5.4 SOILS

5.4.1 Affected Environment

5.4.1.1 Introduction

The Project includes the construction, operation, maintenance, and abandonment of up to 850 megawatts (MW) of capacity by a solar power generating facility and its ancillary systems in two phases (Phase I: 500MW [approximately 5,838 acres]/Phase II 350MW [approximately 2,392 acres]). The Project will consist of up to approximately 34,000 SunCatchers. Construction is anticipated to occur over an approximate four-year period beginning in 2010 and ending in 2014. It is estimated that approximately an average of 400 construction and 180 long-term labor jobs will be required.

The Project is located in an undeveloped area of San Bernardino County, California approximately 37 miles east of Barstow, California and north of Interstate 40 (I-40) between approximately 1,925 to 3,050 feet above mean sea level. The Project is located primarily on Bureau of Land Management (BLM) land within the Barstow Field Office. Approval of the Project Right-of-Way (ROW) Grant Application (Form 299, Applications CACA 49539 and 49537) will result in the issuance of a ROW Grant Permit for use of federal lands administered by the BLM. The Project would require a plan amendment to the 1980 California Desert Conservation Area (CDCA) Plan.

The area where the Project would be constructed is primarily open, undeveloped land within the Mojave Desert. The Cady Mountain Wilderness Study Area (WSA) is located north of the Solar One site. The Pisgah Crater, within the BLM-designated Pisgah Area of Critical Environmental Concern (ACEC), is located south and east of the Project (south of I-40 by several miles). Several underground and above ground utilities traverse the area.

An approved interconnection letter from California Independent Service Operator (CAISO) has been issued for the Project. The associated System Impact Study (SIS) is located in Appendix H. The SIS indicates that additional upgrades to the Southern California Edison (SCE) Lugo-Pisgah No. 2 Transmission Line and upgrades at the SCE Pisgah Substation will be required for the full build out of the 850MW Project. Supplemental studies performed by SCE and CAISO indicate that capacity is available on the existing transmission system to accommodate less than the 850MW Project.

An on-site substation (i.e., Solar One Substation [approximately 3 acres]) will be constructed to deliver the electrical power generated by the Project to the SCE Pisgah Substation. Approximately twelve to fifteen 220kV transmission line structures (90 to 110 feet tall) would be required to make the interconnection from the Solar One Substation to the SCE Pisgah Substation. All of these structures would be constructed within the Project Site.

The Project will include a centrally located Main Services Complex (14.4 acres) that includes three SunCatcher assembly buildings, administrative offices, operations control room, maintenance facilities, and a water treatment complex including a water treatment structure, raw water storage tank, demineralized water storage tank, basins, and potable water tank.

Adjacent to the Main Services Complex, a 14-acre temporary construction laydown area will be developed and an approximately 6-acre construction laydown area will be provided adjacent to the Satellite Services Complex south of the Burlington Northern Santa Fe (BNSF) railroad. Two additional construction laydown areas (26 acres each) one will be located at the south entrance off Hector Road and the other at the east entrance just north of the SCE Pisgah Substation.

Temporary construction site access would be provided off of I-40 beginning east of the SCE Pisgah Substation and would traverse approximately 3.5 miles across the Pisgah ACEC requiring an approximate 30-foot ROW. Long-term permanent access would be provided by a bridge over the BSNF railroad along Hector Road north of I-40. Equipment may be transported during construction via trucks and/or rail car (through the construction of a siding), that would be located on the north side of BNSF railroad and east of Hector Road or as authorized by BNSF.

Water would be provided via a groundwater well located on a portion of the BLM ROW grant north of the Main Services Complex and transported through an underground pipeline. The expected average well water consumption for the Project during construction is approximately 50 acre-feet per year. Under normal operation (inclusive of mirror cleaning, dust control, and potable water usage), water required will be approximately 36.2 acre-feet per year. Emergency water may be trucked in from local municipalities.

The affected environments for soil resources are described in this section. Environmental consequences are discussed in Section 5.4.2, Environmental Consequences, cumulative effects are discussed in Section 5.4.3, Cumulative Effects, and Applicant-committed mitigation measures are presented in Section 5.4.4, Mitigation Measures.

5.4.1.2 Regional Setting

The Project is in the southwest portion of the Mojave Desert, which is characterized by broad alluvial fans, ancient terraces, playas, and scattered mountains. The Mojave River originates in the San Bernardino Mountains south of the Project Area and terminates in the desert northeast of the Project. While the majority of the Project Site is within an alluvial fan emanating from the Cady Mountains, windblown sands are intermittently present over the southern portion of the site. In addition, geologically recent volcanic flow deposits and lacustrine deposits are present along the southern margin of the site area.

The area around the Mojave River is characterized by long, hot summers and mild winters. The region has a long growing season and low precipitation (average 4 inches per year in Barstow). Irrigation is required for all agriculture. The growing season is generally between September and April, when the majority of the rainfall occurs. Rain tends to fall in significant amounts at one time. Winds can be strong and dry throughout the year, although near Daggett, the majority of the erosive wind is from the west. While significant quantities of water are available as groundwater within the alluvial sediments, groundwater levels have been declining since the 1940s, and groundwater can be of poor quality. Precipitation occurs primarily from mid-fall to mid-spring (SCS 1986).

In general, the potential for agriculture in the desert area is limited due to the lack of water discussed above, and additionally, the frequency of the presence of playas with highly alkaline soil. Desert soils are susceptible to wind and water erosion due to the lack of vegetation and low

moisture content. Desert pavement and biological crusts are present in some undisturbed areas, which may be susceptible to erosion should the areas become disturbed (URS 2007b).

5.4.1.3 Affected Soils Resource

Current soil survey data is limited in much of the Mojave Desert due to the lower potential for agricultural use. Available soil data for the Project Area is derived from the STATSGO soil database (STATSGO 2001) which presents mapping at the association level. The mapped soil associations database contains several soil series within each map unit. The soil associations within the Project Site are shown on Figure 5.4-1, Soils in Project Vicinity. Based on this mapping and the current Project layout, primarily two soil associations will be affected by Project construction. The Carrizo-Rositas-Gunsight soil association occupies the majority of the site, while the Nickel-Arizo-Bitter association is present over much of the southern portion of the site, south of the railway. The Rock Outcrop-Lithic Torriorhents-Calvista association is present in the mountains along the northern site perimeter and the Rock Outcrop-Upspring-Sparkhule association is present on the southwest corner of the Project Site, as well as north and northwest of the site. The soil associations on the Project Site and within a two-mile buffer are summarized in Table 5.4-1.

Table 5.4-1
Summary of Soil Associations

Soil Association	Designation
Within Project Boundary	
Carrizo-Rositas-Gunsight	CA922
Nickel-Arizo-Bitter	CA930
Rock Outcrop-Lithic Torriorhents-Calvista	CA913
Rock Outcrop-Upspring-Sparkhule	CA909
Within Two-Mile Buffer	
Dune Land-Cajon-Bousic	CA920
Calvista-Rock Outcrop-Trigger	CA919

Source for soils mapping: STATSGO, 2001.

The following Table 5.4-2 provides characteristics of the mapped soil associations. Recent, detailed soil mapping, although in progress in the general area, has not been performed by NRCS for the site. Such work will not likely be available for a few years. Brief descriptions of the individual soil series within each soil association are presented below.

Table 5.4-2
Characteristics of Soil Units Mapped on Project Site

Map Unit	Soil Association	Texture [1]	Depth of Surface Layer (inches)	Soil Permeability [2]	Natural Drainage Class [3]	Land Capability Class [4]	Erosion Factors [5]		Wind Erodibility [6] (Group)
							Kw	Kf	
Project Site									
CA922	Carrizo-Rositas-Gunsight	Loamy Fine Sand	9	6 to 20	Somewhat Excessively drained	7S	0.15	0.20	2
CA930	Nickel-Arizo-Bitter	Gravelly Sandy Loam	7	2 to 6	Well Drained	7S	0.10	0.37	5
CA913	Rock Outcrip-Lithic Torriorthents-Calvista	Gravelly loam	8	2 to 6	Excessively Drained	7E	0.20	0.20	8
Soils within 2 Miles of Project									
CA920	Dune Land-Cajon-Bousic	Sand	6	6 to 20	NA	8E	0.10	0	1
CA919	Calvista-Rock Outcrop-Trigger	Coarse Sandy Loam	7	2 to 6	Well Drained	7E	0.20	0.24	3
CA 909	Rock Outcrop_Upspring-Sparkhule	Gravelly Loam	2	2 to 6	Somewhat Excessively Drained	7S	0.17	0.37	7
CA635	Cajon-Wasco Rosamond	Loamy sand	16	6 to 20	Well Drained	7E	0.20	0.24	2

Source for soils mapping and characteristics: U.S. Department of Agriculture, NRCS, STATSGO, 2007.

Notes:

1. Texture = USDA texture of surface layer.
2. Permeability refers to saturated hydraulic conductivity for the surface layer. Permeability rates listed are minimum and maximum expressed in inches/hr.
3. 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.
4. Table presents nonirrigated land capability classification. Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Capability classes range from 1 to 8, with higher numbers indicating progressively greater limitations and narrower choices for use: Class 1 - slight limitations that restrict use; Class 2 - moderate limitations restricting choice of plants, or requiring moderate conservation practices; Class 3 - severe limitations restricting plant choice or requiring conservation; Class 4 - severe limitations, requiring very careful management; Class 5 - subject to little or no erosion, but mainly restricted use to pasture, rangeland, forestland, wildlife habitat; Class 6 - severe limitations, generally unsuitable for cultivation, restrictions per Class 5; Class 7 - severe limitations, unsuitable for cultivation, restrictions per Class 5. Capability subclasses: e - erosion is main hazard unless close-growing plant cover maintained; s - soil limited because shallow, droughty or stony; c - chief limitation is very cold or dry climate. Capability units (after '-') are soil groups within a subclass with similar suitability for crops and pasture plants with similar management requirements and productivity.
5. 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 soillayer.
6. Wind erodibility groups range from 1 to 8, with 1 being highly erodible and 8 having low erodibility.

Carrizo Soils

Carrizo soils are formed in alluvium present primarily on flood plains, alluvial fans, fan piedmonts, and bolson floors, with slopes up to 15 percent. These soils are typically very deep gravelly sand. The upper two inches is extremely gravelly sand with about 65 percent gravel. Below the upper two inches, the material contains coarse sand and averages 70 percent gravel and coarser materials, with a clay content less than 8 percent. The soils are excessively drained with negligible or very low runoff and rapid or very rapid permeability.

Rositas Soils

Rositas soils are formed in sandy eolian material on dunes and sand sheets, with slopes up to 30 percent. These soils are typically fine sand with up to 5 percent gravel and up to 10 percent clay. Rositas soils are very deep and somewhat excessively drained, with negligible or low runoff and rapid permeability.

Gunsight Soils

The Gunsight series is comprised of very deep calcareous alluvial soils on fan or stream terraces with slopes up to 60 percent. The soils are very gravelly loam, with gravel content ranging from 40 to 75 percent gravel and an average of less than 18 percent clay. The soils are somewhat excessively drained with very low to high runoff and moderate or moderately rapid permeability.

Nickel Soils

Nickel soils are derived in alluvium from mixed rock sources and are present on fan remnants with slopes up to 35 percent. The soils are very gravelly loam, with gravel content ranging from 25 to 75 percent, generally increasing with depth and typically less than 15 percent clay. The A horizon contains approximately 20 percent gravel and cobbles and is classified as gravelly very fine sandy loam. The soils are very deep, well drained with very low to medium runoff and moderate permeability. Nickel soils are commonly associated with Arizo and Bitter soils.

Arizo Soils

Arizo soils are also formed in mixed alluvium and are present on recent alluvial fans, inset fans, fan apron, fan skirts, stream terraces, and in intermittent stream and channel floodplains. The material is typically very gravelly fine sand with 35 to 80 percent gravel and cobbles, increasing with depth. The A horizon is very gravelly fine sand with 35 percent pebbles. The soils are very deep, excessively drained, with negligible to medium runoff and rapid to very rapid permeability.

Bitter Soils

Similar to Arizo and Nickel soils, Bitter soils are formed in mixed alluvium. They are present on dissected old fans between lower recent fans and the toes of steep slopes generally ranging from 2 to 15 percent. The material is extremely gravelly sandy loam with 45 to 75 percent pebbles and cobbles. The upper horizons are composed of extremely to very gravelly sandy loam with

50 percent pebbles and cobbles. Bitter soils are well drained with medium runoff and moderately slow permeability.

Rock Outcrop

The rock outcrop classification is typically observed on mountainsides, ridges, and rugged hills. It can be composed of many rock types, typically granite, quartz monzonite, basalt, dacite, limestone, quartz, mica, schist, and fanglomerate.

Lithic Torriorthents

Lithic torriorthents are present between rock outcrop areas, in small depressions and on relatively stable hillsides. Slopes typically range from 15 to 50 percent. The soil varies from sandy loam to very gravelly sand. They form in material weathered from granitic rock, with hard, fractured rock present at a depth of 1 to 18 inches. These soils are very shallow and shallow, well drained, with medium to rapid runoff and a high water erosion hazard.

Calvista

The Calvista series consists of sandy loam formed from granitic rock with seams of calcite. It is typically present on slopes of 2 to 30 percent and mountain ridges, buttes and domes in Southern California deserts. Hard rock is generally present at a depth of 14 to 20 inches, although rock outcrops may be present. The gravel content is typically less than 35 percent. Calvista soils are shallow and well drained soils, with medium to rapid runoff and moderately rapid permeability.

Upspring

Upspring soils are typically formed on weathered igneous rock and some pyroclastic material on hills, mountains and plateaus with slopes of 8 to 75 percent. The material is typically a very stony loam with about 45 percent pebbles, 10 percent cobbles and 15 percent stones. The soils are very shallow to shallow, somewhat excessively drained, with high or very high runoff and moderately rapid permeability over impermeable bedrock.

Sparkhule

Sparkhule soils are typically formed in residuum from volcanic or granitic rocks on rock pediments and hills with slopes of 5 to 50 percent. The material is typically a gravelly sandy loam with 10 to 25 percent and 10 to 35 percent clay. The soils are shallow to rock, well drained, with high to very high runoff and moderately slow permeability.

Soils Within Two-Mile Buffer

Other soils outside of the Project Site but within the two-mile buffer include Dune Land-Cajon-Bousic and Calvista-Rock Outcrop-Trigger associations. The locations of these soils are shown on Figure 5.4-1 and soil characteristics are presented in Table 5.4.2.

5.4.1.4 Agricultural and Prime Farmland

Agriculture

The Project Site encompasses largely undeveloped desert land. No crops have been grown at the Project Site and no agricultural land is present in the area. None of the Project components traverse land covered by Williamson Act contracts. See also Section 5.9, Land Use, Section 5.9.2.2, Agricultural Land, for more information.

Prime Farmland

As assessed in Section 5.9, Land Use, the Project facilities are not located within any areas designated as prime farmland or farmland of statewide importance based on review of available information. See also Section 5.9, Land Use, Section 5.9.2.2, Agricultural Land, for more information.

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 dish structures, building pads, electrical transmission facilities, utilities, access roads, and berms for drainage of surface water flow.

Environmental consequences related to soils are presented in Section 5.4.2.1, Soils Resources, 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,
- Project results in degradation of soils or farmland,
- Project results in changes to topography, or unstable soil conditions.

The assessment of Project effects to soil resources is based on interpretation of data presented in the Soil Survey of San Bernardino County, Mojave River Area (SCS 1986), which is near the Project Site, as well as information from the National Resources Conservation Service website (NRCS 2008). The assessment also considers the applicant-committed mitigation measures. The Project Area soil conditions include slightly and moderately sloping topography and undeveloped site conditions. 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 after construction. Quantitative calculations of potential soil loss using the Universal Soil Loss

and Chepil Wind Erosion Equations have been performed, and the results are presented below. The Project's potential effects on soil resources can be categorized into those involving construction activities and those related to Project operation.

The average annual soil erosion rates by sheet and rill erosion caused by rainfall runoff for the soil associations with the Project 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, the existing condition erosion rates increase during construction due primarily to fill placement without the use of erosion and sediment control best management practices (BMPs). The 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.

The Wind Erosion Prediction System (WEPs) model was used to estimate soil loss due to wind erosion. The existing wind erosion rates were estimated to be greater than 100 tons per acre per year for the soil associations. Wind erosion rates are an order of magnitude higher than soil erosion by rainfall runoff at this location due to the relatively low annual rainfall amount. 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 Wind Erosion Prediction System soil loss calculations are provided in Appendix W, Soil Loss Calculations.

Table 5-4-3
Soil Erosion Rates

Soil Type	Existing (ton/ac/yr)	Construction – Cut Area with No BMPs (ton/ac/yr)	Construction – Fill area with No BMPs (ton/ac/yr)	Construction – Average with No BMPs (ton/ac/yr)	Construction with BMPs (ton/ac/yr)	Operations with BMPs (ton/ac/yr)
Carrizo Rositas Gunsight (60% Gravel, 30% Sand, 10% fines)	**0.53**	**0.53**	**1.4**	**0.97**	**0.33**	**0.23**
Nickel-Arizo-Bitter (30% Gravel, 30% Sand, 40% fines)	**2.1**	**2.1**	**5.7**	**3.1**	**0.052**	**0.052**

Source: URS Corporation 2008. See Appendix W, Soil Loss Calculations.

Notes:

< = less than

% = percent

BMP = Best Management Practice

ton/ac/yr = tons per acre per year

Soil erosion rates reflect sheet flow and rill erosion caused by storm water runoff and were calculated using the Revised Universal Soil Loss Equation (Version 2), RUSLE2 computer program.

BMP = Erosion and Sediment Control Best Management Practice (Erosion Blanket, Mulch, Silt Fence, Fiber Roll, or Final Stabilization, etc.).

Construction-Related Effects

Construction-related effects to soil resources associated with Project development, including the proposed electrical transmission line, and laydown areas primarily involve vegetation removal, excavation, grading, and temporary stockpiling.

Much of the site is located on topography sloping gently to the south. Some minor cut and fill will be required to provide level areas for the Project facilities. The surficial soils will likely be excavated and recompacted within the areas of proposed Project facilities. Construction will include approximately 500 miles of paved and unpaved roads, about 50, 650, and 90 miles of underground 34.5kV cable, 600V cable and fiber-optic network cable, respectively, and may include a water supply pipeline approximately 1 mile long.

Effects during Project construction 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 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 surface-receiving 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 the erodibility of the soil, the proximity of the construction activity to receiving water, and the construction methodologies, duration, and season. The gentle topography and site grading on the Project Site would limit soil erosion to minor or moderate. 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.

Operation-Related Effects

The completed Project will include solar collectors, various buildings, paved primary access roads, secondary unpaved access roads, and minor asphalt or crushed aggregate parking lots. Infiltration basins are proposed to handle storm water at the Main Services Complex. Therefore, no significant effects on soil resources are anticipated from Project operations.

5.4.2.2 Agriculture and Prime Farmland

CEQA, Appendix G, identifies the criteria 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 and does not conflict with a Williamson Act contract. The Project does not represent a loss of farmland. Therefore, Project development does not represent a significant impact on agricultural resources.

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. Construction emissions will be temporary and transient, and no off-site locations will be exposed to sustained air pollutants generated by these activities. During operations, the only operational sources of pollutants will be periodic testing of a diesel emergency generator and vehicle operations associated with operation and maintenance. 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 Effects

Cumulative impacts to soils are discussed in detail in Section 5.18, Cumulative Impacts. Construction schedules of the Solar One and Solar Three Projects may overlap. In this instance, the amount of soil disturbance is expected to incrementally increase, as the addition of the Solar Three Project will disturb a larger area of land. However, site development and operation, of either project, is not expected to significantly impact geologic resource or minerals. Hence, impacts from both Solar One and Solar Three, when considered cumulatively, are anticipated to be less than significant.

Because construction and operation of the transmission line would be performed on previously disturbed area, significant cumulative impacts to soils are not anticipated.

5.4.4 Mitigation Measures

No significant agricultural effects were identified; therefore, no agricultural mitigation measures are proposed. This section describes Applicant-committed mitigation measures that will be implemented to reduce Project-related potential effects to soil resources.

The following mitigation measures will be implemented to reduce potentially significant soils effects 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. Refer to Section 5.5, Water Resources, for mitigation measures related to potential effects to water quality associated with soil erosion.

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 the San Bernardino County Conditional Grading Compliance.

- **Soil-2:** Prepare and implement a detailed Erosion Control Plan before construction, which may be a component of the Storm Water Pollution Prevention Plan (SWPPP) (see Mitigation Measure Water-4).
- **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 and/or application of polymeric soil stabilizers. The waterline route will be reseeded using a seed mix native to the area and allowed to naturally revegetate.
- **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 Project Site to direct surface water into the retention basins.
- **Soil-9:** Conduct post-construction monitoring of areas that were disturbed during the construction phase.

5.4.5 Compliance with LORS

The laws, ordinances, regulations, and standards (LORS) summarized in Table 5.4-4, Summary of LORS – Soils, are applicable to protection of soils resources. The project will comply with all LORS.

Table 5.4-4
Summary of LORS-Soils

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Federal Jurisdiction				
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.	Section 5.4.5.3	RWQCB, Colorado River Basin Region 7, under the direction of the State Water Resources Control Board	4, 5

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
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.	Section 5.4.5.3	NRCS	1
State Jurisdiction				
California Public Resource Code §25523(a)	Provisions relating to the manner in which the Project is to be designed, sited, and operated to protect environmental quality and assure public health and safety.	Section 5.4.5.4	CEC	2
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.	Section 5.4.5.4	CEC	2
Williamson Act	Provides for lowered property taxes for lands maintained in agricultural and certain open space uses.	Section 5.4.5.4	Department of Conservation, Office of Land Conservation	3
California Porter-Cologne Water Quality Control Act; California Water Code, Division 7, §13260–13269	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.	Section 5.4.5.4	CEC, RWQCB Colorado River Basin Region 7	2, 4

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Local Jurisdictions				
San Bernardino County Development Code, Chapter 83.04 Conditional Grading Compliance; Chapter 88.02 Soil and Water Conservation, Section 88.02.040.	The applicant for a grading permit will comply with conditions of approval and meet requirements for on-site continuous inspections of grading.	Section 5.4.5.5	County of San Bernardino Land Use Services Department, Building & Safety Division	6
County of San Bernardino 2007 General Plan, Section V – Conservation Element				
Goal CO 6	The County will balance the productivity and conservation of soil resources.	Section 5.4.5.5	County of San Bernardino Land Use Services Department, Building & Safety Division	6
Policy CO 6.1	Protect prime agricultural lands from the adverse effects of urban encroachment, particularly increased erosion and sedimentation, trespass, and non-agricultural land development.	Section 5.4.5.5	County of San Bernardino Land Use Services Department, Building & Safety Division	6
Policy CO 6.3	Preservation of prime and statewide important soils types, as well as areas exhibiting viable agricultural operations will be considered as an integral portion of the Open Space element when reviewing development proposals.	Section 5.4.5.5	County of San Bernardino Land Use Services Department, Building & Safety Division	6

Source: URS Corporation, 2008.

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 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	Carrie-Ann Houdeshell	14393 Park Ave. Suite 200 Victorville, CA 92392-3302	760-843-6882
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	County of San Bernardino Land Use Services Department, Building & Safety Division	Lynn Davis	15456 W. Sage Street Victorville, CA 92392	760-241-7691

5.4.5.2 Permits Required and Permitting Schedule

Permits and schedules are provided in Table 5.4-5, 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
County of San Bernardino Land Use Services Department, Building & Safety Division	Grading Permit	Before construction

5.4.5.3 Federal Authorities and Administering Agencies

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.

A SWPPP would be submitted to the RWQCB to be reviewed and approved. The SWPPP would incorporate all appropriate erosion control measures 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 Natural Resources Conservation Office, 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.

5.4.5.4 State Authorities and Administering Agencies

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 California Energy Commission (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 150000-155387, 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; none of the Project components traverse land covered by Williamson Act contracts.

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 not expected to require the cancellation of any Williamson Act contracts.

California Porter-Cologne Water Quality Control Act of 1972; California Water Code, Sections 13260-13269; 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 the CEC and the RWQCB (Colorado Basin, Region 7).

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

5.4.5.5 Local Authorities and Administering Agencies

San Bernardino County Development Code, Chapter 83.04 Conditional Grading Compliance; Chapter 88.02 Soil and Water Conservation, Section 88.02.040.

A grading permit from the County of San Bernardino Land Use Services Department, Building & Safety Division is required for any project with excavations greater than two feet in depth or a fill one foot or more in thickness. A grading plan is required for projects disturbing more than 5,000 cubic yards of material. The applicant for a grading permit will comply with conditions of approval in the San Bernardino County Development code and meet requirements for on-site continuous inspections of grading.

It may also be necessary to meet the requirements of the Erosion and Sediment Control Ordinance.

The administering agency is the County of San Bernardino Land Use Services Department, Building & Safety Division.

5.4.6 References

County of San Bernardino. 2008. Conty of San Bernardino 2007 Development Code. Amended October 23, 2008.

SCS (U.S. Department of Agriculture, Soil Conservation Service). 1986. Soil Survey of San Bernardino County California, Mojave River Area.

URS Corporation. 2007a. County of San Bernardino, 2007 General Plan. Effective April 12, 2007.

URS Corporation. 2007b. Final Program Environmental Impact Report, San Bernardino County, 2007 General Plan Program. February 2007.

NRCS (U.S. Department of Agriculture, National Resources Conservation Service). 2008. Official Soil Series Descriptions. http://soils.usda.gov/technical/classification/osd/index.html. Accessed November 3, 2008. USDA-NRCS, Lincoln, NE.

STATSGO (State Soil Geographic Data Base). 2001. Soil Data Mart. http://soildatamart.nrcs.usda.gov/USDGSM.aspx.

Adequacy Issue:	Adequate		Inadequate		**DATA ADEQUACY WORKSHEET**		Revision No.	0	Date	
Technical Area:	**Soils**				Project:	SES Solar One		Technical Staff:		
Project Manager:					Docket:			Technical Senior:		

SITING REGULATIONS	**INFORMATION**	**AFC 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.	Section 5.4.1 Section 5.4.2 Section 5.4.3 Section 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:	Section 5.4.1.3 Section 5.9.2.2 Figure 5.4-1* *Maps at scale other than 1:24,000 due to very large Project Site size		
Appendix B (g) (15) (A) (i)	The depth, texture, permeability, drainage, erosion hazard rating, and land capability class of the soil;	Section 5.4.1.3 Table 5.4-1		
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;	Section 5.4.1.3		
Appendix B (g) (15) (A) (iii)	The location of any proposed fill disposal or fill procurement (borrow) sites; and	Section 5.4.1.3		
Appendix B (g) (15) (A) (iv)	The location of any contaminated soils that could be disturbed by Project construction.	N/A		
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:			

Adequacy Issue:	Adequate		Inadequate		**DATA ADEQUACY WORKSHEET**		Revision No.	0	Date	
Technical Area:	**Soils**				Project:	SES Solar One		Technical Staff:		
Project Manager:					Docket:			Technical Senior:		

SITING REGULATIONS	**INFORMATION**	**AFC SECTION NUMBER**	**ADEQUATE YES OR NO**	**INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS**
Appendix B (g) (15) (B) (i)	The quantification of accelerated soil loss due to wind and water erosion; and	Section 5.4.2.1		
Appendix B (g) (15) (B) (ii)	The effect of power plant emissions on surrounding soil-vegetation systems.	Section 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		

Adequacy Issue:	Adequate		Inadequate		**DATA ADEQUACY WORKSHEET**		Revision No.	0	Date	
Technical Area:	**Soils**				Project:	SES Solar One		Technical Staff:		
Project Manager:					Docket:			Technical Senior:		

SITING REGULATIONS	**INFORMATION**	**AFC SECTION NUMBER**	**ADEQUATE YES OR NO**	**INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS**
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		

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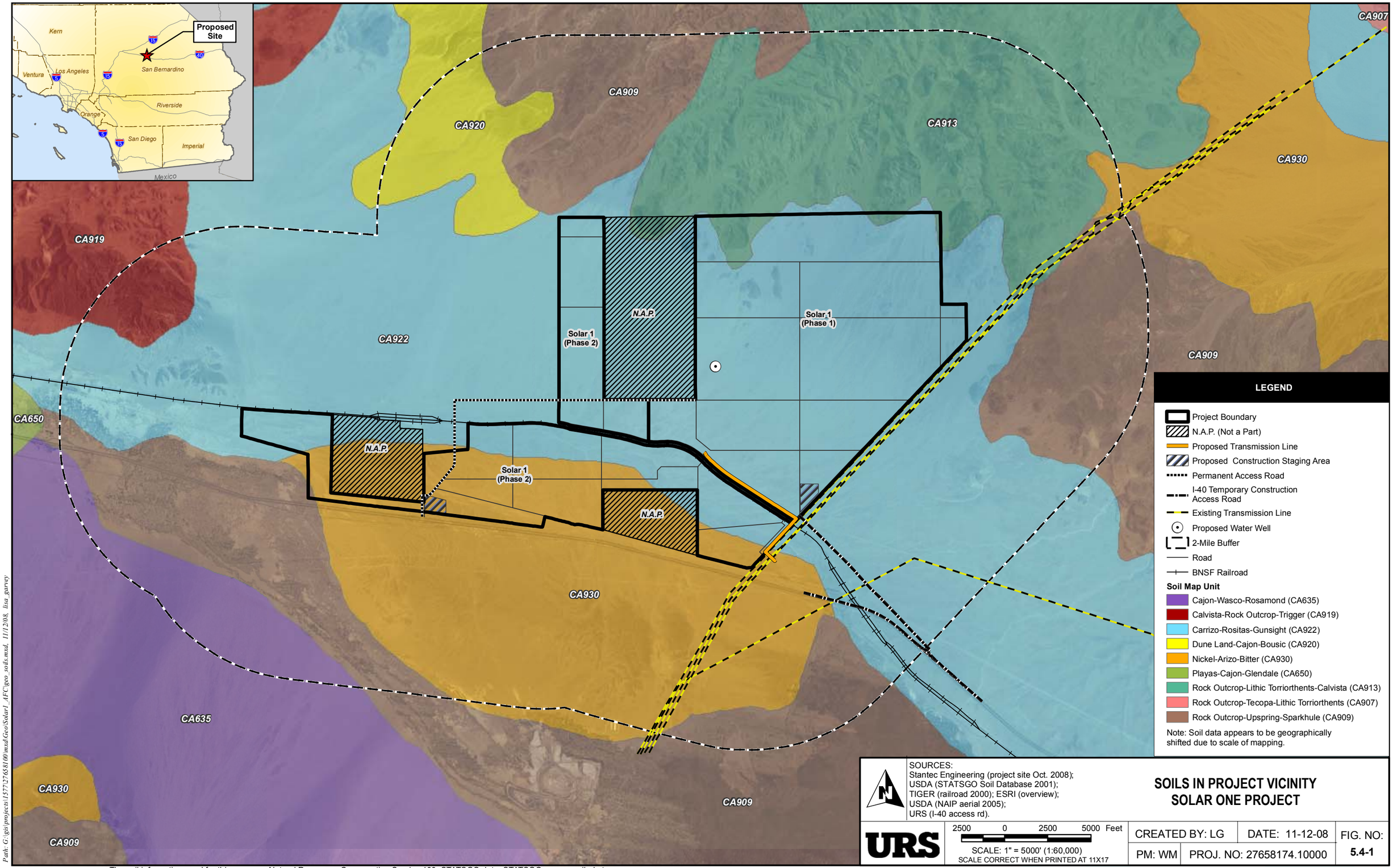

Path: G:\gis\projects\15771276\8100\mxd\Geo\Solar1_AFC\geo_soils.mxd, 11/12/08, lisa_garvey

SOURCES:
Stantec Engineering (project site Oct. 2008);
USDA (STATSGO Soil Database 2001);
TIGER (railroad 2000); ESRI (overview);
USDA (NAIP aerial 2005);
URS (I-40 access rd).

SOILS IN PROJECT VICINITY
SOLAR ONE PROJECT

URS

2500 0 2500 5000 Feet

SCALE: 1" = 5000' (1:60,000)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: LG	DATE: 11-12-08	FIG. NO:
PM: WM	PROJ. NO: 27658174.10000	5.4-1

The soil information used for this map was Natural Resources Conservation Service 199_STATSGO data. STATSGO was compiled at 1:250,000 and designed to be used primarily for regional, multistate, State, and river basin resource planning, management, and monitoring.