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5.9 AGRICULTURE AND SOILS

Hydrogen Energy International LLC (HEI or Applicant) is jointly owned by BP Alternative Energy North America Inc., and Rio Tinto Hydrogen Energy LLC. HEI is proposing to build an Integrated Gasification Combined Cycle (IGCC) power generating facility called Hydrogen Energy California (HECA or the "Project") in Kern County, California. The Project will produce electricity while substantially reducing greenhouse gas emissions by capturing carbon dioxide (CO_2) and transporting it for enhanced oil recovery (EOR) and sequestration.

The 315-acre Project Site is located approximately 6.5 miles west of the outermost edge of the city of Bakersfield and 2 miles northwest of the unincorporated community of Tupman in western Kern County, California, as shown in Figure 2-1, Project Vicinity Map. The Project Site is adjacent to an oil producing area known as the Elk Hills Oil Field Unit. The Project Site is currently undeveloped. Existing surface elevations vary from about 445 feet above mean sea level (msl) in the southwest corner to about 310 feet above msl in the northeast corner.

The Project will gasify petroleum coke (or blends of petroleum coke and coal, as needed) to produce hydrogen to fuel a combustion turbine operating in combined cycle mode. The gasification component feeds a 390 gross megawatt (MW) combined cycle plant. The net electrical generation output from the Project will provide California with approximately 250 MW of low-carbon baseload power to the grid. The gasification component will also capture approximately 90 percent of the carbon dioxide from the syngas at steady-state operation, which will be transported and used for EOR and sequestration (storage) in the Elk Hills Oil Field Unit. In addition, approximately 100 MW of natural gas generated peaking power will be available from the Project.

The Project Site and linear facilities comprise the affected study area and are entirely located in Kern County, California. These Project components are described below.

Major on-site Project components will include, as shown on Figure 2-4, Plot Plan:

- Solids Handling, Gasification, and Gas Treatment
  - Feedstock delivery, handling and storage
  - Gasification
  - Sour shift/gas cooling
  - Mercury removal
  - Acid gas removal
- Power Generation
  - Combined-cycle power generation
  - Auxiliary combustion turbine generator
  - Electrical switching facilities
- Supporting Process Systems
  - Natural gas fuel systems

- Air separation unit (ASU)
- Sulfur recovery unit
- Zero liquid discharge
- Carbon dioxide compression
- Wastewater injection wells
- Raw water treatment plant
- Other plant systems

The Project also includes the following off-site facilities, as shown on Figure 2-5, Project Location Map:

- **Electrical Transmission Line** – An electrical transmission line will interconnect the Project to Pacific Gas & Electric's (PG&E) Midway Substation. The interconnection voltage is expected to be 230 kilovolts (kV). The Project is considering two alternative transmission routes, both of which extend from the western edge of the Project Site to the north, and west to the north side of the substation. Transmission Alternative 1 is approximately 9 miles long and Transmission Alternative 2 is approximately 9.5 miles long.
- **Natural Gas Supply** – A natural gas interconnection will be made with either PG&E or Southern California Gas Company natural gas pipelines, both of which are located southeast of the Project Site. The natural gas pipeline will be approximately 7 miles in length. The interconnect will consist of one tap off the existing natural gas line, one meter set, one service pipeline service connection, and a pressure limiting station located on the Project Site.
- **Water Supply Pipelines** – The Project will utilize brackish groundwater supplied from the Buena Vista Water Storage District (BVWSD) located to the northwest. The raw water supply pipeline will be approximately 18 miles in length. Potable water for drinking and sanitary use will be supplied by West Kern Water District located near the State Route 119 (SR 119)/Tupman Road intersection (southeast of the Project Site). The potable water supply pipeline will be approximately 5.5 miles in length.
- **Carbon Dioxide Pipeline** – The carbon dioxide pipeline will transfer the carbon dioxide captured during gasification from the Project Site southwest to the custody transfer point. The Project is considering two alternative pipeline routes. Alternative 1 is approximately 2 miles in length, while Alternative 2 is approximately 2.5 miles in length.

The Project components described above are shown on Figure 2-5, Project Location Map, which depicts the region, the vicinity, the Project Site and its immediate surroundings for Project components.

All temporary construction equipment laydown and parking, including construction parking, offices, and construction laydown areas, will be located on the Project Site.

The disturbed acreage associated with the Project is summarized in Table 5.9-1, Project Disturbed Acreage.

Table 5.9-1
Project Disturbed Acreage

Project Component	Temporary Disturbance	Permanent Disturbance
Project Site	315 acres	315 acres
Electrical transmission line	Alternative 1 – 15 acres Alternative 2 – 15 acres	Alternative 1 – 2 acres Alternative 2 – 2 acres
Natural gas line	PG&E – 2 acres Southern California Gas Company – 2 acres	PG&E – previously disturbed Southern California Gas Company – previously disturbed
Water supply line	BVWSD – 15 acres	BVWSD – previously disturbed
CO_2 line	Alternative 1 – 1 acre Alternative 2 – 1 acre	Alternative 1 – previously disturbed Alternative 2 – previously disturbed
Temporary construction areas	Included in Project Site	None
Total Project Disturbance	**348 acres**	**317 acres**

Source: HECA Project
Notes:
BVWSD = Buena Vista Water Storage District
CO_2 = carbon dioxide

This section describes the potential environmental consequences of the Project on agriculture and soils in accordance with California Energy Commission (CEC) requirements.

5.9.1 Affected Environment

5.9.1.1 Regional Setting

The Project Site is further described as the northern half of Section 22 in Township 30, Range 24, on the U.S. Geological Survey (USGS) Quadrangle Map. The Project Site is surrounded by land that is currently used for agricultural purposes to the north of the State Water Project and mineral and petroleum purposes to the south, southwest, and southeast. Tupman Road and the State Water Project run parallel, east of the Project Site, extending generally from the southeast to northwest.

Section 5.4, Land Use describes the current and proposed uses of the land in the vicinity of the Project. In summary, according to the Kern County General Plan, existing land use is designated as Mineral and Petroleum and is zoned for Limited Agriculture (Kern County Planning Department 2004). The Plan defines these designations as areas which contain potentially productive petroleum fields, natural gas, and geothermal resources, as well as mineral deposits of regional and state-wide significance. Energy facilities are not specifically defined within the Mineral and Petroleum designation, however, it is assumed to be a similar use by Kern County Planning Department and is therefore consistent with the Kern County General Plan (Casdorph 2008). Currently, the Project Site exists as undeveloped land that contains sparse, arid vegetation.

Agriculture and related operations occur north, northeast, and northwest of the Project Site. The Elk Hills Oil Field Unit is located approximately 0.85 mile south of the Project Site. No agricultural activities currently occur on the Project Site. However, agricultural activity within the affected area is located north and east of the Project Site. Properties surrounding the Project Site include the bordering property to the south, Section 22 South, that Occidental of Elk Hills Inc. previously purchased and currently owns; undeveloped property to the north and east, currently owned by Chevron U.S.A. Inc.; and undeveloped property to the west. The California State Water Project and the associated spillway berms that parallel the California State Water Project on each side are located at the northeast corner of the Project Site. The land east of the California State Water Project is used for agriculture. Occidental of Elk Hills Inc. owns the property southeast of the Project Site and operates the Section 23-S Tank Farm crude oil transfer station and tank farm on this site.

Section 5.15, Geological Hazards and Resources provides details on the geology of the Project Site and vicinity. The Project Site is located on an alluvial fan complex on the southwestern side of the San Joaquin Valley in the southern end of the Great Valley geomorphic province, which separates the Coast Ranges to the west from the Sierra Nevada Range to the east. The regional geology consists of Quaternary alluvium (approximately 6,000 to 7,000 feet thick) underlain by a sequence of sediments up to 30,000 feet deep. Marine sediments within this sequence of sedimentary rocks are the source for rocks for oil production activities within Kern County (URS 2007).

5.9.1.2 Soils

Soils are mapped and described as "soil series." The locations and properties of the soil series were identified from data and maps prepared by the U.S. Department of Agriculture (USDA) Natural Resources Conservation Services (NRCS) Web Soil Survey (WSS) – Soil Survey Geographic (SSURGO) database (NRCS 2008). The WSS database contains official USDA soil survey information as viewable maps and tables for more than 2,300 soil surveys in the U.S. and its territories. A summarized description of the soil types in the Project is included in Table 5.9-2, Soil Mapping Units – Descriptions and Properties, and demonstrated graphically in Figure 5.9-1, Soil Types. Refer to Section 5.15, Geological Hazards and Resources, and Appendix P, Geotechnical Investigation, for the characteristics of the subsurface soils.

The soil association in the Project Site consists of well-drained to somewhat excessively well-drained alluvial soils derived from granitic rock. Surface textures are primarily Cajon loamy sand. The identified soil association is moderately to highly corrosive.

Soil maps and surveys are available from NRCS for the Northwest Section of Kern County, which includes the Project Site (NRCS Map Number CA666), but are not available for the Southwest Section of Kern County (NRCS Map Number CA691). Information for the single Soil Series (Cajon loamy sand, 2 to 5 percent slopes [126]) that comprises the entire Project Site, as shown on Table 5.9-2, Soil Mapping Units – Descriptions and Properties, was derived from the NRCS survey and Map Number CA666. Current routing for off-site linear facilities indicates that both NRCS Map Numbers CA666 and CA691 may be traversed during construction, operation, and maintenance. In addition, a NRCS Area Resource Soil Scientist was contacted to determine when NRCS Map Number CA691 will be available. NRCS indicated that the map is currently being developed and anticipates the map being finalized, issued, and available in late

Fall 2008 (Russell 2008). For these reasons, Table 5.9-2 currently contains limited information from the NRCS that lie within the yet to be finalized Map Number CA691 related to soils that may be encountered during construction, operation, and maintenance of linear facilities. Entries for information that are currently unavailable are shown as "Unknown" on Table 5.9-2, Soil Mapping Units – Descriptions and Properties.

5.9.1.3 Agriculture and Important Farmlands

Four categories of important farmlands are federally regulated by USDA under the Farmland Protection Policy Act: (1) prime farmlands, (2) unique farmlands, (3) farmlands of state-wide importance, and (4) farmlands of local importance. Important farmlands are a distinction made by USDA as soils that support the crops necessary for the preservation of the nation's domestic food and other supplies, specifically the capacity to preserve high yields of food, seed, forage, fiber, and oilseed with minimal agricultural amendment of the soil, adequate water, and a sufficient growing season. Several USDA and other federal natural resource programs, permits, and regulations require the identification of important farmlands.

The California Land Conservation Act (Williamson Act) was passed in 1965 to preserve agriculture and open space lands by discouraging premature and unnecessary conversion to urban uses. The Act creates an arrangement whereby private landowners' contract with counties and cities to voluntarily restrict land to agriculture and open space uses. The vehicle for these agreements is generally a 10-year term contract with a rolling annual renewal (i.e., unless either party files a "notice of non-renewal"). In return, restricted parcels are assessed for property tax purposes at a rate consistent with their actual use, rather than potential market value.

The Project Site was and is currently enrolled under the Williamson Act as Non-Prime Agricultural Land. The former owners of the property, John and Mary Valov (Owner), enrolled the property (that includes the Project Site) in a Land Use Contract (California Land Conservation Act of 1965, and Open-Space Land Valuation Law of 1967) with Kern County on February 19, 1970. For the purposes of the Land Use Contract, Occidental of Elk Hills Inc. assumed the role of Owner when the land was purchased from John and Mary Valov in June of 2005. The Williamson Act contract runs with the land and is binding on all successors in interest of the landowner.

When the property was purchased from John and Mary Valov it was not being actively used as agricultural land. Based on research in support of the Project it appears the land has not been used actively for agricultural purposes since becoming enrolled under the Williamson Act.

In order to develop the site for the Project, the property will require removal from enrollment under the Williamson Act, as discussed in detail in Section 5.4, Land Use.

From research of available databases, Cajon loamy sand soils (126) were found to be prime farm lands if irrigated (NRCS 2008), but were not found to be designated as a Farmlands of State-wide Importance by the NRCS (State of California Department of Conservation 2002). The Project Site is not presently irrigated.

Although the NRCS database indicated that the Cajon loamy sand soils (126) were identified as prime farm lands if irrigated, the property, including the Project Site, is identified on the Kern County Williamson Act Lands map as Non-Prime Agricultural Land (State of California Department of Conservation, Division of Land Resource Protection 2005). In addition, the State

of California Department of Conservation, Farmland Mapping and Monitoring Program, did not identify any Farmland of Local Importance at the Project Site (State of California Department of Conservation 2004).

Prime farmland designations as assigned by NRCS for soils at the Project Site and for soils that may be encountered during installation, operation, and maintenance of linear facilities are included on Table 5.9-2, Soil Mapping Units – Descriptions and Properties, above.

In summary, the Project is consistent with existing designated land uses, but may result in temporary construction impacts to active agricultural lands from the transmission lines. In addition, a small percentage of agricultural land is expected to be converted to non-agricultural uses due to rights-of-way (ROW) that will be needed for the construction, operation, and maintenance of aboveground electrical power transmission lines.

5.9.2 Environmental Consequences

Appendix G of the California Environmental Quality Act (CEQA) identifies the following criteria for determining significance of impacts to soils resources:

- Project results in substantial soil erosion or loss of topsoil, degradation of soils or farmland, changes in topography, or unstable soil conditions.
- Project is in an unstable soil or soil that would become unstable because of the project, and potentially result in landslide, lateral spreading, subsidence, liquefaction, or collapse.
- Project would place septic tanks or alternative wastewater disposal systems on soils incapable of adequately supporting these systems where sewers are unavailable for the disposal of wastewater.

The assessment of Project impacts to the soil resource is based on soils information presented in SSURGO data and the Phase I Environmental Site Assessment conducted by URS in February 2008 (provided in Appendix M, Phase I Environmental Site Assessment), and consideration of the Applicant-committed mitigation measures. Although no previous geotechnical investigations or related reports are available for the Project Site, the Project conducted a geotechnical investigation. Information related to the geotechnical investigations and associated findings are provided in Section 5.15, Geological Hazards and Resources, and Appendix P, Geotechnical Investigation.

The use of erosion control best management practices (BMPs) to control water and wind erosion during construction activities, and placement of impervious surfaces and/or BMPs on disturbed areas within the Project area will effectively control soil loss during and after construction. Consequently, quantitative calculations of potential soil loss using the Universal Soil Loss and Chepil Wind Erosion Equations, which are typically used to quantify water and wind-induced soil loss for agricultural operations were not considered appropriate. Potential impacts of the Project on the soil resources can be divided into those involving construction activities and those related to Project operation.

Table 5.9-2
Soil Mapping Units – Descriptions and Properties

Soil Series	Surface Texture	Depth to Bedrock or Restrictive Feature[1]	Drainage	Runoff	Hydrologic Soil Group[2]	Land Capability Class (non-irrigated)[3]	Erosion Factor T[4]	Erosion Factor K[5]	Surface pH	Risk of Corrosive Action on Steel[6]	Farmland Category
Buttonwillow clay, drained (123)	Clay	No restrictive feature within 200 cm	Somewhat Poorly Drained	High	C	7s	5	0.24	7.9-8.4	High	Prime Farmland if Irrigated
Cajon loamy sand, 0 to 2 percent slopes (125)	Loamy sand	No restrictive feature within 200 cm	Somewhat Excessively Drained	Negligible	A	7s	5	0.15	7.4-8.4	Moderate	Prime Farmland if Irrigated
Cajon loamy sand, 2 to 5 percent slopes (126)	Loamy sand	No restrictive feature within 200 cm	Somewhat Excessively Drained	Negligible	A	7e	5	0.15	7.4-8.4	Moderate	Prime Farmland if Irrigated
Elkhills sandy loam, 9 to 50 percent slopes, eroded (146)	Gravely sandy loam	No restrictive feature within 200 cm	Well Drained	Medium	B	7e	5	0.20	7.4-8.4	High	Not Prime Farmland
Garces silt loam (156)	Silt loam	No restrictive feature within 200 cm	Well Drained	Very High	D	7s	5	0.49	7.9-9.0	High	Farmland of State-Wide Importance
Kimberlina fine sandy loam, 0 to 2 percent slopes (174)	Fine sandy loam	No restrictive feature within 200 cm	Well Drained	Very Low	B	7c	5	0.24	6.6-8.4	High	Prime Farmland if Irrigated
Kimberlina fine sandy loam, saline-alkali, 0 to 2 percent slopes (179)	Fine sandy loam	No restrictive feature within 200 cm	Well Drained	Medium	B	7s	5	0.24	7.9-8.4	High	Farmland of State-Wide Importance
Lokern clay, drained (187)	Clay	No restrictive feature within 200 cm	Moderately Well Drained	High	C	7s	5	0.28	7.9-8.4	High	Prime Farmland if Irrigated

Table 5.9-2
Soil Mapping Units – Descriptions and Properties

Soil Series	Surface Texture	Depth to Bedrock or Restrictive Feature[1]	Drainage	Runoff	Hydrologic Soil Group[2]	Land Capability Class (non-irrigated)[3]	Erosion Factor T[4]	Erosion Factor K[5]	Surface pH	Risk of Corrosive Action on Steel[6]	Farmland Category
Lokern clay, saline-alkali, drained (188)	Clay	No restrictive feature within 200 cm	Moderately Well Drained	Very High	D	7s	5	0.28	7.9-8.4	High	Not Prime Farmland
Milham sandy loam, 0 to 2 percent slopes (196)	Sandy loam	No restrictive feature within 200 cm	Well Drained	Medium	B	7c	5	0.32	7.4-8.4	High	Prime Farmland if Irrigated
Panoche clay loam, 0 to 2 percent slopes (211)	Clay loam	No restrictive feature within 200 cm	Well Drained	Low	B	7c	5	0.43	7.4-8.4	High	Prime Farmland if Irrigated
Panoche clay loam, saline-alkali, 0 to 2 percent slopes (214)	Clay loam	No restrictive feature within 200 cm	Well Drained	Medium	B	7s	5	0.43	7.4-8.4	High	Farmland of State-Wide Importance
Torriorthents stratified, eroded-Elkhills complex, 9 to 50 percent slopes (232)	Sandy loam, gravelly sandy loam	No restrictive feature within 200 cm	Well Drained	Medium to High	C	7e	5	0.20	7.4-8.4	High	Not Prime Farmland
Westhaven-Lerdo-Excelsior-Cajon (S782)	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	5	0.37	Unknown	Unknown	Unknown
Lokern-Buttonwillow (S777)	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	5	0.28	Unknown	Unknown	Unknown

Table 5.9-2
Soil Mapping Units – Descriptions and Properties

Soil Series	Surface Texture	Depth to Bedrock or Restrictive Feature[1]	Drainage	Runoff	Hydrologic Soil Group[2]	Land Capability Class (non-irrigated)[3]	Erosion Factor T[4]	Erosion Factor K[5]	Surface pH	Risk of Corrosive Action on Steel[6]	Farmland Category
Wasco-Kimberlina (S775)	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	5	0.32	Unknown	Unknown	Unknown

Source: NRCS, 2008

Notes:

[1]*Depth to Bedrock or Restrictive Feature:* Represents a restrictive layer that is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers.

[2]*Hydrologic Soil Groups:* Are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms. The four hydrologic soil groups are:

Group A - Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B - Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C - Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D - Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

[3]*Land Capability Classes:* ***Class 7*** soils have very severe limitations that make them unsuited to cultivation and that restrict their use mainly to grazing, forest land, or wildlife. ***Subclass s*** indicates that the soil is limited mainly because it is shallow, droughty, or stony; ***Subclass c*** indicates that the soil is limited by climates that are very cold or very dry; and ***Subclass e*** indicates susceptibility to erosion is the dominant problem or hazard affecting use with erosion susceptibility and past erosion damage comprising the major soil factors that affect soils in this subclass.

[4]*T Factor:* is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

[5]*Erosion Factor K:* indicates the susceptibility of a soil to sheet and rill erosion by water. *Factor K* is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of *K* range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

[6]*Risk of Corrosion:* pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer. For uncoated steel, the risk of corrosion, expressed as “low,” “moderate,” or “high,” is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

cm = centimeter

5.9.2.1 Construction-Related Impacts

Minor construction-related impacts to the soil resources are associated with development of the Project, including minor grubbing, grading, and trenching for installation, operation, and maintenance of under- and aboveground linear facilities (electrical power transmission lines and pipelines [water supply, natural gas, carbon dioxide, etc.]) within the Project Site. Approximately 315 acres of land will be disturbed during construction activities with the completed Project Site improvements encompassing approximately the full 315 acres.

The existing Project Site topography is generally flat, but some grading will be required to provide a level area for the Project. The surficial soils will likely be excavated and re-compacted or replaced with granular soils within and adjacent to the areas of Project facilities. Preliminary grading plans indicate that all soil required for construction will be derived from on-site sources. Therefore, no off-site fill procurement (borrow) sites are anticipated. In addition, soils removed through grading activities are expected to be used again on site as fill, and therefore, no on- or off-site fill disposal is expected. Construction will include the installation of several thousand feet to several miles of aboveground electrical power transmission lines both on the Project Site and off site (linear facilities). Additional details related to the construction and installation of the electrical transmission lines and other pipelines for water supply, natural gas, carbon dioxide, etc., are provided below under Section 5.9.2.3, Linear Facilities Impacts.

Potential impacts during construction activities on soil resources may include alteration of the existing soil profile, increased soil erosion, and soil compaction. Alteration of the existing soil profiles, including mixing of soils, will alter the physical, chemical, and biological characteristics of native soils and underlying geology. Soil erosion causes the loss of topsoil and can increase the sediment load in surface-receiving waters downstream of the construction site. Soil action can decrease infiltration rates, resulting in increased runoff and erosion rates. The magnitude, extent, and duration of construction-related impacts depend on the erodibility of the soil; the proximity of the construction activity to receiving water; and the construction methodologies, duration, and season. Grading and other construction activities at the Project Site will be localized and temporary resulting in minimal soil erosion. The mitigation measures outlined in Section 5.9.4, Mitigation Measures, will further reduce impacts to soil resources resulting from construction of the Project to less than significant levels.

The most likely event of a spill during the construction phase is a small-scale oil or diesel fuel spill during vehicle operation, maintenance, or fuel refilling. If a leak from a liquid or gas storage container occurs, the appropriate construction management personnel will assess the situation to determine the level of hazard of the material stream, and whether the leak can be stopped or repaired. Spills and leaks will be contained and cleaned up as described in the appropriate construction emergency contingency plans (spill, storm water pollution prevention plan [SWPPP], leak, fire, etc.) developed prior to construction.

5.9.2.2 Project Site Impacts

Project construction activities (including site preparation) at the Project Site are estimated to be conducted during a 37-month period which will be partially overlapped by approximately 12 months of commissioning activities before the Project is operational. Land disturbances related to development activities are expected to be conducted on the full 315-acre Project Site,

which includes construction laydown areas. Excavation work will consist of the removal, storage, and/or disposal of earth, sand, gravel, vegetation, organic matter, loose rock, boulders, and debris to the lines and grades necessary for construction. Materials suitable for backfill will be stockpiled at designated locations using proper erosion protection methods. During the construction phase of the Project, erosion and sediment control measures, such as mulching, jute netting, culverts, sediment detention basins, etc., will be temporarily installed as required by local regulations.

Areas to be backfilled will be prepared by removing unsuitable material and rocks. The bottom of an excavation will be examined for loose or soft areas. Such areas will be excavated fully and backfilled with compacted fill. Backfilling will be done in layers of uniform, specified thickness. Soil in each layer will be properly moistened to facilitate compaction to achieve the specified density. To verify compaction, representative field density and moisture-content tests will be performed during compaction.

Existing topsoil will be removed as needed. Graded areas will be smooth, compacted, free from irregular surface changes, and sloped to drain. Structures and their foundations and equipment anchors will be designed according to the 2006 International Building Code (IBC), and the Kern County Building Code. Should there be a conflict in code requirements the more conservative requirements will be implemented. The 2006 IBC will be adopted by the state of California in 2008.

Project-related soil erosion will be minimized through implementation of erosion control measures described in Section 5.9.4, Mitigation Measures. Therefore, impacts from soil erosion are expected to be insignificant.

5.9.2.3 Linear Facilities Impacts

The Project will include the construction, installation, operation, and maintenance of new under- and aboveground linear facilities, including electrical power transmission lines; and water, potable water, natural gas, and carbon dioxide pipelines. Each of the individual feedstocks required and products produced from operating the Project are discussed in additional detail below.

Petroleum coke will be delivered to the Project Site via truck. Coal will be brought in-state by existing rail and trans-loaded to trucks from a nearby rail link, which will then deliver the coal to the plant. No under- or aboveground facilities will be constructed, installed, operated, or maintained to transport petroleum coke or coal to the Project Site. Therefore, no resulting linear facility or soils impacts will be created from the feedstock.

Because some feedstocks contain less mineral matter, the addition of a mineral fluxant is often required to achieve the proper gasification solids flow characteristics. Three primary sources of fluxant have been selected and include common products such as: construction and industrial grade materials – crushed aggregate, rock and sand. The fluxant materials will be delivered to the Project Site via over-road trucking, no under- or aboveground linear facilities will be constructed, installed, operated, or maintained to transport this material, and no resulting linear facility or soils impacts will be created.

Construction, installation, operation, and maintenance of the underground brackish water and potable water linear facilities (pipelines) will result in minor, mostly temporary soils impacts.

Natural gas will be transported to the Project Site through the construction of a new, high strength, carbon-steel underground pipeline that will be interconnected to the existing PG&E or Southern California Gas Company high pressure pipelines. The interconnect will consist of one tap off the existing transmission line, one meter set, one service pipeline service connection, and a pressure-limiting station located on the Project Site. The pipeline route is shown on Figure 2-3, Project Component Map. Construction, installation, operation, and maintenance of the underground natural gas facilities (pipeline) will result in minor, mostly temporary soils impacts.

Construction, installation, operation, and maintenance of the aboveground electrical transmission line linear facility will result in minor, mostly temporary soils impacts.

The carbon dioxide pipeline will parallel existing roads to the extent possible. Construction, installation, operation, and maintenance of this underground linear facility (pipeline) will result in minor, mostly temporary soils impacts.

As part of the gasification process the Project will produce molten sulfur and a solid slag-like by-product or gasification solids. The molten sulfur and gasification solids will be transported off site via over-road trucking. No under- or aboveground facilities will be constructed, installed, operated, or maintained to transport these materials off site. Therefore, no resulting linear facility or other soils impacts will be created.

Table 5.9-1, Project Disturbed Areas, indicates the anticipated acreage that will be disturbed through the process of installing the linear facilities required to operate the Project, and is broken down into direction and approximate total linear distance from the Project Site, temporary disturbance area (resulting from construction and installation), and permanent disturbance area (resulting from operation and maintenance).

The general process for constructing and installing the underground linear facilities will involve clearing of brush, grading and trench excavation, laying of the linear (pipelines), connecting linear facilities, lowering facilities into trenches, backfilling, compaction, and revegetation. Once pipelines are covered, hydrostatic testing will commence to ensure structural integrity. Construction and installation of aboveground linear facilities (the 230 kV electrical transmission line) will follow a sequence similar to that of underground facilities, with trench excavation being replaced by hole angering to facilitate placement of the utility poles, followed by backfilling and compaction. The material excavated from trenches and auger holes will be used to backfill. Every effort will be made to ensure grade cuts will be restored to their original contours and that affected areas will be restored to the original state to minimize erosion. During construction and installation, the soil within the routes for the linear facilities may become more susceptible to erosion. The extent of this construction-related impact on soils and agricultural lands, however, will be temporary and appropriate BMPs will be applied to minimize impacts. With the implementation of Mitigation Measures described in Section 5.9.4, below, no significant impacts to native soils, receiving waters, or area agricultural lands are anticipated at or near linear facilities.

5.9.2.4 Materials and Equipment Staging Area Impacts

A temporary construction area will be located entirely within the 315-acre Project Site and will be used for equipment staging and storage, construction staff parking, and job trailers. The worker parking and equipment staging will not be paved, but crushed aggregate material will be

placed on the laydown to minimize the potential for erosion. Erosion control measures (more fully described in Section 5.9.4.1, Temporary Erosion Control Measures During Construction Activities), such as track out areas and silt fencing, will be implemented during construction activities to help maintain water quality, protect property from erosion damage, and prevent accelerated soil erosion or dust generation. With the implementation of Mitigation Measures described in Section 5.9.4, below, no significant impacts to native soils, receiving waters, or area agricultural lands are anticipated at or near the Project Site.

5.9.2.5 Operation-Related Impacts

Routine vehicle traffic during Project operation will be limited to existing paved roads and Project Site access road, which will be paved. Permanent storm water mitigation measures will be implemented at the Project Site, such as a perimeter drainage berm(s), storm water retention, and appropriate BMPs. It is likely that an operational SWPPP will be required to comply with National Pollutant Discharge Elimination System (NPDES) storm water permitting requirements. If an SWPPP is required, it will be developed and implemented prior to initiation of operations. Thus, with the implementation of Mitigation Measures described in Section 5.9.4, below, Project operation will not disturb soil or result in increased erosion or compaction.

5.9.2.6 Effects of Emissions on Soil-Vegetation Systems

Emissions from electric generating facilities, especially nitrogen oxides (NO_x) from the combustors or drift from the cooling towers, may have an adverse effect on soil-vegetation systems in the facility vicinity. This is primarily a concern when environments that are highly sensitive to nutrients or salts, such as serpentine layers (soils and bedrock that are acidic, dry, erodable, and nutrient-poor), are downwind from the facilities. State-of-the-art air emissions control and monitoring equipment will be installed by the Project to reduce, control, and measure air emissions (e.g. NO_x). A Continuous Emissions Monitoring System (CEMS) will be installed to monitor the emissions as required by LORS. Cooling towers will be equipped with high-efficiency mist eliminators to reduce particulate matter emissions.

The dominant land use within the Project Site consists of undeveloped land containing sparse, arid vegetation, and land uses immediately around the Project Site consists of agriculture to the north and mineral and petroleum exploration and production to the south, southwest, and southeast. No known occurrences of ultramafic (serpentine) bedrock have been identified in the Project area; thus, there are no concerns related to naturally-occurring asbestos (Churchill 2008). The addition of small amounts of nitrogen to the industrial and commercial areas due to air emissions will be insignificant due to the scarcity of vegetation in the Project vicinity. Within more vegetated residential areas (e.g., Tupman), the addition of small amounts of nitrogen created by air emissions from the Project will be insignificant compared to the fertilizers, herbicides, and pesticides typically used by farmers and ranchers.

5.9.3 Cumulative Impacts Analyses

The assessment of cumulative impacts for this Project includes a review of other projects where an application has been filed with Kern County. The project list was provided by Kern County Council of Governments and lists all proposed and approved projects within the county. The list includes discretionary reviews since May 2006. Trends in recent zoning changes in Kern County

indicate increased urbanization of agricultural lands. However, there have not been General Plan amendments or zoning ordinance amendments since the General Plan adoption in 2004 and zoning ordinance adoption in 2007. According to the Kern County Planning Department there are no zoning trends that would impact the Project Site (Casdorph 2008).

Areas near the Project will be developed consistent with the goals and policies contained in the General Plan (Kern County Planning Department 2004). The Kern County Zoning Ordinance is the primary tool for achieving the objectives of the General Plan (Kern County Planning Department 2007). The Kern County Zoning Ordinance consists of both text and maps that divide all unincorporated lands in Kern County into specific zoning districts that specify allowable uses and development standards. Future residential development is anticipated during the life of the Project; however, no developments are proposed or approved within a 2-mile radius of the Project. Additionally, no major development projects have occurred on the Project Site or the surrounding areas in the last 18 months.

Soil erosion and sedimentation impacts associated with the Project Site will not be significant. Impacts related to the potential excavation of contaminated soils will not be significant since all excavated materials will be handled in accordance with the procedures described in Section 2.8, Project Construction, and Section 5.13, Waste Management. Most of the disturbed agricultural land will be restored to its original condition upon completion of construction activities, however, a small percentage of agricultural land is expected to be converted to non-agricultural uses due to trenching, excavation, and ROWs required for installation, operation, and maintenance of above- and underground linear facilities (electrical power transmission lines and pipelines [water supply, natural gas, carbon dioxide, etc]). No major developments have recently occurred or are proposed/approved within a 2-mile radius of the Project. Thus, cumulative impacts to soil or agricultural resources will be negligible.

5.9.4 Mitigation Measures

The development of the Project is consistent with existing zoning designations for Kern County. No permanent agricultural impacts were identified; thus, no mitigation measures are proposed. This section describes Applicant-committed mitigation measures that will be implemented to reduce Project-related potential impacts to soils.

The following mitigation measures will be implemented to mitigate any potential Project impacts to less than insignificant levels. An acceptable level of soil erosion, as used herein, is defined as that amount of soil loss that will not affect (i.e., limit) the potential long-term beneficial uses of the soil as a growth medium, or adversely affect water resources because of accelerated erosion and subsequent sedimentation. Refer to Section 5.14, Water Resources, for mitigation measures related to potential impacts to water quality associated with soil erosion.

- **Soil 1:** Conduct grading operations consistent with the Kern County LORS.
- **Soil 2:** Prepare and implement an Erosion Control Plan prior to construction, which may be a component of the Construction SWPPP.
- **Soil 3:** Limit soil erosion/dust generation by wetting active disturbed soil construction areas (including construction parking areas) with water or by applying dust palliatives (soil binders).

- **Soil 4:** Implement drainage control measures in accordance with Construction SWPPP.

With implementation of the mitigation measures listed above, no significant unavoidable adverse impacts to the soils resources are anticipated due to construction and operation of the Project.

5.9.4.1 Temporary Erosion Control Measures During Construction Activities

Typically, temporary erosion control measures include revegetation, slope stabilizers, dust suppression, construction of berms and ditches, and sediment barriers. Vegetation is the most desirable form of erosion control because it stabilizes the soil and maintains the landscape, and implementation of vegetation is feasible due to the quality of soil.

During construction of the Project, employment of control measures will minimize the wind-blown erosion of soil from construction areas, such as dust suppression (spraying water) and timely vegetation of barren construction areas. BMPs identified in the Erosion Control Plan and SWPPP will be in place prior to the commencement of ground-disturbing activities. At this time, these plans do not exist, but will be developed and implemented prior to initiation of any on- or off-site ground-disturbing activities.

Sediment barriers such as straw bales or silt fences will slow runoff and trap sediment. Generally, placement of barriers will occur at the base of exposed slopes below disturbed areas. Placing barriers around the Project and the property boundary serves as prevention against sediment leaving the Project Site. Runoff retention basins, drainage diversions, and other large-scale sediment traps are not expected to be needed because of the relatively level topography. Soil stockpiles generated during construction will be covered and protected from precipitation if left on site for extended periods of time.

5.9.4.2 Permanent Erosion Control Measures

Following construction of the Project, permanent control measures will be implemented to minimize water and wind-blown erosion of soil from the Project, such as wind barriers, vegetation of barren post-construction areas, and conducting periodic monitoring (inspections) for erosion due to wind or water impacts and initiation of corrective actions to address issues discovered though monitoring. BMPs identified in the Erosion Control Plan and SWPPP will be in place prior to the initiation of operations. These plans will be developed and implemented prior to commencing operation of the completed Project.

5.9.5 Laws, Ordinances, Regulations, and Standards

The following LORS are applicable to protection of soils resources and protection of surface water quality from Project-induced erosion impacts. Table 5.9-3, Summary of LORS – Agriculture and Soils, provides a summary of these applicable LORS. As discussed in Section 5.9.7, Permits Required and Permit Schedule, the Project will be constructed and operated in accordance with applicable LORS and permit conditions.

Table 5.9-3
Summary of LORS – Agriculture and Soils

LORS	Applicability	Conformance
Federal Jurisdiction		
The Federal Water Pollution Control Act of 1972; Clean Water Act of 1977 (including its 1987 amendments)	Establishes requirements for any facility or activity that has or will discharge waste (including sediment due to accelerated erosion) that may interfere with the beneficial uses of receiving waters.	Sections 5.9.2, Environmental Consequences, and 5.9.2.1, Construction-Related Impacts
U.S. Department of Agriculture, SCS. *National Engineering Handbook* (1983), Sections 2 and 3	Planning, design, and construction of soil conservation practices.	Sections 5.9.2, Environmental Consequences, and 5.9.2.1, Construction-Related Impacts
State Jurisdiction		
California Public Resources Code 25523(a): 20 CCR Chapter 6; § 1752, §1752.5, § 2300-§ 2309, and Chapter 2, Subchapter 5, Article 1, Appendix B, Part (i)	Protection of Environmental Quality	Sections 5.9.2, Environmental Consequences, and 5.9.2.2, Project Site Impacts
California Environmental Quality Act, California PRC Chapter 21000 *et seq*.; Guidelines for Implementation of the CEQA, 14 CCR Chapter 3; § 15000- § 15387, and Appendix G	Substantial soil erosion or loss of topsoil, degradation or loss of available agricultural land, agricultural activities, or agricultural land productivity in the Project area, alteration of agricultural land characteristics due to plant air emissions, or conversion of prime or unique farmland, or farmland of state-wide importance, to no-agricultural use.	Sections 5.9.2, Environmental Consequences, and 5.9.2.2, Project Site Impacts
The California Porter-Cologne Water Quality Control Act of 1952; California Water Code, § 13260 – § 13269; and 23 CCR Chapter 9	Requires adequate protection of water quality by appropriate design, sizing, and construction of erosion and sediment controls.	Sections 5.9.2, Environmental Consequences, and 5.9.2.2, Project Site Impacts
Local Jurisdiction		
Kern County Planning Department Conditional Use Permit - Kern County Zoning Ordinance Chapters 19.104 and 19.14.030	Approval of a CUP requires the submittal of an application form, plot plan, and payment of filing fees. The conditional use permit application requires a public hearing before the Kern County Planning Commission, and all surrounding property owners within 300 feet of the site of the proposed use must be notified in advance of the public hearing by mail.	Section 5.9.2, Environmental Consequences
Kern County Building Inspection Division Building Permit - Kern County Zoning Ordinance, Chapter 17.08	A building permit is required for any construction which physically changes or adds structures to your property or for work regulated by local Codes or Ordinances.	Section 5.9.2, Environmental Consequences

Table 5.9-3
Summary of LORS – Agriculture and Soils

LORS	Applicability	Conformance
Kern County Building Inspection Division Grading Permit - Kern County Zoning Ordinance, Chapter 17.08 and 17.28.070	No person shall do any grading or cause the same to be done without first having obtained a grading permit from the building official.	Section 5.9.2, Environmental Consequences

Source: HECA Project
Notes:
CCR = California Code of Regulations
CEQA = California Environmental Quality Act of 1970
CUP = Conditional Use Permit
LORS = laws, ordinances, regulations, and standards
PRC = Public Resources Code
SCS = Soil Conservation Service

5.9.6 Involved Agencies and Agency Contacts

Agencies with jurisdiction to issue applicable permits and/or enforce LORS related to soils resources and agriculture are shown in Table 5.9-4, Agency Contacts.

Table 5.9-4
Agency Contacts

Agency	Contact	Telephone
Natural Resource Conservation Service (NRCS) Bakersfield Field Office	Edd Russell	559-252-2191 x 104
NRCS Davis Service Center	Kit Paris	530-792-5634
Kern County Planning Department	Cheryl Casdorph	661-862-8600
Kern County Land Division	Holly Nelson	661-862-8625
Kern County Building Inspection Division	Charles Lackey	661-862-8650

Source: HECA Project

5.9.7 Permits Required and Permit Schedule

Table 5.9-5, Applicable Permits, lists all applicable permits for the Project in the area of agriculture and soils.

Table 5.9-5
Applicable Permits

Issuing Agency	Chapter-Section-Article	Type of Permit
No federal permits were identified.		
No state permits were identified.		
Kern County Planning Department	Title 19, Chapter 19.104 and 19.14.030	Conditional Use Permit
Kern County Planning Department Land Division	Title 18, Chapter 18.35	Lot Line Adjustment
Kern County Building Inspection Division	Title 17, Chapter 17.08	Building Permit

Table 5.9-5
Applicable Permits

Issuing Agency	Chapter-Section-Article	Type of Permit
Kern County Building Inspection Division	Title 17, Chapter 17.08 and 17.28.070	Grading Permit

Source: HECA Project

5.9.7.1 Federal Authorities and Administering Agencies

The federal LORS applicable to this Project, as detailed in Table 5.9-3, Summary of LORS – Agriculture and Soils, were authorized by the U.S. Environmental Protection Agency (USEPA) and USDA. USEPA has established requirements for any facility or activity that has or will discharge waste (including sediment due to accelerated erosion) that may interfere with the beneficial uses of receiving waters, and USDA prescribes standards of technical excellence for the Soil Conservation Service (SCS), now called the NRCS, for the planning, design, and construction of soil conservation practices.

The administering agency for LORS authorized by USEPA is the Regional Water Quality Control Board (RWQCB), Central Valley Region (5), under the direction of the State Water Resources Control Board (SWRCB). The administering agency for LORS authorized by the USDA is NRCS.

5.9.7.2 State Authorities and Administering Agencies

The state LORS applicable to this Project and listed on Table 5.9-3, Summary of LORS – Agriculture and Soils, were authorized by the California Environmental Protection Agency (Cal/EPA). With respect to the Project, the California Public Resources Code provides for protection of environmental quality by requiring entities to submit information to the CEC concerning potential environmental impacts. The CEC is the administering agency, and the CEC's decision on the Application for Certification (AFC) must include consideration of environmental protection.

The CEQA guidelines pertaining to potential impacts to soils or agricultural lands, as found in the Act, specify that an impact may be considered significant from an agriculture and soil standpoint if the project results in substantial soil erosion or loss of topsoil, degradation or loss of available agricultural land, agricultural activities or agricultural land productivity in the project area, alteration of agricultural land characteristics due to plant air emissions, or conversion of prime or unique farmland or farmland of state-wide importance to non-agricultural use. The CEC is the administering agency for potential impacts to soils or agricultural lands.

The California Porter-Cologne Water Quality Control Act of 1952 requires adequate protection of water quality by appropriate design, sizing, and construction of erosion and sediment controls. Discharge of waste earthen material into surface waters resulting from land disturbance may require filing of a report of waste discharge (Water Code § 13260 – § 13269) and provides for issuance of waste discharge requirements with respect to the discharge of any waste that can affect the quality of the waters of the state. Concerning potential surface water pollution from project area runoff, the waste discharge requirements may incorporate requirements based on the recommended methods or procedures found in the California RWQCB, 1996, Erosion and

Sediment Control Field Manual. The administering agencies for the California Porter-Cologne Water Quality Control Act of 1952 are CEC, RWQCB, and SWRCB.

5.9.7.3 Local Authorities and Administering Agencies

The local LORS applicable to this Project as shown on Table 5.9-3, Summary of LORS – Agriculture and Soils, were authorized by Kern County. Approval of a Conditional Use Permit (CUP) requires the submittal of an application form, plot plan, and payment of filing fees. The CUP application requires that a public hearing be conducted before the Kern County Planning Commission, and all surrounding property owners within 300 feet of the Project Site of proposed use must be notified in advance of the public hearing by mail. The administering agency for the CUP is the Kern County Planning Department. The CUP application form (Form 94) is available on the Kern County website at the following address: http://www.co.kern.ca.us/planning/pdfs/form94.pdf.

Any construction which physically changes or adds structures to property or for work regulated by local codes or ordinances requires a building permit, in accordance with the Kern County Zoning Ordinance. Applications for building permits must be submitted to, are reviewed, and approved or denied by the Kern County Building Inspection Division. The building permit application form is available on the Kern County website at the following address: http://www.co.kern.ca.us/bid/pdfs/PermitApplication.pdf.

Grading permit requirements (as authorized by the Kern County Zoning Ordinance) stipulate that no person shall perform any grading or cause the same to be done without first having obtained a grading permit from the building official. The administering agency for grading permits is the Kern County Building Inspection Division. The grading permit application form (Form 222r2) is available on the Kern County website at the following address: http://www.co.kern.ca.us/bid/pdfs/form222r2.pdf.

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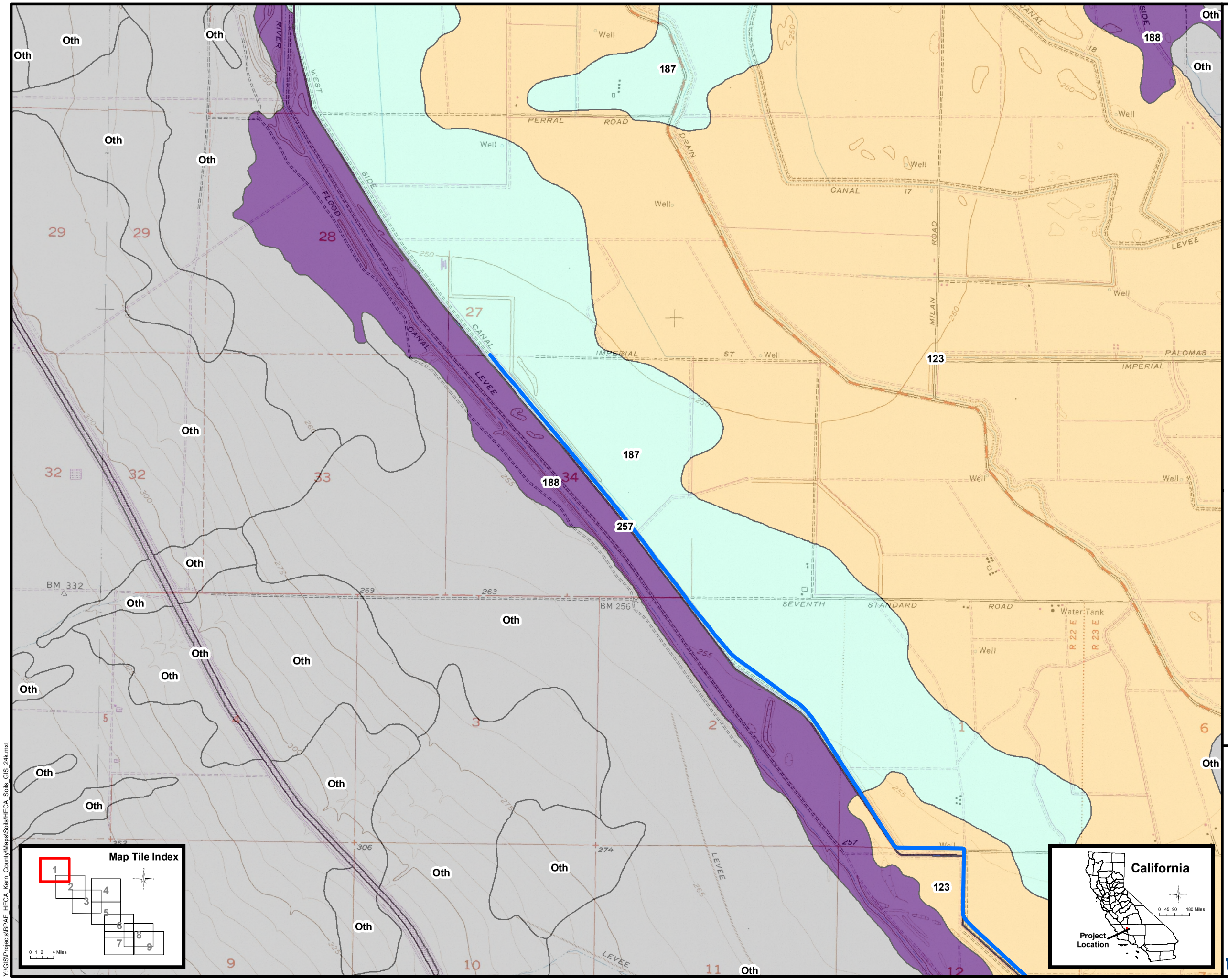

Project Site
Site Access Road
CO2
Natural Gas (NG)
Potable Water
Process Water
Potable Water/NG
Process & Potable Water/NG
Transmission
Transmission/CO2

Soil Types

- Oth - Other Soils
- 123 - Buttonwillow Clay, Drained
- 125 - Cajon Loamy Sand, 0%-2% Slopes
- 126 - Cajon Loamy Sand, 2%-5% Slopes
- 127 - Cajon Sandy Loam, Overblown, 0%-2% Slopes
- 146 - Elkhills Sandy Loam, 9%-50% Slopes, Eroded
- 156 - Garces Silt Loam
- 174 - Kimberlina Fine Sandy Loam, 0%-2% Slopes
- 179 - Kimberlina Fine Sandy Loam, Saline-Alkali, 0%-2% Slopes
- 187 - Lokern Clay, Drained
- 188 - Lokern Clay, Saline-Alkali, Drained
- 196 - Milham Sandy Loam, 0%-2% Slopes
- 211 - Panoche Clay Loam, 0%-2% Slopes
- 214 - Panoche Clay Loam, Saline-Alkali, 0%-2% Slopes
- 232 - Torriorthents Stratified, Eroded-Elkhills Complex, 9%-50% Slopes
- 257 - Water
- s775 - Wasco-Kimberlina
- s777 - Lokern-Buttonwillow
- s782 - Westhaven-Lerdo-Excelsior-Cajon

N W E S

0 1,000 2,000 4,000 Feet

Sources:
USGS (7.5' quads: Belridge 1976, Lokern 1976, Buttonwillow 1976, West Elk Hills 1976, East Elk Hills 1977, Taft 1977, Tupman 1977, Buena Vista Lake Bed 1977). Created using TOPO!, ©2006 National Geographic Maps, All Rights Reserved.
USDA-NRCS (SSURGO Soils, 2007)
USDA-NRCS (STATSGO Soils, 2006)

Soil Types

Sheet 1 of 9

Hydrogen Energy California (HECA)

FIGURE 5.9-1

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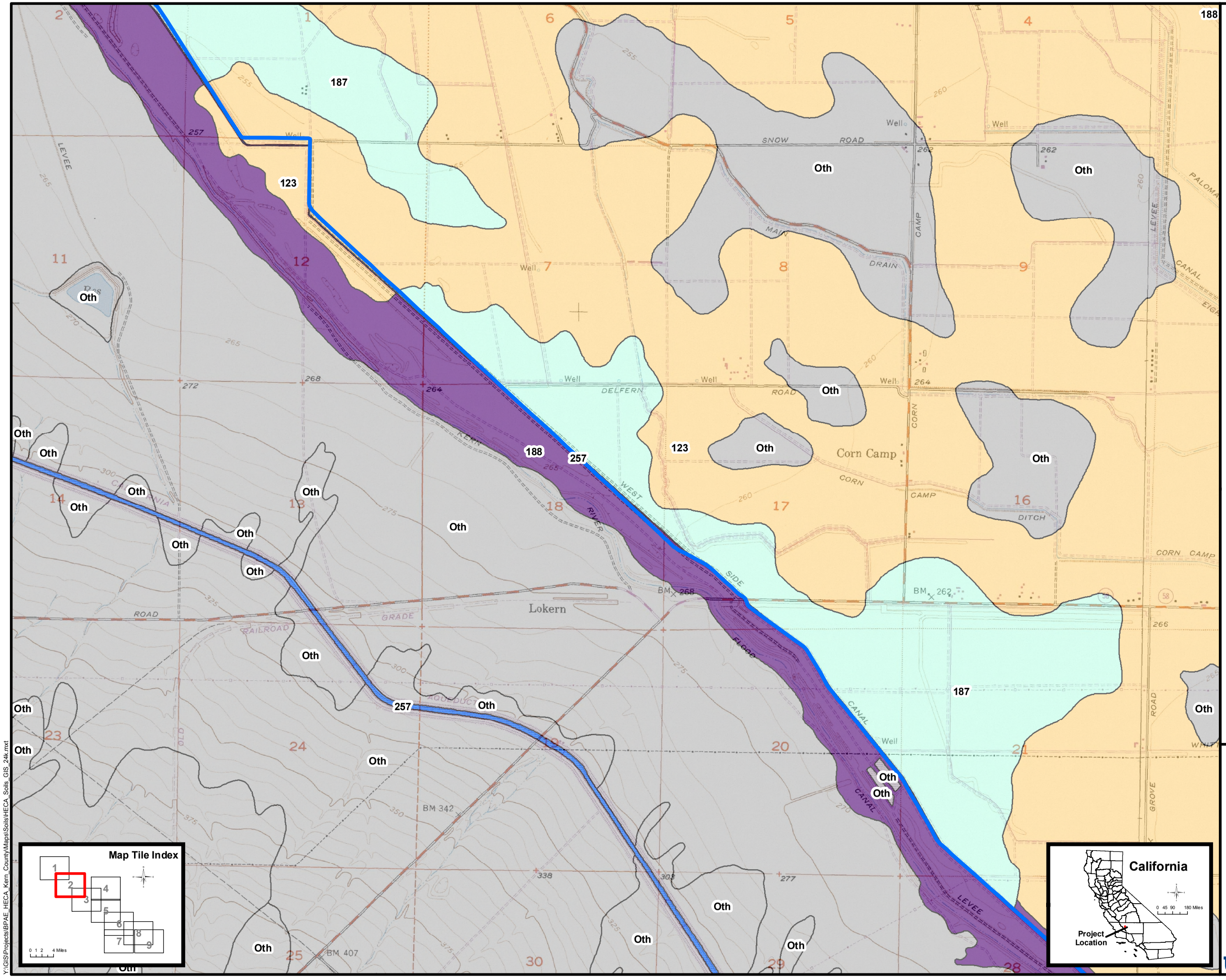

Project Site
Site Access Road
CO2
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N W E S

0 1,000 2,000 4,000 Feet

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USDA-NRCS (SSURGO Soils, 2007)
USDA-NRCS (STATSGO Soils, 2006)

Soil Types

Sheet 2 of 9

Hydrogen Energy California (HECA)

FIGURE 5.9-1

URS

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Project Site
Site Access Road
CO2
Natural Gas (NG)
Potable Water
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Potable Water/NG
Process & Potable Water/NG
Transmission
Transmission/CO2

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N W E S

0 1,000 2,000 4,000 Feet

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USDA-NRCS (SSURGO Soils, 2007)
USDA-NRCS (STATSGO Soils, 2006)

Map Tile Index

0 1 2 4 Miles

California

0 45 90 180 Miles

Project Location

Soil Types

Sheet 3 of 9

Hydrogen Energy California (HECA)

FIGURE 5.9-1

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Project Site
Site Access Road
CO2
Natural Gas (NG)
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Process Water
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Transmission/CO2

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USDA-NRCS (STATSGO Soils, 2006)

Map Tile Index

California
Project Location

Soil Types

Sheet 4 of 9

Hydrogen Energy California (HECA)

FIGURE 5.9-1

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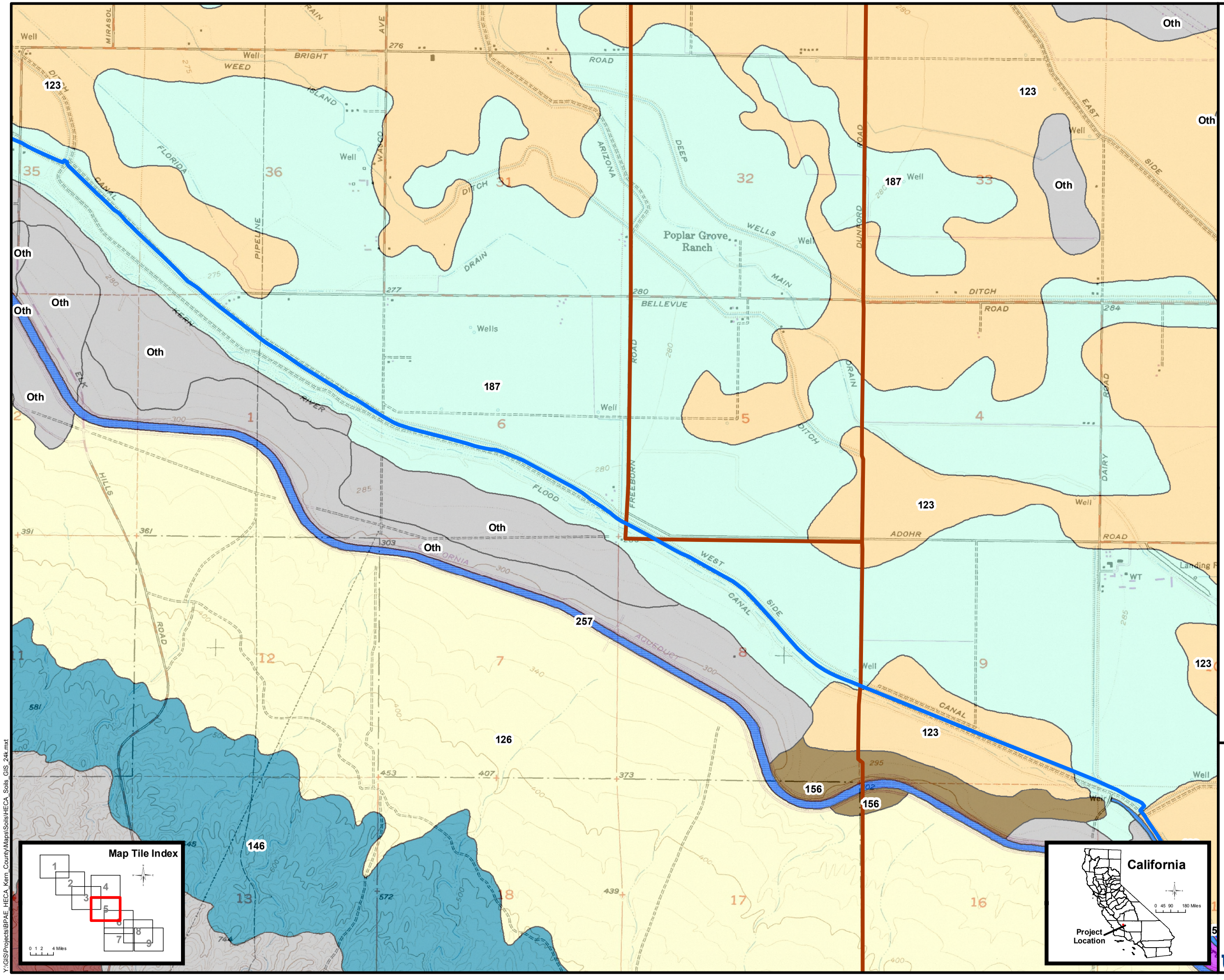

Project Site
Site Access Road
CO2
Natural Gas (NG)
Potable Water
Process Water
Potable Water/NG
Process & Potable Water/NG
Transmission
Transmission/CO2

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USDA-NRCS (SSURGO Soils, 2007)
USDA-NRCS (STATSGO Soils, 2006)

Soil Types

Sheet 5 of 9

Hydrogen Energy California (HECA)

FIGURE 5.9-1

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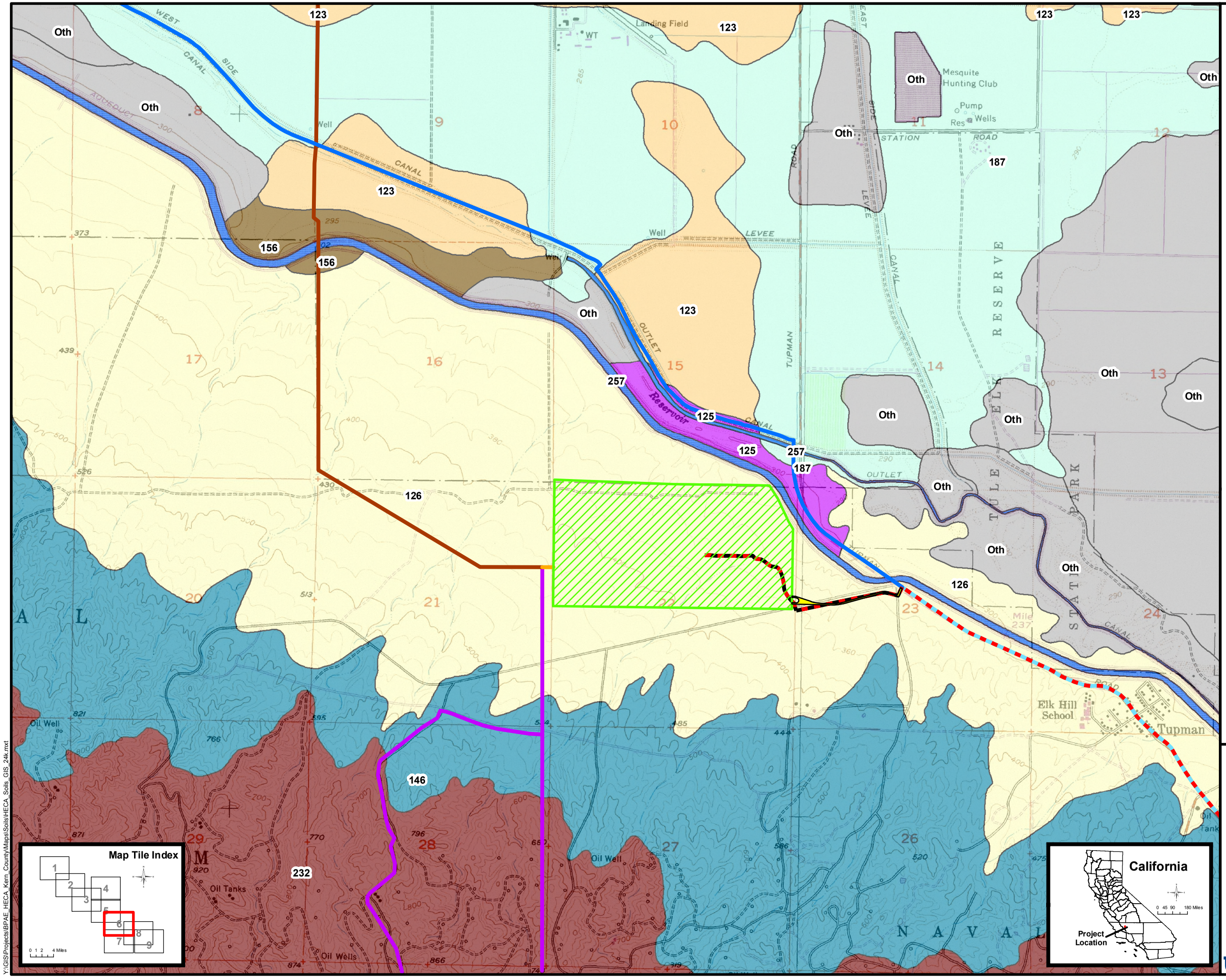

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Soil Types

- Project Site
- Site Access Road
- CO2
- Natural Gas (NG)
- Potable Water
- Process Water
- Potable Water/NG
- Process & Potable Water/NG
- Transmission
- Transmission/CO2

Soil Types

- Oth - Other Soils
- 123 - Buttonwillow Clay, Drained
- 125 - Cajon Loamy Sand, 0%-2% Slopes
- 126 - Cajon Loamy Sand, 2%-5% Slopes
- 127 - Cajon Sandy Loam, Overblown, 0%-2% Slopes
- 146 - Elkhills Sandy Loam, 9%-50% Slopes, Eroded
- 156 - Garces Silt Loam
- 174 - Kimberlina Fine Sandy Loam, 0%-2% Slopes
- 179 - Kimberlina Fine Sandy Loam, Saline-Alkali, 0%-2% Slopes
- 187 - Lokern Clay, Drained
- 188 - Lokern Clay, Saline-Alkali, Drained
- 196 - Milham Sandy Loam, 0%-2% Slopes
- 211 - Panoche Clay Loam, 0%-2% Slopes
- 214 - Panoche Clay Loam, Saline-Alkali, 0%-2% Slopes
- 232 - Torriorthents Stratified, Eroded-Elkhills Complex, 9%-50% Slopes
- 257 - Water
- s775 - Wasco-Kimberlina
- s777 - Lokern-Buttonwillow
- s782 - Westhaven-Lerdo-Excelsior-Cajon

N W E S

0 1,000 2,000 4,000 Feet

Sources:
USGS (7.5' quads: Belridge 1976, Lokern 1976, Buttonwillow 1976, West Elk Hills 1976, East Elk Hills 1977, Taft 1977, Tupman 1977, Buena Vista Lake Bed 1977). Created using TOPO!, ©2006 National Geographic Maps, All Rights Reserved.
USDA-NRCS (SSURGO Soils, 2007)
USDA-NRCS (STATSGO Soils, 2006)

Soil Types

Sheet 6 of 9

Hydrogen Energy California (HECA)

FIGURE 5.9-1

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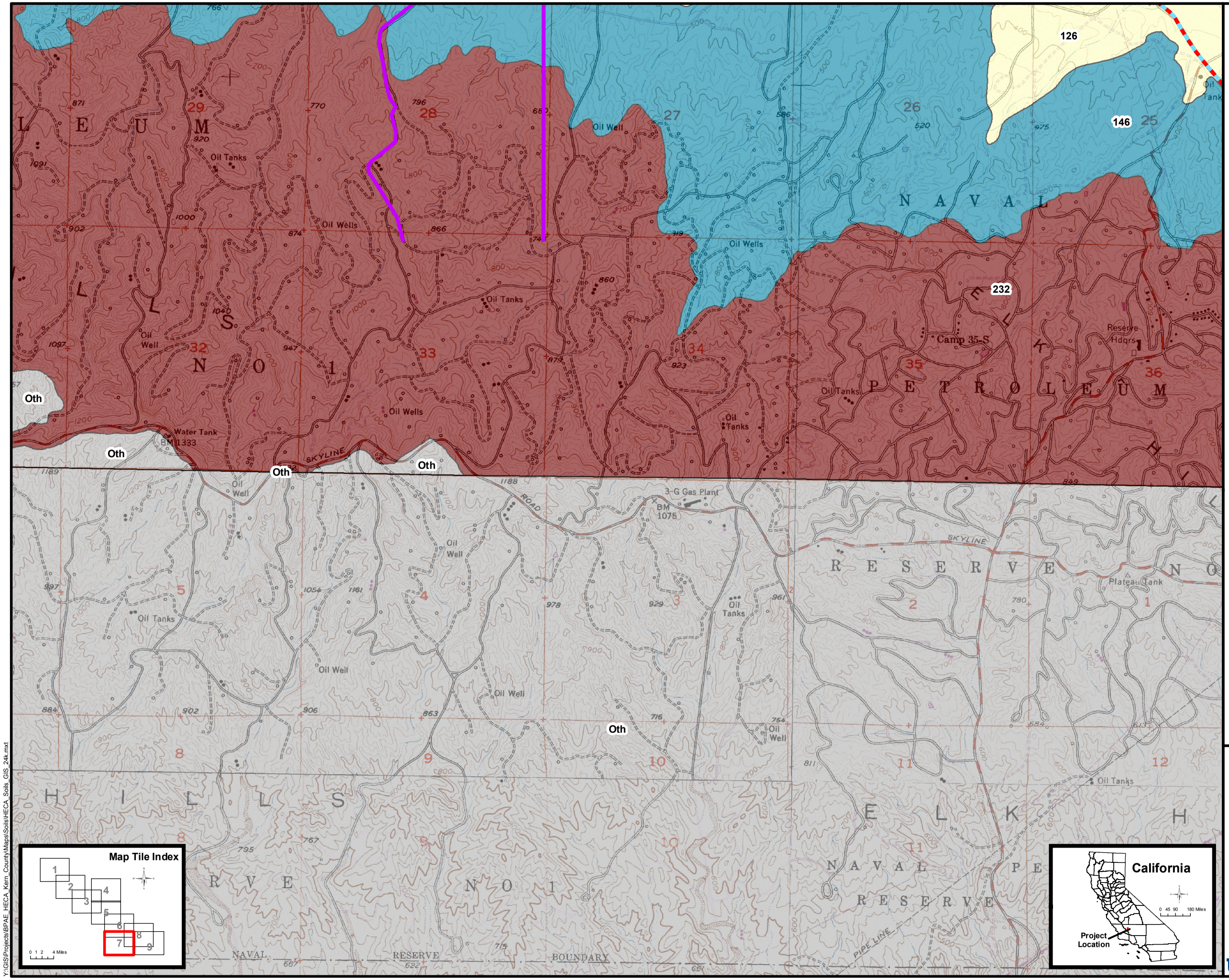

Project Site
Site Access Road
CO2
Natural Gas (NG)
Potable Water
Process Water
Potable Water/NG
Process & Potable Water/NG
Transmission
Transmission/CO2

Soil Types

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0 1,000 2,000 4,000 Feet

Sources:
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USDA-NRCS (SSURGO Soils, 2007)
USDA-NRCS (STATSGO Soils, 2006)

Soil Types

Sheet 7 of 9

Hydrogen Energy California (HECA)

FIGURE 5.9-1

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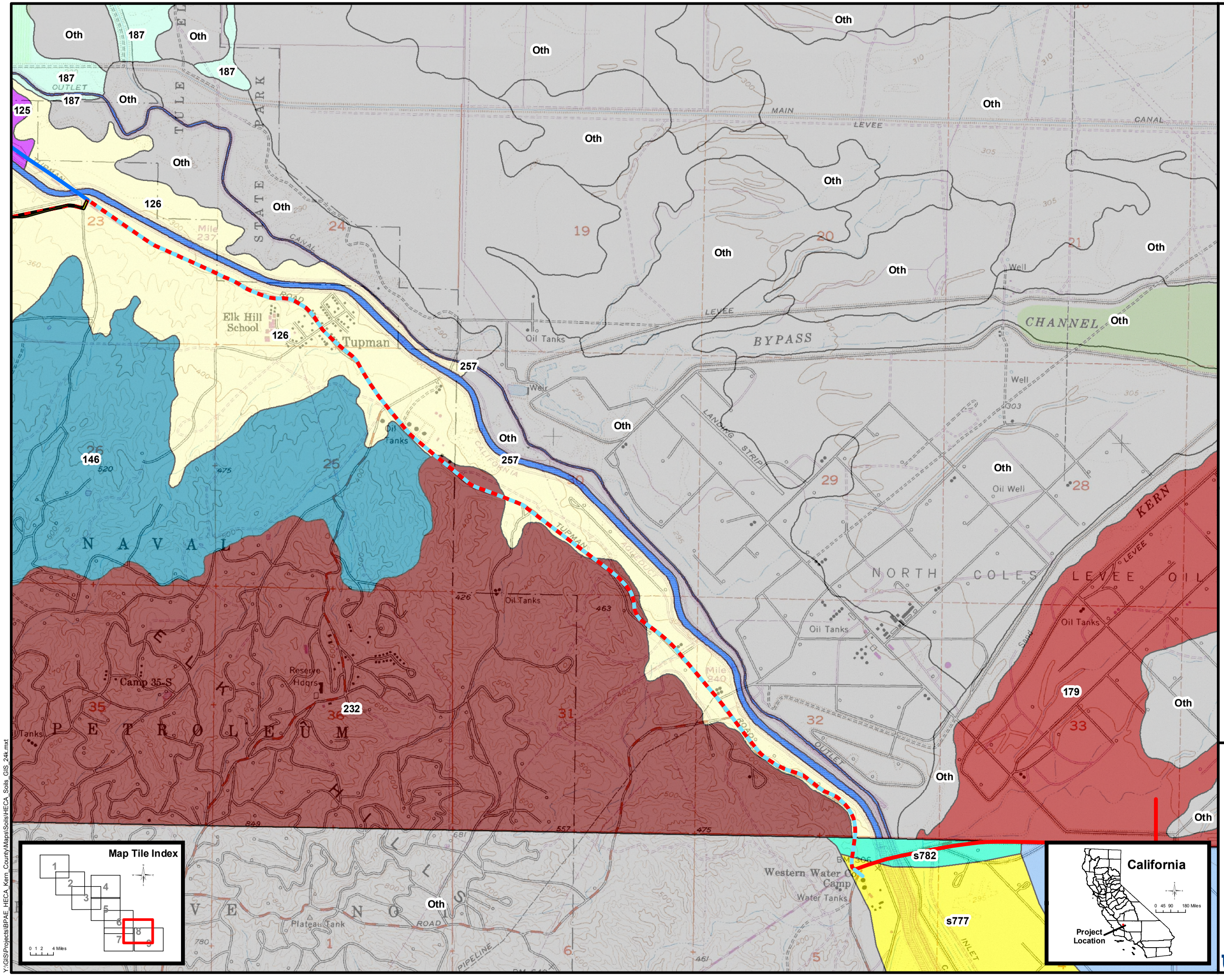

Project Site
Site Access Road
CO2
Natural Gas (NG)
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Process Water
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Process & Potable Water/NG
Transmission
Transmission/CO2

Soil Types

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Sources:
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USDA-NRCS (SSURGO Soils, 2007)
USDA-NRCS (STATSGO Soils, 2006)

Soil Types

Sheet 8 of 9

Hydrogen Energy California (HECA)

FIGURE 5.9-1

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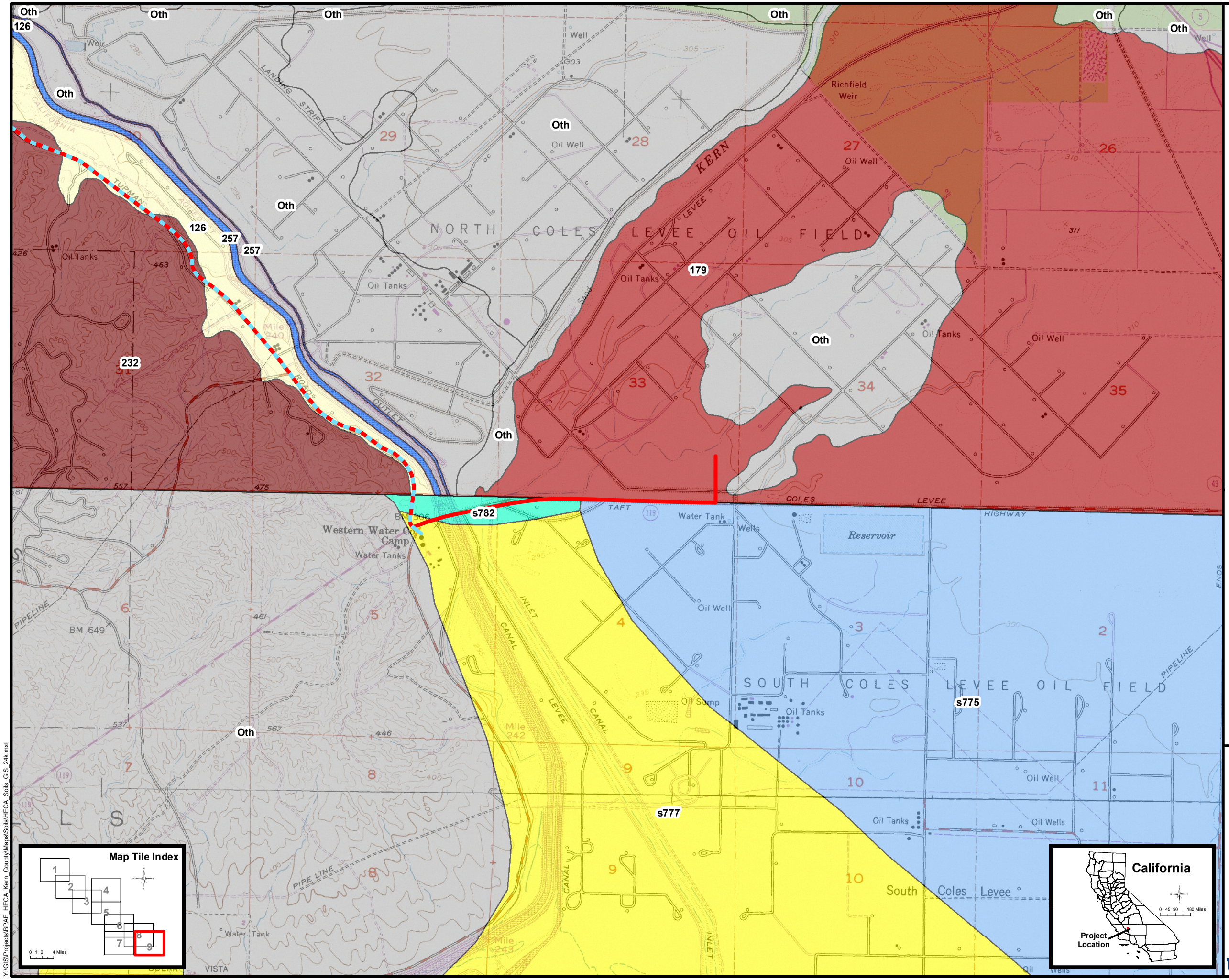

Project Site
Site Access Road
CO2
Natural Gas (NG)
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Process Water
Potable Water/NG
Process & Potable Water/NG
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Transmission/CO2

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USDA-NRCS (SSURGO Soils, 2007)
USDA-NRCS (STATSGO Soils, 2006)

Soil Types

Sheet 9 of 9

Hydrogen Energy California (HECA)

FIGURE 5.9-1

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Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

Technical Area: **Agriculture and Soils** Project: ____ Technical Staff: ____

Project Manager: ____ Docket: ____ Technical Senior: ____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (g) (1)	...provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.	Sections 5.9.1, 5.9.2, 5.9.3, and 5.9.4.		
Appendix B (g) (15) (A)	A map at a scale of 1:24,000 and written description of soil types and all agricultural land uses that will be affected by the proposed project. The description shall include:	Figure 5.9-1: Soil Types		
Appendix B (g) (15) (A) (i)	The depth, texture, permeability, drainage, erosion hazard rating, and land capability class of the soil;	Table 5.9-2: Soil Mapping Units – Descriptions and Properties.		
Appendix B (g) (15) (A) (ii)	An identification of other physical and chemical characteristics of the soil necessary to allow an evaluation of soil erodibility, permeability, re-vegetation potential, and cycling of pollutants in the soil-vegetation system;	Table 5.9-2: Soil Mapping Units – Descriptions and Properties, and Sections 5.9.1.2, and 5.9.2.		
Appendix B (g) (15) (A) (iii)	The location of any proposed fill disposal or fill procurement (borrow) sites; and	Sections 5.9.2.1		
Appendix B (g) (15) (A) (iv)	The location of any contaminated soils that could be disturbed by project construction.	Sections 5.9.2.2 and 5.9.3		
Appendix B (g) (15) (B)	An assessment of the effects of the proposed project on soil resources and agricultural land uses. This discussion shall include:	Section 5.9.1.3 and 5.9.2		
Appendix B (g) (15) (B) (i)	The quantification of accelerated soil loss due to wind and water erosion; and	Section 5.9.2		
Appendix B (g) (15) (B) (ii)	The effect of power plant emissions on surrounding soil-vegetation systems.	Section 5.9.2.6		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

Technical Area: **Agriculture and Soils** Project: ____ Technical Staff: ____

Project Manager: ____ Docket: ____ Technical Senior: ____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (i) (1) (A)	Tables which identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and	Section 5.9.5 and Table 5.9-3: Laws, Ordinances, Regulations, and Standards Applicable to Soils Resources and Agriculture		
Appendix B (i) (1) (B)	Tables which identify each agency with jurisdiction to issue applicable permits, leases, and approvals or to enforce identified laws, regulations, standards, and adopted local, regional, state and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the commission to certify sites and related facilities.	Section 5.9.7 and Tables 5.9-3: Laws, Ordinances, Regulations, and Standards Applicable to Soils Resources and Agriculture; and 5.9-5: Applicable Permits		
Appendix B (i) (2)	The name, title, phone number, address (required), and email address (if known), of an official who was contacted within each agency, and also provide the name of the official who will serve as a contact person for Commission staff.	Section 5.9.6 and Table 5.9-4: Agency Contacts		
Appendix B (i) (3)	A schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits.	Section 5.9.7 and Table 5.9-5: Applicable Permits		