5.4 SOILS

5.4.1 Affected Environment

5.4.1.1 Introduction

The Project is approximately 6 miles east of Coalinga in Fresno County. This region of Fresno County is primarily an agriculture land use area. The site lies in the western portion of the Great Valley Physiographic Region of California, near the eastern side of the California Coast Ranges. The site is located within Pleasant Valley, in the southwestern portion of the San Joaquin Valley, and on the southwestern flank of the Guijarral Hills. The majority of the subject property, which encompasses a 1-square-mile section, is developed for agricultural use. Development observed on site includes several unpaved service roads that separate different fields, a groundwater well, and equipment associated with agriculture.

This section discusses the affected soil resources for the Project (see Figure 5.4-1, Soils in Project Vicinity).

5.4.1.2 Regional Setting

The Project site generally lies on alluvial fan deposits at the transition from the California Coast Ranges to the west and the San Joaquin Valley to the east. The Project vicinity slopes toward the east, where the San Joaquin River, which becomes the Fresno Slough to the south, drains the mountains and surrounding areas. However, the site is on the southwestern flank of the Guijarral Hills that forms part of the eastern boundary of Pleasant Valley. As such, the site is underlain primarily by alluvial fan remnants associated with the local hills. Fan remnants are typically upslope of an alluvial fan and consist of alluvial fan deposits that have been eroded due to their elevation above intermittent streams in the area. Stream terrace deposits are also present near the northeast corner of the Project site. The parent material of the alluvium is derived from Tertiary-age sedimentary rocks, primarily sandstone, mudstone and shale, of the Coast Ranges and the western flank of the Kettleman Hills. The alluvium on and around the site is mapped as Quaternary-age alluvium and Plio-Pleistocene-age sedimentary rock composed of sandy lean and fat clay (CRWQCB 2006). Bedrock is believed to be present several hundred feet bgs in this area.

The site slopes gradually down to the southwest, with elevations ranging from approximately 620 feet above msl in the northeastern corner to 570 feet above msl in the southwestern corner of the site. The southwest corner of the site is relatively level, with slightly steeper grades near the central portion of the site and slightly rougher terrain near the northeast corner. The site is incised by some unnamed northeast-southwest direction drainages, mainly located in the northeastern quarter of the site that have been partially graded and partially converted into agricultural land. The northeastern corner of the site was previously used for oil exploration. While generation of hazardous waste was not reported or identified on site, any contaminated soil encountered during excavation in the vicinity of the former oil fields and/or during removal of equipment associated with the groundwater well and diesel fuel storage tank would require proper treatment or disposal (URS 2008).

5.4.1.3 Affected Soil Resources

Soil formation is a complex phenomenon. The soils within the Project area reflect the nearby geologic deposits, the extent of weathering of those deposits, the degree of slope, the climate the soils have been exposed to, and the degree of modification by human activities. Soil data for the Project were obtained primarily from United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) publications and online data. The primary sources of information include the Soil Survey of Fresno County, California, Western Part (USDA 2006) and Soil Survey Geographic (SSURGO) database for Fresno County, California, Western Part (USDA 2007).

Specific soils mapped within a 2-mile radius of the Project are described in Table 5.4-1 and shown graphically on Figure 5.4-1. At the northeast corner of the Project site, on the flank of the Guijarral Hills, the Mugatu fine sandy loam soils (5 to 30 percent slopes) dominate, with a band of the Mugatu soils (0 to 5-percent slopes) along the base of the hills. The finer-grained alluvial fan deposits on the flatter portion of the site consist primarily of the Lethent clay loam soils, with a smaller area of Ciervo, wet-Ciervo complex soils in the southeast corner of the site. Other soils within the 2-mile buffer are primarily associated with alluvial fan deposits.

Table 5.4-1
Soil Types in the Western Part of Fresno County
(In Proximity to the Project)

Map Unit	Detailed Map Unit Name and Description
Project Site	
588	Mugatu fine sandy loam, 5 to 30-percent slopes
587	Mugatu fine sandy loam, 0 to 5-percent slopes
462	Ciervo, wet-Ciervo complex, saline-sodic, 0 to 1-percent slopes
435	Lethent clay loam, 0 to 1 percent slopes
Soils within 2 Miles of Project	
404	Milham-Guijarral association, 5 to 15-percent slopes
405	Polvadero-Guijarral complex, 5 to 15-percent slopes
412	Yribarren clay loam, 0 to 2-percent slopes
425	Kimberlina sandy loam, 0 to 2-percent slopes
445	Excelsior sandy loam, 0 to 2-percent slopes
447	Excelsior sandy loam, sandy substratum, 0 to 2-percent slopes
448	Excelsior loamy sand, sandy substratum, 0 to 1-percent slopes, eroded
451	Milham sandy loam, 0 to 2-percent slopes
454	Polvadero sandy loam, 0 to 2-percent slopes
455	Polvadero sandy loam, 2 to 5-percent slopes
459	Ciervo clay, 0 to 2-percent slopes

Table 5.4-1
Soil Types in the Western Part of Fresno County
(In Proximity to the Project)
(Continued)

Map Unit	Detailed Map Unit Name and Description
474	Westhaven loam, 0 to 2-percent slopes
476	Posochanet clay loam, saline-sodic, 0 to 2-percent slopes
477	Westhaven clay loam, 0 to 2-percent slopes
478	Cerini sandy loam, 0 to 2-percent slopes
479	Cerini clay loam, 0 to 2-percent slopes
480	Calflax clay loam, saline-sodic, 0 to 2-percent slopes
488	Wasco sandy loam, 0 to 2-percent slopes
489	Wasco sandy loam, 2 to 5-percent slopes
404	Milham-Guijarral association, 5 to 15-percent slopes

Source for soils mapping and characteristics: U.S. Department of Agriculture, NRCS, SSURGO data, Fresno County, Western Part, California, GIS; STATSGO, 2007.

The Mugatu and Lethent units and Ciervo, wet-Ciervo complex are described below. These and other soils in the vicinity and their soil properties are presented in Table 5.4-2. Refer to Section 5.3, Geological Hazards and Resources for the site-specific engineering characteristics of the subsurface soils.

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Table 5.4-2
Properties of Detailed Soil Map Units
Western Part of Fresno County
(In Proximity to the Project)

Map Unit	Soil Association	Texture [1]	Depth of Surface Layer [2] (inches)	Soil Permeability Class [3]	Natural Drainage Class [4]	Land Capability Class [5]	Erosion Factors [6]			Wind Erodibility [7] (Group/ Index)
							Kw	Kf	T (tons/ acre/year)	
Project Site										
435	Lethent	clay loam	25	slow	Moderately well drained	3s-6/7s	0.37	0.37	3	6/48
462	Ciervo, wet-Ciervo complex	clay	17	very slow	Moderately well drained	3s-6/7s	0.28	0.28	5	4/86
587	Mugatu (0 to 5% slopes)	sandy loam	24	moderately slow	Well drained	2e-1/6e	0.28	0.28	4	3/86
588	Mugatu (5 to 30% slopes)	sandy loam	24	moderately slow	Well drained	4e-1/6e	0.28	0.28	4	3/86
Soils within 2 Miles of Project										
404	Milham-Guijarral association	sandy loam	6	mod. slow (Milham)/ mod. rapid (Guijarral)	Well drained	3e-1/7e	0.32 (Milham) / 0.24 (Guijarral)	0.32	5 (Milham)/ 4 (Guijarral)	3 / 86
405	Polvadero-Guijarral complex	sandy loam	12	mod. Slow (Polvadero)/ mod. rapid (Guijarral)	Well drained	3e-1/7e	0.28 (Polvadero)/ 0.24 (Guijarral)	0.32	5 (Polvadero) / 4 (Guijarral)	3 / 86
412	Yribarren	clay loam	16	slow	Well drained	2s-5/7s	0.37	0.37	5	4L/86
425	Kimberlina	sandy loam	14	moderately rapid	Well drained	1/7c	0.32	0.32	5	3 / 86
445	Excelsior (0 to 2% slopes)	sandy loam	23	moderate	Well drained	1/7c	0.28	0.28	5	3/86

Table 5.4-2
Properties of Detailed Soil Map Units
Western Part of Fresno County
(In Proximity to the Project)
(Continued)

Map Unit	Soil Association	Texture [1]	Depth of Surface Layer [2] (inches)	Soil Permeability Class [3]	Natural Drainage Class [4]	Land Capability Class [5]	Erosion Factors [6]			Wind Erodibility [7] (Group/ Index)
							Kw	Kf	T (tons/ acre/year)	
447	Excelsior (sandy sub., 0 to 2 % slopes)	sandy loam	23	moderate	Well drained	2s-4/7s	0.28	0.28	4	3/86
448	Excelsior (sandy sub., 0 to 1% slopes)	loamy sand	8	moderate	Well drained	2s-1/7e	0.17	0.17	4	2/134
451	Milham	sandy loam	6	moderately slow	Well drained	1/7c	0.32	0.32	5	3/86
454	Polvadero (0 to 2 % slopes)	sandy loam	12	moderately slow	Well drained	2s-1/7s	0.28	0.32	5	3/86
455	Polvadero (2 to 5 % slopes)	sandy loam	12	moderately slow	Well drained	2e-1/7e	0.28	0.32	5	3/86
459	Ciervo	clay	17	slow	Moderately well drained	2s-3/7s	0.28	0.28	5	4/86
474	Westhaven	loam	7	moderately slow	Well drained	1/7c	0.37	0.37	5	6/48
476	Posochanet	clay loam	15	slow	Moderately well drained	2s-6/7s	0.32	0.32	NA	NA
477	Westhaven	clay loam	12	moderately slow	Well drained	1/7c	0.37	0.37	5	6/48
478	Cerini	sandy loam	5	moderately slow	Well drained	1/7c	0.28	0.28	5	3/86
479	Cerini	clay loam	5	moderately slow	Well drained	1/7c	0.37	0.37	5	6/48
480	Calflax	clay loam	8	moderately slow	Moderately well drained	2s-6/7s	0.37	0.37	5	6/48

Table 5.4-2
Properties of Detailed Soil Map Units
Western Part of Fresno County
(In Proximity to the Project)
(Continued)

Map Unit	Soil Association	Texture [1]	Depth of Surface Layer [2] (inches)	Soil Permeability Class [3]	Natural Drainage Class [4]	Land Capability Class [5]	Erosion Factors [6]			Wind Erodibility [7] (Group/ Index)
							Kw	Kf	T (tons/ acre/year)	
488	Wasco (0 to 2 % slopes)	sandy loam	21	moderately rapid	Well drained	2s-4/7e	0.32	0.32	5	3/86
489	Wasco (2 to 5 % slopes)	sandy loam	21	moderately rapid	Well drained	2e-1/7e	0.32	0.32	5	3/86

Source for soils mapping and characteristics: U.S. Department of Agriculture, NRCS, SSURGO data, Fresno County, Western Part, California, GIS; STATSGO, 2007.

Notes:

1. Texture = USDA texture of surface layer.
2. Surface layer was considered A-horizon.
3. Permeability refers to saturated hydraulic conductivity. Classifications listed are for the surface horizon. Permeability rates (cm/hr): Very slow - < 0.13, Slow - 0.13-0.3; Moderately slow - 0.5-2.0; Moderate - 2.0-6.3; Moderately rapid - 6.3-12.7.
4. Drainage class is based on specific soil morphological features and common site indicators. Drainage classes include: very poorly drained, poorly drained, somewhat poorly drained, moderately well drained, well drained, somewhat excessively drained and excessively drained.
5. Table presents irrigated/nonirrigated land capability classification. Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Capability classes range from 1 to 8, with higher numbers indicating progressively greater limitations and narrower choices for use: Class 1 - slight limitations that restrict use; Class 2 - moderate limitations restricting choice of plants, or requiring moderate conservation practices; Class 3 - severe limitations restricting plant choice or requiring conservation; Class 4 - severe limitations, requiring very careful management; Class 5 - subject to little or no erosion, but mainly restricted use to pasture, rangeland, forestland, wildlife habitat; Class 6 - severe limitations, generally unsuitable for cultivation, restrictions per Class 5; Class 7 - severe limitations, unsuitable for cultivation, restrictions per Class 5. Capability subclasses: e - erosion is main hazard unless close-growing plant cover maintained; s - soil limited because shallow, droughty or stony; c - chief limitation is very cold or dry climate. Capability units (after '-') are soil groups within a subclass with similar suitability for crops and pasture plants with similar management requirements and productivity.
6. Erosion factors Kw and Kf indicate the soil's susceptibility to sheet and rill erosion by water: Kw indicates the erodibility of the whole soil, modified by the presence of rock fragments; Kf indicates the erodibility of the fine (less than 2 mm) fraction. Kw and Kf range from 0.02 to 0.69, with higher values more susceptible to erosion. Kw and Kf given for upper soil unit only. T is an estimate of the maximum annual rate of soil erosion by wind or water that will not affect crop productivity.
7. Wind erodibility groups range from 1 to 8, with 1 being highly erodible and 8 having low erodibility. Wind erodibility index is the estimated soil loss due to wind measured in tons per acre per year.

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5.4.1.3.1 Mugatu Units

Two Mugatu units are present on the northeast half of the site. Both are described as sandy loam and are typically present on stream terraces. In general, these soils are Land Capability Class 2 (0 to 5-percent slopes) or 4 (5 to 30-percent slopes) for irrigated conditions and Capability Class 6 for the nonirrigated condition. Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices. Class 4 soils have very severe limitations for plants or require very careful management, or both. Class 6 soils have severe limitations that make them unsuitable for cultivation and restrict use primarily to grazing, forestland, or wildlife habitat. The 'e' capability subclass indicates that erosion is the main hazard for the soils unless close-growing plant cover is maintained. Due to the restrictions on these units, the soil is typically used for livestock grazing.

Permeability of these soils is Moderately Slow, while the natural drainage class is Well Drained. The erosion factors for the units indicate they have a relatively low to moderate potential for water erosion, and a wind erodibility group of 3 suggests there is a moderate potential for wind erosion.

The surface layers (A-horizons) for these soils are about 24 inches thick. Below the A-horizon, clay-enriched subsoil layers (B-horizons) extend to a total depth of 60 inches. Oil exploration was concentrated in the higher elevation portion of this area of the site, although exploration remnants have since been removed from the site and/or obscured. The lower-elevation portions are used for irrigated farming.

5.4.1.3.2 Lethent Unit

The Lethent clay loam unit occupies the majority of the southwest side of the site, which is relatively level and used for agriculture. In general, these soils are Capability Class 3 for irrigated conditions and Capability Class 7 for the nonirrigated condition. Class 3 soils have severe limitations for plants or require special conservation practices, or both. Class 7 soils also have very severe limitations for cultivation and restrict land use primarily to grazing, forestland, or wildlife habitat. The 's' capability subclass indicates that the soil is limited mainly because it is shallow, droughty, or stony. The unit is typically used for crops that are tolerant of saline-sodic development.

Permeability of Lethent soils is Slow, while the natural drainage class is Moderately Well Drained. The erosion factors for the units indicate they have a moderate potential for water erosion, and a wind erodibility group of 6 suggests there is a lower potential for wind erosion. The A-horizon for this unit is about 25 inches thick, and the B-horizons extend to a total depth of 62 inches.

5.4.1.3.3 Ciervo, Wet-Ciervo Complex

The Ciervo, wet-Ciervo Complex is composed of clay soils on the site's southeast corner, which is also used for agriculture. A natural depression or drainage is present near the site southeastern boundary (URS 2008). The Land Capability Classes are the same as for the Lethent unit: Capability Class 3 for irrigated conditions and Capability Class 7 for the nonirrigated condition. The unit is typically present in valleys and is used for crops that are tolerant of saline-sodic development.

Permeability of these soils is Very Slow, while the natural drainage class is Moderately Well Drained. The erosion factors for the units indicate they have a relatively low to moderate potential for water

erosion, and a wind erodibility group of 5 suggests there is a low to moderate potential for wind erosion. The A-horizon for this unit is relatively thin, about 17 inches thick, and the B-horizons extend to a total depth of 60 inches.

5.4.1.4 Agriculture and Prime Farmland

The site is disturbed land and the majority has been used as agricultural land or for grazing. Based on the assessments presented in Section 5.9, Land Use, the proposed Project area does not contain prime farmland; however, the Project site is considered farmland of local importance. Further, Parcel 085-030-57S (469 acres) is currently under a Williamson Act Contract. The Project's impact on agricultural lands is described in Section 5.9, Land Use.

5.4.2 Environmental Consequences

The Project's environmental consequences, with respect to soil and agricultural resources, are mainly related to Project construction and operation. Grading will be performed in the areas planned for solar collectors, power-generation equipment, building pads, electrical transmission facilities, utilities, access roads, and drainage.

Environmental consequences related to soils are presented in Section 5.4.2.1, Soils Resource, and environmental consequences related to agricultural resources are presented in Section 5.4.2.2, Agriculture and Prime Farmland. Potential effects resulting from Project emissions are presented in Section 5.4.2.3, Potential Effects of Project Emissions.

5.4.2.1 Soils Resources

California Environmental Quality Act (CEQA), Appendix G, identifies the criterion below for determining significance of effects 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.

The assessment of Project effects on soil resources is based on soils information presented in the Soil Survey of Fresno County, California, Western Part (USDA 2006) and SSURGO database for Fresno County, California, Western Part (USDA 2007) and consideration of the applicant-committed mitigation measures. The Project's potential effects on soil resources can be divided between those involving construction activities and those related to Project operation. 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.

Quantitative calculations of potential soil loss using the Revised Universal Soil Loss Equation 2 (RUSLE2) computer model and the Wind Erosion Prediction System (WEPS) computer model have been performed, and the results are presented below. The Project area soil conditions include slightly sloping

topography and disturbance due to farming and access road construction. The planned site terracing was considered in the calculations.

The average annual soil erosion rates by sheet, and rill erosion caused by rainfall runoff for the Project soil associations are provided in Table 5.4-3, Soil Erosion Rates. Several soil textures were used for the calculations to correlate soil loss rates with soil texture. Based upon the calculations, without the use of erosion and sediment control BMPs, the existing condition erosion rates increase during construction due primarily to fill placement. However, the proposed Project will use construction- and operation-phase erosion and sediment control BMPs, and final stabilization, to reduce soil erosion rates to at or below existing levels. Soil erosion rates due to stormwater runoff will decrease in the operation phase due to implementation of erosion and sediment control BMPs and final site stabilization.

The Wind Erodibility Indices provided in the SSURGO database are 48 tons per acre per year (ton/ac/yr) for the Lethent unit and 86 ton/ac/yr for the other units on the site (Ciervo and Mugatu units), as shown in Table 5.4-2. The *Wind Erodibility Index* is the theoretical, long-term amount of soil lost per year through wind erosion. It is based on the assumption that the soil is bare, lacks a surface crust, occurs in an unsheltered position, and is subject to the weather at Garden City, Kansas. These wind erodibility index values were checked using the WEPS model with Fresno County wind and climate information. Based on the analysis results, soil loss due to wind erosion is estimated to be in trace amounts for the existing conditions and for the construction and operational phases (with BMPs). Wind erosion control BMPs (e.g., tracking control, stabilized construction entrance/exits, construction road stabilization, and dust control) will be used to maintain or reduce existing wind erosion rates during construction and operation.

The RUSLE2 and WEPS soil loss calculations are provided in Appendix D-1, Soil Loss Calculations.

Table 5.4-3
Soil Erosion Rates

Soil Map Unit	Existing (ton/ac/yr)	Construction - with no BMPs (ton/ac/yr)	Construction - with BMPs (ton/ac/yr)	Operations with BMPs (ton/ac/yr)
435	1.5	13.0	0.73	0.44
462	1.1	7.9	0.56	0.33
587	1.1	27.9	0.52	0.34
588	1.1	27.8	0.52	0.34

Source: URS Corporation calculations using WEPS and RUSLE2 computer models (see Appendix D-1, Soil Loss Calculations).

Notes:

Soil erosion rates reflect wind erosion predicted using the WEPS model and sheet flow and rill erosion caused by stormwater runoff and calculated using Revised Universal Soil Loss Equation (version 2), RUSLE2 computer program

BMP = Erosion and Sediment Control Best Management Practice (e.g., Erosion Blanket, Mulch, Silt Fence, Fiber Roll, and/or final stabilization, etc.)

ton/ac/yr = tons per acre per year

Construction-Related Effects

Construction-related effects to soil resources associated with Project development, including the proposed electrical transmission line, primarily involve vegetation removal, excavation, grading, and temporary soil stockpiling. Approximately 640 acres of land will be disturbed during construction, with the completed Project site improvements limited to approximately 640 acres.

The existing site topography includes an area sloping gently to the southwest. Some minor cut and fill will be required to provide level areas for the Project facilities, including construction areas at each mirror location. Surficial soils will likely be excavated and recompacted within the areas of proposed Project facilities. Where possible, slopes will be returned to natural grades after the completion of construction. Construction will also include approximately 6 miles of electrical transmission line.

Project construction effects on soil resources can include alteration of the existing soil profile, increased soil erosion, and soil compaction. Alteration of the existing soil profiles, including mixing of soils and rock, will alter the physical, chemical, and biological characteristics of the native soils and underlying geology. Clearing or cutting of the protective vegetative cover and subsequent soil disturbance will likely result in short-term increases in water and wind erosion rates. Soil erosion causes the loss of topsoil and can increase the sediment load in receiving surface waters downstream of the construction site. Soil compaction can decrease infiltration rates, resulting in increased runoff and erosion rates.

The magnitude, extent, and duration of construction-related effects depend on soil erodibility; the proximity of the construction activity to receiving water; and the construction methodologies, duration, and season. Erosion characteristics of the site soil units are considered low to moderate for erosion by water or wind. The Project site's gentle topography and the limited site grading required for the proposed Project would limit soil erosion to minor or moderate levels. Project-related soil erosion will be minimized through implementation of erosion BMPs. The mitigation measures outlined in Section 5.4.4, Mitigation Measures, would further reduce effects to soil resources resulting from Project construction to less-than-significant levels.

Construction of the two proposed hybrid solar/biomass units will result in soil compaction due to the site grading and the placement of foundations and paving. Soil compaction will also result from construction vehicle traffic along temporary access roads and in equipment staging areas. Compaction makes the soil denser, reducing pore space and impeding water and gas movement through it. Such compaction can result in increased runoff, erosion, and sedimentation; however, incorporation of erosion control measures during Project construction will result in less than significant impacts from soil compaction.

While there is no documented contamination at the site, site preparation and Project construction may potentially involve excavation of contaminated soils. Contaminated excavated soils, if encountered, will be stored temporarily in onsite construction zones, then removed for appropriate disposal or treatment and recycling. Management of contaminated excavated materials will be conducted in accordance with applicable federal, state, and local regulations, as described in Section 5.14, Waste Management; therefore, impacts to the potential receiving waters will be less than significant. As applicable, engineered fill will be imported to replace excavated site soils that are not suitable for reuse.

Operation-Related Effects

Following construction, wind, and water erosion on developed portions of the site will be reduced because the majority of SJS 1&2 site will be compacted, with minor areas covered with asphalt, concrete, and/or gravel. Drainage will be controlled through infiltration basins. Implementation of the Applicant-committed mitigation measures is expected to limit impacts to the soils resource to insignificant levels.

5.4.2.2 Agriculture and Prime Farmland

CEQA, Appendix G, identifies the criteria listed below for determining significance of effects to agriculture and prime farmland.

- Does the Project convert prime farmland, unique farmland, or farmland of statewide importance to nonagricultural uses?
- Does the Project conflict with existing zoning for agricultural use or a Williamson Act contract?
- Does the Project involve other changes in the existing environment that, because of their location or nature, could result in conversion of farmland to nonagricultural use?

As discussed in Section 5.9, Land Use, the Project does not convert prime farmland, unique farmland or farmland of statewide importance; however, the Project site is considered farmland of local importance and a portion of the Project site does conflict with a Williamson Act contract. The Project site land use will be changed permanently from agriculture and open space to solar/biomass hybrid power generation. A total of 640 acres of designated agriculture, rangeland, and open space will be converted to a non-agricultural industrial use (as discussed in Section 5.9, Land Use).

5.4.2.3 Potential Effects of Project Emissions

Project construction and operation will not expose nearby soils and vegetation to any significantly increased levels of air pollutants, as discussed in Section 5.2, Air Quality. As presented, these emissions would not adversely affect Project habitats. Based on the minimal level of emissions, the paucity of surrounding vegetation, and the implementation of dust-control measures, effects to the soil vegetation system from Project emissions are expected to be insignificant.

5.4.3 Cumulative Impacts

From a soils and agricultural lands resources perspective, no cumulative effects have been identified for the Project.

5.4.4 Mitigation Measures

The following mitigation measures will be implemented to reduce potentially significant effects to soils resources to less-than-significant levels. An acceptable level of soil erosion, as used herein, is defined as that amount of soil loss that would 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.

With implementation of the mitigation measures listed below, no significant unavoidable adverse effects to soils resources are anticipated because of Project construction and operation.

- **Soil-1:** Conduct grading operations consistent with Fresno County's "Grading and Excavation" ordinance.
- **Soil-2:** Prepare and implement a detailed Drainage, Erosion, Sediment Control Plan before construction, which may be a component of the Project SWPPP (see Section 5.5, Water Resources).
- **Soil-3:** Limit soil erosion/dust generation by wetting active construction areas (including roads) with water or by applying dust palliatives (soil binders).
- **Soil-4:** Stabilize disturbed areas that will not be covered with structures (*e.g.,* buildings or collectors) or pavement following grading and/or cut-and-fill operations. Stabilization methods will include moisturizing and compacting.
- **Soil-5**: Minimize disturbance of soils and vegetation by reducing access and construction areas to smallest practical dimensions.
- **Soil-6:** Cut/mow vegetation when removal is necessary, clear vegetation only to the extent necessary during construction activities.
- **Soil-7:** Segregate and stockpile removed topsoil for reuse, if practicable.
- **Soil-8:** Implement drainage control measures and grade the Project site to direct surface water runoff into the retention basins.
- **Soil-9:** Conduct post-construction monitoring of areas that were disturbed during the construction phase.

5.4.5 LORS Compliance

The LORS summarized in Table 5.4-4, Summary of LORS, are applicable to protection of soils resources.

Table 5.4-4
Summary of LORS

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Federal					
Federal government	Federal Water Pollution Control Act of 1972; Clean Water Act of 1977 (including 1987 amendments).	Meet discharge requirements relative to sediment because of accelerated erosion.	5.4.2, 5.4.3	RWQCB, Colorado River Basin Region 7, under the direction of the State Water Resources Control Board	4, 5
U.S. Department of Agriculture	U.S. Department of Agriculture, SCS, National Engineering Handbook (1983), Sections 2 and 3.	Implement standards for the planning, design, and conservation of soil conservation practices.	5.4.2, 5.4.3	NRCS	1
State					
State of California	California Public Resource Code §25523(a)	Design, site, and operate the Project to protect environmental quality and assure public health and safety.	5.4.2, 5.4.3	CEC	2
State of California	California Public Resource Code §21000 *et. seq*.; Guidelines for Implementation of California Environmental Quality, Appendix G	Environmental checklist form, evaluation of erosion or siltation and conversion of agricultural lands.	5.4.2, 5.4.3	CEC	2
California Department of Conservation	Williamson Act	Provides for lowered property taxes for lands maintained in agricultural and certain open space uses.	5.4.2.2, 5.9.1	California Department of Conservation, Division of Land Resource Protection	3

Table 5.4-4
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
State of California	California Porter-Cologne Water Quality Control Act; California Water Code, Division 7, §13260–13269	Provide adequate protection of water quality by appropriate design, sizing and construction of erosion and sediment controls; obtain waste discharge requirements concerning potential surface water pollution from Project runoff.	5.4.2, 5.4.3	CEC, RWQCB Colorado River Basin Region 7	2, 4
Local					
Fresno County	Fresno County Building and Construction Code, Title 15: Chapter 15.28	Establishes grading and excavation requirements during the Project construction phase.	5.4.2, 5.4.3	Fresno County Department of Public Works and Planning, Development Engineering	6

Notes:
CEC = California Energy Commission
LORS = laws, ordinances, regulations, and standards
NRCS = Natural Resources Conservation Service
RWQCB = Regional Water Quality Control Board
SCS = Soil Conservation Service

5.4.5.1 Federal

Federal Water Pollution Control Act of 1972; Clean Water Act of 1977 (including its 1987 amendments)

These authorities establish requirements for any facility or activity that has or that will discharge wastes (including sediment because of accelerated erosion) that may interfere with the beneficial uses of receiving waters.

The administering agency for the above authority is the Regional Water Quality Control Board (RWQCB), Colorado River Basin, Region 7, under the direction of the State Water Resources Control Board.

An SWPPP would be submitted to RWQCB for review and approval. The SWPPP would incorporate all appropriate erosion control measures to be followed during Project construction.

U.S. Department of Agriculture, Soil Conservation Service, National Engineering Handbook (1983), Sections 2 and 3

The U.S. Department of Agriculture prescribes standards of technical excellence for the Soil Conservation Service (SCS) (now the NRCS) for the planning, design, and construction of soil conservation practices.

The administering agency for the above authority is the NRCS.

The Applicant would adhere to the appropriate standards associated with the planning, design, and construction of soil conservation practices.

5.4.5.2 State

California Public Resources Code Section 25523(a) and California Code of Regulations Sections 1752, 1752.5, 2300-2309, and Chapter 2, Subchapter 5, Article 1, Appendix B, Part (i)

The code provides for protection of environmental quality. Regarding the Project, the code requires submission of information to the CEC concerning potential environmental effects, and the CEC's decision on the Application for Certification must include consideration of environmental protection.

The administering agency for the above authority is the CEC.

California Environmental Quality Act, California Public Resources Code Section 21000 et seq.; Guidelines for Implementation of the California Environmental Quality Act of 1970, 14 California Code of Regulations Section 150000-5387, Appendix G

The CEQA guidelines specify that: "A project will normally have a significant effect on the environment if it will…[¶] (q) Cause substantial flooding, erosion or siltation; …[¶](y) Convert prime agricultural land to nonagricultural use or impair the agricultural productivity of prime agricultural lands."

The administering agency for the above authority is the CEC.

The Project would comply with these CEQA requirements because BMPs would be implemented to mitigate significant erosion, siltation, or flooding effects. The Project site would not require the conversion of prime agricultural land to non-agricultural use; the Land Evaluation and Site Assessment model does not indicate a significant effect; the Project does not represent a significant net loss of farmland. The Project is located on land covered by a Williamson Act contract; however, the contract will be cancelled.

California Land Conservation Act (Williamson Act), California Government Code Title 5, Part 1, Chapter 7 Sections 51200-51295

The Williamson Act provides for lowered property taxes for lands maintained in agricultural and certain open space uses. The landowner enters into a contract with the county or city to restrict land uses to those

compatible with agriculture, wildlife habitat, scenic corridors, recreational use, or open space. In return, the local authorities calculate the property tax assessment based on the actual use of the land instead of its potential value assuming full commercial development. To be eligible, the land must be designated by a city or county as agricultural preserve, scenic highway corridor, or wildlife habitat area; or it must be actively used for the three years immediately preceding the beginning of the contract as a salt pond, managed wetland, or recreational or open space area.

The administering agency for the above authority is the Department of Conservation, Office of Land Conservation.

The Project is expected to require the cancellation of a Williamson Act contract.

California Porter-Cologne Water Quality Control Act of 1972; California Water Code, Section 13260-3269; 23 California Code of Regulations Chapter 9

The code 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 the filing of a report of waste discharge (Water Code §13260(a)), and provides for the issuance of waste discharge requirements regarding the discharge of any waste that can affect the quality of the waters of the state. Regarding potential surface water pollution from Project runoff, the waste discharge requirements may incorporate requirements based on the following sources of recommended methods and procedures.

The administering agencies for the above authority are CEC and RWQCB (Colorado Basin, Region 7).

The Project would develop an Erosion Control Plan to address surface water runoff.

5.4.5.3 Local

Fresno County Ordinance Code, Chapter 15.28, Grading and Excavation

This section of the Municipal Code establishes grading and excavation requirements during the construction phase of the Project. The administering agency is Fresno County Department of Public Works and Planning, Development Engineering division.

The Applicant would comply with the ordinance requirements through the CEC review process. Project grading and drainage plans would incorporate BMPs and appropriate grading techniques that would minimize the amount of cut and fill. Grading plans would implement erosion control measures for construction and a permanent storm water drainage plan. A registered engineer would prepare the grading and drainage plans.

5.4.5.4 Agencies and Agency Contacts

Agency contacts are provided in Table 5.4-5, Agency Contact List for LORS.

Table 5.4-5
Agency Contact List for LORS

No.	Agency	Contact	Address	Telephone
1	U.S. Department of Agriculture, Natural Resources Conservation Services	David Durham	4625 W Jennifer Ave Ste 109 Fresno, CA 93722-6424	(559) 276-7494
2	California Energy Commission	Eileen Allen, Energy Facility Licensing Program	1516 Ninth Street Sacramento, CA 95814-5504	916-654-4082
3	California Department of Conservation, Division of Land Resource Protection	Bridgett Luther	801 K Street, MS 18-01 Sacramento, CA 95814-3528	916-324-0850
4	Regional Water Quality Control Board, Colorado River Basin Region	John Carmona	73-720 Fred Waring Drive, Suite 100 Palm Desert, CA 92260	760-346-7491
5	California Department of Water Resources	Lester Snow	1416 9th Street Sacramento, CA 94236-0001	916-653-5791
6	Fresno County Department of Public Works & Planning, Development Engineering	Gladys Guzman	2220 Tulare Street, 6th Floor Fresno, CA 93721	559-262-4022

5.4.5.5 Permits Required and Permitting Schedule

Applicable permits and schedules are provided in Table 5.4-6, Applicable Permits.

Table 5.4-6
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
Regional Water Quality Control Board Colorado River Basin Region 7	Notice of Intent	Before construction
	National Pollutant Discharge Elimination System General Construction Storm Water Permit	Before construction
Fresno County	Grading Permit, Construction Permit	Before construction
	Development Permit Requirements to be met	Before construction
	Septic Tank/Leach Field Permit	Before construction

5.4.6 References

California Regional Water Quality Control Board (CRWQCB). 2006. San Joaquin Valley Groundwater Basin, Pleasant Valley Subbasin, Tulare Lake Hydrologic Region, San Joaquin Valley Groundwater Basin California's Groundwater Bulletin 118, January 20.

United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS). 2006. Soil Survey of Fresno County, California, Western Part.

United States Department of Agriculture, Natural Resources Conservation Service. 2007. Soil Survey Geographic (SSURGO) database for Fresno County, California, Western Part. [Available Online, http://soildatamart.nrcs.usda.gov/].

URS Corporation Americas. 2008. Phase I Environmental Site Assessment, San Joaquin Solar 1&2, Assessor's Parcel Nos. 85-030-57S and 85-030-58S, West Jayne Avenue, Coalinga, California, 92259. URS Project No. 27658031.01400. June 10 (draft).

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

Technical Area: **Soils** Project: San Joaquin Solar 1&2 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.	5.4.1 5.4.2 5.4.3 5.4.4		
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 5.4-1* (*Note: scale modified to 1:63,360 [1"=1 mile] due to size of project and extent of linears)		
Appendix B (g) (15) (A) (i)	The depth, texture, permeability, drainage, erosion hazard rating, and land capability class of the soil;	Table 5.4-2		
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 5.4-2		
Appendix B (g) (15) (A) (iii)	The location of any proposed fill disposal or fill procurement (borrow) sites; and	5.3.1		
Appendix B (g) (15) (A) (iv)	The location of any contaminated soils that could be disturbed by project construction.	5.4.1.2		
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:			
Appendix B (g) (15) (B) (i)	The quantification of accelerated soil loss due to wind and water erosion; and	5.4.2.1		

Adequacy Issue: Adequate ____ Inadequate ____

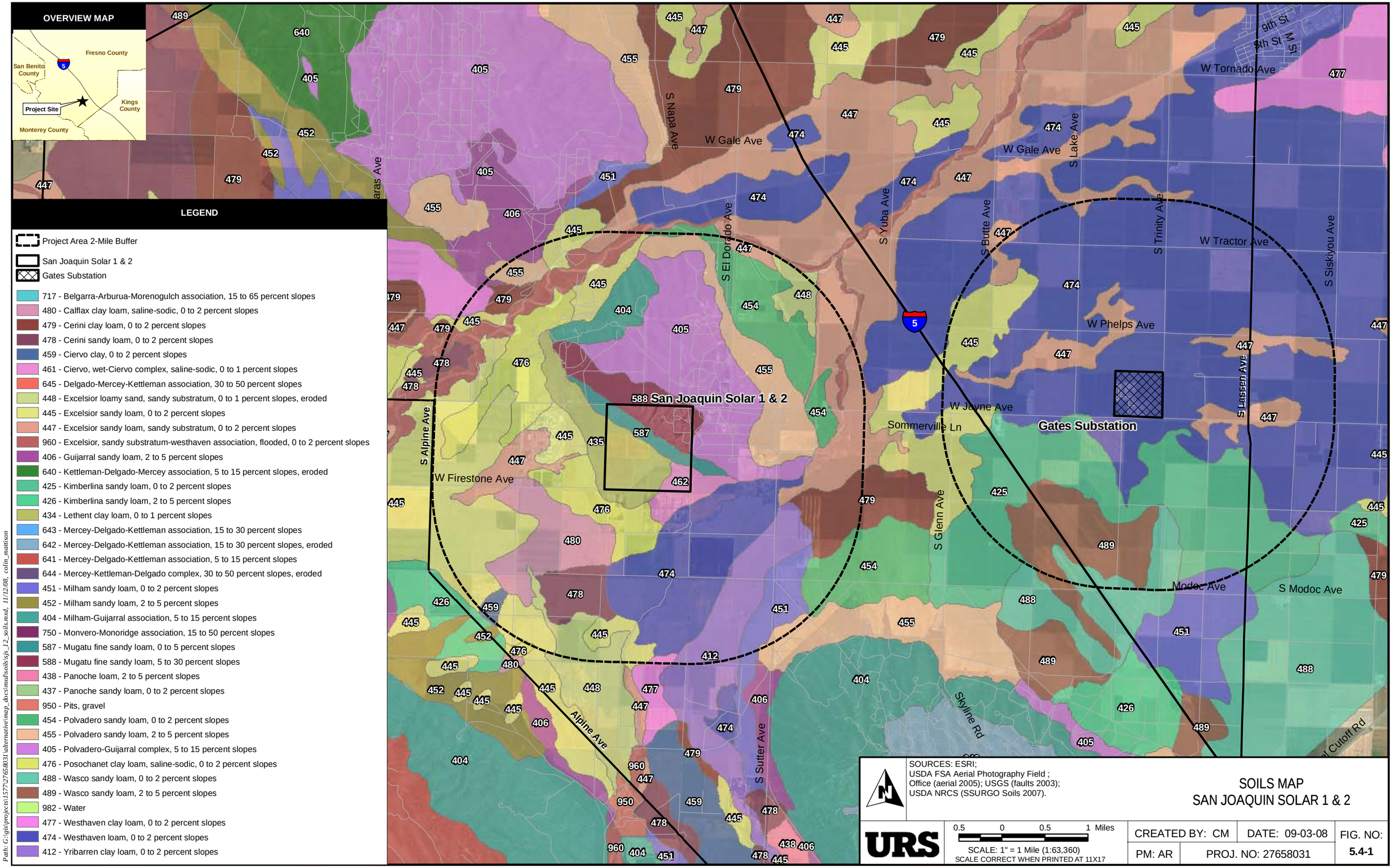
DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

Technical Area: **Soils** Project: San Joaquin Solar 1&2 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) (15) (B) (ii)	The effect of power plant emissions on surrounding soil-vegetation systems.	5.4.2.3		
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	Table 5.4-4		
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.	Table 5.4-4		
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.	Table 5.4-5		
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.	Table 5.4-6		



SOURCES: ESRI;
USDA FSA Aerial Photography Field ;
Office (aerial 2005); USGS (faults 2003);
USDA NRCS (SSURGO Soils 2007).

SOILS MAP
SAN JOAQUIN SOLAR 1 & 2

URS

0.5 0 0.5 1 Miles

SCALE: 1" = 1 Mile (1:63,360)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: CM	DATE: 09-03-08	FIG. NO:
PM: AR	PROJ. NO: 27658031	5.4-1

Path: G:\gis\projects\1577\27658031\alternative\map_docs\mxd\soils\sjs_12_soils.mxd, 11/12/08, colin_mattison