795 acres on mountainous terrain. The elevation ranges from approximately 4,400 feet above MSL in the northwest to approximately 3,300 feet above MSL in the southeast (Figure 2-1).

2.4.1 Overview of Surface Water Hydrology

A review of the USGS topographic maps shows Alternative Site 1 situated on steep terrain, sloping in the southeast direction (Figure 2-1). The average slope on the west is approximately 20 percent, while the southeast portion of the site slopes at two percent. There appears to be no existing buildings within the Site. Several ephemeral or “blue-line” streams run through the Site, and these drainages run towards the south to dry washes that eventually end at Lucerne Lake.

Potential for alluvial fan flooding exists through the site with associated scour. FIRM Panels 06071C5925H and 06071C5250H cover the project area. These panels are non-printed panels, and potential flooding hazards are unknown.

2.4.2 Groundwater: Lucerne Valley

The Project Site lies within the Lucerne Groundwater Basin. The basin is approximately 230 square miles and is bounded by the San Bernardino Mountains on the south and on the west by the Granite Mountains and the Helendale fault. The Ord Mountains bound the basin on the north. The Camp Rock fault and Kane Wash Area Groundwater Basin bound this basin on the east and the Fry Mountains bound this basin on the southeast. Surface water drains toward Lucerne (dry) Lake in the western portion of the basin, which has an altitude of 2,850 feet above sea level (Schaefer 1979). Average annual precipitation is 4 to 6 inches in the lower part of the valley and 6 to 8 inches in the upper parts of the valley.

Water Bearing Formations

The principal water-bearing deposits are Quaternary age alluvium, and dune sand. The deposits are unconsolidated or semi-consolidated and the alluvium is composed of gravel, sand, silt, clay, and occasional boulders. Where saturated, the alluvium yields water freely to wells. The average specific yield for these deposits is 11 percent. Irrigation wells in the basin yield as much as 1,000 gpm (Schaefer 1979).

Thickness of the alluvial deposits varies throughout the basin and reaches at least 1,800 feet along the Helendale fault. Water well and oil well logs indicate that the thickness of the alluvium averages about 600 feet (Schaefer 1979). Fine-grained playa deposits in the western part of the basin yield little water to wells and the water is usually of poor quality (Schaefer 1979). In the western part of the basin, between Lucerne Lake and Helendale faults, a thick layer of playa deposits separates the groundwater system into an upper unconfined aquifer and a lower, confined aquifer. Throughout the rest of the basin, groundwater is unconfined (Schaefer 1979).

Recharge Areas

The basin is principally recharged by runoff from the San Bernardino Mountains and secondarily by runoff from the Granite, Ord, and Fry Mountains to the north. Groundwater generally flows from areas of recharge toward Lucerne Lake (Schaefer 1979).

Groundwater Level Trends

Depth to water varies from several feet below land surface, near the Helendale fault, to more than 300 feet along the flanks of the San Bernardino Mountains; however, in most parts of the basin, it is about 150 feet (Schaefer 1979). Water levels have declined in parts of the basin since 1917 (Schaefer 1979). Water level declines of 40 to 100 feet affecting both the unconfined and confined aquifers have occurred in the southwestern part of the basin. Some wells in the basin have declined as much as 100 feet since the early 1950s, indicating that overdraft is occurring (Mendez and Christensen 1997). Land subsidence was noted by 1977 and had apparently been occurring in parts of the basin for many years because of overdraft of the aquifer system (Fife 1977).

Groundwater Storage Capacity

Total groundwater storage capacity for the basin is reported to be about 4,740,000 af (DWR 1975) and 2,000,000 af (Schaefer 1979). The 2,000,000 af capacity was calculated for 1917 water levels, and presumably represents a steady-state full basin (Schaefer 1979).

Groundwater in Storage

Groundwater in storage was estimated to be 1,750,000 af in 1977 (Schaefer 1979).

Groundwater Budget (Type A)

A hydrologic budget for the basin using 1976 data was estimated by Schaefer (1979). Recharge was reported at 1,000 af, discharge was 10,000 af, and change in storage was 9,000 af. Groundwater overdraft of 9,000 af/yr was calculated using this data. Recharge has been estimated to be 1,000 af/yr (DWR 1967).

Groundwater Quality

Calcium-magnesium bicarbonate water is found in the southwestern part of the basin. TDS content range from 200 to 500 mg/L in the southwestern part of the basin except near Rabbit Springs where they are as high as 2,000 mg/L (Schaefer 1979). In the southeastern part of the basin, there is a mixture of calcium bicarbonate and magnesium-sodium sulfate water. Where magnesium-sodium sulfate water predominates, TDS concentrations range from 300 to 1,200 mg/L and average about 800 mg/L. Groundwater near Lucerne Lake is sodium chloride in character and has TDS concentrations that range from 1,200 to 7,000 mg/L and average about 5,000 mg/L (Schaefer 1979). In a shallow aquifer zone, TDS concentrations average about 2,700 mg/L; whereas, in the deeper aquifer zone, they average about 1,300 mg/L (Schaefer 1979).

High nitrate and TDS concentrations associated with irrigation are found in the shallow aquifer (Schaefer 1979).

2.4.3 Findings

Potential for alluvial fan flooding exists through the site with associated scour. Groundwater may be difficult to obtain because the Lucerne Valley groundwater basin may be over-drafted. The current water agency is the Mojave Water Agency.

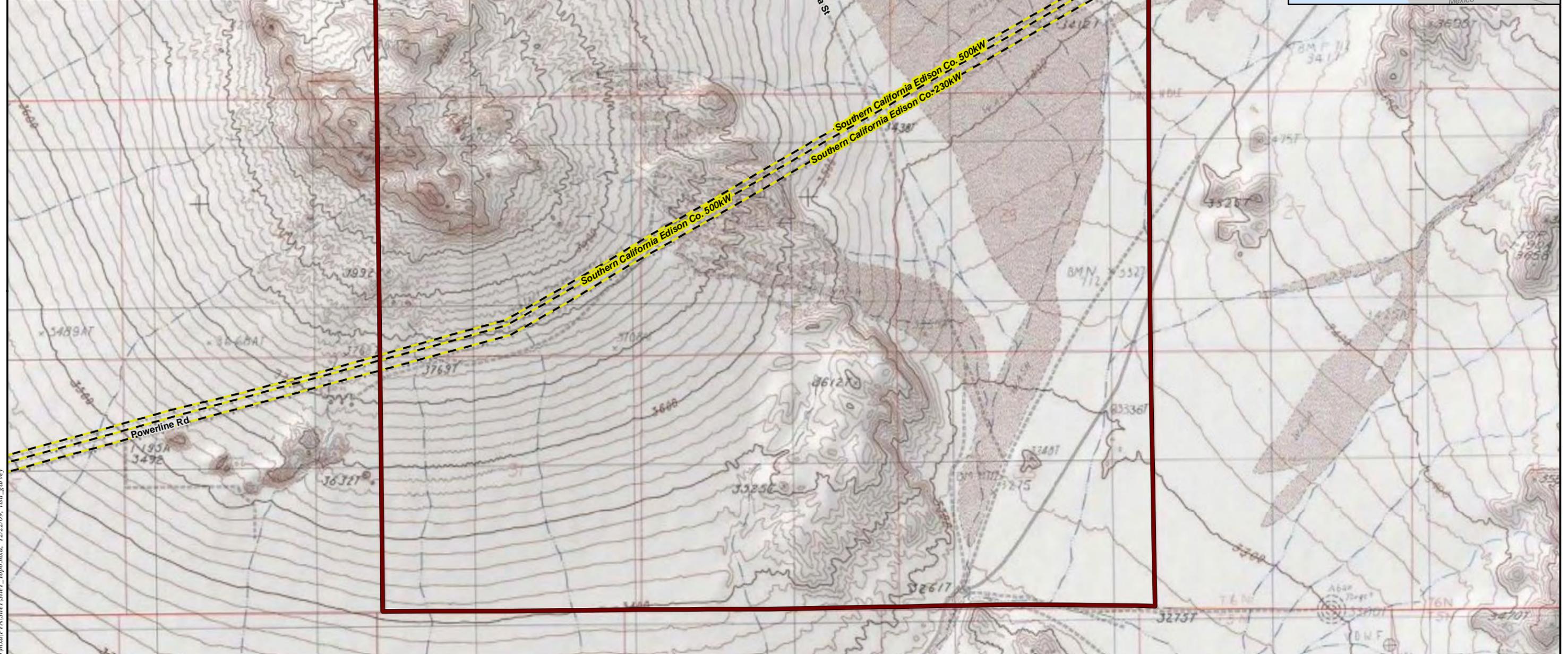
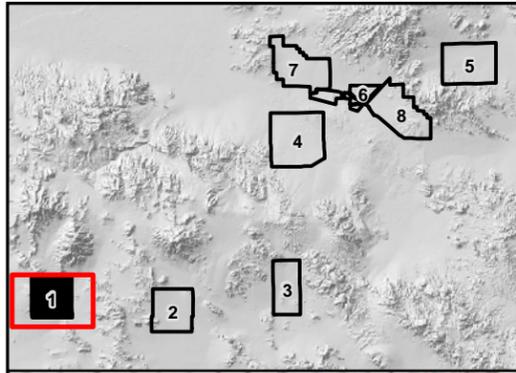
2.4.4 Conclusions

Site facilities must be designed to convey surface stormwater flows and be adequately protected from potential scour and sedimentation. Surface water supplies from direct storm water runoff cannot be relied upon to provide a steady, predictable source of water. The most possible source of water would be the Lucerne Valley Groundwater Basin. However, the groundwater flow may be impeded due to the mountainous terrain. Groundwater would be flowing away from the project site, making the ability to obtain or secure an adequate groundwater water supply for the project is a potential fatal flaw.

2.4.5 References

DWR (California Department of Water Resources). 2004. California's Groundwater Bulletin 118, Hydrological Region Colorado River, Lucerne Valley Groundwater Basin. <
http://www.water.ca.gov/pubs/groundwater/bulletin_118/basindescriptions/7-19.pdf>

FEMA Map Service Center <<http://gis1.msc.fema.gov/Website/newstore/Viewer>>

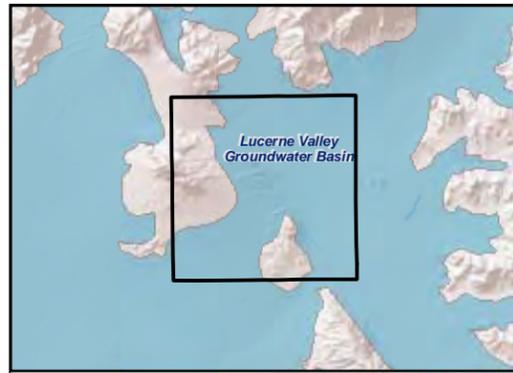
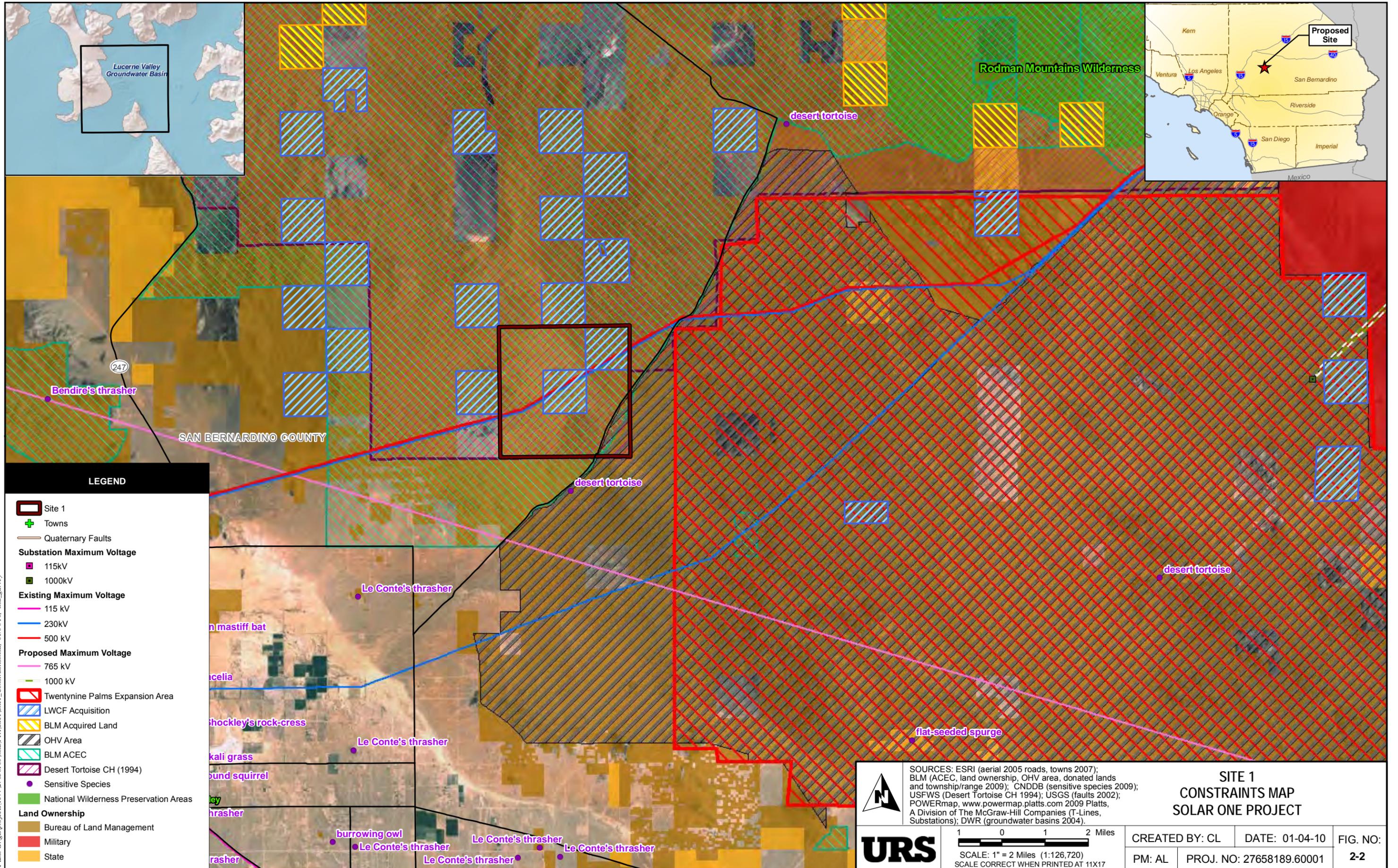


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LEGEND

- Site 1
- Existing Transmission Line

	<p>SOURCES: ESRI (overview, roads); Tessera Solar (sites 2009); USGS 7.5' quad (Grand View Mine 1993); POWERmap, www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (T-Lines, Substations).</p>	<p>SITE 1 TOPOGRAPHIC MAP SOLAR ONE PROJECT</p>	
	<p>URS</p>	<p>1000 0 1000 2000 Feet SCALE: 1" = 2,000' (1:24,000) SCALE CORRECT WHEN PRINTED AT 11X17</p>	<p>CREATED BY: CL DATE: 12-22-09</p>
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LEGEND

- Site 1
- + Towns
- Quaternary Faults
- Substation Maximum Voltage**
- 115kV
- 1000kV
- Existing Maximum Voltage**
- 115 kV
- 230kV
- 500 kV
- Proposed Maximum Voltage**
- 765 kV
- 1000 kV
- Twentynine Palms Expansion Area
- LWCF Acquisition
- BLM Acquired Land
- OHV Area
- BLM ACEC
- Desert Tortoise CH (1994)
- Sensitive Species
- National Wilderness Preservation Areas
- Land Ownership**
- Bureau of Land Management
- Military
- State

SOURCES: ESRI (aerial 2005 roads, towns 2007); BLM (ACEC, land ownership, OHV area, donated lands and township/range 2009); CNDDDB (sensitive species 2009); USFWS (Desert Tortoise CH 1994); USGS (faults 2002); POWERmap, www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (T-Lines, Substations); DWR (groundwater basins 2004).

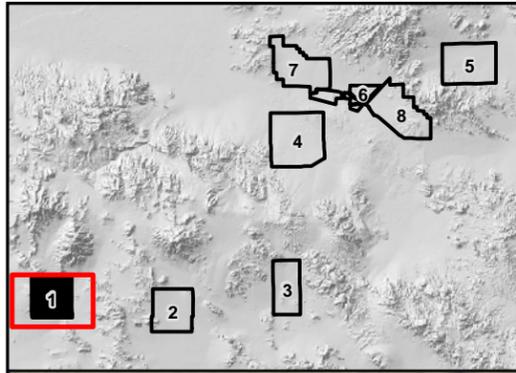
**SITE 1
CONSTRAINTS MAP
SOLAR ONE PROJECT**



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LEGEND

- Site 1
- Existing Transmission Line

 	SOURCES: ESRI (overview, roads); Tessera Solar (sites 2009); NAIP (aerial 2005); POWERmap, www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (T-Lines, Substations).		SITE 1 AERIAL MAP SOLAR ONE PROJECT	
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SECTION 3 SITE 2 – ENVIRONMENTAL ANALYSIS

Alternative Site 2 (Site) is located within San Bernardino County, California. The Site consists of approximately 6,009 acres of desert scrub habitat located nine miles southeast of Lucerne Valley, California and eight miles west of Twenty-nine Palms Marine Corps Base (Figure 1-1). The elevation ranges from approximately 3,200 feet above MSL in the southeast to approximately 3,800 feet above MSL in the northwest (Figure 3-1). The site is on BLM and private land within the Twenty-nine Palms Expansion Area. The SCE Pisgah-Lugo 230kV transmission line occurs in the northwest corner of the site. The entire site is located within an “open” OHV Area (Figure 3-2).

3.1 SITE 2 – BIOLOGICAL RESOURCES

The Site falls within the West Mojave Plan (BLM 2006, as amended). The Western Mojave Plan functions as an HCP that provides guidance for protection of listed species and the issuance of incidental take permits from USFWS and the CDFG for any federally- or state-listed species within the Plan boundaries.

The West Mojave Plan also designates a total of four DWMAAs that focus on the protection and conservation of desert tortoise (*Gopherus agassizii*), Mojave ground squirrel (*Spermophilus mohavensis*), and other state- or federally listed special-status species that share their habitats. The Site does not fall within any areas designated as DCH or PCH, ACEC, WSA, or DWMA (Figure 3-2).

3.1.1 Sensitive Species and Their Habitats

The Site does not fall within any ACEC, WSA, DHC, or PCH areas. The nearest BLM ACEC occurs approximately 2.5 miles to the southwest. The Rodman Mountains WSA occurs approximately five miles to the north. The nearest desert tortoise DCH occurs approximately four miles north of the site. No other DCH or PCH occurs within the vicinity of Alternative Site 2 (Figure 3-2).

A list of USFWS and CDFG special-status species within San Bernardino County was obtained from the CNDDDB (2009). According to the CNDDDB, no special-status species have been historically recorded on Alternative Site 2. The closest known occurrence of special-status wildlife species is desert tortoise, located approximately 3.5 and 6 miles southeast, west, and northwest of the site, and flat-seeded spurge (*Chamaesyce platysperma*, CNPS List 1B.2), located approximately 5.5 miles south of the site. No additional CNDDDB special-status wildlife or plant occurrences are recorded within a 10-mile radius of Alternative Site 1; however, the potential exists for additional, un-recorded special-status plant and wildlife species occurrences on-site. Rare plant surveys would need to be conducted during plant blooming periods, and standard vegetation mapping, jurisdictional waters delineation, and general plant and animal surveys would be required as part of the environmental review process.

Because the Site is located within suitable desert tortoise habitat and three historical records of desert tortoise occur within a 10-mile radius of Alternative Site 2, a habitat assessment and presence/absence surveys would likely need to be conducted. USFWS desert tortoise survey guidelines require one diurnal survey consisting of 30-foot belt transects within the impact footprint to be conducted when tortoises are active from April through May or from September through October (USFWS 2009).

Birds of prey, which are, as a group, listed by CDFG as Protected Species, likely use the site as foraging habitat. Any large trees or transmission line towers that may be present are potential raptor nest sites. Removal of any potential raptor nests during the non-breeding season prior to construction would be required upon approval of the agencies.

3.1.2 Wildlife Movement Corridors

No major constraint to wildlife movement currently exists within the vicinity of Alternative Site 2. The site is currently undeveloped and surrounded by open land. Development of Alternative Site 2 would potentially impede local wildlife movement. While this potential impediment is not considered a fatal flaw, mitigation and/or changes in the Project design should be considered an additional cost and/or construction scheduling constraint. Regionally, there are other opportunities for wildlife movement in the vicinity.

3.1.3 Potential Jurisdictional Waters

Based on aerial and topographical maps, there are seven intermittent blue-line drainages that cross the Site from northwest to southeast. These drainages may be ACOE-jurisdictional and/or CDFG-jurisdictional washes that would require a lengthy permitting process for development. The presence of jurisdictional waters would not be considered a fatal flaw, but the permitting process can be a construction scheduling constraint.

3.1.4 Conclusions

No fatal flaws were identified in this analysis; however, field verification of existing conditions and inventory of biological resources would provide further insight into the compatibility with the proposed solar energy facilities. In addition, consultation with the USFWS, CDFG, and BLM to determine the need for any special-status species surveys is highly recommended.

3.1.5 References

Bureau of Land Management. 2006. West Mojave Plan/EIS.

http://www.blm.gov/ca/news/2005/03/nr/CDD34_westmojavemap.html

California Natural Diversity Database. Biogeographic Data Branch. California Department of Fish and Game. November 24, 2009.

California Native Plant Society. 2009. Inventory of Rare and Endangered Plants (online edition, v7-08c-interim). California Native Plant Society. Sacramento, CA. Accessed on November 30, 2009 from <http://www.cnps.org/inventory>.

United States Fish and Wildlife Service. 2009. *Preparing for any Action that may occur within the Range of the Mojave Desert Tortoise (Gopherus agassizii)*. April 2009.

3.2 SITE 2 – CULTURAL RESOURCES

3.2.1 Findings

Alternative Site 2 is located approximately 15 miles northeast of Lucerne Valley and 12 miles west of Twenty-nine Palms Marine Corps Base. The SCE Lugo-Eldorado 500 kV and SCE Pisgah-Lugo 230 kV transmission lines are north of the Project site. The Project is situated in the San Bernardino County in the Mojave Desert in an area that is relatively uninhabited (Figure 3-3).

Although the Site area is arid desert, prehistorically a large number of archaeological resources are known to exist in the Mojave Desert. A number of lake beds, now dry, formed during prehistoric times and provided sufficient resources for native populations to exploit. As a result, there is a moderate to high potential that this area could contain prehistoric habitation sites. Based on a review of terrain maps and available archaeological literature, the Site may contain undocumented prehistoric or historic-period cultural resources. In addition to habitation sites, prehistoric logistical strategies also may produce a wide variety of other site types associated with hunting, gathering and other resource procurement activities. Common types of such “limited activity” sites include artifact scatters, temporary campsites and individual (isolated) artifacts. Historic cultural resource types may reflect activities related to mining and transportation.

The records search conducted at the SBAIC included specific information about previously recorded sites in the area as well as previous surveys that had been conducted. Eleven previously recorded cultural resource sites were located within the boundaries of Alternative Site 2:

1. Site P36-061177 – This site is a single chert waste flake.
2. Site P36-061178 – This is an isolated jasper flake.
3. Site CA-SBR-3812 – This is a small lithic and ceramic scatter that was recorded in 1979 with no subsequent recheck. Less than five lithic artifacts were noted.
4. Site CA-SBR-3844 – This is a small lithic scatter covering a 5 x 12 meter area, consisting of flakes, a knife fragment, a biface fragment, and a quartzite cobble tool.
5. Site P36-061188 – These are two isolated unutilized waste flakes.
6. Site CA-SBR-3843 – This is a sparse lithic scatter of worked and unworked flakes, two cores, a knife fragment, and a Pinto-like projectile point about 40 x 100 meters in size.
7. Site P36-061187 – This site consists of one unutilized waste flake.
8. Site P36-061186 – This site consists of three unutilized waste flakes.
9. Site CA-SBR-3845 – This site is a sparse lithic scatter of about 100 x 150 meters in size, with utilized flakes, a quartzite core, a triangular knife, and a biface.
10. Site P36-061184 – This site consists of two unutilized waste flakes.
11. Site P36-061185 – This site consists of two unutilized waste flakes.

Five previous surveys have been conducted within the Site boundaries, and cover about one third of the eastern portion of the Site. This area also accounts for 10 of the 11 resources found on the property. These surveys include:

1. Survey #1060240 – This was a linear survey for an electrical generating station and transmission lines that recorded a number of cultural resources along its length. No resources were recorded on the Site Two property.
2. Survey #1062158 – This was a linear survey for an electrical generating station and transmission lines that recorded a number of cultural resources along its length. No resources were recorded on the Site Two property.
3. Survey #1060240/1062158/1060900/1060901 – These were linear surveys for an electrical project and transmission lines that recorded a number of cultural resources along its length, but none were recorded on the Site Two property.
4. Survey #1063065 – This was an ethnographic investigation conducted in conjunction with a proposed power plant. Results were not reported by SBAIC.
5. Survey #1060851- This project included a record search and field study of seven proposed trenching sites for Southern California Edison. Results were not reported by SBAIC.

A review of the National Register of Historic Places (NRHP) Listed Properties, National Register Eligible Properties, CHL, and California Points of Historic Interest (CPHI) database indicated no listed cultural resources in or within the vicinity of the Site.

Because the entire parcel has not been surveyed for cultural resources, additional undocumented prehistoric or historic-period cultural resources of unknown significance are possible in the Site. Although portions of the Site may have undergone disturbances, significant surface or subsurface cultural resources could still be present on the property.

3.2.2 Conclusions

No obvious fatal flaws for the Site were evident as a result of initial research. Although the presence, size, age and significance of prehistoric sites in the Site area cannot be determined with the limited data on hand, the available information suggests that the Site has the potential to contain prehistoric or historic habitation sites, as well as evidence of limited activity sites such as prehistoric lithic scatters and ephemeral camp sites. URS recommends conducting additional archaeological literature reviews of the Site and surrounding area to determine whether other unrecorded cultural resources may exist on the property. In addition, a Class III field survey of the Site would need to be conducted based on the record search to evaluate potential Project impacts to cultural resources.

3.2.3 References

- Connelly, M. Carole, 1974. Archaeological Impact Evaluation: Southern California Edison Proposed Generating Station in Upper Johnson Valley and Associated Transmission, Gas, and Fuel Routes. Archaeological Research Unit, UCR. Unpublished report located at the SBAIC.
- Gacs, Ute D., 1978. Archival Ethnographic Investigation in Conjunction with Southern California Edison's Proposed New Plant at Lucerne Valley, California. Unpublished report located at SBAIC.
- Taylor, Thomas T., 1979. Archaeological Records Search and Field Reconnaissance of Seven Proposed Lucerne Valley Project Trenching Sites. Unpublished report located at the SBAIC.
- Weil, Edward B., 1979. Prehistoric Cultural Resource Investigations: Southern California Edison Lucerne Valley Project, Summary Report. California State University, Dominguez Hills. Unpublished report located at the SBAIC.
- Weil, Edward B., 1980. Prehistoric Cultural Investigations for the Lucerne Valley Project, San Bernardino County, California. California State University, Dominguez Hills. Unpublished report located at the SBAIC.

3.3 SITE 2 – LAND USE

Alternative Site 2 is approximately 6,009 acres of land located nine miles southeast of Lucerne Valley, California and eight miles west of Twenty-nine Palms Marine Corps Base (Figure 3-2). The site is on BLM and private land within the Twenty-nine Palms Expansion Area. The lead agencies for the environmental review process for Site 2 would be the CEC and the BLM. The environmental review process would be conducted under the Memorandum of Understanding (MOU) between these two agencies and a joint AFC/EIS review process would be mandated. 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.

3.3.1 Findings

Under BLM jurisdiction, the site falls within the West Mojave Plan (BLM 2006, as amended). The Site is located within a designated utility corridor. The SCE Pisgah-Lugo 230kV transmission line occurs in the northwest corner of the site. The entire site is located within an “open’ OHV Area (Figure 3-2).

The County has zoned this area RC. The RC District category is to designate areas suitable for conservation, open space and recreational uses, and to prevent the encroachment of incompatible uses and the premature conversion of such lands to intensive or urban uses. Uses in the RC District are limited primarily to open space and recreational uses and other activities compatible with agricultural uses. This category identifies areas of the County that are appropriate for conservation, rural residences, recreation areas, and related uses that support rural communities.

Six parcels within the Site are privately owned. The parcel numbers are included as Table 3.3-1.

**Table 3.3-1
Private Parcels Occurring within Alternative Site2**

APN	Acreage
052702132	159.2943
052702130	160.5945
052702130	240.1842
052702131	80.10987
052728106	729.9428
052702107	640.5569

3.3.2 Conclusions

On BLM lands, solar energy generation facilities are placed according to discretionary review of compatibility issues on a case-by-case basis. Because the Site is currently utilized for purposes of preservation and recreation, the determination of compatibility of the Project with surrounding land uses might be problematic. The Project on this Site would require a plan amendment to the 1980 CDCA Plan and West Mojave Plan (BLM 2006, as amended). Additionally, designation as the Twenty-nine Palms Expansion Area could mark the site as incompatible for solar thermal development.

There appears to be no direct fatal flaws identified for Site 2 due to current land use restrictions and/or obligations that would categorically deny the Project at this location. The land use restrictions that could inhibit the Project at this location include the current designation as an OHV recreational area and the multiple use designated for the site by the BLM.

3.3.3 References

County of San Bernardino Department of Planning Website: <http://www.sbcounty.gov/landuseservices/>

California Department of Conservation Division of Land Resource Protection: 2005 data.

California Department of Conservation Division of Land Resource Protection Website: <http://www.conservation.ca.gov/dlrp/lca/Pages/Index.aspx>

California Desert Conservation Area Plan, Bureau of Land Management, California Desert District, 1980.

3.4 SITE 2 – WATER RESOURCES

This section summarizes water resources in the vicinity of Solar One's Alternative Site 2 located within San Bernardino County, California. Alternative Site 2 (Site) is approximately 6,009 acres of land located nine miles southeast of Lucerne Valley, California and eight miles west of Twenty-nine Palms Marine Corps Base. The elevation ranges from approximately 3,200 feet above MSL in the southeast to approximately 3,800 feet above MSL in the northwest (Figure 3-1).

3.4.1 Overview of Surface Water Hydrology

USGS topographic maps show the Site situated on sloping land, towards the southeast direction (Figure 3-1). The average slope across the site is approximately five percent, while some portions of the site on the north and southwest corners have much steeper slopes. There appears to be no existing buildings within the Site. Several ephemeral or “blue-line” streams run through the Site, and these drainages run towards the south to dry washes that eventually end at Lucerne Lake.

Potential for alluvial fan flooding exists through the site with associated scour. FIRM Panels 06071C5925H and 06071C5250H cover the project area; however, these are non-printed panels, and the potential flooding hazards are unknown.

3.4.2 Groundwater: Johnson Valley

The Site lies within the Johnson Valley Groundwater Basin. The basin is approximately 54 square miles and is bounded by Fry Mountains to the north and on all other sides principally by other unnamed crystalline rocks. The western boundary follows the Johnson Valley fault, and surface drainage divides form parts of the southern and eastern boundaries. Upper Johnson Valley has internal surface drainage that converges to Melville (dry) Lake. Average annual precipitation ranges from 4 to 6 inches.

The main water-bearing materials in the subbasin are alluvial deposits consisting of silt, clay, sand, and gravel, along with some fine-grained lakebed deposits. Depth to bedrock is unknown, but probably is about 200 feet in the deepest part of the valley (French 1978). The alluvium in the northern part of the subbasin is a thin cover over a bedrock pediment. A well completed in the northern part of the subbasin penetrated 40 feet of alluvium and 84 feet of weathered bedrock and struck unweathered bedrock at 125 feet. Water was found at a depth of 480 feet in fractured bedrock (French 1978).

3.4.3 Findings

Potential for alluvial fan flooding exists through the site with associated scour. Groundwater may be difficult to obtain because the Johnson Valley groundwater storage is unknown.

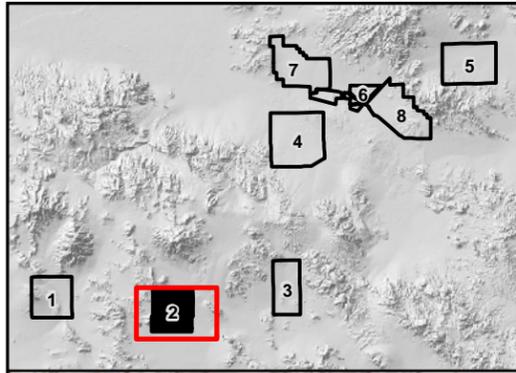
3.4.4 Conclusions

Site facilities must be designed to convey surface stormwater flows and be adequately protected from potential scour and sedimentation. Surface water supplies from direct storm water runoff cannot be relied upon to provide a steady, predictable source of water. The ability to obtain or secure an adequate groundwater water supply for the project is a potential fatal flaw due to the non-water bearing nature of the groundwater basin, described above.

3.4.5 References

DWR (California Department of Water Resources). 2004. California's Groundwater Bulletin 118, Hydrological Region Colorado River, Johnson Valley Groundwater Basin. < http://www.water.ca.gov/pubs/groundwater/bulletin_118/basindescriptions/7-18.02.pdf >

FEMA Map Service Center < <http://gis1.msc.fema.gov/Website/newstore/Viewer.>>

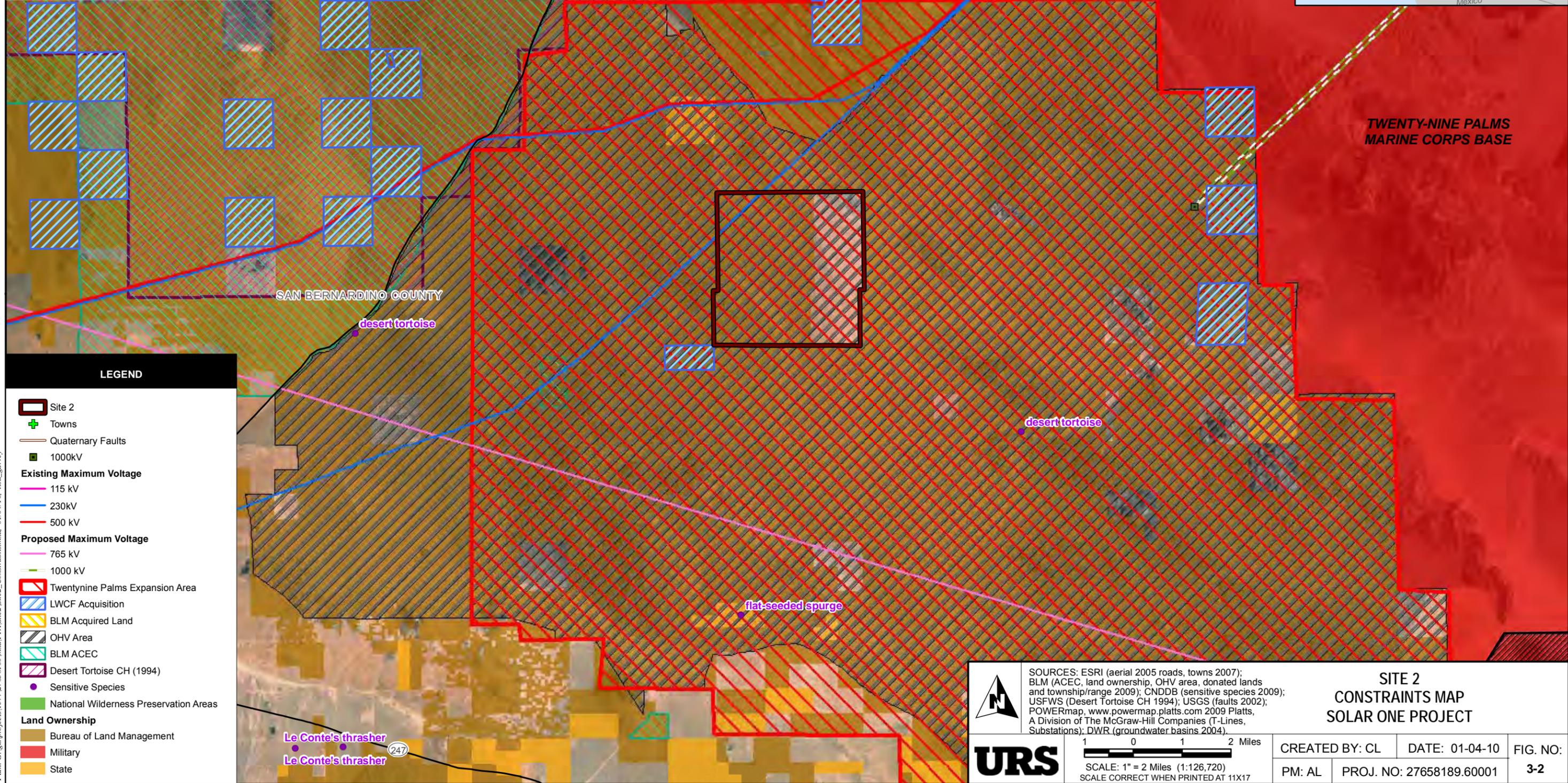
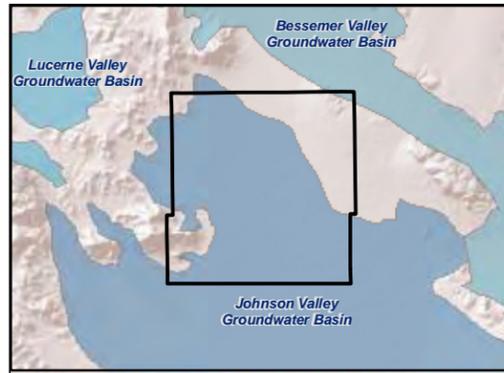


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LEGEND

- Site 2
- Existing Transmission Line

 	<p>SOURCES: ESRI (overview, roads); Tessera Solar (sites 2009); USGS 7.5' quads (Fry Mountains 1992, Iron Ridge 1982); POWERmap, www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (T-Lines, Substations).</p>		<p>SITE 2 TOPOGRAPHIC MAP SOLAR ONE PROJECT</p>	
	<p>1000 0 1000 2000 Feet</p> <p>SCALE: 1" = 2,000' (1:24,000) SCALE CORRECT WHEN PRINTED AT 11X17</p>		<p>CREATED BY: CL</p>	<p>DATE: 12-22-09</p>
		<p>PM: AL</p>	<p>PROJ. NO: 27658189.60001</p>	<p>3-1</p>



**TWENTY-NINE PALMS
MARINE CORPS BASE**

SAN BERNARDINO COUNTY

LEGEND

- Site 2
- Towns
- Quaternary Faults
- 1000kV
- Existing Maximum Voltage**
 - 115 kV
 - 230kV
 - 500 kV
- Proposed Maximum Voltage**
 - 765 kV
 - 1000 kV
- Twentynine Palms Expansion Area
- LWCF Acquisition
- BLM Acquired Land
- OHV Area
- BLM ACEC
- Desert Tortoise CH (1994)
- Sensitive Species
- National Wilderness Preservation Areas
- Land Ownership**
 - Bureau of Land Management
 - Military
 - State

Le Conte's thrasher
Le Conte's thrasher

desert tortoise

desert tortoise

desert tortoise

flat-seeded spurge

Rodman Mountains Wilderness



SOURCES: ESRI (aerial 2005 roads, towns 2007); BLM (ACEC, land ownership, OHV area, donated lands and township/range 2009); CNDDDB (sensitive species 2009); USFWS (Desert Tortoise CH 1994); USGS (faults 2002); POWERmap, www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (T-Lines, Substations); DWR (groundwater basins 2004).

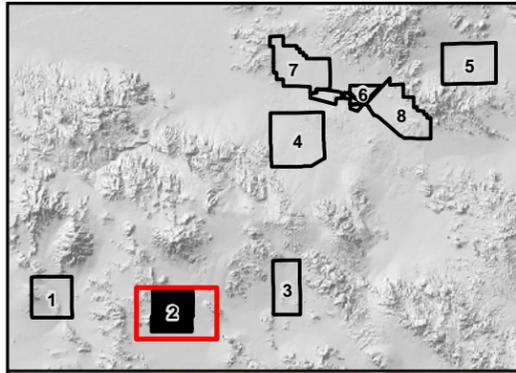


1 0 1 2 Miles
SCALE: 1" = 2 Miles (1:126,720)
SCALE CORRECT WHEN PRINTED AT 11X17

**SITE 2
CONSTRAINTS MAP
SOLAR ONE PROJECT**

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Path: G:\gis\projects\157727658100\mxd\FFA\Site2\Site2_Aerial.mxd, 12/22/09, lisa_garvey

LEGEND

Site 2

Existing Transmission Line

 	<p>SOURCES: ESRI (overview, roads); Tessera Solar (sites 2009); NAIP (aerial 2005); POWERmap, www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (T-Lines, Substations).</p>		<p>SITE 2 AERIAL MAP SOLAR ONE PROJECT</p>		
	<p>1000 0 1000 2000 Feet</p> <p>SCALE: 1" = 2,000' (1:24,000) SCALE CORRECT WHEN PRINTED AT 11X17</p>		<p>CREATED BY: CL</p>	<p>DATE: 12-22-09</p>	<p>FIG. NO:</p>
		<p>PM: AL</p>	<p>PROJ. NO: 27658189.60001</p>		<p>3-3</p>

SECTION 4 SITE 3 – ENVIRONMENTAL ANALYSIS

Alternative Site 3 (Site) located within San Bernardino County, California. The Site consists of approximately 5,118 acres of desert scrub habitat located 12 miles southwest of Pisgah, California and bordered along the northern and eastern edges by Twenty-nine Palms Marine Corps Base (Figure 1-1). The elevation ranges from approximately 2,740 feet above MSL in the south to approximately 3,400 feet above MSL in the north (Figure 4-1). The site is on BLM and LWCF Acquisition land within the Twenty-nine Palms Expansion Area. The SCE Pisgah-Lugo 230kV and SCE Griffith Energy Project-1-Lugo 500kV transmission lines occur approximately four miles northwest. The entire site is located within an “open” OHV Area (Figure 4-2).

4.1 SITE 3 – BIOLOGICAL RESOURCES

Alternative Site 3 falls within the West Mojave Plan (BLM 2006, as amended). The Western Mojave Plan functions as an HCP that provides guidance for the protection of listed species and the issuance of incidental take permits from the USFWS and the CDFG for any federally- or state-listed species within the Plan boundaries.

The West Mojave Plan also designates a total of four DWMA's that focus on the protection and conservation of desert tortoise (*Gopherus agassizii*), Mojave ground squirrel (*Spermophilus mohavensis*), and other state- or federally listed special status species that share their habitats. The Site does not fall within any areas designated as DCH or PCH, ACEC, WSA, or DWMA.

4.1.1 Special-status Species and Their Habitats

The Site does not fall within any ACEC, WSA, DHC, or PCH areas. The nearest BLM ACEC occurs approximately three miles to the northwest. The Rodman Mountains WSA also occurs approximately three miles to the northwest. The nearest desert tortoise DCH occurs approximately two miles north of the Project site. No other DCH or PCH occurs within the vicinity of Alternative Site 3.

A list of USFWS and CDFG special-status species within San Bernardino County was obtained from the CNDDDB (2009). According to the CNDDDB, no special-status species have been historically recorded on Alternative Site 3 (Figure 4-2). The closest known occurrence of special-status wildlife species is desert tortoise, located approximately four miles southwest of the Project site. No additional CNDDDB special-status wildlife records or CNDDDB special-status plant records occur within a 10-mile radius of the Alternative Site 3; however, the potential exists for additional un-recorded special-status plant and wildlife species occurrences on-site. Rare plant surveys would need to be conducted during plant blooming periods, and standard vegetation mapping, jurisdictional waters delineation, and general plant and animal surveys would be required as part of the environmental review process.

Because the Site is also within suitable desert tortoise habitat and two records of desert tortoise occur approximately four miles southwest and six miles northeast of Alternative Site 3, a habitat assessment and presence/absence surveys would most likely be required. USFWS desert tortoise survey guidelines require one diurnal survey consisting of 30-foot belt transects within the impact footprint, conducted when tortoises are active, from April through May or from September through October (USFWS 2009). No DCH or PCH occurs within the vicinity of Alternative Site 3.

Birds of prey (raptor species including prairie falcon), which are, as a group, listed by CDFG as Protected Species, likely use the site as foraging habitat. Any large trees or transmission line towers that may be present are potential raptor nest sites. Removal of any potential raptor nests during the non-breeding season prior to construction would be required.

4.1.2 Wildlife Movement Corridors

One major constraint to wildlife movement currently exists within the vicinity of Alternative Site 3—the Lava Bed Mountains to the north, northwest, and east of the Site. This mountain range wraps around the northern end of the Site and it is bisected by a large, flat wash into which all smaller washes on-site appear to funnel and flow north across the Lava Bed Mountains. This wash may be utilized as a north-south corridor across the Lava Bed Mountains for species, such as desert tortoise, that are incapable of traversing mountain ranges. Development of the Site within the currently proposed boundaries could potentially impede movement of such species through this corridor; however, the potential is low as there are several other opportunities for movement within the greater vicinity of Alternative Site 3. While this potential impediment is not considered a fatal flaw, mitigation and/or changes in the Project design should be considered an additional cost and/or construction scheduling constraint.

4.1.3 Potential Jurisdictional Waters

Based on topographical (Figure 4-1) and aerial maps (Figure 4-3), the site does not appear to contain any ACOE-jurisdictional waters. There may be CDFG-jurisdictional washes, such as the large series of braided washes concentrated near the northern end of the Site, that would require a 1602 permit. The presence of jurisdictional waters would not be considered a fatal flaw, but the permitting process can be a construction scheduling constraint.

4.1.4 Conclusions

No fatal flaws were identified in this analysis; however, field verification of existing conditions and inventory of biological resources would provide further insight into the compatibility of the Site with the proposed solar energy facilities. In addition, consultation with the USFWS, CDFG, and BLM to determine the need for any special-status species surveys is highly recommended.

4.1.5 References

- Bureau of Land Management. 2006. West Mojave Plan/EIS.
http://www.blm.gov/ca/news/2005/03/nr/CDD34_westmojaveplan.html
- California Natural Diversity Database. Biogeographic Data Branch. California Department of Fish and Game. November 24, 2009.
- California Native Plant Society. 2009. Inventory of Rare and Endangered Plants (online edition, v7-08c-interim). California Native Plant Society. Sacramento, CA. Accessed on November 30, 2009 from <http://www.cnps.org/inventory>.
- United States Fish and Wildlife Service. 2009. Preparing for any Action that may occur within the Range of the Mojave Desert Tortoise (*Gopherus agassizii*). April 2009.

4.2 SITE 3 – CULTURAL RESOURCES

For purposes of the cultural resources review, fatal flaws were defined as highly sensitive cultural resources that could represent major conflicts with development of a solar generating facility. High-sensitivity resources include properties listed in the National Register of Historic Places (National Register) or CHL database, and other properties developed for public interpretation or for which there is substantial agency, tribal, or public sentiment for preservation in place.

4.2.1 Findings

Alternative Site 3 is located 12 miles southwest of Pisgah, California in San Bernardino County and bordered along the northern and eastern edges by Twenty-nine Palms Marine Corps Base. The SCE Pisgah-Lugo 230kV and SCE Griffith Energy Project-1-Lugo 500kV transmission lines occur approximately four miles northwest. The Lava Beds Mountains are near the eastern border of the site, while Galway Lake is near the southern border.

Although the Site area is arid desert, prehistorically a large number of archaeological resources are known to exist in the Mojave Desert. A number of lake beds, now dry, formed during prehistoric times and provided sufficient resources for native populations to exploit. As a result, there is a moderate to high potential that this area could contain prehistoric habitation sites. Based on a review of terrain maps and available archaeological literature, the Site may contain undocumented prehistoric or historic-period cultural resources. In addition to habitation sites, prehistoric logistical strategies also may produce a wide variety of other site types associated with hunting, gathering and other resource procurement activities. Common types of such “limited activity” sites include artifact scatters, temporary campsites and individual (isolated) artifacts. Historic cultural resource types may reflect activities related to mining and transportation.

The records search conducted at the SBAIC included specific information about previously recorded sites in the area as well as previous surveys that had been conducted. Three previously recorded cultural resource sites were located within the boundaries of Alternative Site 3:

1. Site P36-014426 – This site is a single reduction locus that is 6 x 5 meters in size, consisting of one biface and 38 flakes.
2. Site P36-014427 – This site is a single reduction locus in a 2 x 1 meter area consisting of a biface and 16 flakes.
3. Site CA-SBR-1811 - Although it is plotted on the record check map, no information is available about this cultural resource site. There is the word “Petro” on the site form, suggesting that it may be a petroglyph site, but no other information is available on the site form.

Two previous surveys have been conducted within the Site boundaries, but cover only a small portion of Alternative Site Three. These surveys include:

1. Survey #1062257 – This was a survey conducted by the BLM of many parcels in the Mojave Desert, including a small portion of the Site area. Site specific results are not available for the parcel surveyed within Alternative Site 3 and it appears that no resources were found as nothing is mapped within the parcel that was surveyed.
2. Survey #1060701 – This area was first surveyed in 1978 and was later updated in 1988. It was a linear survey with no resources encountered on the property.

4.2.3 Conclusions

No obvious fatal flaws for the Site were evident as a result of initial research. Although the presence, size, age and significance of prehistoric sites in the Site area cannot be determined with the limited data on hand, the available information suggests that the Site has the potential to contain prehistoric or historic habitation sites, as well as evidence of limited activity sites such as prehistoric lithic scatters and ephemeral camp sites. URS recommends conducting additional archaeological literature reviews of the Project and surrounding area to determine whether other unrecorded cultural resources may exist on the property. In addition, a Class III field survey of the Site area would need to be conducted based on the record search to evaluate potential Project impacts to cultural resources.

4.2.4 References

BLM.1978. Archaeological Sites of the California Desert Area (Calico, Kramer, Stoddard, Johnson, Morongo, Twentynine Palms) Transect Forms. Unpublished report located at the SBAIC.

Stumpf, Gary.1978. Archaeological Reconnaissance Report: Checkers Motorcycle Race. Submitted to American Motorcycle Association. Unpublished report located at the SBAIC.

4.3 SITE 3 – LAND USE

Alternative Site 3 is approximately 5,118 acres of uninhabited land located 12 miles southwest of Pisgah. Site 3 is bordered on the north and east edges by Twenty-nine Palms Marine Corps Base (Figure 4-2). The site is entirely on BLM and LWCF Acquisition land located within the Twenty-nine Palms Expansion Area. The SCE Pisgah-Lugo 230kV and SCE Griffith Energy Project-1-Lugo 500kV transmission lines occur approximately four miles northwest. The entire site is located within an “open” OHV Area.

The lead agency for the environmental review process for Site 3 would be the BLM. The environmental review process would be conducted and approval of the Project ROW Grant Application would result in the issuance of a ROW Grant Permit for use of federal lands administered by the BLM.

4.3.1 Findings

The Site is zoned within the RC district by the County of San Bernardino. The intent of the RC District category is to designate areas suitable for conservation, open space and recreational uses, and to prevent the encroachment of incompatible uses and the premature conversion of such lands to intensive or urban uses. Uses in the RC District are limited primarily to open space and recreational uses and other activities compatible with agricultural uses. According to the General Plan, this category identifies areas of the County that are appropriate for conservation, rural residences, recreation areas, and related uses that support rural communities.

The site is designated by the BLM for Limited Use. This multiple-use class protects sensitive natural, scenic, ecological, and cultural resource values. These lands are managed to provide for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished. According to this use class, solar development may be allowed once NEPA requirements are met.

4.3.2 Conclusions

On BLM lands, solar energy generation facilities are placed according to discretionary review of compatibility issues on a case-by-case basis. Because Project land is currently utilized for purposes of preservation and recreation, the determination of compatibility of the Project with surrounding land uses might be problematic. The Project would require a plan amendment to the 1980 CDCA Plan and West Mojave Plan (BLM 2006, as amended). Additionally, proximity to the Twenty-nine Palms Expansion Area could mark the site as incompatible for solar thermal development.

There appears to be no direct fatal flaws identified for Site 3 due to current land use restrictions and/or obligations that would categorically deny the Project at this location. The land use restrictions that could inhibit the Project at this location include the current designation as an OHV recreational area and the multiple use category designated for the site by the BLM.

4.3.3 References

County of San Bernardino Department of Planning Website: <http://www.sbcounty.gov/landuseservices/>

California Department of Conservation Division of Land Resource Protection: 2005 data.

California Department of Conservation Division of Land Resource Protection Website:
<http://www.conservation.ca.gov/dlrp/lca/Pages/Index.aspx>

California Desert Conservation Area Plan, Bureau of Land Management, California Desert District, 1980.

4.4 SITE 3 – WATER RESOURCES

This section summarizes water resources in the vicinity of Alternative Site 3, located within San Bernardino County, California (Site). Alternative Site 3 is approximately 5,118 acres of land located 12 miles southwest of Pisgah, California and bordered along the northern and eastern edges by Twenty-nine Palms Marine Corps Base. The elevation ranges from approximately 2,740 feet above MSL in the south to approximately 3,400 feet above MSL in the north.

4.4.1 Overview of Surface Water Hydrology

A review of USGS topographic maps shows the Site situated on sloping land, towards the southeast direction. The average slope across the Site is approximately five percent, while some portions of the Site on the north and southwest corners have much steeper slopes. There appears to be no existing buildings within the project area. Several ephemeral or “blue-line” streams run through the Site, and these drainages run towards the south to dry washes that eventually end at Lucerne Lake.

Potential for alluvial fan flooding exists through the site with associated scour. FIRM Panel 06071C5300H is assumed to cover the project area; however, this is a non-printed panel, and the potential flooding hazards are unknown.

4.4.2 Groundwater: Bessemer Valley

The Site lies within the Bessemer Valley Groundwater Basin. The basin is approximately 61.1 square miles and is bounded by nonwater-bearing rocks of the Iron Ridge Mountains on the north and bedrock highlands on the south, and by the West Calico fault on the east and the Emerson fault on the west (Rogers 1967). An arm of the basin extends northwestwards following the Camp Rock and Emerson faults and is bounded by the Rodman Mountains on the east and the Fry Mountains and bedrock highlands on the west. Surface waters drain southward towards Galway (Dry) Lake. Annual average precipitation ranges from about 4 to 8 inches.

Water Bearing Formations

The water bearing materials that form this basin consist of alluvium, fanglomerate, and playa lake deposits. Quaternary alluvium is the principal water-bearing material and includes included are the unconsolidated younger alluvial deposits and the underlying unconsolidated to semi-consolidated older alluvial deposits (DWR 1964). Wells in the basin yield as much as 60 gpm.

Holocene Deposits. The younger alluvium consists of Holocene age unconsolidated, undissected coarse gravel to sand deposited in alluvial fans with a maximum thickness of about 100 feet (Dibblee 1964, 1966). At Galway Lake, Holocene age silt and clay playa deposits are found. A well at the east end of Galway Lake is shown drilled in the younger alluvium, but dry (Dibblee 1966); however, no record is found for that well.

Pleistocene Deposits. Older alluvium consists of presumed Pleistocene age gravel, sand, and silt of dissected alluvial fans at least 100 feet thick (Dibblee 1964, 1966).

Miocene Deposits. Older fanglomerate and gravel deposits, that are presumably late Miocene to Pleistocene age, may underlie younger alluvial deposits and reach more than 1,000 feet in thickness (Dibblee 1966).

Restrictive Structures

The West Calico and Emerson faults bound the basin on the east and west sides (Dibblee 1964, 1966). The Camp Rock fault cuts through the northwest arm of the basin (Dibblee 1964). It is unknown whether or not these faults are barriers to groundwater movement.

Recharge Areas

The principal source of recharge to the basin is likely percolation of runoff from surrounding mountains, with likely negligible contribution from percolation of precipitation to the valley floor (DWR 1967).

Groundwater Storage Capacity.

The total storage capacity is estimate at 740,000 (DWR 1975). The estimated groundwater currently in storage is unknown.

Groundwater Budget (Type C)

Natural recharge is estimated to be about 300 af/yr (DWR 1975).

4.4.3 Findings

Potential for alluvial fan flooding exists through the site with associated scour. Surface water supplies from direct storm water runoff cannot be relied upon to provide a steady, predictable source of water.

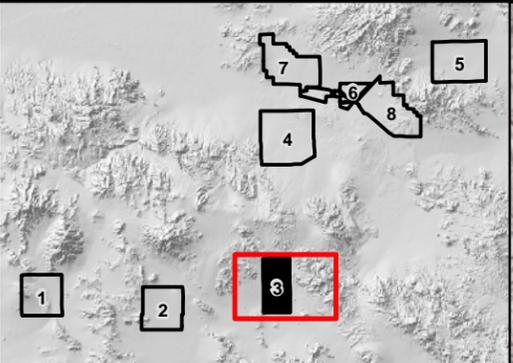
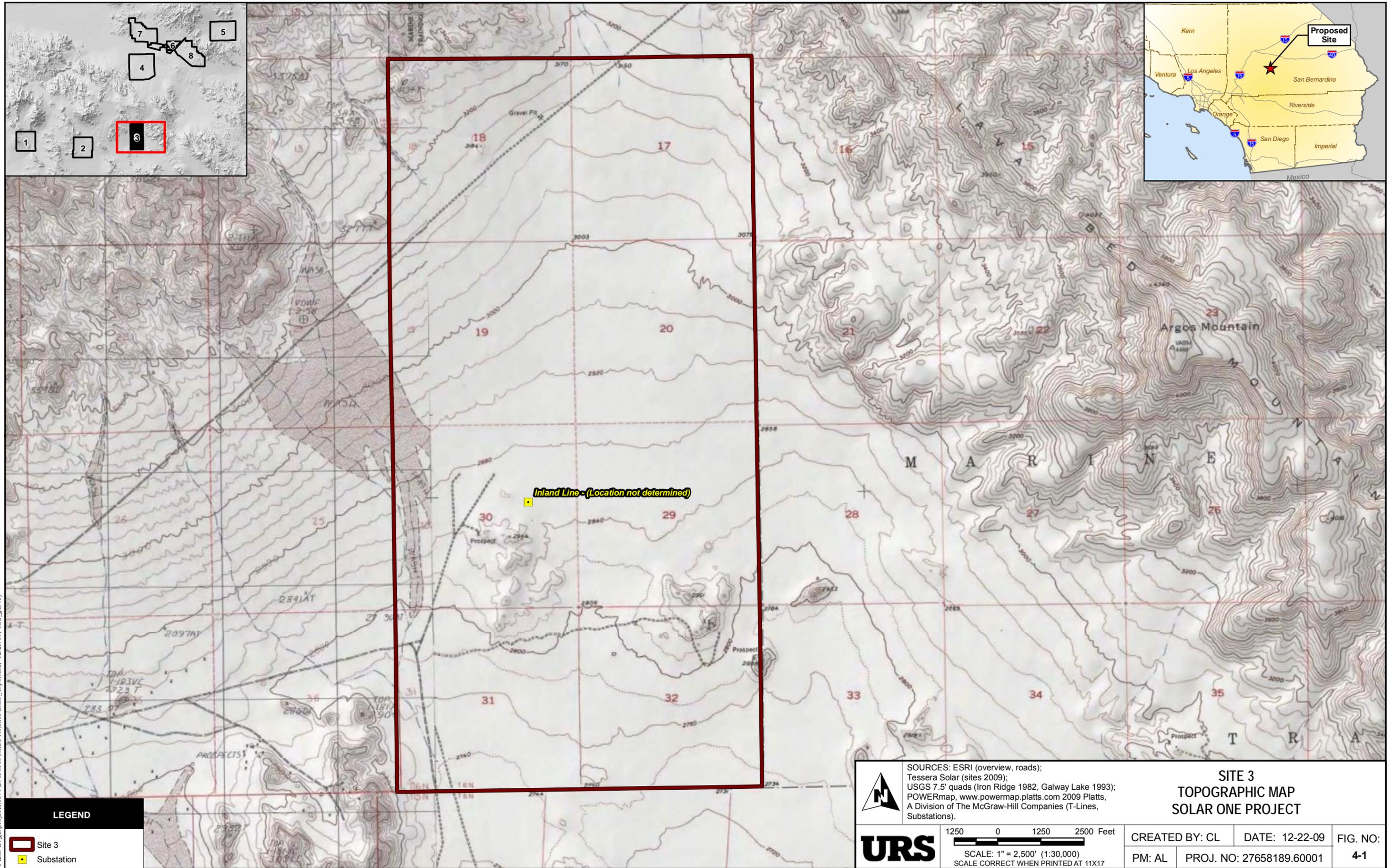
4.4.4 Conclusions

Site facilities must be designed to convey surface stormwater flows and be adequately protected from potential scour and sedimentation. Surface water supplies from direct stormwater runoff cannot be relied upon to provide a steady, predictable source of water. The most likely source of water supply for the project is from groundwater within the Bessemer Valley Groundwater Basin or neighboring basins.

4.4.5 References

DWR (California Department of Water Resources). 2004. California's Groundwater Bulletin 118, Hydrological Region Colorado River, Bessemer Valley Groundwater Basin. <
http://www.water.ca.gov/pubs/groundwater/bulletin_118/basindescriptions/7-15.pdf >

FEMA Map Service Center <<http://gis1.msc.fema.gov/Website/newstore/Viewer.>>



Inland Line - (Location not determined)

SOURCES: ESRI (overview, roads); Tessler Solar (sites 2009); USGS 7.5' quads (Iron Ridge 1982, Galway Lake 1993); POWERmap, www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (T-Lines, Substations).

**SITE 3
TOPOGRAPHIC MAP
SOLAR ONE PROJECT**

UR S

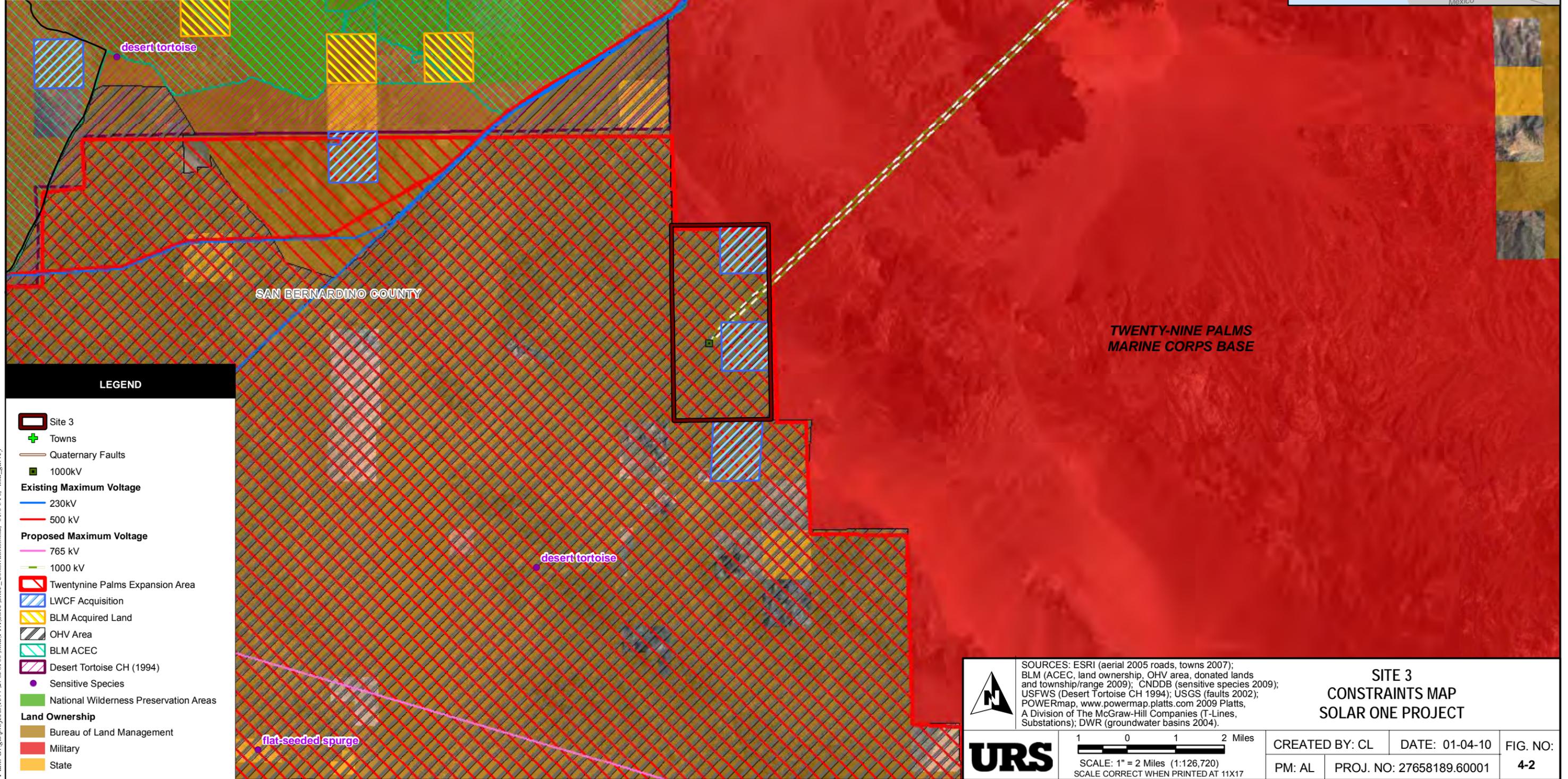
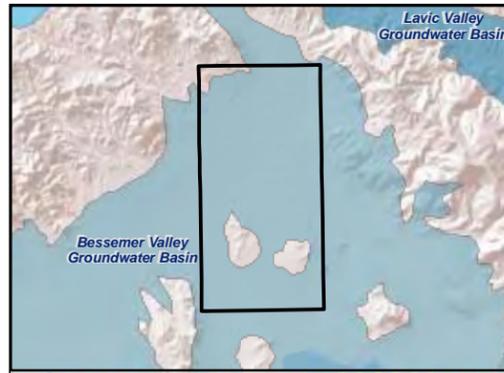
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LEGEND

- Site 3
- Substation



LEGEND

- Site 3
- Towns
- Quaternary Faults
- 1000kV
- Existing Maximum Voltage**
 - 230kV
 - 500 kV
- Proposed Maximum Voltage**
 - 765 kV
 - 1000 kV
- Twentynine Palms Expansion Area
- LWCF Acquisition
- BLM Acquired Land
- OHV Area
- BLM ACEC
- Desert Tortoise CH (1994)
- Sensitive Species
- National Wilderness Preservation Areas
- Land Ownership**
 - Bureau of Land Management
 - Military
 - State

URS

SOURCES: ESRI (aerial 2005 roads, towns 2007); BLM (ACEC, land ownership, OHV area, donated lands and township/range 2009); CNDDDB (sensitive species 2009); USFWS (Desert Tortoise CH 1994); USGS (faults 2002); POWERmap, www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (T-Lines, Substations); DWR (groundwater basins 2004).

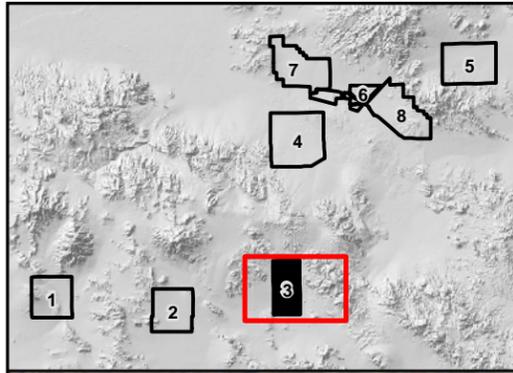
**SITE 3
CONSTRAINTS MAP
SOLAR ONE PROJECT**

1 0 1 2 Miles

SCALE: 1" = 2 Miles (1:126,720)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: CL	DATE: 01-04-10	FIG. NO:	
PM: AL	PROJ. NO: 27658189.60001		4-2

Path: G:\gis\projects\1577276581\00\mxd\FFA\Site3\Site3_Constraints.mxd, 01/04/10, lisa_garvey



Path: G:\gis\projects\1577276581\00\mxd\FFA\Sites3\Sites3_Aerial.mxd, 12/23/09, lisa_garvey

LEGEND

- Site 3
- Substation

 	SOURCES: ESRI (overview, roads); Tessera Solar (sites 2009); NAIP (aerial 2005); POWERmap, www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (T-Lines, Substations).		SITE 3 AERIAL MAP SOLAR ONE PROJECT	
	 SCALE: 1" = 2,500' (1:30,000) SCALE CORRECT WHEN PRINTED AT 11X17	CREATED BY: CL PM: AL	DATE: 12-22-09 PROJ. NO: 27658189.60001	FIG. NO: 4-3

SECTION 5 SITE 4 – ENVIRONMENTAL ANALYSIS

Alternative Site 4 (Site) consists of approximately 10,007 acres of desert scrub habitat located four miles west of Pisgah, California, just south of Interstate 40 (I-40) (Figure 1-1). Twenty-nine Palms Marine Corps Base directly abuts the southeast corner of the Site. The elevation ranges from approximately 2,800 feet above MSL in the southwest to approximately 1,930 feet above MSL in the northeast with peaks in the northeast ranging between 2,070 and 2,095 feet above MSL (Figure 5-1). According to the aerial photo and topography maps, a large lava flow appears to run diagonally across the northeast corner of the Project site. The majority of the site is on BLM land. Other intermittent sections are privately owned or unclassified lands. A strip mine occurs along the eastern boundary of the Project site. The Southern California Edison (SCE) Pisgah-Lugo 230kV and SCE Griffith Energy Project-1-Lugo 500kV transmission lines provide the boundary for the southeast corner of the Project site along with the Twenty-nine Palms Marine Corps Base property boundary (Figure 5-2).

5.1 SITE 4 – BIOLOGICAL RESOURCES

Alternative Site 4 falls within the West Mojave Plan (BLM 2006, as amended). The Western Mojave Plan functions as a HCP that provides guidance for the protection of listed species and issuance of incidental take permits from the USFWS and CDFG for any federally- or state-listed species within the Plan boundaries.

The West Mojave Plan also designates a total of four DWMA that focus on the protection and conservation of desert tortoise (*Gopherus agassizii*), Mojave ground squirrel (*Spermophilus mohavensis*), and other state- or federally listed special status species that share their habitats. Eighty percent of Site falls within USFWS DCH (1994) for desert tortoise and a BLM ACEC. The Project site does not fall with any WSA or DWMA; however, the Rodman Mountains WSA occurs approximately one mile to the west.

5.1.1 Methodology

In addition to previously stated methodology, URS conducted general and focused biological surveys throughout this Site in 2007 and 2008 as part of a larger survey effort for the Solar One Solar Power Generating Facility Project. The Biological Resources Baseline Survey Report (USR 2009) for these field efforts was consulted during this analysis.

5.1.2 Special-status Species and Their Habitats

Eighty percent of the Site falls within USFWS DCH (1994) for desert tortoise and a BLM ACEC (Figure 5-2). URS would consider this a fatal flaw. The Project site does not fall with any WSA or DWMA; however, the Rodman Mountains WSA occurs approximately one mile to the west.

A list of USFWS and CDFG special-status species within San Bernardino County was obtained from the CNDDDB (2009). According to the CNDDDB, no special-status species have been historically recorded on Alternative Site 4. The closest known occurrence of special-status wildlife species is desert tortoise, located approximately 1.5 miles south of the Project site. The closest known special-status plant species

is Emory's crucifix-thorn (*Castela emoryi*), located approximately 2.5 miles east of the Site. According to the surveys conducted by URS in 2007 and 2008, several special-status plant and wildlife species occur within vicinity of Alternative Site 4 (URS 2009). Special-status species that occur within 10 miles of Alternative Site 4 are shown in Table 5.1-1.

**Table 5.1-1
Special-status Species that Occur within 10 Miles of Alternative Site 4
San Bernardino County, California**

Species		Sensitivity Status			Habitat Associations	Potential To Occur Onsite	Status Onsite
Common Name	Scientific Name	Federal	State	CNPS			
Plants							
Small-flowered androstephium	<i>Androstephium breviflorum</i>	None	None	2	Mojave desert scrub (bajadas), blooms March-April.	High	Observed adjacent areas in 2008
Emory's crucifixion thorn	<i>Castela emoryi</i>	None	None	2	Dry, rocky desert washes, slopes and plains, blooms June-July.	High	Observed adjacent areas in 2008
Foxtail cactus	<i>Coryphantha alversonii</i>	None	None	4.3	Mojave desert scrub, Sonoran desert scrub, blooms April-June.	High	Observed adjacent areas in 2008
Utah vine milkweed	<i>Cynanchum utahense</i>	None	None	4.2	Mojave desert scrub, blooms April-June.	High	Observed adjacent areas in 2008
White-margined beardtongue	<i>Penstemon albomarginatus</i>	BLM:S	None	1B	Mojave desert scrub, blooms March-May.	High	Observed adjacent areas in 2008
Reptiles							
Desert tortoise	<i>Gopherus agassizii</i>	FT	ST	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	Observed adjacent areas in 2007 and 2008

**Table 5.1-1
Special-status Species that Occur within 10 Miles of Alternative Site 4
San Bernardino County, California
(Continued)**

Species		Sensitivity Status			Habitat Associations	Potential To Occur Onsite	Status Onsite
Common Name	Scientific Name	Federal	State	CNPS			
Mojave fringe-toed lizard	<i>Uma scoparia</i>	BLM: S	CDFG: SSC	N/A	Areas of aeolian sands including dunes, flats with sandy hummocks, washes and banks of rivers.	High	Observed adjacent areas in 2008
Birds							
Golden Eagle	<i>Aquila chrysaetos</i>	BLM: S USFWS: BCC	CDFG: FP, WL	N/A	Desert scrub near cliff nest sites.	High	Fly-over observed in 2007 and 2008
Burrowing owl	<i>Athene cunicularia</i>	BLM: S USFWS: BCC	CDFG: SSC	N/A	Found in open grasslands and agricultural areas with suitable fossorial mammal burrows for nesting.	High	Observed adjacent areas in 2008
Swainson's Hawk	<i>Buteo swainsoni</i>	USFWS: BCC	ST	N/A	Found in grasslands, prairies, and other wide-open ranges with minimal tree cover.	High	Observed adjacent areas in 2008
Loggerhead shrike	<i>Lanius ludovicianus</i>	USFWS: BCC	CDFG: SSC	N/A	Desert, farmland; nests in cholla and thorny bushes.	High	Observed adjacent areas in 2008
Bendire's thrasher	<i>Toxostoma bendirei</i>	BLM: S USFWS: BCC	CDFG: SSC	N/A	Desert wash vegetation	High	Observed adjacent areas in 2008

**Table 5.1-1
Special-status Species that Occur within 10 Miles of Alternative Site 4
San Bernardino County, California
(Continued)**

Species		Sensitivity Status			Habitat Associations	Potential To Occur Onsite	Status Onsite
Common Name	Scientific Name	Federal	State	CNPS			
Mammals							
Nelson's bighorn sheep	<i>Ovis canadensis nelsoni</i>	BLM:S FS:S	None	N/A	Dry, relatively barren desert mountain ranges.	High	Not observed Known to north of site.
American badger	<i>Taxidea taxus</i>	None	CDFG: SSC	N/A	Grasslands, savannas, and mountain meadows near timberline are preferred, but also occur in desert scrub areas.	High	Observed adjacent areas in 2008

BCC = Birds of conservation concern

FP = Fully protected

S = Sensitive

ST = State threatened

BLM = Bureau of Land Management

FT = Federally threatened

SC = Species of concern

USFWS = United States

CDFG = California Department of Fish and Game

SSC = Species of special concern

Fish and Wildlife Service

WL = Watch list

While these are the only records that occur within a 10-mile radius, additional special-status plant and wildlife species may utilize the Site. Rare plant surveys would need to be conducted during plant blooming periods, and standard vegetation mapping, jurisdictional waters delineation, and general plant and animal surveys would also be required as part of the environmental review process.

Because the Site is within suitable desert tortoise habitat and several desert tortoises were detected within 10 miles of Alternative Site 4, a habitat assessment would need to be conducted, and presence/absence surveys would most likely be required. USFWS desert tortoise survey guidelines require one diurnal survey consisting of 30-foot belt transects within the impact footprint, conducted when tortoises are active, from April through May or from September through October (USFWS 2009). Eighty percent of the Site occurs within DCH for desert tortoise.

Burrowing owls (*Athene cunicularia*) were also detected in the vicinity of Alternative Site 4. CDFG has issued a formal policy recommendation for mitigating impacts to burrowing owl (6.5 acres per nesting pair) (California Burrowing Owl Consortium 1993). Such a mitigation program would not be considered a fatal flaw for development of solar facilities. Passive relocation of any resident owls would also be required.

Should CDFG Species of Special Concern (such as Mojave fringe-toed lizard [*Uma scoparia*] and Le Conte's thrasher [*Toxostoma lecontei*]) be detected onsite, the wildlife agencies would expect mitigation

for impacts to their habitat. An offsite habitat mitigation requirement would likely be nominal (e.g., 1:1 ratio) and be included as part of any listed species mitigation requirement. Such a mitigation program would not be considered a fatal flaw for development of solar facilities, but should be considered as an additional cost.

Birds of prey (raptor species), which are, as a group, listed by CDFG as Protected Species, likely use the site as foraging habitat. Any large trees or transmission line towers that may be present are potential raptor nest sites. Removal of any potential raptor nests during the non-breeding season prior to construction would be required.

5.1.3 Wildlife Movement Corridors

Two major constraints to wildlife movement currently exist within the vicinity of Alternative Site 4 – the lava flow to the northeast, and the Rodman Mountains to the southwest of the Site. The Site sits between these two features over a large alluvial plain which may be utilized as a north-south corridor for species incapable of traversing mountain ranges and rough terrain such as desert tortoise and Mojave fringe-toed lizard. Nelson's bighorn sheep (*Ovis canadensis nelsoni*) may also utilize the mountain ranges to the northwest. Development of the Site within the currently proposed boundaries would potentially impede local wildlife movement through this corridor or effect wildlife movement due to visual impacts. While this impediment is not considered a fatal flaw, mitigation and/or changes in the Project design should be considered an additional cost and/or construction scheduling constraint.

5.1.4 Potential Jurisdictional Waters

Based on topographical (Figure 5-1) and aerial (Figure 5-3) maps, the site does not appear to contain any ACOE-jurisdictional waters. There may be CDFG-jurisdictional washes, such as the large series of braided washes concentrated near the southwest corner of the Project site, that would require a 1602 permit. The presence of jurisdictional waters would not be considered a fatal flaw, but the permitting process can be a construction scheduling constraint.

5.1.5 Conclusions

Two fatal flaws were identified in this analysis – 80 percent inclusion of the site within both DCH for desert tortoise and the BLM ACEC. URS would not recommend development of Alternative Site 4 as the Project may not be permitted and/or the permitting process would be too costly and time consuming. Should development be pursued, field verification of existing conditions and inventory of biological resources on the Project site would provide further insight into the compatibility of the site with the proposed solar energy facilities. In addition, consultation with the USFWS, CDFG, and BLM to determine the need for any special-status species surveys would be highly recommended.

5.1.6 References

- Bureau of Land Management. 2006. West Mojave Plan/EIS.
http://www.blm.gov/ca/news/2005/03/nr/CDD34_westmojaveplan.html
- California Burrowing Owl Consortium. 1993. Burrowing Owl Survey Protocol and Mitigation Guidelines. April 1993.
- California Natural Diversity Database. Biogeographic Data Branch. California Department of Fish and Game. November 24, 2009.
- California Native Plant Society. 2009. Inventory of Rare and Endangered Plants (online edition, v7-08c-interim). California Native Plant Society. Sacramento, CA. Accessed on November 30, 2009 from <http://www.cnps.org/inventory>
- URS. Biological Resources Baseline Survey Report For the SES Projects Study Area, San Bernardino County, California. Prepared for: Stirling Energy Systems. April 1, 2009 (revised December 1, 2009).
- United States Fish and Wildlife Service. 2009. Preparing for any Action that may occur within the Range of the Mojave Desert Tortoise (*Gopherus agassizii*). April 2009.

5.2 SITE 4 – CULTURAL RESOURCES

For purposes of the cultural resources review, fatal flaws were defined as highly sensitive cultural resources that could represent major conflicts with development of a solar generating facility. High-sensitivity resources include properties listed in the National Register of Historic Places (National Register) or CHL database, and other properties developed for public interpretation or for which there is substantial agency, tribal, or public sentiment for preservation in place.

5.2.1 Findings

Alternative Site 4 is located 2 miles south of Pisgah, California in San Bernardino County and borders the northwestern edge of Twenty-nine Palms Marine Corps Base. The SCE Pisgah-Lugo 230kV and SCE Griffith Energy Project-1-Lugo 500kV transmission lines occur along the southeastern border of the property. The Site is situated in the San Bernardino County in the Mojave Desert in an area that is relatively uninhabited (Figure 5-3).

Although the area is arid desert, prehistorically a large number of archaeological resources are known to exist in the Mojave Desert. A number of lake beds, now dry, formed during prehistoric times and provided sufficient resources for native populations to exploit. As a result, there is a moderate to high potential that this area could contain prehistoric habitation sites. Based on a review of terrain maps and available archaeological literature, the Site may contain undocumented prehistoric or historic-period cultural resources. In addition to habitation sites, prehistoric logistical strategies also may produce a wide variety of other site types associated with hunting, gathering and other resource procurement activities. Common types of such “limited activity” sites include artifact scatters, temporary campsites and

individual (isolated) artifacts. Historic cultural resource types may reflect activities related to mining and transportation.

The records search conducted at the SBAIC included specific information about previously recorded sites in the area as well as previous surveys that had been conducted. Twenty-two previously recorded cultural resource sites were located within the boundaries of Alternative Site 4. Table 5.2-1 below outlines the site constituents.

**Table 5.2-1
Recorded Cultural Constituents in Alternative Site 4**

Site Number	Cultural Constituents
P36-061529	isolated grey volcanic primary flake
SBR-3592	small lithic scatter (lithic reduction site) with three cores and related flakes
P36-061422	isolated cryptocrystalline flake
P36-061443	two cores/test blocks
SBR-4159	rock shelter of aboriginal and recent occupation; archaeological evidence consists of 15 flakes; recent camping debris including a stove, car seats, a wooden bench, and a steel drum
SBR-7104H	low density scatter of 70 historic tin cans, 40 fragments of glass, and 2 prehistoric potsherds
P36-061444	an isolated evaporated milk can
SBR-3518	lithic reduction locus consisting of a lithic scatter with core debris
SBR-7111H	secondary deposit of 14 historic cans
P36-061152	isolated jasper flake
P36-061157	one hole in top solder sealed historic can
SBR-7112H	lithic reduction site consisting of a sparse lithic scatter
P36-014074	isolated small quartz flake
P36-014073	one isolated chert flake
P36-014072	one isolated chalcedony flake
P36-014069	small lithic scatter
P36-014075	two isolated flakes
P36-014076	two isolated flakes
P36-014078	two isolated flakes
P36-014077	one isolated flake
P360014079	one isolated flake
P36-014070	lithic scatter of three flakes

Seven previous surveys have been conducted within the Site boundaries, but these surveys cover only a small portion of Alternative Site Four. These surveys include:

1. Survey #1060964/1060965 – These were surveys conducted for a proposed motorcycle racecourse that covered linear portions of the property as well as large areas outside the boundaries of the property, although it appears that no resources were identified within Alternative Site 4.
2. Survey #1061037 – No cultural resources were located on this small survey for a Southern California Edison anode pit.
3. Survey #1062710/1062862 – A number of prehistoric and historic cultural resources were recorded on this survey, some of which are located on Alternative Site 4.
4. Survey #1066883 – Although this area was plotted on the record search map, no information was available about this survey.
5. Survey #1062220 – This was apparently an overview survey conducted for the BLM on various parcels in the Mojave Desert. No resources were identified in the parcel surveyed on Alternative Site 4.
6. Survey #1060874 – This was a transmission line survey conducted in 1979 and later updated in 1989. A large number of cultural resources were recorded along the corridor, but none within Alternative Site 4.
7. Survey #1065903 – Although this area was plotted on the record search map, no information was available about this survey.

5.2.2 Conclusions

No obvious fatal flaws for the Project were evident as a result of initial research. Although the presence, size, age and significance of prehistoric sites in the Site area cannot be determined with the limited data on hand, the available information suggests that the Site has the potential to contain prehistoric or historic habitation sites, as well as evidence of limited activity sites such as prehistoric lithic scatters and ephemeral camp sites. URS recommends conducting additional archaeological literature reviews of the Site and surrounding area to determine whether other unrecorded cultural resources may exist on the property. In addition, a Class III field survey of the Site area would need to be conducted based on the record search to evaluate potential Project impacts to cultural resources.

5.2.3 References

- Apple, Rebecca McCorkle and Lori Lilburn, 1993. Cultural Resources Survey for the Fort Cady Boric Acid Mining and Processing Facility, Newberry Springs, California. Dames and Moore. Unpublished report on file at SBAIC.
- Apple, Rebecca McCorkle, 1993. Cultural Resources Testing and Evaluation Report for the Fort Cady Boric Acid Mining and Processing Facility, Newberry Springs, California. Unpublished report on file at SBAIC.

Barker, James P., Carol H. Rector, and Philip J. Wilke, 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. Archaeological Research Unit, UCR. Unpublished report on file at SBAIC.

Bureau of Land Management, 1978. Archaeological Sites of the California Desert Area (Owlshead, Amargosa Mojave Basin Planning Unit, Phase I-III): Archaeological Sample Unit Records. Unpublished report on file at SBAIC.

Musser, Ruth, 1980. A Cultural Resource Inventory: Johnson Valley to Parker Motorcycle Race – the Public Comment Alternative. Unpublished report on file at SBAIC.

Norwood, Richard H., 1980. Cultural Resource Survey for a portion of the Earp to Johnson Valley, California, Enduro Racecourse Route. ReCon. Unpublished report on file at SBAIC.

Sutton, Mark Q., 1980. Southern California Gas Company Anode Pit. Unpublished report on file at SBAIC.

5.3 SITE 4 – LAND USE

Alternative Site 4 is approximately 10,007 acres, located four miles west of Pisgah, California, just south of Interstate 40 (I-40) (Figure 5-2). Twenty-nine Palms Marine Corps Base directly abuts the southeast corner of the Project site. The elevation ranges from approximately 2,800 feet above MSL in the southwest to approximately 1,930 feet above MSL in the northeast with peaks in the northeast ranging between 2,070 and 2,095 feet above MSL.

The site is comprised of BLM land and privately owned or unclassified lands. A strip mine occurs along the eastern boundary of the Project site. The Southern California Edison (SCE) Pisgah-Lugo 230kV and SCE Griffith Energy Project-1-Lugo 500kV transmission lines provide the boundary for the southeast corner of the Project site along with the Twenty-nine Palms Marine Corps Base property boundary.

Five parcels within the Site are privately owned. The parcel numbers are included as Table 5.3-1 below.

**Table 5.3-1
Private Parcels Occurring within Alternative Site 4**

APN	Acreage
052923102	638.9772
052924107	659.7173
052927107	646.503
052924113	63.17214
052707102	620.1275

5.3.1 Findings

The Site is designated by the BLM for Limited Use. This multiple-use class protects sensitive natural, scenic, ecological, and cultural resource values. These lands are managed to provide for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished. According to this use class, solar development may be allowed once NEPA requirements are met.

Alternative Site 4 is within the West Mojave Plan (BLM 2006, as amended). The West Mojave Plan also designates four DWMA that focus on the protection and conservation of state or federally listed special status species. A large majority of the Site falls within USFWS DCH (1994) for desert tortoise and a BLM ACEC. The Rodman Mountains WSA occurs approximately one mile to the west.

San Bernardino County has zoned this areas RC. The RC District category designates areas suitable for conservation, open space and recreational uses, and to prevent the encroachment of incompatible uses and the premature conversion of such lands to intensive or urban uses. Uses in the RC District are limited primarily to recreation, open space, and other activities compatible with agricultural uses. According to the General Plan, this category identifies areas of the County that are appropriate for conservation, rural residences, recreation areas, and related uses that support rural communities.

5.3.2 Conclusions

On BLM lands, solar energy generation facilities are placed according to discretionary review of compatibility issues on a case-by-case basis. Because the Site is currently utilized for purposes of preservation, recreation and utility corridors, the determination of compatibility of the Project with surrounding land uses would be problematic.

There appears to be direct fatal flaws identified for Site 4 due to current land use restrictions and/or obligations that would categorically deny the Project at this location. The land use restrictions that would deny the Project at this location include the current designation as an ACEC, USFWS DCH (1994) for desert tortoise. The Project would require a plan amendment to the 1980 (CDCA Plan).

5.3.3 References

County of San Bernardino Department of Planning Website: <http://www.sbcounty.gov/landuseservices/>

California Department of Conservation Division of Land Resource Protection: 2005 data.

California Department of Conservation Division of Land Resource Protection Website: <http://www.conservation.ca.gov/dlrp/lca/Pages/Index.aspx>

California Desert Conservation Area Plan, Bureau of Land Management, California Desert District, 1980.

5.4 SITE 4 – WATER RESOURCES

This section summarizes water resources in the vicinity of Alternative Site 4. The elevation ranges from approximately 2,800 feet above MSL in the southwest to approximately 1,930 feet above MSL in the northeast with peaks in the northeast ranging between 2,070 and 2,095 feet above MSL (Figure 5-1). According to the aerial photo and topography maps, a large lava flow appears to run diagonally across the northeast corner of the Site.

5.4.1 Overview of Surface Water Hydrology

A review of USGS topographic maps shows the Site situated on sloping land, towards the southeast direction (Figure 5-1). The average slope across the Site is approximately five percent, while some portions of the Site on the north and southwest corners have much steeper slopes. There appears to be no existing buildings within the project area. Several ephemeral or “blue-line” streams run through the Site, and these drainages run towards the south to dry washes that eventually end at Lucerne Lake.

Potential for alluvial fan flooding exists through the site with associated scour. FIRM Panel 06071C5300H is assumed to cover the project area; however, this is a non-printed panel, and the potential flooding hazards are unknown.

5.4.2 Groundwater: Lower Mojave River Valley

The Site lies within the Lower Mojave River Valley Groundwater Basin (Figure 5-2). The basin is approximately 447 square miles and is bounded by unconsolidated Quaternary sediments, consolidated Tertiary and older rocks of the Waterman and Calico Mountains to the north. The unconsolidated sediments and consolidated rocks forming Daggett Ridge, the Newberry Mountains, and the Rodman Mountains and the Camp Rock-Harper Lake fault zone occur to the south, and the Pisgah fault occurs to the southeast.

The basin is naturally recharged by direct precipitation, ephemeral stream flow, infrequent surface flow of the Mojave River, and underflow of the Mojave River into the basin from the west (Eccles 1981, Lines 1996). Treated wastewater effluent, septic tank effluent, and irrigation waters are allowed to percolate into the ground and recharge the groundwater system (Eccles 1981, Lines 1996). A large, but sporadic contribution to recharge occurs when the Mojave River is flowing, with 40 feet of rise in the water table observed during 1969 and 87 feet of rise observed in 1993 (Hardt 1969, Robson 1974, Lines 1996).

Groundwater levels in wells in the floodplain unit near the Mojave River tend to vary in concert with rainfall and runoff rates, whereas groundwater levels in the fan unit do not show significant changes due to local rainfall (MWA 1999). The general trend in this basin is for declining groundwater levels, particularly in the fan unit. Three of the 10 highest precipitation years over a 60-year base period occurred during 1991 through 1999 (MWA 1999). Infiltration of the runoff from this relatively abundant precipitation has produced an increase in the groundwater level (and groundwater storage) in the floodplain unit near the Mojave River (MWA 1999). Hydrographs for wells near Yermo and Newberry Springs show a decline in water level of about 80 to 100 feet over the last 50 years and a decrease of one to two feet over the last 10 years (MWA 1999). The general groundwater flow pattern follows topography

toward the active Mojave River channel, and it then follows the course of the Mojave River eastward to Afton Canyon (Stamos and Predmore 1995; Lines 1996).

Published total storage capacity for the Lower Mojave River Valley Basin varies. The boundaries of the Lower Mojave River Valley Groundwater Basin correspond closely to the boundaries of the Troy and Daggett storage units discussed by DWR (1967). DWR (1967) calculated the total storage capacity for these storage units using the base of water-bearing materials, an average of about 300 feet. The total storage for the Troy and Daggett storage units is 7,950,000 af (DWR 1967). The Lower Mojave River Valley Groundwater Basin underlies the Baja subarea administered by the Mojave Water Agency. The Baja subarea also extends to include parts of the neighboring Coyote Lake Valley and Caves Canyon Valley Groundwater Basins of this report (MWA 1999).

The Lower Mojave River Valley Groundwater Basin underlies the Baja subarea administered by the Mojave Water Agency. The Baja subarea also extends to include parts of the neighboring Coyote Lake Valley and Caves Canyon Valley Groundwater Basins of this report (MWA 1999). MWA calculated a total effective storage capacity of the Baja subarea using an economic pumping depth of 100 feet (BEE 1994), to be about 1,544,000 af. Using an overlying area of about 286,000 acres, an average thickness of about 300 feet, and a specific yield of 10.5 percent indicates a total storage capacity of about 9,010,000 af for the Lower Mojave River Valley Groundwater Basin. The total storage for the Troy and Daggett storage units is 7,950,000 af (DWR 1967).

Not enough data exist to compile a detailed groundwater budget for the basin. However, the MWA monitors groundwater extraction and reports extractions of 3,300 af for urban uses, 28,900 af for agriculture, and 6,400 af for industrial and recreational uses in the 1997-1998 water year (MWA 1999). In addition to the extraction data, several other components of the water budget have been reported. For the 1997-1998 water year, MWA (1999) estimated natural recharge at 27,400 af, artificial recharge at 3,390 af, and applied water recharge at 14,500 af. Subsurface inflow and outflow averages are estimated by DWR (1967) at 2,000 af inflow and 1,000 af outflow, and have been corroborated by Bookman-Edmonston Engineering (1994).

5.4.3 Groundwater: Lavic Valley

The northeastern portion of the site lies within the Lavic Valley Groundwater Basin. This groundwater basin underlies Lavic Valley in central San Bernardino County. The basin is bounded by non-water-bearing rocks of the Cady Mountains on the north and east, of the Bullion Mountains on the south and east, of the Lava Bed Mountains on the southwest, and by the Pisgah fault on the west (Rogers 1967). Parts of the eastern and northern boundaries are drainage divides. The southern part of this basin lies within the Twenty-nine Palms Marine Corps Base. In the northern part of the basin, surface drainage is toward Hector Siding and in the southern part of the basin, surface drainage is toward Lavic (dry) Lake. Average annual precipitation ranges from four to six inches.

Water Bearing Formations

Groundwater in the basin is found in Quaternary alluvial and lacustrine deposits. Holocene age alluvium consists of unconsolidated, well-sorted, fine- to coarse-grained sand, pebbles, and boulders with variable amounts of silt and clay deposited in washes and alluvial fans (DWR 1967). Pleistocene age deposits are

composed of gently tilted, unconsolidated to moderately consolidated, moderately well bedded gravel, sand, silt and clay (DWR 1967).

Restrictive Structures

The southwest-trending Pisgah fault is the northwest boundary of the basin, and water levels appear to drop eastward across the fault, which indicates that this fault is likely a barrier to groundwater flow. The Lavic Lake fault cuts through the southern part of the basin, but it is not known whether or not this fault is a groundwater barrier.

Recharge Areas

Recharge to the basin is from percolation of runoff from surrounding mountains through alluvial fans and washes (DWR 1967). Subsurface flow from adjoining basins may also contribute to recharge (DWR 1967).

Groundwater Level Trends

In the northern part of the basin, groundwater flows toward Hector Siding. In the southern part of the basin, groundwater flows toward Lavic Lake. Groundwater may flow eastward out of the basin beneath a surface drainage divide.

Groundwater Storage

The total storage capacity is estimated to be 270,000 (DWR 1975). Total groundwater in storage is unknown. Natural recharge is estimated at about 300 af/yr (DWR 1975).

Groundwater Quality

Water from a well in the southern part of the basin near Lavic Lake sampled in 1917 was sodium sulfate in character with a Total Dissolved Solids (TDS) content of 1,680 mg/L (DWR 1967; DWR 1954). 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 1,721 mg/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.

5.4.4 Findings

Surface water supplies from direct storm water runoff cannot be relied upon to provide a steady, predictable source of water. Groundwater may be difficult to obtain because the Mojave River Basin is adjudicated.

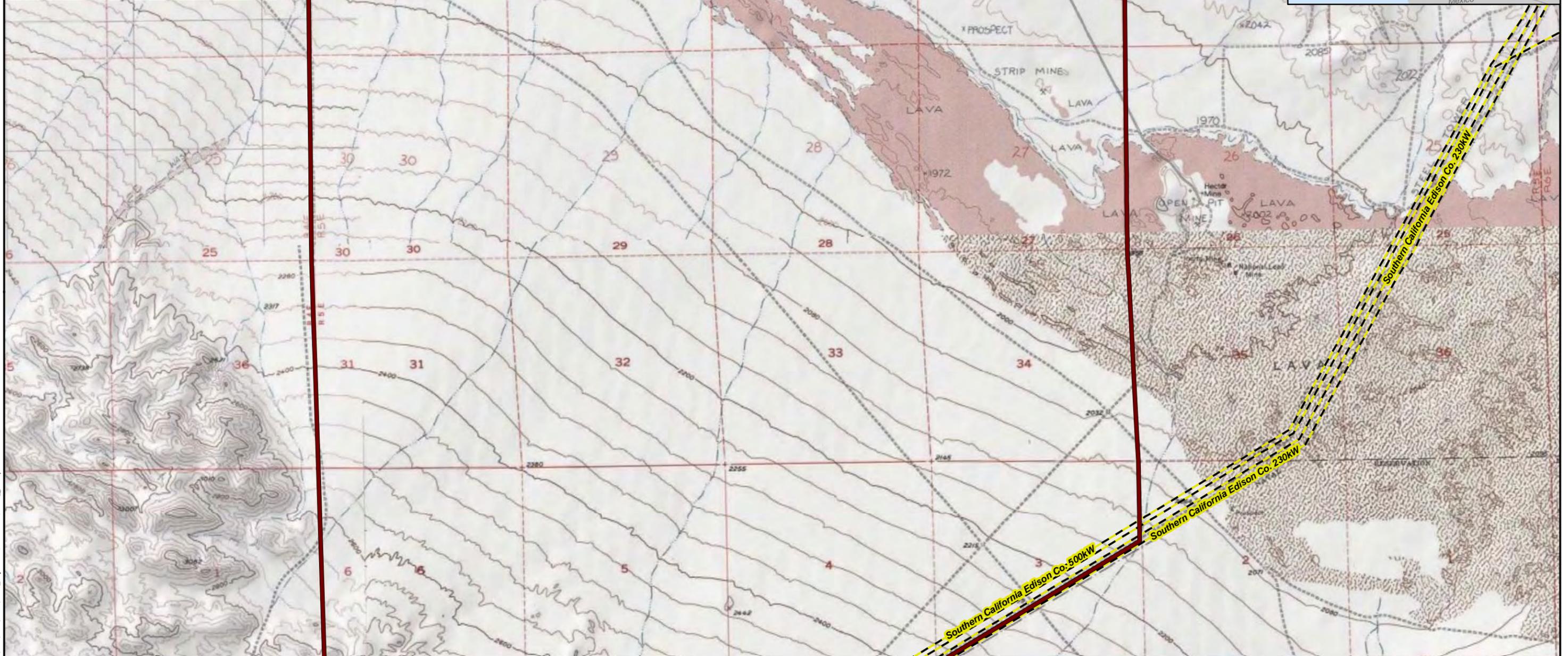
5.4.5 Conclusions

The ability to obtain or secure an adequate groundwater water supply for the project is a potential fatal flaw due to the adjudicated nature of the groundwater basin.

5.4.6 References

DWR (California Department of Water Resources). 2004. California's Groundwater Bulletin 118, Hydrological Region South Lahontan, Lower Mojave River Valley Groundwater Basin. <http://www.water.ca.gov/pubs/groundwater/bulletin_118/basindescriptions/6-40.pdf>

FEMA Map Service Center <<http://gis1.msc.fema.gov/Website/newstore/Viewer.>>



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LEGEND

- Site 4
- Existing Transmission Line



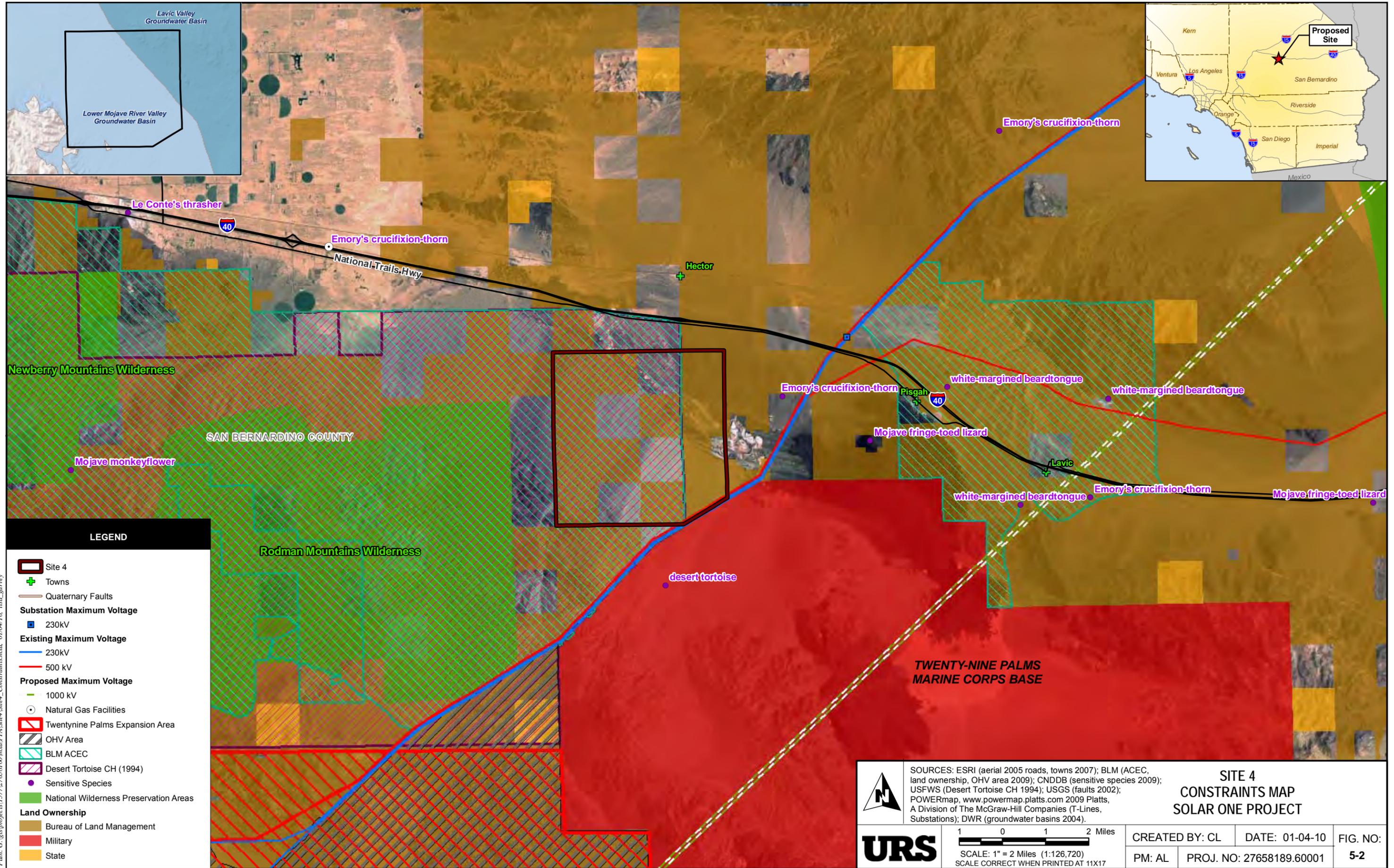
SOURCES: ESRI (overview, roads);
 Tessera Solar (sites 2009);
 USGS 7.5' quads (Troy Lake, Silver Bell Mine 1993;
 Hector, Sunshine Peak 1992);
 POWERmap, www.powermap.platts.com 2009 Platts,
 A Division of The McGraw-Hill Companies (T-Lines,
 Substations).



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 SCALE: 1" = 2,500' (1:30,000)
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**SITE 4
 TOPOGRAPHIC MAP
 SOLAR ONE PROJECT**

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LEGEND

- Site 4
- + Towns
- Quaternary Faults
- Substation Maximum Voltage**
- 230kV
- Existing Maximum Voltage**
- 230kV
- 500 kV
- Proposed Maximum Voltage**
- 1000 kV
- Natural Gas Facilities
- Twentynine Palms Expansion Area
- OHV Area
- BLM ACEC
- Desert Tortoise CH (1994)
- Sensitive Species
- National Wilderness Preservation Areas
- Land Ownership**
- Bureau of Land Management
- Military
- State



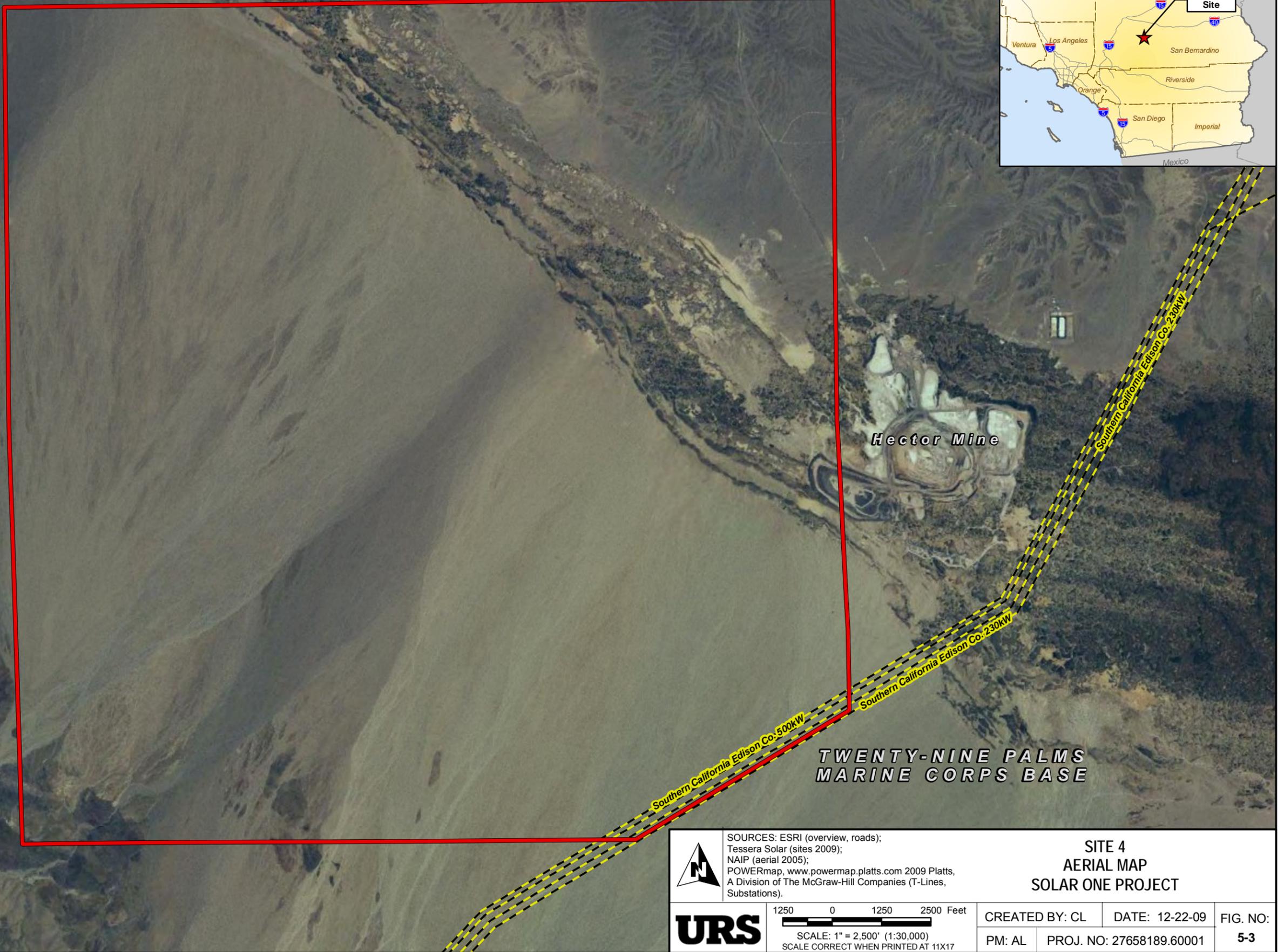
SOURCES: ESRI (aerial 2005 roads, towns 2007); BLM (ACEC, land ownership, OHV area 2009); CNDDDB (sensitive species 2009); USFWS (Desert Tortoise CH 1994); USGS (faults 2002); POWERmap, www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (T-Lines, Substations); DWR (groundwater basins 2004).

**SITE 4
CONSTRAINTS MAP
SOLAR ONE PROJECT**



1 0 1 2 Miles
SCALE: 1" = 2 Miles (1:126,720)
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LEGEND

Site 4

Existing Transmission Line

 	SOURCES: ESRI (overview, roads); Tessera Solar (sites 2009); NAIP (aerial 2005); POWERmap, www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (T-Lines, Substations).		SITE 4 AERIAL MAP SOLAR ONE PROJECT	
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SECTION 6 SITE 5 – ENVIRONMENTAL ANALYSIS

Alternative Site 5 (Site) is located within San Bernardino County, California. Alternative Site 5 consists of approximately 7,704 acres of desert scrub habitat located 5.5 miles northeast of Pisgah, California and 8.5 miles north of Twenty-nine Palms Marine Corps Base (Figure 1-1). The elevation ranges from approximately 1,400 feet above MSL in the east to approximately 2,500 feet above MSL in the west (Figure 6-1). The site is on BLM and LWCF Acquisition lands. The SCE Pisgah-Lugo 230kV and SCE Griffith Energy Project-1-Lugo 500kV transmission lines occur approximately one mile northwest of the Site (Figure 6-2).

6.1 SITE 5 – BIOLOGICAL RESOURCES

Alternative Site 5 falls within the West Mojave Plan (BLM 2006, as amended). The Western Mojave Plan functions as an HCP that provides protection for listed species and guidance for the issuance of incidental take permits by the USFWS and CDFG for federally- and state-listed species.

The West Mojave Plan also designates a total of four DWMA that focus on the protection and conservation of desert tortoise (*Gopherus agassizii*), Mojave ground squirrel (*Spermophilus mohavensis*), and other state- or federally listed special status species that share their habitats. The Site does not fall with any DCH, PCH, ACEC, WSA, or DWMA.

6.1.1 Methodology

In addition to previously stated methodology, URS conducted general and focused biological surveys throughout the Site in 2007 and 2008 as part of a larger survey effort for the Solar One Solar Power Generating Facility Project. The Biological Resources Baseline Survey Report (USR 2009) for these field efforts was also consulted during this analysis.

6.1.2 Special-status Species and Their Habitats

The Site does not fall within any ACEC, WSA, DHC, or PCH areas. The nearest BLM ACEC occurs approximately one mile to the south. The Kelso Dunes and Bristol Mountains WSAs occur approximately two miles to the east. The nearest desert tortoise DCH occurs approximately 10.5 miles southwest of the Site. No other DCH or PCH occurs within the vicinity of Alternative Site 5.

A list of USFWS and CDFG special-status species within San Bernardino County was obtained from the CNDDDB (2009). According to the CNDDDB, no special-status species have been historically recorded on Alternative Site 5 (Figure 6-2). The closest known occurrence of special-status wildlife species is Mojave fringe-toed lizard (*Uma scoparia*), located approximately six miles southwest of the Site. The closest known special-status plant species is Emory's crucifix-thorn (*Castela emoryi*), located approximately 2.5 miles west of the Site. According to the surveys conducted by URS in 2007 and 2008, several special-status plant and wildlife species occur within vicinity of Alternative Site 5 (URS 2009). Special-status species that occur within 10 miles of Alternative Site 5 are shown in Table 6.1-1.

**Table 6.1-1
Special-status Species that Occur within 10 Miles of Alternative Site 5
San Bernardino County, California**

SPECIES		SENSITIVITY STATUS			HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR ONSITE	STATUS ONSITE
Common Name	Scientific Name	Federal	State	CNPS			
Plants							
Small-flowered androstephium	<i>Androstephium breviflorum</i>	None	None	2	Mojave desert scrub (bajadas), blooms March-April.	High	Observed adjacent areas in 2008
Emory's crucifixion thorn	<i>Castela emoryi</i>	None	None	2	Dry, rocky desert washes, slopes and plains, blooms June-July.	High	Observed adjacent areas in 2008
Foxtail cactus	<i>Coryphantha alversonii</i>	None	None	4.3	Mojave desert scrub, Sonoran desert scrub, blooms April-June.	High	Observed adjacent areas in 2008
Utah vine milkweed	<i>Cynanchum utahense</i>	None	None	4.2	Mojave desert scrub, blooms April-June.	High	Observed adjacent areas in 2008
White-margined beardtongue	<i>Penstemon albomarginatus</i>	BLM:S	None	1B	Mojave desert scrub, blooms March-May.	High	Observed adjacent areas in 2008
Reptiles							
Desert tortoise	<i>Gopherus agassizii</i>	FT	ST	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	Observed adjacent areas in 2007 and 2008
Mojave fringe-toed lizard	<i>Uma scoparia</i>	BLM: S	CDFG: SSC	N/A	Areas of aeolian sands including dunes, flats with sandy hummocks, washes and banks of rivers.	High	Observed adjacent areas in 2008

**Table 6.1-1
Special-status Species that Occur within 10 Miles of Alternative Site 5
San Bernardino County, California
(Continued)**

SPECIES		SENSITIVITY STATUS			HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR ONSITE	STATUS ONSITE
Common Name	Scientific Name	Federal	State	CNPS			
Birds							
Golden Eagle	<i>Aquila chrysaetos</i>	BLM: S USFWS: BCC	CDFG: FP, WL	N/A	Desert scrub near cliff nest sites.	High	Fly-over observed in 2007 and 2008
Burrowing owl	<i>Athene cunicularia</i>	BLM: S USFWS: BCC	CDFG: SSC	N/A	Found in open grasslands and agricultural areas with suitable fossorial mammal burrows for nesting.	High	Observed adjacent areas in 2008
Swainson's Hawk	<i>Buteo swainsoni</i>	USFWS: BCC	ST	N/A	Found in grasslands, prairies, and other wide-open ranges with minimal tree cover.	High	Observed adjacent areas in 2008
Loggerhead shrike	<i>Lanius ludovicianus</i>	USFWS: BCC	CDFG: SSC	N/A	Desert, farmland; nests in cholla and thorny bushes.	High	Observed adjacent areas in 2008
Bendire's thrasher	<i>Toxostoma bendirei</i>	BLM: S USFWS: BCC	CDFG: SSC	N/A	Desert wash vegetation	High	Observed adjacent areas in 2008
Mammals							
Nelson's bighorn sheep	<i>Ovis canadensis nelsoni</i>	BLM:S FS:S	None	N/A	Dry, relatively barren desert mountain ranges.	High	Not observed Known to north of site.
American badger	<i>Taxidea taxus</i>	None	CDFG: SSC	N/A	Grasslands, savannas, and mountain meadows near timberline are preferred, but also occur in desert scrub areas.	High	Observed adjacent areas in 2008

BCC = Birds of conservation concern FP = Fully protected S = Sensitive ST = State threatened
 BLM = Bureau of Land Management FT = Federally threatened SC = Species of concern USFWS = United States Fish and Wildlife Service
 CDFG = California Department of Fish and Game SSC = Species of special concern WL = Watch list

While these are the only records that occur within a 10-mile radius, additional special-status plant and wildlife species may utilize the Site. Rare plant surveys would need to be conducted during plant blooming periods, and standard vegetation mapping, jurisdictional waters delineation, and general plant and animal surveys would also be required as part of the environmental review process.

Because the Site is within suitable desert tortoise habitat and one record of desert tortoise occurs within 10 miles of Alternative Site 5, a habitat assessment would need to be conducted, and presence/absence surveys would most likely be required. USFWS Survey guidelines require one diurnal survey consisting of 30-foot belt transects within the impact footprint, conducted when tortoises are active, from April through May or from September through October (USFWS 2009). No DCH or PCH for desert tortoise occurs within the vicinity of Alternative Site 5.

Burrowing owls (*Athene cunicularia*) were also detected in the vicinity of Alternative Site 5. CDFG has issued a formal policy recommendation for mitigating impacts to burrowing owl (6.5 acres per nesting pair) (California Burrowing Owl Consortium 1993). Such a mitigation program would not be considered a fatal flaw for development of solar facilities. Passive relocation of any resident owls would also be required.

Should CDFG Species of Special Concern (such as Mojave fringe-toed lizard and Le Conte's thrasher [*Toxostoma lecontei*]) or BLM sensitive species (such as Nelson's bighorn sheep [*Ovis canadensis nelsoni*]) be detected on-site, the wildlife agencies would expect mitigation for impacts to their habitat. An offsite habitat mitigation requirement would likely be nominal (*e.g.*, 1:1 ratio) and be included as part of any listed species mitigation requirement. Such a mitigation program would not be considered a fatal flaw for development of solar facilities, but should be considered as an additional cost.

Birds of prey (raptor species), which are, as a group, listed by CDFG as Protected Species, likely use the site as foraging habitat. Any large trees or transmission line towers that may be present are potential raptor nest sites. Removal of any potential raptor nests during the non-breeding season prior to construction would be required.

6.1.3 Wildlife Movement Corridors

One major constraint to wildlife movement currently exists within the vicinity of Alternative Site 5—the Cady Mountains. This mountain range wraps around the northern, southern, and western sides of the Site. While this mountain range can be considered a corridor for species such as Nelson's bighorn sheep (for winter ranges and providing connection across Interstate 40), it can impede movement of other species, such as desert tortoise, incapable of traversing mountain ranges. According to the aerial photo and topography maps, a few small washes appear to traverse this mountain range at multiple locations. These may provide north-west and east-west corridors for movement across the Cady Mountains. Development of the Site within the currently proposed boundaries could potentially impede local wildlife movement through these numerous washes; however, the potential is low. While this impediment is not considered a fatal flaw, mitigation and/or changes in the Project design should be considered an additional cost and/or construction scheduling constraint.

6.1.4 Potential Jurisdictional Waters

Based on topographical (Figure 6-1) and aerial (Figure 6-3) maps, the site does not appear to contain any ACOE-jurisdictional waters. There may be CDFG-jurisdictional washes on-site, such as the large, extensive series of braided washes that cross the entire Site, that would require a 1602 permit. The presence of jurisdictional waters would not be considered a fatal flaw, but the permitting process can be a construction scheduling constraint.

6.1.5 Conclusions

No fatal flaws were identified in this analysis; however, field verification of existing conditions and inventory of biological resources on Alternative Site 5 would provide further insight into the compatibility of the Site with the proposed solar energy facilities. In addition, consultation with the USFWS, CDFG, and BLM to determine the need for any special-status species surveys is highly recommended.

6.1.6 References

- Bureau of Land Management. 2006. West Mojave Plan/EIS.
http://www.blm.gov/ca/news/2005/03/nr/CDD34_westmojaveplan.html
- California Burrowing Owl Consortium. 1993. Burrowing Owl Survey Protocol and Mitigation Guidelines. April 1993.
- California Natural Diversity Database. Biogeographic Data Branch. California Department of Fish and Game. November 24, 2009.
- California Native Plant Society. 2009. Inventory of Rare and Endangered Plants (online edition, v7-08c-interim). California Native Plant Society. Sacramento, CA. Accessed on November 30, 2009 from <http://www.cnps.org/inventory>.
- Biological Resources Baseline Survey Report For the SES Projects Study Area, San Bernardino County, California. Prepared for: Stirling Energy Systems. April 1, 2009 (revised December 1, 2009).
- United States Fish and Wildlife Service. 2009. Preparing for any Action that may occur within the Range of the Mojave Desert Tortoise (*Gopherus agassizii*). April 2009.

6.2 SITE 5 – CULTURAL RESOURCES

For purposes of the cultural resources review, fatal flaws were defined as highly sensitive cultural resources that could represent major conflicts with development of a solar generating facility. High-sensitivity resources include properties listed in the National Register of Historic Places (National Register) or CHL database, and other properties developed for public interpretation or for which there is substantial agency, tribal, or public sentiment for preservation in place.

6.2.1 Findings

Alternative Site 5 is located 4 miles northeast of Pisgah, California in San Bernardino County and borders the SCE Pisgah-Lugo 230kV and SCE Griffith Energy Project-1-Lugo 500kV transmission lines along the northwestern border of the property. The Site is situated in the San Bernardino County in the Mojave Desert in an area that is relatively uninhabited (Figure 6-3).

Although the area is arid desert, prehistorically a large number of archaeological resources are known to exist in the Mojave Desert. A number of lake beds, now dry, formed during prehistoric times and provided sufficient resources for native populations to exploit. As a result, there is a moderate to high potential that this area could contain prehistoric habitation sites. Based on a review of terrain maps and available archaeological literature, the Site may contain undocumented prehistoric or historic-period cultural resources. In addition to habitation sites, prehistoric logistical strategies also may produce a wide variety of other site types associated with hunting, gathering and other resource procurement activities. Common types of such “limited activity” sites include artifact scatters, temporary campsites and individual (isolated) artifacts. Historic cultural resource types may reflect activities related to mining and transportation.

The records search conducted at the SBAIC included specific information about previously recorded sites in the area as well as previous surveys that had been conducted. No previously recorded cultural resource sites were located within the boundaries of Alternative Site 5. One previous survey has been conducted within Site boundaries, but covers only a very small portion of Alternative Site Five. Survey #1062775 was conducted for a geological exploration project and reported the presence of flaked lithics and one archaeological site, SBR-7321, although no site record update form was available for the site.

6.2.2 Conclusions

No obvious fatal flaws for the Site were evident as a result of initial research. Although the presence, size, age and significance of prehistoric sites in the Site area cannot be determined with the limited data on hand, the available information suggests that the Site has the potential to contain prehistoric or historic habitation sites, as well as evidence of limited activity sites such as prehistoric lithic scatters and ephemeral camp sites. URS recommends conducting additional archaeological literature reviews of the Site and surrounding area to determine whether other unrecorded cultural resources may exist on the property. In addition, a Class III field survey of the Site area would need to be conducted based on the record search to evaluate potential Project impacts to cultural resources.

6.2.3 References

Lerch, Michael K., 1993. Class III Cultural Resources Assessment of Proposed Geologic Exploration Activities, Broadwell Basin Residuals Repository, San Bernardino County, CA, and Addendum. Michael K. Lerch & Associates. Unpublished report on file at the SBAIC.

6.3 SITE 5 – LAND USE

Alternative Site 5 is comprised of approximately 7,704 acres located 5.5 miles northeast of Pisgah, California and 8.5 miles north of Twenty-nine Palms Marine Corps Base (Figure 6-2). The Site is located entirely on BLM and LWCF Acquisition lands. The SCE Pisgah-Lugo 230kV and SCE Griffith Energy Project-1-Lugo 500kV transmission lines occur approximately one mile northwest of the Site. Alternative Site 5 also falls within the West Mojave Plan (BLM 2006, as amended).

The lead agency for the environmental review process for Site 5 would be the BLM. 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. Alternative Site 5 also falls within the West Mojave Plan (BLM 2006, as amended).

6.3.1 Findings

The San Bernardino County zoning district for the Site is RC. The intent of the RC District category is to designate areas suitable for conservation, open space and recreational uses, and to prevent the encroachment of incompatible uses and the premature conversion of such lands to intensive or urban uses. Uses in the RC District are limited primarily to recreational uses, open space, and other activities compatible with agricultural uses. According to the San Bernardino County General Plan, this category identifies areas of the County that are appropriate for conservation, rural residences, recreation areas, and related uses that support rural communities.

The site is designated by the BLM for Limited Use. This multiple-use class protects sensitive natural, scenic, ecological, and cultural resource values. These lands are managed to provide for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished. According to this use class, solar development may be allowed once NEPA requirements are met.

6.3.2 Conclusions

On BLM lands, solar energy generation facilities are placed according to discretionary review of compatibility issues on a case-by-case basis. Because the Site is currently utilized for purposes of preservation, recreation and utility corridors, the determination of compatibility of the Project with surrounding land uses would not be problematic.

There appear to be no direct fatal flaws identified for Site 5 due to current land use restrictions and/or obligations that would categorically deny the Project at this location. The Project would require a plan amendment to the 1980 CDCA Plan.

6.3.3 References

County of San Bernardino Department of Planning Website: <http://www.sbcounty.gov/landuseservices/>

California Department of Conservation Division of Land Resource Protection: 2005 data.

California Department of Conservation Division of Land Resource Protection Website:

<http://www.conservation.ca.gov/dlrp/lca/Pages/Index.aspx>

California Desert Conservation Area Plan, Bureau of Land Management, California Desert District, 1980.

6.4 SITE 5 – WATER RESOURCES

This section summarizes water resources in the vicinity of Alternative Site 5, located within San Bernardino County, California (Project). The elevation ranges from approximately 1,400 feet above MSL in the east to approximately 2,500 feet above MSL in the west (Figure 6-1).

6.4.1 Overview of Surface Water Hydrology

A review of the USGS topographic maps shows the project area situated on fairly steep terrain, sloping in the northeast direction (Figure 6-1). The average slope of the site is approximately 8 to 10 percent. There appear to be no existing buildings within the Site. Several ephemeral or “blue-line” streams/washes run through the Site ending at a dry lake bed offsite.

FIRM panels mapped for this area are non-printed panels. Potential flooding hazards are unknown. Alluvial fan flooding has the potential to impact proposed facilities.

6.4.2 Groundwater: Broadwell Valley

The Site lies within the Broadwell Valley Groundwater Basin (Figure 6-2). The following information is taken from the DWR Groundwater Bulletin. Broadwell Valley Groundwater Basin underlies a north trending valley in south-central San Bernardino County. Elevation of the valley floor ranges from about 2,600 feet on the west to 1,296 feet MSL at Broadwell (dry) Lake. The basin is bounded by non-water-bearing consolidated rocks of the Cady Mountains on the north and west, the Bristol Mountains on the north and east, the Bullion Mountains on the south, and a surface drainage divide on the southwest. The Cady Mountains attain elevations exceeding 4,600 feet (DWR 1964). Average annual precipitation ranges from three to five inches. Runoff from the surrounding mountains drains towards Broadwell Lake in the north central part of the basin (Rogers 1967).

Water Bearing Formations

Quaternary alluvium forms the major water-bearing unit within the basin. Included in this unit are the unconsolidated younger alluvial deposits and the underlying unconsolidated to poorly consolidated older alluvial deposits. Maximum thickness of the alluvium is at least 1,600 feet (DWR 1964).

Recharge and Discharge Areas

Recharge of the basin is mainly from the percolation of runoff through alluvial fan deposits at the base of the Bullion and Cady Mountains and from infiltration of precipitation that falls to the valley floor. Groundwater in the younger and underlying older alluvium moves in the direction of Broadwell Lake.

From Broadwell Lake, groundwater likely moves north through alluvial deposits between the Cady Mountains on the northwest and the Bristol Mountains on the northeast into Soda Lake Valley Groundwater Basin (DWR 1964).

Groundwater Level Trends

Of the few wells known to exist in the basin, most are dry. Groundwater was encountered at a depth of 785 and 1,084 feet in a well located at Ludlow in the southern part of the basin in 1883. Another well located along the westside of Broadwell Lake, measured water at a depth of 101.6 feet in the spring of 1979.

Groundwater Storage

Total storage capacity is estimated at about 1,220,000 af (DWR 1975). Total groundwater in storage is unknown.

6.4.3 Findings

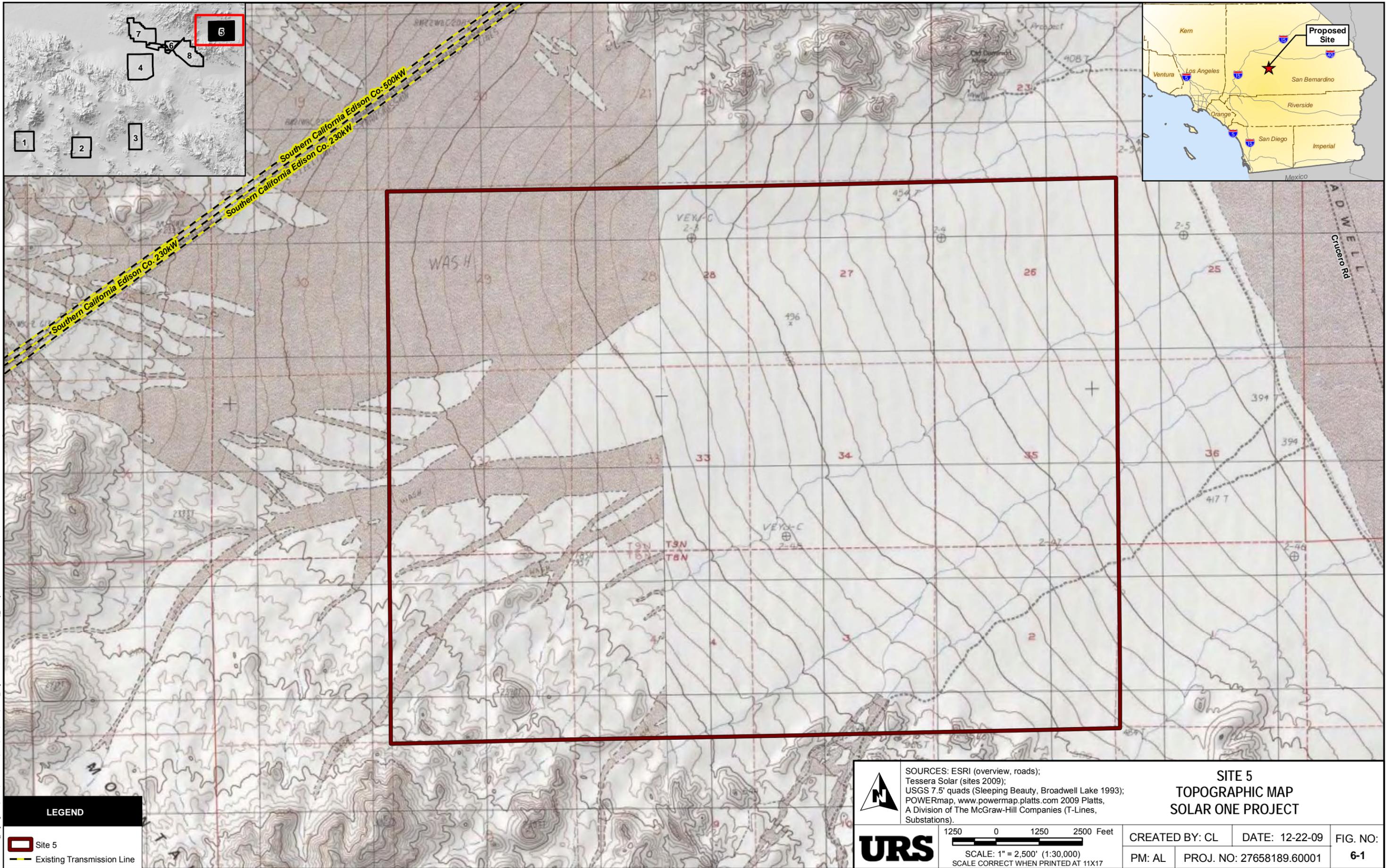
Potential for alluvial fan flooding exists through the site with associated scour and deposition. Surface water supplies from direct storm water runoff cannot be relied upon to provide a steady, predictable source of water. Groundwater may be difficult to obtain and water quality may be of poor quality.

6.4.4 Conclusions

The ability to obtain or secure an adequate groundwater water supply for the project is a potential fatal flaw if groundwater depths, supply rates, or quality do not meet the water demands for the project.

6.4.5 References

DWR (California Department of Water Resources). 2004. California's Groundwater Bulletin 118, Hydrological Region South Lahontan, Broadwell Valley Groundwater Basin. <
[http://www.water.ca.gov/pubs/groundwater/bulletin_118/basindescriptions/6-32\[1\].pdf](http://www.water.ca.gov/pubs/groundwater/bulletin_118/basindescriptions/6-32[1].pdf)>



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LEGEND

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- Existing Transmission Line

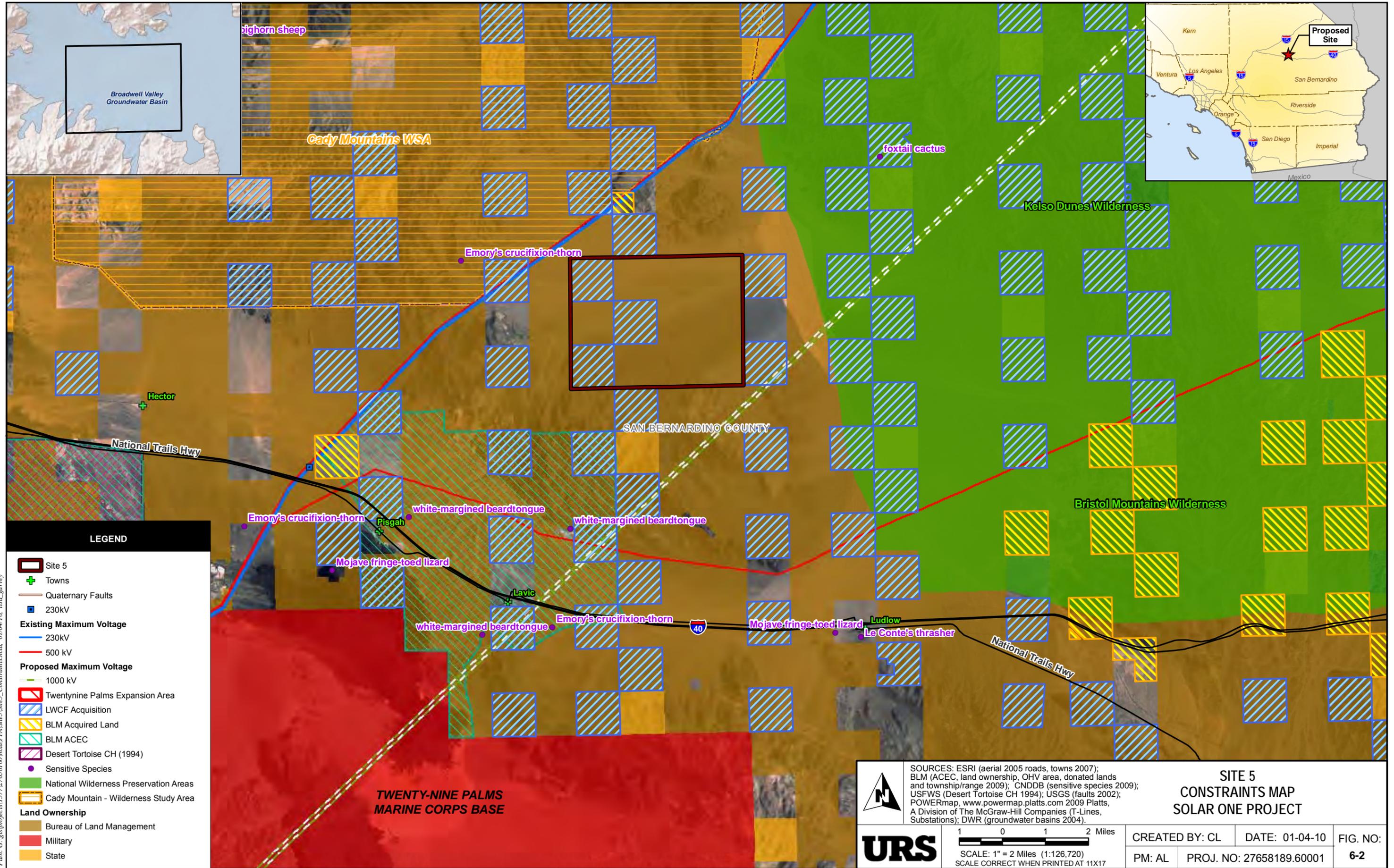


SOURCES: ESRI (overview, roads);
 Tessera Solar (sites 2009);
 USGS 7.5' quads (Sleeping Beauty, Broadwell Lake 1993);
 POWERmap, www.powermap.platts.com 2009 Platts,
 A Division of The McGraw-Hill Companies (T-Lines,
 Substations).

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**SITE 5
 TOPOGRAPHIC MAP
 SOLAR ONE PROJECT**

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LEGEND

- Site 5
- + Towns
- Quaternary Faults
- 230kV
- Existing Maximum Voltage**
- 230kV
- 500 kV
- Proposed Maximum Voltage**
- 1000 kV
- Twentynine Palms Expansion Area
- LWCF Acquisition
- BLM Acquired Land
- BLM ACEC
- Desert Tortoise CH (1994)
- Sensitive Species
- National Wilderness Preservation Areas
- Cady Mountain - Wilderness Study Area
- Land Ownership**
- Bureau of Land Management
- Military
- State

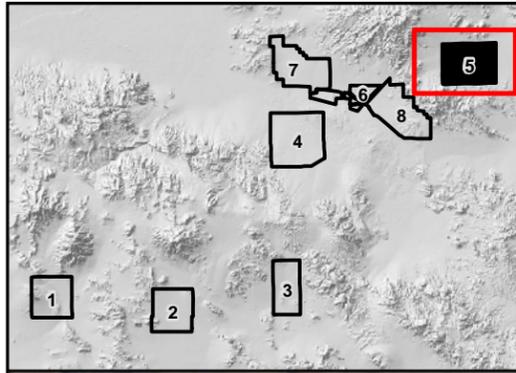
URS

SOURCES: ESRI (aerial 2005 roads, towns 2007); BLM (ACEC, land ownership, OHV area, donated lands and township/range 2009); CNDDB (sensitive species 2009); USFWS (Desert Tortoise CH 1994); USGS (faults 2002); POWERmap, www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (T-Lines, Substations); DWR (groundwater basins 2004).

**SITE 5
CONSTRAINTS MAP
SOLAR ONE PROJECT**

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SCALE: 1" = 2 Miles (1:126,720)
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LEGEND

- Site 5
- Existing Transmission Line

 	SOURCES: ESRI (overview, roads); Tessera Solar (sites 2009); NAIP (aerial 2005); POWERmap, www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (T-Lines, Substations).		SITE 5 AERIAL MAP SOLAR ONE PROJECT	
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SECTION 7 SITE 6 (SOLAR 1 – 275 MW OPTION) – ENVIRONMENTAL ANALYSIS

Alternative Site 6 (Solar One's 275 MW option or Site) is located within San Bernardino County, California. The Site is approximately 2,786 acres of Mojave Desert creosote bush scrub located approximately two miles northwest of Pisgah, California and three miles north of Twenty-nine Palms Marine Corps Base (Figure 1-1). The elevation ranges from approximately 1,980 feet above MSL in the west to approximately 2,200 feet above MSL in the east (Figure 7-1). The site is on BLM land. The SCE Pisgah-Lugo 230kV and SCE Griffith Energy Project-1-Lugo 500kV transmission lines border the southeastern edge of the Project site (Figure 7-2).

7.1 SITE 6 – BIOLOGICAL RESOURCES

The Site also falls within the West Mojave Plan (BLM 2006, as amended). The Western Mojave Plan functions as an HCP that provides guidance for protection of listed species and the issuance of incidental take permits by USFWS and CDFG for federally- and state-listed species within the Plan boundaries.

The West Mojave Plan also designates a total of four DWMAs that focus on the protection and conservation of desert tortoise (*Gopherus agassizii*), Mojave ground squirrel (*Spermophilus mohavensis*), and other state- or federally listed special-status species that share their habitats. The Site does not fall within any DCH or PCH, ACEC, WSA, or DWMA.

7.1.1 Methodology

In addition to previously stated methodology, URS conducted general and focused biological surveys throughout the Site in 2007 and 2008 as part of a larger survey effort for the Solar One Solar Power Generating Facility Project. The Biological Resources Baseline Survey Report (URS 2009) for these field efforts was also consulted during this analysis.

7.1.2 Special-status Species and Their Habitats

The Site does not fall within any ACEC, WSA, DHC, or PCH areas. Two BLM ACECs occur within the vicinity of the Site. One borders the southeastern edge of the Project site while the other occurs approximately 0.5 mile southwest. The Rodman Mountains WSA occurs approximately four miles to the southeast. The nearest desert tortoise DCH occurs approximately 0.5 mile southwest of the Site, just south of Interstate 40 (I-40). No other DCH or PCH occurs within the vicinity.

A list of USFWS and CDFG special-status species within San Bernardino County was obtained from the CNDDDB (2009). According to the CNDDDB, no special-status species have been historically recorded on Site. The closest known CNDDDB occurrence of special-status wildlife species is Mojave fringe-toed lizard (*Uma scoparia*), located approximately 2.5 miles southeast of the Site. The closest known CNDDDB special-status plant species is Emory's crucifix-thorn (*Castela emoryi*), located approximately 1.5 miles south of the Site (Figure 7-2). However, according to the surveys conducted by URS in 2007 and 2008, several special-status plant and wildlife species occur on-site or within vicinity of the Project site (URS 2009). Special-status species that occur on or within 10 miles of Site are shown in Table 7.1-1.

**Table 7.1-1
Special-status Species that Occur on or within 10 Miles of the Alternative Site 6
San Bernardino County, California**

SPECIES		SENSITIVITY STATUS			HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR ONSITE	STATUS ONSITE
Common Name	Scientific Name	Federal	State	CNPS			
Plants							
Small-flowered androstephium	<i>Androstephium breviflorum</i>	None	None	2	Mojave desert scrub (bajadas), blooms March-April.	Present	Observed in 2008
Emory's crucifixion thorn	<i>Castela emoryi</i>	None	None	2	Dry, rocky desert washes, slopes and plains, blooms June-July.	High	Observed adjacent areas in 2008
Foxtail cactus	<i>Coryphantha alversonii</i>	None	None	4.3	Mojave desert scrub, Sonoran desert scrub, blooms April-June.	High	Observed adjacent areas in 2008
Utah vine milkweed	<i>Cynanchum utahense</i>	None	None	4.2	Mojave desert scrub, blooms April-June.	Present	Observed in 2008
White-margined beardtongue	<i>Penstemon albomarginatus</i>	BLM:S	None	1B	Mojave desert scrub, blooms March-May.	Present	Observed in 2008
Reptiles							
Desert tortoise	<i>Gopherus agassizii</i>	FT	ST	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.	Present	Observed in 2007 and 2008
Mojave fringe-toed lizard	<i>Uma scoparia</i>	BLM: S	CDFG: SSC	N/A	Areas of aeolian sands including dunes, flats with sandy hummocks, washes and banks of rivers.	Present	Observed in 2008
Birds							
Golden Eagle	<i>Aquila chrysaetos</i>	BLM: S USFWS: BCC	CDFG: FP, WL	N/A	Desert scrub near cliff nest sites.	Present	Fly-over observed in 2007 and 2008

**Table 7.1-1
Special-status Species that Occur on or within 10 Miles of the Alternative Site 6
San Bernardino County, California
(Continued)**

SPECIES		SENSITIVITY STATUS			HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR ONSITE	STATUS ONSITE
Common Name	Scientific Name	Federal	State	CNPS			
Burrowing owl	<i>Athene cucularia</i>	BLM: S USFWS: BCC	CDFG: SSC	N/A	Found in open grasslands and agricultural areas with suitable fossorial mammal burrows for nesting.	High	Observed adjacent areas in 2008
Swainson's Hawk	<i>Buteo swainsoni</i>	USFWS: BCC	ST	N/A	Found in grasslands, prairies, and other wide-open ranges with minimal tree cover.	High	Observed adjacent areas in 2008
Loggerhead shrike	<i>Lanius ludovicianus</i>	USFWS: BCC	CDFG: SSC	N/A	Desert, farmland; nests in cholla and thorny bushes.	Present	Observed in 2008
Bendire's thrasher	<i>Toxostoma bendirei</i>	BLM: S USFWS: BCC	CDFG: SSC	N/A	Desert wash vegetation	High	Observed adjacent areas in 2008
Mammals							
American badger	<i>Taxidea taxus</i>	None	CDFG: SSC	N/A	Grasslands, savannas, and mountain meadows near timberline are preferred, but also occur in desert scrub areas.	High	Observed adjacent areas in 2008

BCC = Birds of conservation concern

BLM = Bureau of Land Management

CDFG = California Department of Fish and Game

FP = Fully protected

FT = Federally threatened

S = Sensitive

SC = Species of concern

SSC = Species of special concern

ST = State threatened

USFWS = United States Fish and Wildlife Service

WL = Watch list

Rare plant surveys, standard vegetation mapping, jurisdictional waters delineation, and general plant and animal surveys were already completed as part of the required CEQA review process for Solar One. The results of these surveys can be observed in the Biological Resources Baseline Survey Report (URS 2009).

Due to the presence of rare plants (as indicated in Table 7.1-1), the wildlife agencies would expect the development and implementation of avoidance measures to preserve onsite populations. This is not considered a fatal flaw, but should be considered an extra cost to the Project.

Surveys for desert tortoise were conducted in 2007 and 2008 according to the USFWS field survey protocol for non-federal action that may occur within range of the desert tortoise (USFWS 2009). Numerous desert tortoise and desert tortoise sign were found onsite and within the vicinity. The presence of desert tortoise is not considered a fatal flaw; however, extensive mitigation measures and a compensatory mitigation program will likely be required (e.g., 1:1 ratio for impacts to desert tortoise habitat) and should be considered as an additional cost.

Burrowing owls (*Athene cunicularia*) were also detected in areas adjacent to the Project site. CDFG has issued a formal policy recommendation for mitigating impacts to burrowing owl (6.5 acres per nesting pair) (California Burrowing Owl Consortium 1993). Such a mitigation program would not be considered a fatal flaw for development of solar facilities. Passive relocation of any resident owls would also be required.

Due to the presence of BLM Sensitive species and CDFG Species of Special Concern (such as Mojave fringe-toed lizard [*Uma scoparia*], Bendire's thrasher [*Toxostoma bendirei*] and American Badger [*Taxidea taxus*]), the wildlife agencies would expect mitigation for impacts to their habitat. An off-site habitat mitigation requirement would likely be nominal (e.g., 1:1 ratio) and be included as part of any listed species mitigation requirement. Such a mitigation program would not be considered a fatal flaw for development of solar facilities, but should be considered as an additional cost.

Birds of prey (raptor species), which are, as a group, listed by CDFG as Protected Species, likely use the site as foraging habitat. Any large trees or transmission line towers that may be present are potential raptor nest sites. Removal of any potential raptor nests during the non-breeding season prior to construction would be required.

7.1.3 Wildlife Movement Corridors

Wildlife movement patterns were examined as part of the Biological Resources Baseline Survey for the SES Solar Projects Study Area, San Bernardino County, California (URS 2009). Generally, the Site and the surrounding vicinity are unrestricted and conducive to live-in habitat and movement of wildlife throughout the area, with uniform habitat composition throughout. The primary constraints to wildlife movement are the existing BNSF railroad and Interstate 40, which both run east-west across the northern and southern portions of the site, respectively. Development of the Site within the currently proposed boundaries would potentially impede local wildlife movement through this corridor. While this potential impediment is not considered a fatal flaw, mitigation and/or changes in the Project design should be considered an additional cost and/or construction scheduling constraint.

7.1.4 Potential Jurisdictional Waters

Based on topographical maps (Figure 7-1), aerial photos (Figure 7-2), and the jurisdictional waters delineation performed for the Solar One Baseline Report (URS 2009), there are several intermittent blue-line drainages throughout the Site. These drainages may be ACOE-jurisdictional and/or CDFG-jurisdictional washes that would require a lengthy permitting process for development. The presence of jurisdictional waters would not be considered a fatal flaw, but the permitting process can be a construction scheduling constraint.

7.1.5 Conclusions

No fatal flaws were identified in this analysis; however, because of the abundance of special-status species observed on and in the immediate vicinity of the Project site, consultation with the USFWS, CDFG, and BLM would be required prior to any ground disturbance.

7.1.6 References

- Bureau of Land Management. 2006. West Mojave Plan/EIS.
http://www.blm.gov/ca/news/2005/03/nr/CDD34_westmojavemap.html
- California Burrowing Owl Consortium. 1993. Burrowing Owl Survey Protocol and Mitigation Guidelines. April 1993.
- California Natural Diversity Database. Biogeographic Data Branch. California Department of Fish and Game. November 24, 2009.
- California Native Plant Society. 2009. Inventory of Rare and Endangered Plants (online edition, v7-08c-interim). California Native Plant Society. Sacramento, CA. Accessed on November 30, 2009 from <http://www.cnps.org/inventory>.
- URS. 2009. Biological Resources Baseline Survey Report For the SES Projects Study Area, San Bernardino County, California. Prepared for: Stirling Energy Systems. April 1, 2009 (revised December 1, 2009).
- United States Fish and Wildlife Service. 2009. Preparing for any Action that may occur within the Range of the Mojave Desert Tortoise (*Gopherus agassizii*). April 2009.

7.2 SITE 6 – CULTURAL RESOURCES

For purposes of the cultural resources review, fatal flaws were defined as highly sensitive cultural resources that could represent major conflicts with development of a solar generating facility. High-sensitivity resources include properties listed in the National Register of Historic Places (National Register) or CHL database, and other properties developed for public interpretation or for which there is substantial agency, tribal, or public sentiment for preservation in place.

7.2.1 Findings

Alternative Site 6 (Solar One's 275 MW option) is located adjacent to the community of Pisgah, California in San Bernardino County. The SCE Pisgah-Lugo 230kV and SCE Griffith Energy Project-1-Lugo 500kV transmission lines are about two miles to the east. The Project is situated in the San Bernardino County in the Mojave Desert in an area that is relatively uninhabited (Figure 7-3).

Although the area is arid desert, prehistorically a large number of archaeological resources are known to exist in the Mojave Desert. A number of lake beds, now dry, formed during prehistoric times and provided sufficient resources for native populations to exploit. As a result, there is a moderate to high potential that this area could contain prehistoric habitation sites. Based on a review of terrain maps and

available archaeological literature, the Site may contain undocumented prehistoric or historic-period cultural resources. In addition to habitation sites, prehistoric logistical strategies also may produce a wide variety of other site types associated with hunting, gathering and other resource procurement activities. Common types of such “limited activity” sites include artifact scatters, temporary campsites and individual (isolated) artifacts. Historic cultural resource types may reflect activities related to mining and transportation.

The records search conducted at the SBAIC included specific information about previously recorded sites in the area as well as previous surveys that had been conducted. The Site and the surrounding area had been previously surveyed by URS archaeologists in 2008 and 2009, encompassing about 8,000 acres that were surveyed. A total of 383 archaeological resources were identified within the larger project area, which include 242 isolates and 141 archaeological sites. Of the 141 updated and new archaeological sites, 126 are prehistoric, 11 are historic, and 4 are multi-component sites. On the basis of surface indications it was possible to recommend 33 of the archaeological resources and the 242 isolated finds as not eligible under NRHP and CRHR criterion. For the remainder of the resources, an extended Class III limited subsurface testing plan was recommended to determine eligibility. Because the 275 MW Alternative is smaller in size than the Solar One Project area, there would be a lesser number of cultural resources within this alternative that would be quantified in more detail if this alternative were selected.

7.2.2 Conclusions

The presence, size, age and significance of prehistoric sites in the Site area have been determined as a part of the larger cultural resource survey for Solar One as described above. URS recommends either finalizing the Solar One cultural resources technical report or preparing a new technical report for the 275 MW alternative to assess the impacts to resources that fall within the boundaries of this alternative.

7.2.3 References

Nixon, Rachael A., 2008. Class III Cultural Resources Technical Report for the Solar One Project, San Bernardino County, California. Unpublished report on file with BLM Barstow Field Office.

7.3 SITE 6 – LAND USE

Alternative Site 6 (Solar One’s 275 MW option) is located approximately two miles northwest of Pisgah, California and three miles north of Twenty-nine Palms Marine Corps Base. The Project is located in an undeveloped area of San Bernardino County, California, approximately 40 miles east of Barstow, California and north of Interstate 40 (I-40). The Project site is approximately 2,786 acres of undeveloped land located approximately two miles northwest of Pisgah, California and three miles north of Twenty-nine Palms Marine Corps Base (Figure 7-2). The site is on BLM and private land. The SCE Pisgah-Lugo 230kV and SCE Griffith Energy Project-1-Lugo 500kV transmission lines border the southeastern edge of the Project site. The Project site also falls within the West Mojave Plan (BLM 2006, as amended).

7.3.1 Findings

Alternative Site 6 is designated RC by the County of San Bernardino. The intent of the RC District category is to designate areas suitable for conservation, open space and recreational uses, and to prevent the encroachment of incompatible uses and the premature conversion of such lands to intensive or urban uses. Uses in the RC District are limited primarily to recreation, open space, and other activities

compatible with agricultural uses. According to the General Plan, this category identifies areas of the County that are appropriate for conservation, rural residences, recreation areas, and related uses that support rural communities.

The Site is located within a designated utility corridor. The SCE Lugo-Eldorado 500kV and SCE Pisgah-Lugo 230kV transmission lines bisect the site from southwest to northeast.

The site is designated by the BLM for Limited Use. This multiple-use class protects sensitive natural, scenic, ecological, and cultural resource values. These lands are managed to provide for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished. According to this use class, solar development may be allowed once NEPA requirements are met.

One parcel within the Site is privately owned. The parcel number is included as Table 7.3-1 below.

**Table 7.3-1
Private Parcels Occurring within Alternative Site 6**

APN	Acreage
052920109	2.978791

7.3.2 Conclusions

On BLM lands, solar energy generation facilities are placed according to discretionary review of compatibility issues on a case-by-case basis. Project land is currently utilized for purposes of utility corridors, and exists next to a well traveled highway; the determination of compatibility of the Project with surrounding land uses should not be problematic.

There appear to be no direct fatal flaws identified for Site 6 due to current land use restrictions and/or obligations that would categorically deny the Project at this location. The land use restrictions that would inhibit the Project at this location include the current designated BLM multiple use category. The Project would require a plan amendment to the 1980 CDCA Plan.

7.3.3 References

County of San Bernardino Department of Planning Website: <http://www.sbcounty.gov/landuseservices/>

California Department of Conservation Division of Land Resource Protection: 2005 data.

California Department of Conservation Division of Land Resource Protection Website: <http://www.conservation.ca.gov/dlrp/lca/Pages/Index.aspx>

California Desert Conservation Area Plan, Bureau of Land Management, California Desert District, 1980.

7.4 SITE 6 – WATER RESOURCES

This section summarizes water resources in the vicinity of Alternative Site 6 (Solar One's 275 MW option), located within San Bernardino County, California. The elevation ranges from approximately 2150 feet above MSL to approximately 2800 feet above MSL (Figure 7-1).

7.4.1 Overview of Surface Water Hydrology

A review of USGS topographic maps shows the Site situated on varying terrain (Figure 7-1). Average slopes range from approximately one to five percent. There appear to be no existing buildings within the project area. Several ephemeral streams/washes run through the site.

There are several FIRM panels for this area; however, these are non-printed panels with no flood hazards shown. Potential flooding hazards exist within the alluvial fan on-site, and it is likely that the ephemeral washes present some risk of flooding and scour to proposed structures.

7.4.2 Groundwater: Lavic Valley Basin

The Project Site lies predominately within the Lavic Valley Groundwater Basin. This groundwater basin underlies Lavic Valley in central San Bernardino County. The basin is bounded by non-water-bearing rocks of the Cady Mountains on the north and east, of the Bullion Mountains on the south and east, of the Lava Bed Mountains on the southwest, and by the Pisgah fault on the west (Rogers 1967). Parts of the eastern and northern boundaries are drainage divides. The southern part of this basin lies within the Twenty-nine Palms Marine Corps Base. In the northern part of the basin, surface drainage is toward Hector Siding and in the southern part of the basin, surface drainage is toward Lavic (dry) Lake. Average annual precipitation ranges from four to six inches.

Water Bearing Formations

Groundwater in the basin is found in Quaternary alluvial and lacustrine deposits. Holocene age alluvium consists of unconsolidated, well-sorted, fine- to coarse-grained sand, pebbles, and boulders with variable amounts of silt and clay deposited in washes and alluvial fans (DWR 1967). Pleistocene age deposits are composed of gently tilted, unconsolidated to moderately consolidated, moderately well bedded gravel, sand, silt and clay (DWR 1967).

Restrictive Structures

The southwest-trending Pisgah fault is the northwest boundary of the basin, and water levels appear to drop eastward across the fault, which indicates that this fault is likely a barrier to groundwater flow. The Lavic Lake fault cuts through the southern part of the basin, but it is not known whether or not this fault is a groundwater barrier.

Recharge Areas

Recharge to the basin is from percolation of runoff from surrounding mountains through alluvial fans and washes (DWR 1967). Subsurface flow from adjoining basins may also contribute to recharge (DWR 1967).

Groundwater Level Trends

In the northern part of the basin, groundwater flows toward Hector Siding. In the southern part of the basin, groundwater flows toward Lavic Lake. Groundwater may flow eastward out of the basin beneath a surface drainage divide.

Groundwater Storage

The total storage capacity is estimated to be 270,000 (DWR 1975). Total groundwater in storage is unknown. Natural recharge is estimated at about 300 af/yr (DWR 1975).

Groundwater Quality

Water from a well in the southern part of the basin near Lavic Lake sampled in 1917 was sodium sulfate in character with a Total Dissolved Solids (TDS) content of 1,680 mg/L (DWR 1967; DWR 1954). 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 1,721 mg/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.

7.4.3 Findings

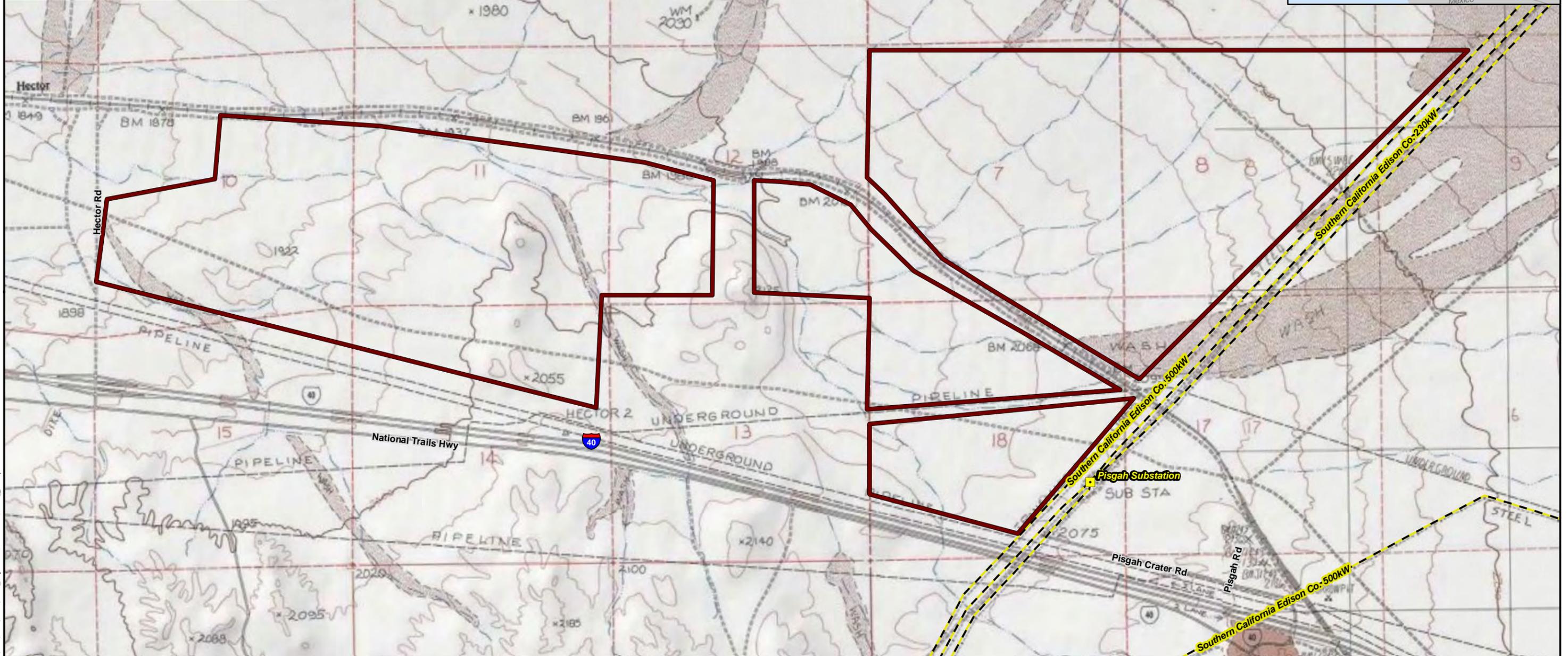
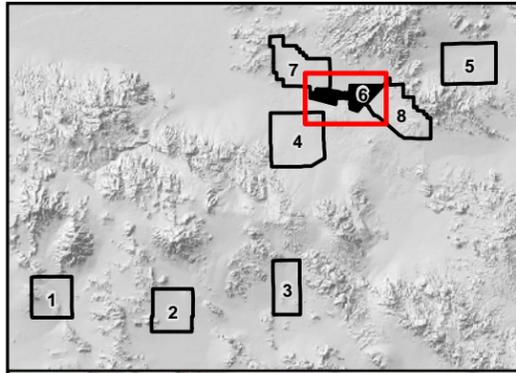
Potential for alluvial fan flooding exists through the site with associated scour and sedimentation.

7.4.4 Conclusions

Site facilities must be designed to convey surface stormwater flows and be adequately protected from potential scour and sedimentation. Surface water supplies from direct stormwater runoff cannot be relied upon to provide a steady, predictable source of water. The most likely source of water supply for the project is from groundwater within the Lavic Lake Groundwater Basin or neighboring basins.

7.4.5 References

DWR (California Department of Water Resources). 2004. California's Groundwater Bulletin 118, Hydrological Region Colorado River Basin, Lavic Lake Groundwater Basin. <http://www.water.ca.gov/pubs/groundwater/bulletin_118/basindescriptions/7-14.pdf>



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LEGEND

- Site 6
- Substation
- Existing Transmission Line

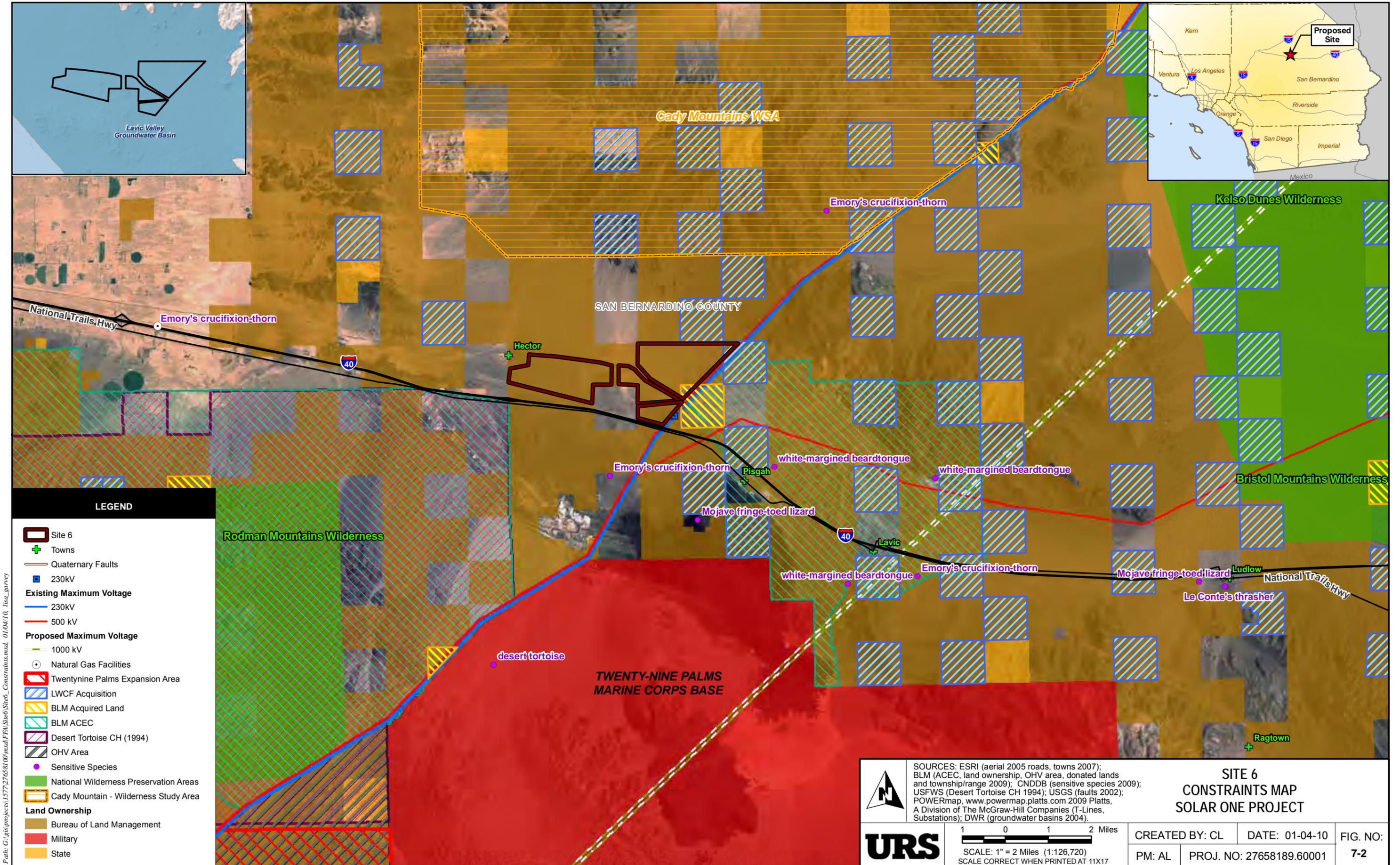
SOURCES: ESRI (overview, roads);
 Tessera Solar (sites 2009);
 USGS 7.5' quads (Hector 1992, Sleeping Beauty 1993);
 POWERmap, www.powermap.platts.com 2009 Platts,
 A Division of The McGraw-Hill Companies (T-Lines,
 Substations).

**SITE 6
 TOPOGRAPHIC MAP
 SOLAR ONE PROJECT**

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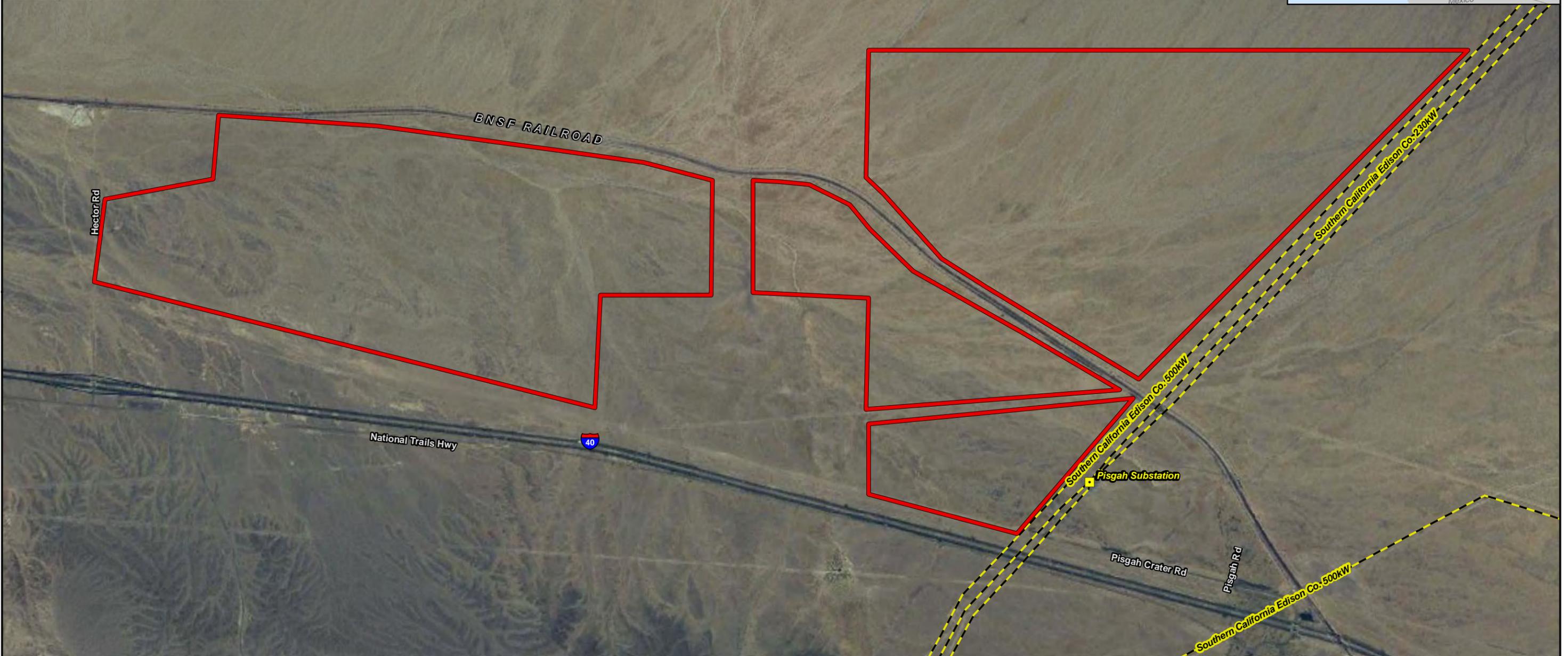
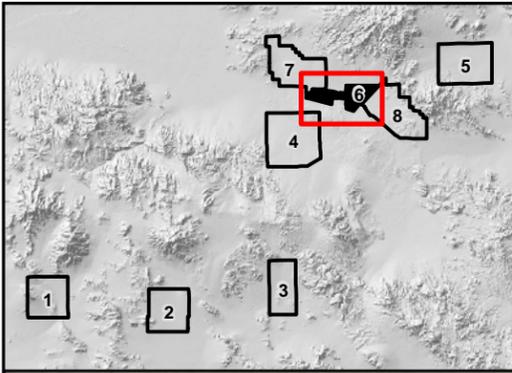


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LEGEND

- Site 6
- + Towns
- Quaternary Faults
- 230kV
- Existing Maximum Voltage**
- 230kV
- 500 kV
- Proposed Maximum Voltage**
- 1000 kV
- Natural Gas Facilities
- Twentynine Palms Expansion Area
- LWCF Acquisition
- BLM Acquired Land
- BLM ACEC
- Desert Tortoise CH (1994)
- OHV Area
- Sensitive Species
- National Wilderness Preservation Areas
- Cady Mountain - Wilderness Study Area
- Land Ownership**
- Bureau of Land Management
- Military
- State

 	SOURCES: ESRI (aerial 2005 roads, towns 2007); BLM (ACEC, land ownership, OHV area, donated lands and township/range 2009); CNDDDB (sensitive species 2009); USFWS (Desert Tortoise CH 1994); USGS (faults 2002); POWERmap, www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (T-Lines, Substations); DWR (groundwater basins 2004).		SITE 6 CONSTRAINTS MAP SOLAR ONE PROJECT	
	1 0 1 2 Miles SCALE: 1" = 2 Miles (1:126,720) SCALE CORRECT WHEN PRINTED AT 11X17	CREATED BY: CL PM: AL	DATE: 01-04-10 PROJ. NO: 27658189.60001	FIG. NO: 7-2



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LEGEND

- Site 6
- Substation
- Existing Transmission Line

 	SOURCES: ESRI (overview, roads); Tessera Solar (sites 2009); NAIP (aerial 2005); POWERmap, www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (T-Lines, Substations).		SITE 6 AERIAL MAP SOLAR ONE PROJECT	
	1000 0 1000 2000 Feet SCALE: 1" = 2,000' (1:24,000) SCALE CORRECT WHEN PRINTED AT 11X17	CREATED BY: CL DATE: 12-22-09	FIG. NO:	
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SECTION 8 SITE 7 (SOLAR 3) – ENVIRONMENTAL ANALYSIS

Alternative Site 7 (Site), also known as the Solar 3 Site, located within San Bernardino County, California. Alternative Site 7 (Site) consists of approximately 4,862 acres of desert scrub habitat located just south of the town of Hector, California and three miles north of Twenty-nine Palms Marine Corps Base (Figure 1-1). The elevation ranges from approximately 1,900 feet MSL to approximately 2,200 feet above MSL (Figure 8-1). The site is on BLM and private land. The Southern California Edison (SCE) Pisgah-Cima 230kV and SCE Lugo-Eldorado 500kV transmission lines occur along the southeast boundary of the site (Figure 8-2).

8.1 SITE 7 – BIOLOGICAL RESOURCES

The site falls within the West Mojave Plan (BLM 2006, as amended). The Western Mojave Plan functions as an HCP that provides guidance for the protection of listed species and for the issuance of incidental take permits by USFWS and CDFG for federally- and state-listed species.

The West Mojave Plan designates a total of four DWMA's that focus on the protection and conservation of desert tortoise (*Gopherus agassizii*), Mojave ground squirrel (*Spermophilus mohavensis*), and other state- or federally listed special status species that share their habitats. The site is adjacent to desert tortoise DCH and two BLM ACECs (Figure 8-2).

8.1.1 Sensitive Species and Their Habitats

The Site does not fall within any ACEC, WSA, DCH, or PCH areas, however, it is adjacent to two ACECs, and a WSA,. The first BLM ACEC occurs south of Interstate 40, southwest of the site, and the second ACEC is 3 miles east of the site. The Cady Mountains WSA occurs directly north of the site. The nearest desert tortoise DCH occurs southwest of I-40 within the BLM ACEC. No other DCH or PCH occurs within the vicinity of Alternative Site 7 (Figure 8-2).

A list of USFWS and CDFG special-status species within San Bernardino County was obtained from the CNDDDB (2009). According to the CNDDDB, no special-status species have been historically recorded on Alternative Site 7, however, during extensive general and focused surveys of the Solar 1 and 3 sites in 2007-2008, multiple species were documented onsite including desert tortoise, Mojave fringe-toed lizard (*Uma scoparia*), and small-flowered androstephium (*Androstephium breviflorum*), and white-margined beardtongue (*Penstemon albomarginatus*) (Table 8.1-1). Additional special-status plant and wildlife species may also occur onsite.

Rare plant surveys, standard vegetation mapping, jurisdictional waters delineation, and general plant and animal surveys were completed for the Site as part of the required CEQA review process for Solar One. The results of these surveys can be reviewed in the Biological Resources Baseline Survey Report for Solar One and Three (URS 2009).

Due to the presence of rare plants (as indicated in Table 8.1-1), the wildlife agencies would expect the development and implementation of avoidance measures to preserve on-site populations where practicable. This is not considered a fatal flaw, but should be considered an extra cost to the Project.

Table 8.1-1
Listed Species observed during Solar One Baseline Surveys

SPECIES		SENSITIVITY STATUS			HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR	STATUS ONSITE
Common Name	Scientific Name	Federal	State	CNPS			
Plants							
Small-flowered androstephium	<i>Androstephium breviflorum</i>	None	None	2	Mojave desert scrub (bajadas), blooms March-April.	Present. Habitat throughout the survey area.	Observed in 2008.
Emory's crucifixion thorn	<i>Castela emoryi</i>	None	None	2	Dry, rocky desert washes, slopes and plains, blooms June-July.	High.	Observed adjacent to the site during 2008 survey.
Foxtail cactus	<i>Coryphantha alversonii</i>	None	None	4.3	Mojave desert scrub, Sonoran desert scrub, blooms April-June.	High.	Observed adjacent to the site in 2008.
Utah vine milkweed	<i>Cynanchum utahense</i>	None	None	4.2	Mojave desert scrub, blooms April-June.	Present	Observed in 2008.
White-margined beardtongue	<i>Penstemon albomarginatus</i>	BLM:S	None	1B	Mojave desert scrub, blooms March-May.	Present.	Observed during 2008 survey.
Reptiles							
Desert tortoise	<i>Gopherus agassizii</i>	FT	ST	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.	Present	Observed during 2007 and 2008 surveys.
Mojave fringe-toed lizard	<i>Uma scoparia</i>	BLM: S	CDFG: SSC	N/A	Areas of aeolian sands including dunes, flats with sandy hummocks, washes and banks of rivers.	Present.	Observed in 2008.

Table 8.1-1
Listed Species observed during Solar One Baseline Surveys
(Continued)

SPECIES		SENSITIVITY STATUS			HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR	STATUS ONSITE
Common Name	Scientific Name	Federal	State	CNPS			
Birds							
Golden eagle	<i>Aquila chrysaetos</i>	BLM: S USFWS: BCC	CDFG: FP, WL CDF: S	N/A	Desert scrub near cliff nest sites.	Present.	Fly-over observed in 2007 and 2008 surveys.
Burrowing owl	<i>Athene cunicularia</i>	BLM: S USFWS: BCC	CDFG: SSC	N/A	Found in open grasslands and agricultural areas with suitable fossorial mammal burrows for nesting.	High.	Observed adjacent to the site in 2008.
Swainson's hawk	<i>Buteo swainsoni</i>	FS: S USFWS: BCC	ST	N/A	Found in grasslands, prairies, and other wide-open ranges with minimal tree cover.	High.	Observed adjacent to the site in 2008.
Loggerhead shrike	<i>Lanius ludovicianus</i>	USFWS: BCC	CDFG: SSC	N/A	Desert, farmland; nests in cholla and thorny bushes.	Present	Observed in 2008.
Bendire's thrasher	<i>Toxostoma bendirei</i>	BLM: S USFWS: BCC	CDFG: SSC	N/A	Desert wash vegetation	High.	Observed adjacent to the site in 2008.
Mammals							
American badger	<i>Taxidea taxus</i>	None	CDFG: SSC	N/A	Grasslands, savannas, and mountain meadows near timberline are preferred, but also occur in desert scrub areas.	High.	Observed adjacent to the site in 2008.

Table 8.1-1
Listed Species observed during Solar One Baseline Surveys
(Continued)

SPECIES		SENSITIVITY STATUS			HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR	STATUS ONSITE
Common Name	Scientific Name	Federal	State	CNPS			
Nelson's bighorn sheep	<i>Ovis canadensis nelsoni</i>	BLM:S FS:S	None	N/A	Dry, relatively barren desert mountain ranges.	High.	Not observed in 2007 or 2008 survey area. Known to occur in area directly north of site.

BCC = Birds of conservation concern

BLM = Bureau of Land Management

CDF = California Department of Forestry

CDFG = California Department of Fish and Game

FS = United States Forest Service

FP = Fully protected

FT = Federally threatened

S = Sensitive

SC = Species of concern

SSC = Species of special concern

ST = State threatened

USFWS = United States Fish and Wildlife Service

WL = Watch list

Surveys for desert tortoise were conducted in 2007 and 2008 according to the USFWS field survey protocol for non-federal action that may occur within range of the desert tortoise (USFWS 2009). Numerous desert tortoise and desert tortoise sign were found on-site and within the vicinity. The presence of desert tortoise is not considered a fatal flaw; however, extensive mitigation measures and a compensatory mitigation program will likely be required (e.g., a minimum 1:1 ratio for impacts to desert tortoise habitat) and should be considered as an additional cost.

Burrowing owls (*Athene cunicularia*) were also detected in areas adjacent to the Site. CDFG has issued a formal policy recommendation for mitigating impacts to burrowing owl (6.5 acres per nesting pair) (California Burrowing Owl Consortium 1993). Such a mitigation program would not be considered a fatal flaw for development of solar facilities. Passive relocation of any resident owls would also be required.

Due to the presence of BLM Sensitive species and CDFG Species of Special Concern (such as Mojave fringe-toed lizard [*Uma scoparia*], Bendire's thrasher [*Toxostoma bendirei*] and American Badger [*Taxidea taxus*]), the wildlife agencies would expect mitigation for impacts to their habitat. An off-site habitat mitigation requirement would likely be nominal (e.g., 1:1 ratio) and be included as part of any listed species mitigation requirement. Such a mitigation program would not be considered a fatal flaw for development of solar facilities, but should be considered as an additional cost.

Birds of prey (raptor species), which are, as a group, listed by CDFG as Protected Species, likely use the site as foraging habitat. Any large trees or transmission line towers that may be present are potential

raptor nest sites. Removal of any potential raptor nests during the non-breeding season prior to construction would be required.

8.1.2 Wildlife Movement Corridors

Wildlife movement patterns were examined as part of the Biological Resources Baseline Survey for the SES Solar Projects Study Area, San Bernardino County, California (URS 2009). Generally, the site and the surrounding vicinity are unrestricted and conducive to live-in habitat and movement of wildlife throughout the area, with uniform habitat composition throughout. The primary constraints to wildlife movement are the existing BNSF railroad and Interstate 40, which both run east-west across the northern and southern portions of the site, respectively. A potential bighorn sheep movement corridor exists in the mountainous terrain northeast and west of the site. While this is not considered a fatal flaw, mitigation and/or changes in the Project design should be considered an additional cost and/or construction scheduling constraint.

8.1.3 Potential Jurisdictional Waters

Based on and topographical maps of the site and the jurisdictional waters delineation performed for the Solar One Baseline Report (URS 2009), there are several ephemeral blue-line drainages within the site (Figure 8-1). These drainages may be CDFG-jurisdictional washes that would require a lengthy permitting process for development. The presence of jurisdictional waters would not be considered a fatal flaw, but the permitting process can be a construction scheduling constraint.

8.1.4 Conclusions

No fatal flaws were identified in this analysis; however, because of the abundance of listed species observed on and in the immediate vicinity of the Solar 3 site, consultation with the USFWS, CDFG, and BLM would be required prior to any ground disturbance.

8.1.5 References

- Bureau of Land Management. 2006. West Mojave Plan/EIS.
http://www.blm.gov/ca/news/2005/03/nr/CDD34_westmojaveplan.html
- California Natural Diversity Database. Biogeographic Data Branch. California Department of Fish and Game. November 24, 2009.
- California Native Plant Society. 2009. Inventory of Rare and Endangered Plants (online edition, v7-08c-interim). California Native Plant Society. Sacramento, CA. Accessed on November 30, 2009 from <http://www.cnps.org/inventory>.
- URS Corporation. 2009. Biological Resources Baseline Survey for the SES Solar Projects Study Area, San Bernardino County, California. December 1, 2009.
- United States Fish and Wildlife Service. 1992. Field Protocol for any Federal Action that may occur within the range of the desert tortoise.

8.2 SITE 7 – CULTURAL RESOURCES

For purposes of the cultural resources review, fatal flaws were defined as highly sensitive cultural resources that could represent major conflicts with development of a solar generating facility. High-sensitivity resources include properties listed in the National Register of Historic Places (National Register) or CHL database, and other properties developed for public interpretation or for which there is substantial agency, tribal, or public sentiment for preservation in place.

8.2.1 Findings

Alternative Site 7, also known as the Solar 3 Site, is located adjacent to the community of Pisgah, California in San Bernardino County. The SCE Pisgah-Lugo 230kV and SCE Griffith Energy Project-1-Lugo 500kV transmission lines are about two miles to the east. The Site is situated in the San Bernardino County in the Mojave Desert in an area that is relatively uninhabited (Figure 8-3).

Although the area is arid desert, prehistorically a large number of archaeological resources are known to exist in the Mojave Desert. A number of lake beds, now dry, formed during prehistoric times and provided sufficient resources for native populations to exploit. As a result, there is a moderate to high potential that this area could contain prehistoric habitation sites. Based on a review of terrain maps and available archaeological literature, the Site may contain undocumented prehistoric or historic-period cultural resources. In addition to habitation sites, prehistoric logistical strategies also may produce a wide variety of other site types associated with hunting, gathering and other resource procurement activities. Common types of such “limited activity” sites include artifact scatters, temporary campsites and individual (isolated) artifacts. Historic cultural resource types may reflect activities related to mining and transportation.

Site 7 and the surrounding area had been previously surveyed by URS archaeologists in 2008 and 2009, encompassing about 8,000 acres that were surveyed. A total of 57 archaeological sites and 332 isolated artifacts have been identified within the Site area, but the survey has not yet been completed, and the possibility of other cultural resource sites being present on the property is high. A comprehensive analysis of the site data generated during the survey is not yet available because the remainder of the survey needs to be completed. In addition, a report describing the methods used, the results of the survey, and recommendations as to NRHP or CRHR eligibility would need to be prepared to be able to fully quantify impacts to significant resources. Based on other surveys conducted in the vicinity of the Site, site density in this region is very high.

8.2.2 Conclusions

The presence, size, relative age and significance of prehistoric sites in the Project area have been determined as a part of the cultural resource survey for Alternative Site 7 (Solar Three Alternative) as described above for those areas that have been surveyed; however, a portion of the property is as yet unsurveyed. URS recommends finalizing the Solar Three cultural resources survey, preparing the technical report and providing recommendations of eligibility to the NRHP and the CRHR for all sites on the property.

8.2.3 References

URS. 2009. DPR Forms and Isolate Forms, Solar Three Survey Area. Unpublished data on file at URS San Diego office.

8.3 SITE 7 – LAND USE

Located within San Bernardino County, California Alternative Site 7, also known as the Solar 3 Site, is approximately 4,862 acres of uninhabited land located just south of the town of Hector, California and three miles north of Twenty-nine Palms Marine Corps Base (Figure 8-2). The site is on BLM and private land. The SCE Pisgah-Cima 230kV and SCE Lugo-Eldorado 500kV transmission lines occur along the southeast boundary of the site (Figure 8-2).

The site falls within the West Mojave Plan (BLM 2006, as amended). The site is adjacent to desert tortoise DCH and two BLM ACEC.

8.3.1 Findings

The Site is zoned within the RC District of San Bernardino County. The intent of the RC District category is to designate areas suitable for conservation, open space and recreational uses, and to prevent the encroachment of incompatible uses and the premature conversion of such lands to intensive or urban uses. Uses in the RC District are limited primarily to recreational uses, open space, and other activities compatible with agricultural uses. According to the San Bernardino County General Plan, this category identifies areas of the County that are appropriate for conservation, rural residences, recreation areas, and related uses that support rural communities.

In addition, the Site is adjacent and within sight of a desert tortoise DCH and two BLM ACEC. The Rodman Mountains WSA occurs approximately eight miles to the northeast. Additionally the southeast portion of Site 7 is currently an OHV recreation area. The Site is located within a designated utility corridor. The SCE Lugo-Eldorado 500kV and SCE Pisgah-Lugo 230kV transmission lines bisect the site from southwest to northeast.

The Site is designated by the BLM for Limited Use. This multiple-use class protects sensitive natural, scenic, ecological, and cultural resource values. These lands are managed to provide for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished. According to this use class, solar development may be allowed once NEPA requirements are met.

Twenty-seven parcels within the Site are privately owned. The parcel numbers are included as Table 8.3-1.

**Table 8.3-1
Privately Owned Parcels within Alternative Site 7**

APN	Acreage
053022122	19.98145
053022127	80.07946
053023147	40.03507
053023137	39.97438
053023149	19.9657
053022123	39.97216
053022110	19.98107
053023145	39.96266
053022107	40.09275
053023139	80.41373
053023146	40.00434
053023126	83.18296
053022124	40.00952
053022128	39.99164
053022113	40.09387
053023138	39.99371
053023134	81.11685
053023141	79.80818
053023143	40.00897
053022119	39.96349
053022115	79.94424
053023124	40.05359
053023150	19.96399
053022121	39.96418
053022118	40.07855
053022125	79.8944
053022111	40.01854

8.3.2 Conclusions

On BLM lands, solar energy generation facilities are placed according to discretionary review of compatibility issues on a case-by-case basis. Because the Site is currently utilized for purposes of preservation, recreation and utility corridors, the determination of compatibility of the Project with surrounding land uses may be problematic.

There are no direct fatal flaws identified for Site 7 due to current land use restrictions and/or obligations that would categorically deny the Project at this location. The land use restrictions that would inhibit the Project at this location include the current designation as the multiple use category L that is currently designated for the site by the BLM, and close proximity to preservation areas. The Project would require a plan amendment to the 1980 CDCA Plan.

8.3.3 References

County of San Bernardino Department of Planning Website: <http://www.sbcounty.gov/landuseservices/>

California Department of Conservation Division of Land Resource Protection: 2005 data.

California Department of Conservation Division of Land Resource Protection Website: <http://www.conservation.ca.gov/dlrp/lca/Pages/Index.aspx>

California Desert Conservation Area Plan, Bureau of Land Management, California Desert District, 1980.

8.4 SITE 7 – WATER RESOURCES

This section summarizes water resources in the vicinity of the Alternative Site 7, also known as the Solar 3 Site, located within San Bernardino County, California. The elevation ranges from approximately 1,900 feet above MSL to approximately 2,200 feet above MSL (Figure 8-1).

8.4.1 Overview of Surface Water Hydrology

A review of the USGS topographic maps shows the project area situated on varying terrain (Figure 8-1). Average slopes range from approximately one to five percent. There appear to be no existing buildings within the Site. Several ephemeral streams/washes run through the Site.

There are several FIRM panels for this area; however, these panels are non-printed panels with no flood hazards shown. Potential flooding hazards exist within the alluvial fan area, and it is likely that the ephemeral washes present some risk of flooding and scour to proposed structures.

8.4.2 Groundwater: Lavic Basin

The Project Site lies predominately within the Lavic Groundwater Basin (Figure 8-2). This groundwater basin underlies Lavic Valley in central San Bernardino County. The basin is bounded by non-water-bearing rocks of the Cady Mountains on the north and east, of the Bullion Mountains on the south and east, of the Lava Bed Mountains on the southwest, and by the Pisgah fault on the west (Rogers 1967). Parts of the eastern and northern boundaries are drainage divides. The southern part of this basin lies within the Twenty-nine Palms Marine Corps Base. In the northern part of the basin, surface drainage is toward Hector Siding and in the southern part of the basin, surface drainage is toward Lavic (dry) Lake. Average annual precipitation ranges from four to six inches.

Water Bearing Formations

Groundwater in the basin is found in Quaternary alluvial and lacustrine deposits. Holocene age alluvium consists of unconsolidated, well-sorted, fine- to coarse-grained sand, pebbles, and boulders with variable amounts of silt and clay deposited in washes and alluvial fans (DWR 1967). Pleistocene age deposits are composed of gently tilted, unconsolidated to moderately consolidated, moderately well bedded gravel, sand, silt and clay (DWR 1967).

Restrictive Structures

The southwest-trending Pisgah fault is the northwest boundary of the basin, and water levels appear to drop eastward across the fault, which indicates that this fault is likely a barrier to groundwater flow. The Lavic Lake fault cuts through the southern part of the basin, but it is not known whether or not this fault is a groundwater barrier.

Recharge Areas

Recharge to the basin is from percolation of runoff from surrounding mountains through alluvial fans and washes (DWR 1967). Subsurface flow from adjoining basins may also contribute to recharge (DWR 1967).

Groundwater Level Trends

In the northern part of the basin, groundwater flows toward Hector Siding. In the southern part of the basin, groundwater flows toward Lavic Lake. Groundwater may flow eastward out of the basin beneath a surface drainage divide.

Groundwater Storage

The total storage capacity is estimated to be 270,000 (DWR 1975). Total groundwater in storage is unknown. Natural recharge is estimated at about 300 af/yr (DWR 1975).

Groundwater Quality

Water from a well in the southern part of the basin near Lavic Lake sampled in 1917 was sodium sulfate in character with a TDS content of 1,680 mg/L (DWR 1967; DWR 1954). 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 1,721 mg/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.

8.4.3 Findings

Potential for alluvial fan flooding exists through the site with associated scour and sedimentation.

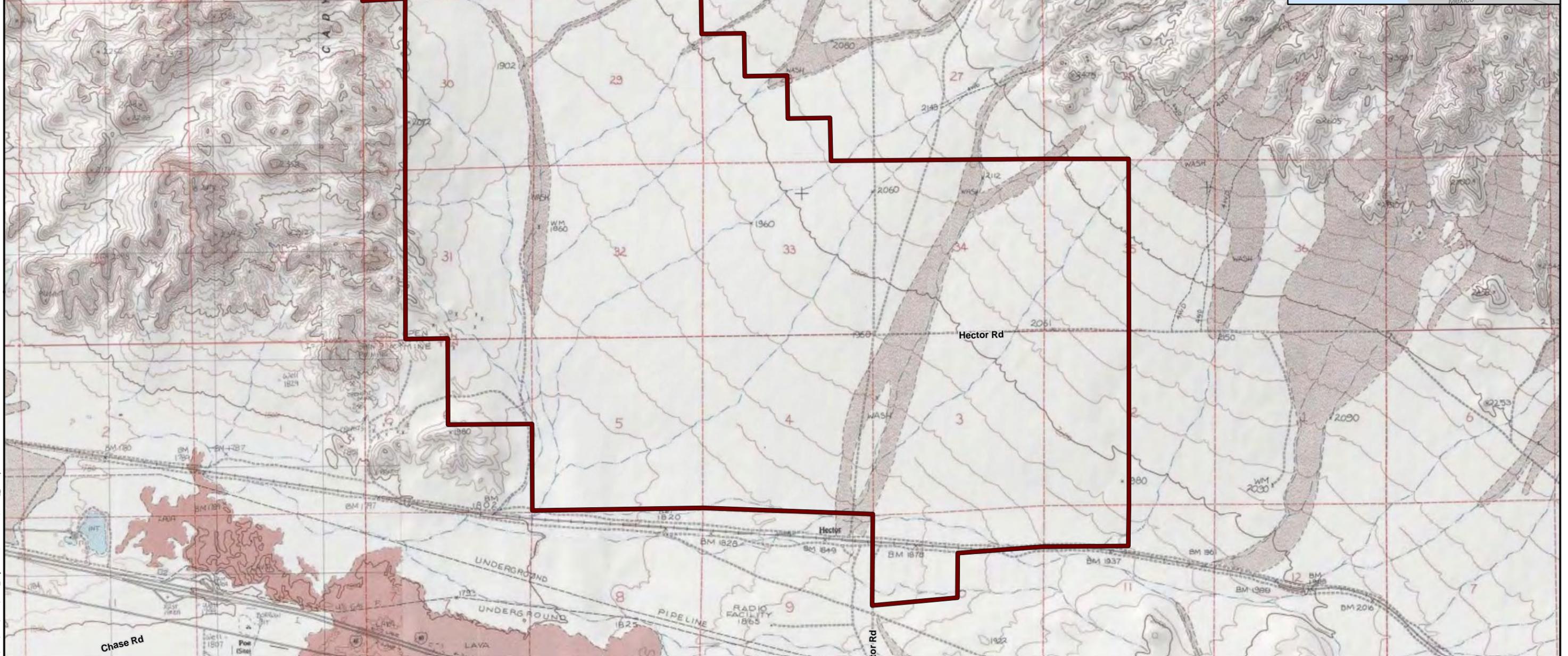
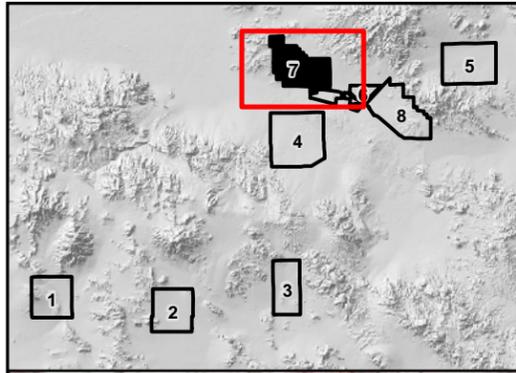
8.4.4 Conclusions

Site facilities must be designed to convey surface stormwater flows and be adequately protected from potential scour and sedimentation. Surface water supplies from direct stormwater runoff cannot be relied upon to provide a steady, predictable source of water. The most likely source of water supply for the Project is from groundwater within the Lavic Lake Groundwater Basin or neighboring basins. Since the site resides on the non-water-bearing rocks of the Cady Mountains, it is expected that there will be no water available for the Project. Any water that is drawn from groundwater may infringe on the Lower Mojave groundwater basin. The ability to obtain or secure an adequate groundwater water supply for the project is a potential fatal flaw due to the adjudicated nature of the Lower Mojave groundwater basin.

8.4.5 References

DWR (California Department of Water Resources). 2004. California's Groundwater Bulletin 118, Hydrological Region Colorado River Basin, Lavic Lake Groundwater Basin. <
http://www.water.ca.gov/pubs/groundwater/bulletin_118/basindescriptions/7-14.pdf>

FEMA Map Service Center <<http://gis1.msc.fema.gov/Website/newstore/Viewer.>>



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Site 7

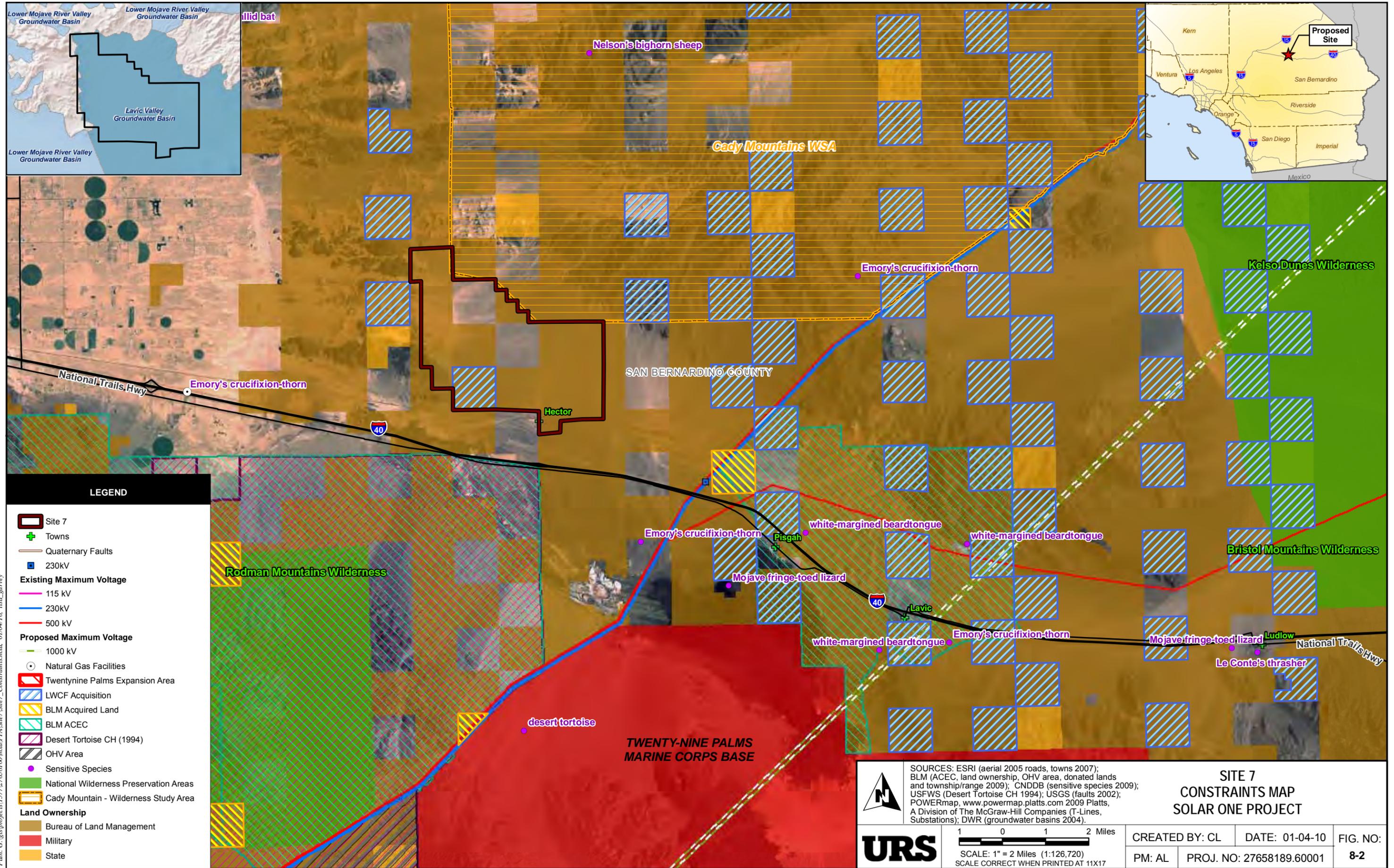
SOURCES: ESRI (overview, roads);
 Tessera Solar (sites 2009);
 USGS 7.5' quads (Troy Lake 1993, Hector 1992);
 POWERmap, www.powermap.platts.com 2009 Platts,
 A Division of The McGraw-Hill Companies (T-Lines,
 Substations).

URS

1500 0 1500 3000 Feet
 SCALE: 1" = 3,000' (1:36,000)
 SCALE CORRECT WHEN PRINTED AT 11X17

**SITE 7
 TOPOGRAPHIC MAP
 SOLAR ONE PROJECT**

CREATED BY: CL	DATE: 12-22-09	FIG. NO:
PM: AL	PROJ. NO: 27658189.60001	8-1



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LEGEND

- Site 7
- + Towns
- Quaternary Faults
- 230kV
- Existing Maximum Voltage**
- 115 kV
- 230kV
- 500 kV
- Proposed Maximum Voltage**
- 1000 kV
- Natural Gas Facilities
- Twentynine Palms Expansion Area
- LWCF Acquisition
- BLM Acquired Land
- BLM ACEC
- Desert Tortoise CH (1994)
- OHV Area
- Sensitive Species
- National Wilderness Preservation Areas
- Cady Mountain - Wilderness Study Area
- Land Ownership**
- Bureau of Land Management
- Military
- State

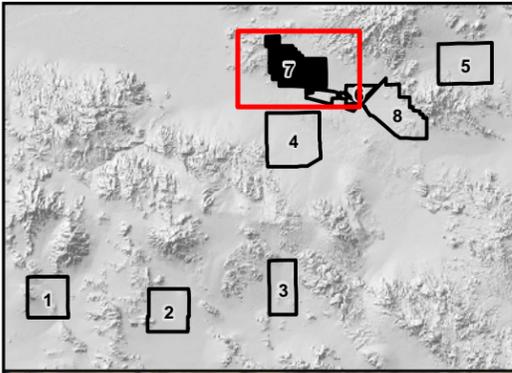


SOURCES: ESRI (aerial 2005 roads, towns 2007);
 BLM (ACEC, land ownership, OHV area, donated lands
 and township/range 2009); CNDDDB (sensitive species 2009);
 USFWS (Desert Tortoise CH 1994); USGS (faults 2002);
 POWERmap, www.powermap.platts.com 2009 Platts,
 A Division of The McGraw-Hill Companies (T-Lines,
 Substations); DWR (groundwater basins 2004).

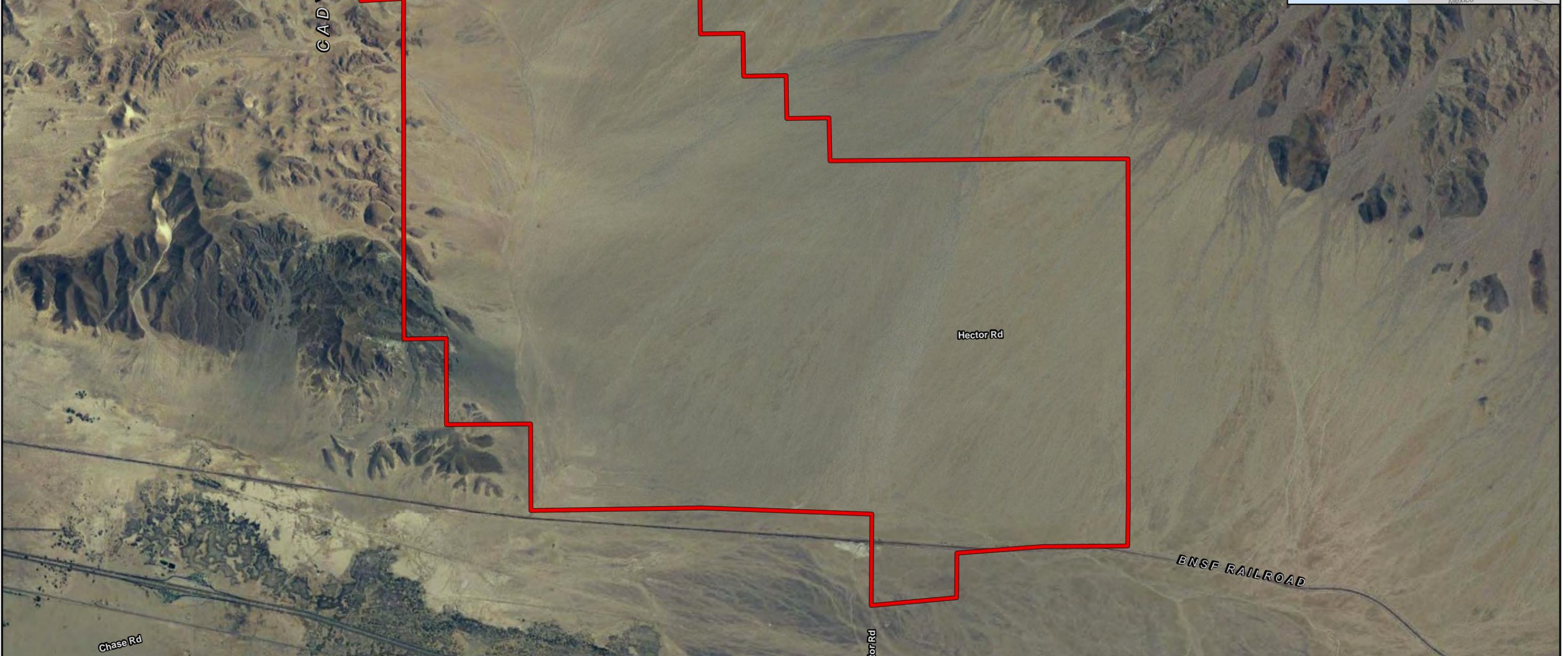


**SITE 7
 CONSTRAINTS MAP
 SOLAR ONE PROJECT**

CREATED BY: CL	DATE: 01-04-10	FIG. NO:	
PM: AL	PROJ. NO: 27658189.60001	8-2	



CADY MOUNTAINS



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LEGEND

 Site 7

 	<p>SOURCES: ESRI (overview, roads); Tessera Solar (sites 2009); NAIP (aerial map 2005); POWERmap, www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (T-Lines, Substations).</p>		<p>SITE 7 AERIAL MAP SOLAR ONE PROJECT</p>	
	<p>1500 0 1500 3000 Feet</p> <p>SCALE: 1" = 3,000' (1:36,000) SCALE CORRECT WHEN PRINTED AT 11X17</p>		<p>CREATED BY: CL</p>	<p>DATE: 12-22-09</p>
		<p>PM: AL</p>	<p>PROJ. NO: 27658189.60001</p>	

SECTION 9 SITE 8 (SOLAR 6) – ENVIRONMENTAL ANALYSIS

Alternative Site 8 (Site), also known as the Solar 6 Site, is located within San Bernardino County, California. The elevation ranges from approximately 650 feet above MSL to approximately 750 feet above MSL (Figure 1-1). Alternative Site 8 consists of approximately 13,400 acres of desert scrub habitat located just north of the town of Pisgah, California and 1.5 miles north of Twenty-nine Palms Marine Corps Base (Figure 9-2). The site is on BLM and private land. The SCE Pisgah-Cima 230kV and SCE Lugo-Eldorado 500kV transmission lines bisect the center of the site from southwest to northeast (Figure 9-2).

9.1 SITE 8 – BIOLOGICAL RESOURCES

The site falls within the West Mojave Plan (BLM 2006, as amended). The West Mojave Plan functions as an HCP that provides guidance for the protection of listed species and for the issuance of incidental take permits by USFWS and CDFG for federally- and state-listed species that occur within the Plan boundaries.

The West Mojave Plan designates a total of four DWMA's that focus on the protection and conservation of desert tortoise (*Gopherus agassizii*), Mojave ground squirrel (*Spermophilus mohavensis*), and other state- or federally listed special status species that share their habitats. The site is within a recently established BLM ACEC (Figure 9-2). Additionally, the Site is expected to occur, at least in part, within the proposed Mother Road National Monument.

9.1.1 Methodology

In addition to previously stated methodology, the Biological Resources Baseline Survey for the SES Solar Projects Study Area, San Bernardino County, California (URS 2009) was also reviewed for the purposes of this analysis.

9.1.2 Sensitive Species and Their Habitats

The eastern portion of the site occurs within a BLM ACEC. Another ACEC and desert tortoise DCH occurs south of I-40, southwest of the site. No other DCH or PCH occurs within the vicinity of Alternative Site 8 (Figure 9-2).

A list of USFWS and CDFG special-status species within San Bernardino County was obtained from the CNDDDB (2009). According to the CNDDDB, one special-status plant species, white-margined beardtongue (*Penstemon albomarginatus*) has been historically recorded on Alternative Site 8. In addition, during extensive general and focused surveys of the Solar One Project site in 2007-2008, multiple species were documented onsite including desert tortoise, Mojave fringe-toed lizard (*Uma scoparia*), and small-flowered androstephium (*Androstephium breviflorum*) (Table 9.1-1). Additional special-status plant and wildlife species may also occur on-site.

Table 9.1-1
Listed Species observed during Solar One Baseline Surveys

SPECIES	SENSITIVITY STATUS				HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR	STATUS ONSITE
	Common Name	Scientific Name	Federal	State			
Plants							
Small-flowered androstephium	<i>Androstephium breviflorum</i>	None	None	2	Mojave desert scrub (bajadas), blooms March-April.	Present. Habitat throughout the survey area.	Observed in 2008.
Emory's crucifixion thorn	<i>Castela emoryi</i>	None	None	2	Dry, rocky desert washes, slopes and plains, blooms June-July.	Present.	Observed during 2008 survey.
Foxtail cactus	<i>Coryphantha alversonii</i>	None	None	4.3	Mojave desert scrub, Sonoran desert scrub, blooms April-June.	High.	Observed adjacent to the site in 2008.
Utah vine milkweed	<i>Cynanchum utahense</i>	None	None	4.2	Mojave desert scrub, blooms April-June.	High.	Observed adjacent to the
White-margined beardtongue	<i>Penstemon albomarginatus</i>	BLM:S	None	1B	Mojave desert scrub, blooms March-May.	Present.	Observed during 2008 survey.
Reptiles							
Desert tortoise	<i>Gopherus agassizii</i>	FT	ST	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.	Present.	Observed during 2007 and 2008 surveys.
Mojave fringe-toed lizard	<i>Uma scoparia</i>	BLM: S	CDFG: SSC	N/A	Areas of aeolian sands including dunes, flats with sandy hummocks, washes and banks of rivers.	Present.	Observed in 2008.

Table 9.1-1
Listed Species observed during Solar One Baseline Surveys
(Continued)

SPECIES		SENSITIVITY STATUS			HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR	STATUS ONSITE
Common Name	Scientific Name	Federal	State	CNPS			
Birds							
Golden eagle	<i>Aquila chrysaetos</i>	BLM: S USFWS: BCC	CDFG: FP, WL CDF: S	N/A	Desert scrub near cliff nest sites.	Present.	Fly-over observed in 2007 and 2008 surveys.
Burrowing owl	<i>Athene cunicularia</i>	BLM: S USFWS: BCC	CDFG: SSC	N/A	Found in open grasslands and agricultural areas with suitable fossorial mammal burrows for nesting.	Present.	Observed in 2008.
Swainson's hawk	<i>Buteo swainsoni</i>	FS: S USFWS: BCC	ST	N/A	Found in grasslands, prairies, and other wide-open ranges with minimal tree cover.	High.	Observed adjacent to the site in 2008.
Loggerhead shrike	<i>Lanius ludovicianus</i>	USFWS: BCC	CDFG: SSC	N/A	Desert, farmland; nests in cholla and thorny bushes.	High.	Observed adjacent to the site in 2008.
Bendire's thrasher	<i>Toxostoma bendirei</i>	BLM: S USFWS: BCC	CDFG: SSC	N/A	Desert wash vegetation	High.	Observed adjacent to the site in 2008.
Mammals							
American badger	<i>Taxidea taxus</i>	None	CDFG: SSC	N/A	Grasslands, savannas, and mountain meadows near timberline are preferred, but also occur in desert scrub areas.	Present.	Observed in 2008.

Table 9.1-1
Listed Species observed during Solar One Baseline Surveys
(Continued)

SPECIES	SENSITIVITY STATUS				HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR	STATUS ONSITE
	Common Name	Scientific Name	Federal	State			
Nelson's bighorn sheep	<i>Ovis canadensis nelsoni</i>	BLM:S FS:S	None	N/A	Dry, relatively barren desert mountain ranges.	High.	Not observed in 2007 or 2008 survey area. Known to occur in area directly north of site.

BCC = Birds of conservation concern

BLM = Bureau of Land Management

CDF = California Department of Forestry

CDFG = California Department of Fish and Game

FS = United States Forest Service

FP = Fully protected

FT = Federally threatened

S = Sensitive

SC = Species of concern

SSC = Species of special concern

ST = State threatened

USFWS = United States Fish and Wildlife Service

WL = Watch list

Rare plant surveys, standard vegetation mapping, jurisdictional waters delineation, and general plant and animal surveys were completed for the Site as part of the required CEQA review process for Solar One. The results of these surveys can be observed in the Biological Resources Baseline Survey Report (URS 2009).

Due to the presence of rare plants (as indicated in Table 9.1-1), the wildlife agencies would expect the development and implementation of avoidance measures to preserve onsite populations. This is not considered a fatal flaw, but should be considered an extra cost to the Project.

Surveys for desert tortoise were conducted in 2007 and 2008 according to the USFWS field survey protocol for non-federal action that may occur within range of the desert tortoise (USFWS 1992). Numerous desert tortoise and desert tortoise sign were found on-site and within the vicinity. The presence of desert tortoise is not considered a fatal flaw; however, extensive mitigation measures and a compensatory mitigation program will likely be required (e.g., 1:1 ratio for impacts to desert tortoise habitat) and should be considered as an additional cost.

Burrowing owls (*Athene cunicularia*) were also detected in areas adjacent to the Site. CDFG has issued a formal policy recommendation for mitigating impacts to burrowing owl (6.5 acres per nesting pair) (California Burrowing Owl Consortium 1993). Such a mitigation program would not be considered a fatal flaw for development of solar facilities. Passive relocation of any resident owls would also be required.

Due to the presence of BLM Sensitive species and CDFG Species of Special Concern (such as Mojave fringe-toed lizard [*Uma scoparia*], Bendire's thrasher [*Toxostoma bendirei*] and American Badger [*Taxidea taxus*]), the wildlife agencies would expect mitigation for impacts to their habitat. An off-site habitat mitigation requirement would likely be nominal (e.g., 1:1 ratio) and be included as part of any listed species mitigation requirement. Such a mitigation program would not be considered a fatal flaw for development of solar facilities, but should be considered as an additional cost.

Birds of prey (raptor species), which are, as a group, listed by CDFG as Protected Species, likely use the site as foraging habitat. Any large trees or transmission line towers that may be present are potential raptor nest sites. Removal of any potential raptor nests during the non-breeding season prior to construction would be required.

9.1.3 Wildlife Movement Corridors

Wildlife movement patterns were examined as part of the Biological Resources Baseline Survey for the SES Solar Projects Study Area, San Bernardino County, California (URS 2009). Generally, the Site and the surrounding vicinity are unrestricted and conducive to live-in habitat and movement of wildlife throughout the area, with uniform habitat composition throughout. The primary constraints to wildlife movement are the existing BNSF railroad and Interstate 40, which both run east-west across the northern and southern portions of the site, respectively. A potential bighorn sheep movement corridor exists in the mountainous terrain northeast of the site connecting a year-round use area to an area used as winter range habitat. Development of the Site within the currently proposed boundaries would potentially impede local wildlife movement through this corridor. While this potential impediment is not considered a fatal flaw, mitigation and/or changes in the Project design should be considered an additional cost and/or construction scheduling constraint.

9.1.4 Potential Jurisdictional Waters

Based on and topographical maps of the site and the jurisdictional waters delineation performed for the Solar One Baseline Report (URS 2009), there are several blue-line drainages throughout the Site (Figure 9-1). These drainages may be ACOE-jurisdictional and/or CDFG-jurisdictional washes that would require a permitting process prior to development. The presence of jurisdictional waters would not be considered a fatal flaw, but the permitting process can be a construction scheduling constraint.

9.1.5 Conclusions

The location of Alternative Site 8 within a BLM ACEC is considered a fatal flaw. Development of this site would most likely not be approved by the agencies and it is recommended that other alternative sites be considered.

9.1.6 References

Bureau of Land Management. 2006. West Mojave Plan/EIS.

http://www.blm.gov/ca/news/2005/03/nr/CDD34_westmojaveplan.html

California Natural Diversity Database. Biogeographic Data Branch. California Department of Fish and Game. November 24, 2009.

California Native Plant Society. 2009. Inventory of Rare and Endangered Plants (online edition, v7-08c-interim). California Native Plant Society. Sacramento, CA. Accessed on November 30, 2009 from <http://www.cnps.org/inventory>.

URS Corporation. 2009. Biological Resources Baseline Survey for the SES Solar Projects Study Area, San Bernardino County, California. December 1, 2009.

United States Fish and Wildlife Service. 1992. Field Protocol for any Federal Action that may occur within the range of the desert tortoise.

9.2 SITE 8 – CULTURAL RESOURCES

For purposes of the cultural resources review, fatal flaws were defined as highly sensitive cultural resources that could represent major conflicts with development of a solar generating facility. High-sensitivity resources include properties listed in the National Register of Historic Places (National Register) or CHL database, and other properties developed for public interpretation or for which there is substantial agency, tribal, or public sentiment for preservation in place.

9.2.1 Findings

Alternative Site 8, also known as the Solar 6 Site, is located northeast and adjacent to the community of Pisgah, California in San Bernardino County (Figure 1-1). It is just east of the Solar One project site. The SCE Pisgah-Lugo 230kV and SCE Griffith Energy Project-1-Lugo 500kV transmission lines are about two miles to the east. The Project is situated in the San Bernardino County in the Mojave Desert in an area that is relatively uninhabited (Figure 9-3).

Although the area is arid desert, prehistorically a large number of archaeological resources are known to exist in the Mojave Desert. A number of lake beds, now dry, formed during prehistoric times and provided sufficient resources for native populations to exploit. As a result, there is a moderate to high potential that this area could contain prehistoric habitation sites. Based on a review of terrain maps and available archaeological literature, the Site may contain undocumented prehistoric or historic-period cultural resources. In addition to habitation sites, prehistoric logistical strategies also may produce a wide variety of other site types associated with hunting, gathering and other resource procurement activities. Common types of such “limited activity” sites include artifact scatters, temporary campsites and individual (isolated) artifacts. Historic cultural resource types may reflect activities related to mining and transportation.

The Site has not been previously surveyed for cultural resources. However, the immediate surrounding area has been previously surveyed by URS archaeologists in 2008 and 2009, encompassing about 8,000 acres that were surveyed for the Solar One Project. A total of 383 archaeological resources were

identified within the larger project area, which include 242 isolates and 141 archaeological sites. Of the 141 updated and new archaeological sites, 126 are prehistoric, 11 are historic, and 4 are multi-component sites. On the basis of surface indications it was possible to recommend 33 of the archaeological resources and the 242 isolated finds as not eligible under NRHP and CRHR criterion. No specific cultural resource studies have been done on Site.

9.2.2 Conclusions

The presence, size, age and significance of prehistoric sites in areas adjacent to the Site have been determined as a part of the larger cultural resource survey for Solar One as described above, but site specific surveys of the Site property have not been conducted. The available information suggests that the Site has the potential to contain prehistoric or historic habitation sites, as well as evidence of limited activity sites such as prehistoric lithic scatters and ephemeral camp sites. URS recommends conducting additional archaeological literature reviews of the Project and surrounding area to determine whether other unrecorded cultural resources may exist on the property. In addition, a Class III field survey of the Project area would need to be conducted based on the record search to evaluate potential Project impacts to cultural resources.

9.2.3 References

Nixon, Rachael A., 2008. Class III Cultural Resources Technical Report for the Solar One Project, San Bernardino County, California. Unpublished report on file with BLM Barstow Field Office.

9.3 SITE 8 – LAND USE

Located within San Bernardino County, California Alternative Site 8, also known as the Solar 6 Site, is approximately 13,400 acres of uninhabited land located just north of the town of Pisgah, California and 1.5 miles north of Twenty-nine Palms Marine Corps Base (Figure 9-2). The site falls within the West Mojave Plan (BLM 2006, as amended). The West Mojave Plan designates a total of four DWMAs, each of which focuses on the protection and conservation of state- or federally listed special status species. The site is within a recently established BLM ACEC.

9.3.1 Findings

The site is designated as RC by the County of San Bernardino. The intent of the RC District category is to designate areas suitable for conservation, open space and recreational uses, and to prevent the encroachment of incompatible uses and the premature conversion of such lands to intensive or urban uses. Uses in the RC District are limited primarily to recreational uses, open space, and other activities compatible with these uses. According to the General Plan, this category identifies areas of the County that are appropriate for conservation, rural residences, recreation areas, and related uses that support rural communities.

In addition, the entire area is within a desert tortoise DCH and a BLM ACEC. The project site is located within a designated utility corridor. The Southern California Edison (SCE) Lugo-Eldorado 500kV and SCE Pisgah-Lugo 230kV transmission lines bisect the site from southwest to northeast.

The site is designated by the BLM for Limited Use. This multiple-use class protects sensitive natural, scenic, ecological, and cultural resource values. These lands are managed to provide for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished. According to this use class, solar development may be allowed once NEPA requirements are met.

Twenty parcels within the Site are privately owned. The parcel numbers are included as Table 9.3-1.

**Table 9.3-1
Privately Owned Parcels within Alternative Site 8**

APN	Acreage
055203137	39.87974
055203121	4.990054
055203134	3.745656
055203119	9.9687
055203133	22.4982
055203120	5.001972
055203127	4.799924
055203118	9.973934
055203122	3.745491
055203126	34.61789
055203124	80.05226
055203136	79.66577
055203142	20.1389
055203135	79.78626
055203117	19.93127
055203141	19.05128
055203123	79.94492
055203139	39.75962
055203138	39.78286
055203140	39.87971

9.3.2 Conclusions

On BLM lands, solar energy generation facilities are placed according to discretionary review of compatibility issues on a case-by-case basis. Because Project land is currently utilized for purposes of preservation, the determination of compatibility of the Project with surrounding land uses would be problematic.

There appear to be direct fatal flaws identified for Site 8 due to current land use restrictions and/or obligations that would categorically deny the Project at this location. The land use restrictions that would deny the Project at this location include the current designation as an ACEC, Desert Tortoise conservation area, and the multiple use category that is currently designated for the site by the BLM. The Project would require a plan amendment to the 1980 CDCA Plan.

9.3.3 References

County of San Bernardino Department of Planning Website: <http://www.sbcounty.gov/landuseservices/>

California Department of Conservation Division of Land Resource Protection: 2005 data.

California Department of Conservation Division of Land Resource Protection Website: <http://www.conservation.ca.gov/dlrp/lca/Pages/Index.aspx>

California Desert Conservation Area Plan, Bureau of Land Management, California Desert District, 1980.

9.4 SITE 8 – WATER RESOURCES

This section summarizes water resources in the vicinity of Alternative Site 8, also known as the Solar 6 Site, located within San Bernardino County, California. The elevation ranges from approximately 1,900 feet above MSL to approximately 2,200 feet above MSL (Figure 9-1).

9.4.1 Overview of Surface Water Hydrology

A review of the USGS topographic maps shows the project area situated on varying terrain (Figure 9-1). Average slopes range from approximately one to five percent. There appear to be no existing buildings within the Site. Several ephemeral streams/washes run through the Site.

There are several FIRM panels for this area; however, these are non-printed panels and no flood hazards shown. Potential flooding hazards exist within the alluvial fan, and it is likely that the ephemeral washes present some risk of flooding and scour to proposed structures.

9.4.2 Groundwater: Lavic Valley Basin

The Project Site lies predominately within the Lavic Valley Groundwater Basin. This groundwater basin underlies Lavic Valley Valley in central San Bernardino County (Figure 9-2). The basin is bounded by non-water-bearing rocks of the Cady Mountains on the north and east, of the Bullion Mountains on the south and east, of the Lava Bed Mountains on the southwest, and by the Pisgah fault on the west (Rogers 1967). Parts of the eastern and northern boundaries are drainage divides. The southern part of this basin lies within the Twenty-nine Palms Marine Corps Base. In the northern part of the basin, surface drainage is toward Hector Siding and in the southern part of the basin, surface drainage is toward Lavic (dry) Lake. Average annual precipitation ranges from 4 to 6 inches.

Water Bearing Formations

Groundwater in the basin is found in Quaternary alluvial and lacustrine deposits. Holocene age alluvium consists of unconsolidated, well-sorted, fine- to coarse-grained sand, pebbles, and boulders with variable amounts of silt and clay deposited in washes and alluvial fans (DWR 1967). Pleistocene age deposits are composed of gently tilted, unconsolidated to moderately consolidated, moderately well bedded gravel, sand, silt and clay (DWR 1967).

Restrictive Structures

The southwest-trending Pisgah fault is the northwest boundary of the basin, and water levels appear to drop eastward across the fault, which indicates that this fault is likely a barrier to groundwater flow. The Lavic Lake fault cuts through the southern part of the basin, but it is not known whether or not this fault is a groundwater barrier.

Recharge Areas

Recharge to the basin is from percolation of runoff from surrounding mountains through alluvial fans and washes (DWR 1967). Subsurface flow from adjoining basins may also contribute to recharge (DWR 1967).

Groundwater Level Trends

In the northern part of the basin, groundwater flows toward Hector Siding. In the southern part of the basin, groundwater flows toward Lavic Lake. Groundwater may flow eastward out of the basin beneath a surface drainage divide.

Groundwater Storage

The total storage capacity is estimated to be 270,000 (DWR 1975). Total groundwater in storage is unknown. Natural recharge is estimated at about 300 af/yr (DWR 1975).

Groundwater Quality

Water from a well in the southern part of the basin near Lavic Lake sampled in 1917 was sodium sulfate in character with a TDS content of 1,680 mg/L (DWR 1967; DWR 1954). 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 1,721 mg/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.

9.4.3 Findings

Potential for alluvial fan flooding exists through the site with associated scour and sedimentation.

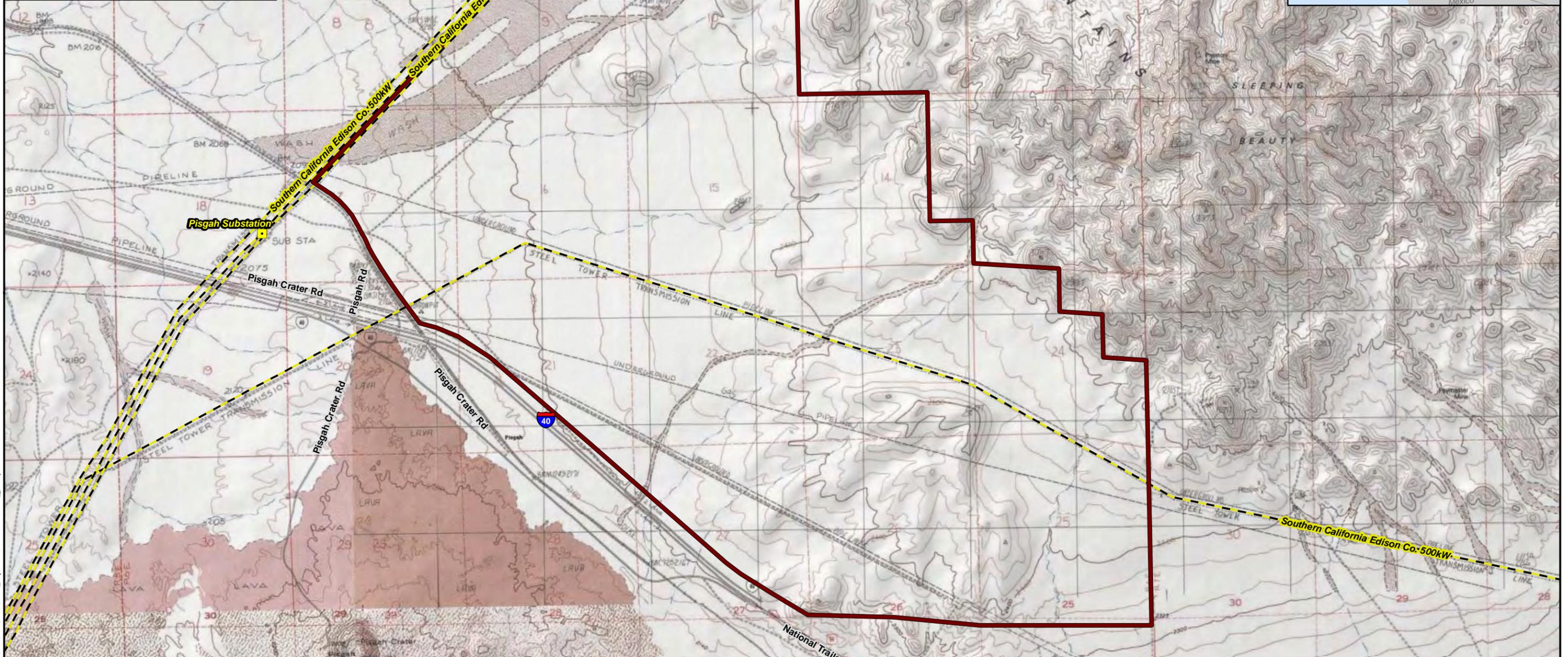
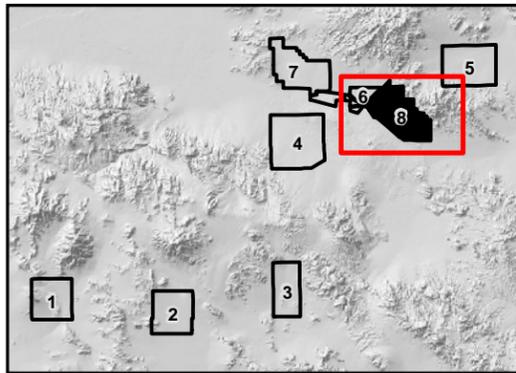
9.4.4 Conclusions

Site facilities must be designed to convey surface stormwater flows and be adequately protected from potential scour and sedimentation. Surface water supplies from direct stormwater runoff cannot be relied upon to provide a steady, predictable source of water. The most likely source of water supply for the project is from groundwater within the Lavic Lake Groundwater Basin or neighboring basins.

9.4.5 References

DWR (California Department of Water Resources). 2004. California's Groundwater Bulletin 118, Hydrological Region Colorado River Basin, Lavic Lake Groundwater Basin. <
http://www.water.ca.gov/pubs/groundwater/bulletin_118/basindescriptions/7-14.pdf>

FEMA Map Service Center <<http://gis1.msc.fema.gov/Website/newstore/Viewer.>>

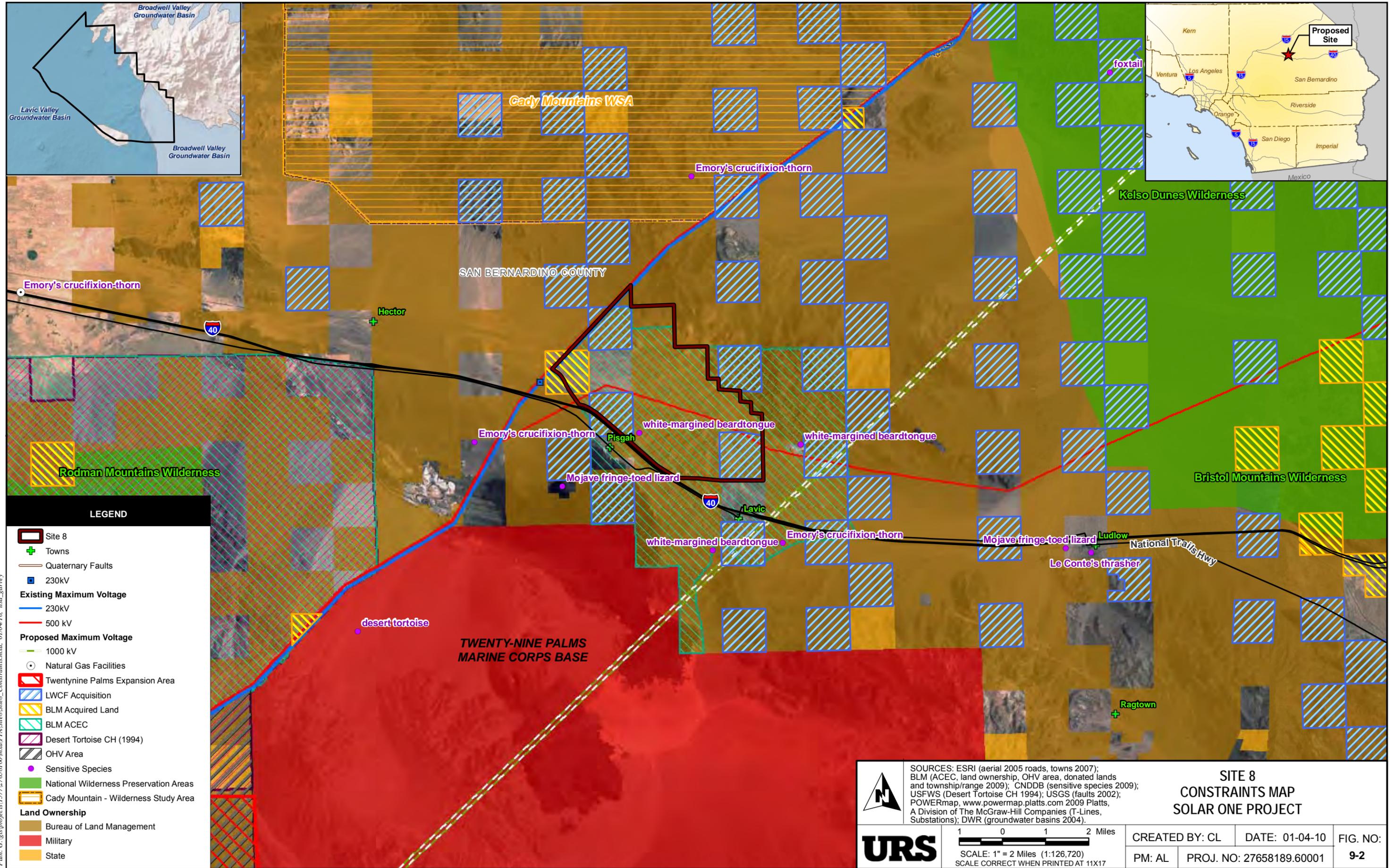


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LEGEND

- Site 8
- Substation
- Existing Transmission Line

 	SOURCES: ESRI (overview, roads); Tessera Solar (sites 2009); USGS 7.5' quads (Hector, Sunshine Peak 1992; Sleeping Beauty 1993, Lavic Lake 1973); POWERmap, www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (T-Lines, Substations).		SITE 8 TOPOGRAPHIC MAP SOLAR ONE PROJECT	
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LEGEND

- Site 8
- + Towns
- Quaternary Faults
- 230kV
- Existing Maximum Voltage**
- 230kV
- 500 kV
- Proposed Maximum Voltage**
- 1000 kV
- Natural Gas Facilities
- Twentynine Palms Expansion Area
- LWCF Acquisition
- BLM Acquired Land
- BLM ACEC
- Desert Tortoise CH (1994)
- OHV Area
- Sensitive Species
- National Wilderness Preservation Areas
- Cady Mountain - Wilderness Study Area
- Land Ownership**
- Bureau of Land Management
- Military
- State

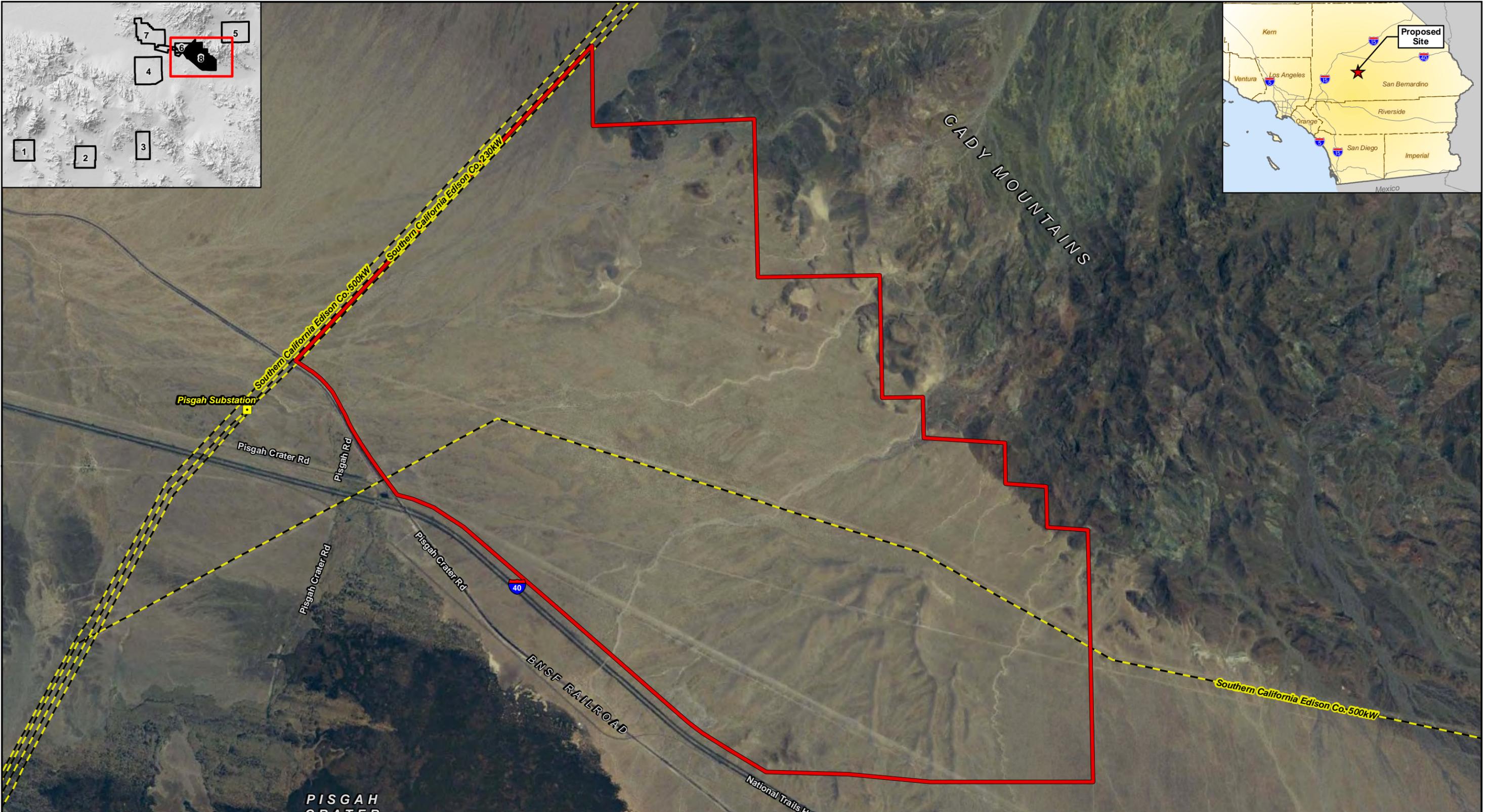
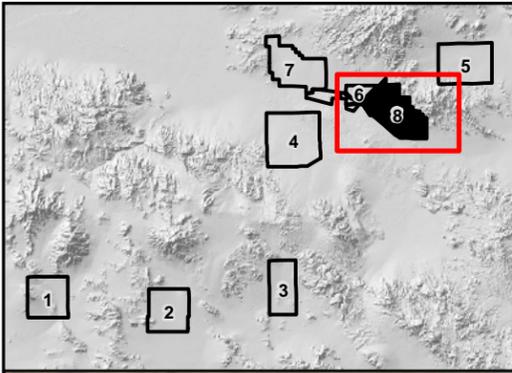


SOURCES: ESRI (aerial 2005 roads, towns 2007); BLM (ACEC, land ownership, OHV area, donated lands and township/range 2009); CNDDDB (sensitive species 2009); USFWS (Desert Tortoise CH 1994); USGS (faults 2002); POWERmap, www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (T-Lines, Substations); DWR (groundwater basins 2004).

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 SCALE CORRECT WHEN PRINTED AT 11X17

**SITE 8
 CONSTRAINTS MAP
 SOLAR ONE PROJECT**

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LEGEND

- Site 8
- Substation
- Existing Transmission Line

 	SOURCES: ESRI (overview, roads); Tessera Solar (sites 2009); NAIP (aerial 2005); POWERmap, www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (T-Lines, Substations).		SITE 8 AERIAL MAP SOLAR ONE PROJECT	
	1500 0 1500 3000 Feet SCALE: 1" = 3,000' (1:36,000) SCALE CORRECT WHEN PRINTED AT 11X17	CREATED BY: CL DATE: 12-30-09	FIG. NO:	
	PM: AL PROJ. NO: 27658189.60001	9-3		



BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
COMMISSION OF THE STATE OF CALIFORNIA
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**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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DECLARATION OF SERVICE

I Corinne Lytle, declare that on January 8, 2010, I served and filed copies of the attached Applicant's Submittal of Additional Alternatives Analysis. 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