5.11 Soils

This section describes the potential effects of the construction and operation of the Rice Solar Energy Project (RSEP) on soil resources and is organized as follows: Section 5.11.1 describes the existing environment that could be affected, including soil types and their use; Section 5.11.2 presents the environmental analysis of project development; Section 5.11.3 discusses cumulative impacts; Section 5.11.4 presents mitigation measures; Section 5.11.5 presents the laws, ordinances, regulations, and standards (LORS) applicable to soils and their use; Section 5.11.6 provides agency contacts for all involved agencies; Section 5.11.7 describes permits required for the project; and Section 5.11.8 provides the references used to develop this section.

5.11.1 Affected Environment

The project is in Rice Valley, a very sparsely settled portion of the Sonoran Desert in eastern Riverside County. The valley is comprised of relatively stable sheets of sand held in place by perennial vegetation. Sand dunes are present in some areas. Rice Valley is part of a massive sand sheet that extends from Cadiz Valley through Ward Valley, representing a part of one of the largest dune systems in the California Desert (Bureau of Land Management [BLM], 2009). Nearer the mountains, the soils become rockier and have clay textures. Typical of this arid environment, periodic flash flooding has produced some soil erosion, particularly along drainages on the upper bajadas (BLM, 2009).

The parcel of land proposed for the heliostat field is privately owned, while surrounding lands are public and are managed by the BLM. During World War II, the project site was used as a training airfield, Rice Army Airfield, as part of the Desert Training Center/California-Arizona Maneuver Area. After the war, the airfield was privately operated until it was abandoned during the 1950s. Evidence of historical land disturbance (i.e., footprint of old runways) is still visible on aerial photographs.

The nearest residences are located in Vidal Junction, about 15 miles northeast of the site; and at Metropolitan Water District's Iron Mountain Pumping Plant, about 17 miles to the west. The town of Blythe is 38 miles south of the site, and Twentynine Palms, California, is 75 miles west of the site. The nearest agricultural land use is south of Parker, Arizona, about 20 miles east of the site, on irrigated land in the Colorado River floodplain.

The project will encompass approximately 1,410 acres in a fenced security area. Included in this area are a 1,370 acre solar collector field with up to 17,500 heliostats; a 12-acre power block; evaporation ponds; detention basin; and administration/maintenance buildings. Outside the project boundary to the north along State Route (SR) 62, are a 12-acre construction parking area; a 31-acre construction trailer parking area; and an 18-acre area for the construction office, laydown, and heliostat assembly. Additionally, a 7-acre area will be graded to provide a 12-foot-wide access road from the solar field to a location where the generator tie-line parallels Rice Valley Road (4.6 miles). The total area that will be subject to grading is approximately 1,504 acres.

The RSEP will connect with the Western Area Power Administration's 161/230-kilovolt (kV) Parker-Blythe electrical transmission system via a 10.0-mile-long 230-kV generator tie-line (Figure 5.11-1). The generator tie-line will use steel monopoles with a pole height of about

80 feet, with some poles as tall as 115 feet. A 300-by-400-foot electrical substation will be constructed at the interconnection point with the Parker-Blythe line.

Stormwater that flows onto the site will be routed around each side of the heliostat field via constructed drainage swales. Onsite flows will be allowed to sheet flow across the site and into a stormwater detention basin with an approximate 30 acre-foot capacity, located on the southern portion of the heliostat field.

The Natural Resource Conservation Service (NRCS) is responsible for mapping soils and developing soil surveys. The NRCS has not mapped soils in the vicinity of the project, and there is no published soil survey for the area. Generalized soils information was obtained from the NRCS STATSGO2 data set (Soil Survey Staff, 2009). This data set was developed by the NRCS to create the U.S. Generalized Soil Map, which provides generalized soils information for areas with no detailed soil survey data.

Generalized soil units for the project area are identified in Figure 5.11-1, and soil characteristics for the area potentially affected by project construction are estimated in Table 5.11-1. The project area includes structures/features on the project site; construction laydown area, parking, office area, and heliostat fabrication area; and the linear transmission corridor (including overhead electrical lines and interconnection substation) and access roads. Table 5.11-1 summarizes soil depth, texture, drainage, permeability, water runoff, and items related to revegetation potential. Actual soil conditions in the project area could differ from what is described in the generalized soil descriptions because of the historical use of the area as an airfield and because data are derived from generalized soils information.

5.11.1.1 Agricultural Use

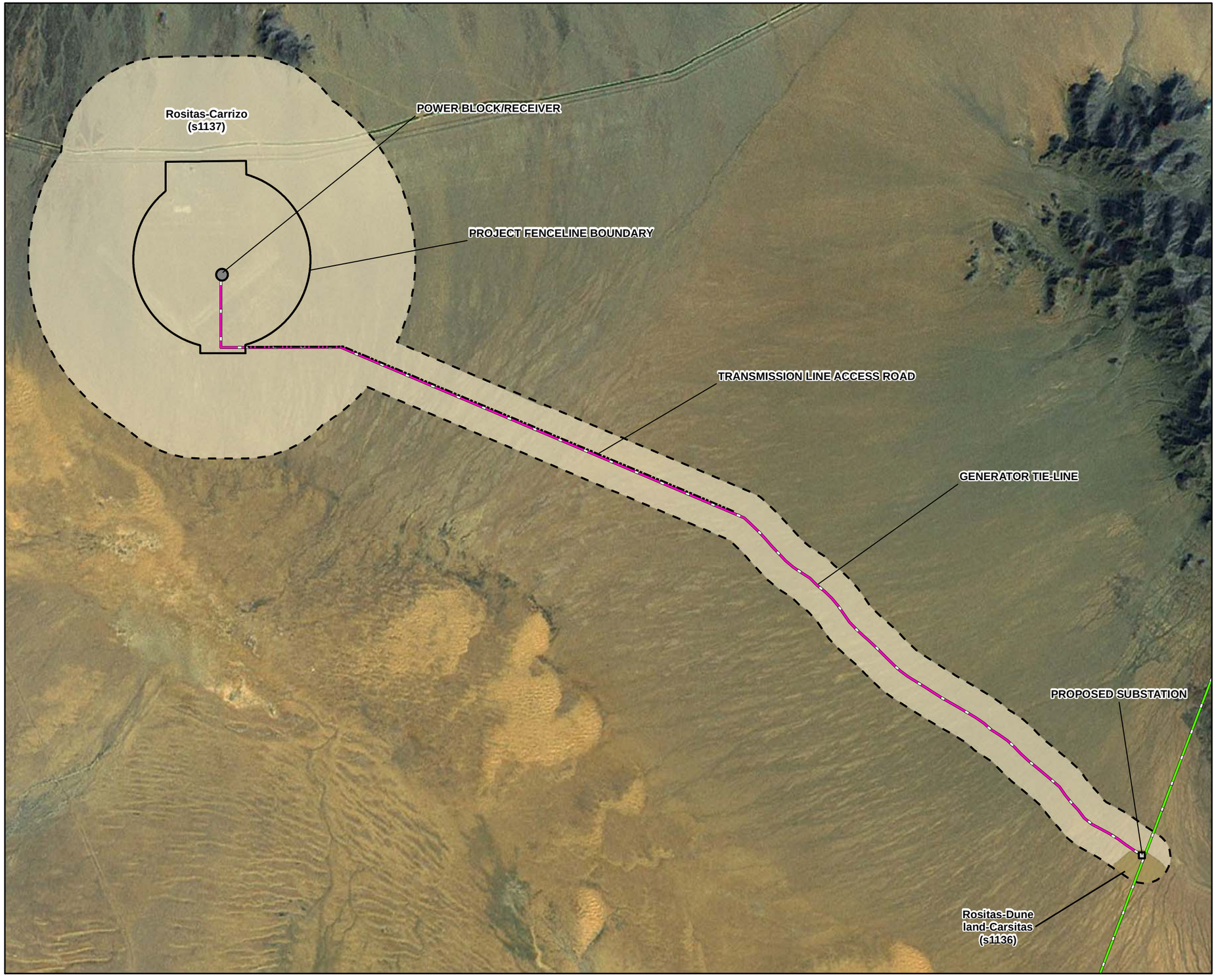
The site is in a remote desert area in eastern Riverside County. Aerial photographs indicate that the closest agricultural land use is approximately 20 miles east of the project site near the Colorado River and south of Parker, Arizona.

5.11.1.2 Wetlands and Other Waters of the U.S.

There are no wetlands or other waters of the U.S. on or near the RSEP site.

5.11.1.3 Soil Mapping Units

Table 5.11-1 describes estimated properties of the soil series that may occur in and around the project site and along the generator tie-line. As indicated above, soils have not been mapped in this part of Riverside County, and generalized soils information was obtained from STATSGO2. Detailed NRCS soil surveys typically have a scale of 1:24,000, with differentiation between soil units at a landscape scale of about 5 acres. The U.S. General Soils Map used for this soils investigation was produced at a scale of about 1:250,000, meaning that soil units are mapped at a coarser scale and are generally not sufficiently detailed for project-level analysis. The discussion that follows is based on data from the U.S. General Soil Map of the U.S. and, therefore, has limited usefulness for performing project-level evaluations. As shown on Figure 5.11-1, Rositas and Carrizo soils may occupy most of the project site, including the generator tie-line corridor. These soils are formed from alluvium and eolian deposits, and demonstrate the importance of water and wind erosion and depositional processes in this desert landscape. These soils are estimated to have a fairly coarse texture near the soil surface and generally low potential for erosion by water.



LEGEND

- TRANSMISSION LINE ACCESS ROAD
- GENERATOR TIE-LINE
- PARKER-BLYTHE TRANSMISSION LINE
- PROJECT FENCELINE BOUNDARY
- PROPOSED SUBSTATION
- POWER BLOCK/RECEIVER
- BUFFER

SOIL TYPE

- ROSITAS-CARRIZO (S1137)
- ROSITAS-DUNE LAND-CARSITAS (S1136)

Notes:
1. 1 Mile around the Project Site and 1/4 mile around the Proposed Transmission Line.
2. Source: Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. U.S. General Soil Map (STATSGO2) for Riverside County, California. Available online at http://soildatamart.nrcs.usda.gov accessed August, 07, 2009.

This map was compiled from various scale source data and maps and is intended for use as only an approximate representation of actual locations.

N

0 2,500 5,000
Feet

FIGURE 5.11-1
SOIL TYPES WITHIN PROJECT SITE
RICE SOLAR ENERGY PROJECT
RIVERSIDE COUNTY, CALIFORNIA

CH2MHILL

SAC\\ZION\SACGIS\PROJ\SOLARPROJECTS\SOLARRESERVE_377714\MAPFILES\SOILS_FINAL.MXD MHASKELL 10/13/2009 15:38:17

TABLE 5.11-1
Soil Series Descriptions and Characteristics*

Map Unit	Description
s1137	**Rositas-Carrizo:** These soil series are estimated to be the dominant soils in the project area. **Rositas soil series:** Formation: Dunes and sand sheets, formed in eolian material, with slopes ranging from 0 to 30 percent Typical profile: Fine sand to a depth of 60 inches (but soil textures can include sand, loamy sand, fine sand, or loamy fine sand; the 10- to 40-inch control section has less than 15 percent coarse and very coarse sand). Shrink-swell capacity: Estimated to be low, since clay content is 0 to 10 percent Depth and drainage: Very deep; somewhat excessively drained Permeability: Rapid Runoff: Negligible to low Inherent fertility: Low Capability class: Information not available Taxonomic class: Mixed, hyperthermic Typic Torripsamments **Carrizo soil series:** Formation: Floodplains, alluvial fans, fan piedmonts, and bolson floors, formed in mixed alluvium, with slopes ranging from 0 to 15 percent Typical profile: Extremely gravelly sand over stratified extremely gravelly coarse sand to very gravelly coarse sand (but soil textures can include coarse sand, sand, loamy coarse sand, or loamy sand) Shrink-swell capacity: Low: clay content averages 0 to 8 percent Depth and drainage: Very deep, excessively drained Permeability: Rapid or very rapid Runoff: Negligible to low Inherent fertility: Low Capability class: Information not available Taxonomic class: Sandy-skeletal, mixed, hyperthermic Typic Torriorthents
s1140	**Rillito-Gunsight:** This generalized soil unit occurs to the northwest of the project boundary. **Rillito soil series:** Formation: Mixed alluvium, on fan terraces or stream terraces, with slopes predominantly from 0 to 5 percent but ranging up to 40 percent Typical profile: Gravelly sandy loam over gravelly loam and weakly lime-cemented gravelly sandy loam (soil textures can include fine sandy loams, sandy loams and loams) Shrink-swell capacity: Information not available Depth and drainage: Very deep, somewhat excessively drained Permeability: Moderate Runoff: Slow or medium Inherent fertility: Low Capability class: Information not available Taxonomic class: Coarse-loamy, mixed, superactive, hyperthermic Typic Haplocalcids **Gunsight soil series:** Formation: Alluvium from mixed sources, on fan terraces or stream terraces, with slopes of 0 to 60 percent Typical profile: Very gravelly loam over extremely gravelly loam and extremely gravelly sandy loam (soil textures can range from fine sandy loam, sandy loam and loam in the control section) Shrink-swell capacity: Information not available; clay content averages less than 18 percent Depth and drainage: Very deep, somewhat excessively drained Permeability: Moderate or moderately rapid Runoff: Very low to high Inherent fertility: Low, contains substantial calcium carbonate Capability class: Information not available Taxonomic class: Loamy-skeletal, mixed, superactive, hyperthermic Typic Haplocalcids

TABLE 5.11-1
Soil Series Descriptions and Characteristics*

Map Unit	Description
s1136	**Rositas-Dune land-Carsitas:** This map unit occurs south and southwest of the project site and is likely representative of soils that occur in the Rice Valley dune system. These dunes historically have been used for off-highway vehicle recreation, but BLM has closed the Rice Valley Dunes area for off-road use.

*Soil characteristics are based on soil mapping descriptions provided in the Official Soil Series Descriptions (http://ortho.ftw.nrcs.usda.gov/cgi-bin/osd/osdname.cgi). Soil descriptions are provided above for those soil series that could be directly affected by the RSEP, as well as for other soil series, which are well outside of the project area but are shown on Figure 5.11-1. These descriptions represent the best available information from published literature, but onsite evaluation of soils would be necessary for purposes of project design and engineering.

Wind erosion potential may be high where there are few rock fragments on the soil surface; where vegetative cover is low; and where soils have loose, sandy textures in the surface horizon. The Preliminary Geotechnical Engineering Report (Terracon Consultants, 2009) indicates the near surface soils are dense silty sand and poorly graded sand. Overall, the soils are estimated to have a low shrink-swell potential because soils of these series generally have low clay content; however, the Terracon report indicates that some soils have a moderate to high tendency for hydro-compaction when wetted under loaded conditions. The report also indicates the site and the site soils are suitable for the proposed construction. The report is included as Appendix 2B to this document.

The Preliminary Geotechnical Engineering Report (Terracon Consultants, 2009) estimated that Carrizo soil associations are present on the site; however, it also noted that cemented caliche layers at depth could hinder percolation of water through subsurface horizons.

5.11.1.4 Potential for Soil Loss and Erosion

The factors that have the largest effect on soil loss include steep slopes, lack of vegetation, and erodible soils comprised of large proportions of silt and fine sands. The soils found in the project area are predicted to have slopes that are nearly flat, ranging from 0 to 2 percent. A high proportion of fine sand in the surface horizon is likely, although soils also may be gravelly or loamy. Soils are predicted to have rapid permeability and low amounts of runoff; therefore, their potential for water erosion is relatively low.

Factors that contribute to wind erodibility include loose, noncohesive silty or sandy textures with few rock fragments on the surface; low organic matter; and presence of calcium carbonate. These characteristics are likely to be representative of onsite soils, and potential for wind erosion is estimated to be relatively high.

5.11.1.5 Other Notable Soil Characteristics

A notable soil characteristic of the proposed project site is that the native soils have inherent limitations in terms of supporting revegetation. The desert climate, low water-holding capacity in soils, and susceptibility to blowing would present challenges to site revegetation upon closure. To mitigate these effects, the project plans to limit grading activity and vegetation removal within the heliostat field. Vegetation will be cut and removed only as required to install the heliostat foundations and associated facilities. In areas where grading is not required, the vegetation will be cut and the root mass left in place to provide a level of

erosion control. Effective mitigation measures would include application of soil dust palliatives, application of mulch or other soil amendments, and implementation of methodology derived from other successful desert restoration projects in the area.

Additionally, the presence of cemented calcium carbonate (caliche) in soil subsurface horizons could present some difficulty for certain construction activities, such as drilling and excavation (Terracon Consultants, 2009). For example, equipment capable of breaking through this material would be required for soil drilling related to heliostat installation.

5.11.2 Environmental Analysis

The following sections describe the potential environmental effects on soils during the construction and operation phases of the project.

5.11.2.1 Significance Criteria

The potential for impacts to soil resources and their uses (such as agriculture) were evaluated with respect to the criteria described in Appendix G of the California Environmental Quality Act (CEQA) Guidelines (§15000-15387, California Code of Regulations [CCR] Title 14, Chapter 3). An impact is considered potentially significant if it would:

- Involve changes in the existing environment that, because of their location or nature, could result in conversion of farmland to non-agricultural use
- Impact jurisdictional wetlands
- Result in substantial soil erosion
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (International Code Council, 1997), creating substantial risks to life or property

The following sections describe the anticipated environmental impacts on agricultural production and soils during project construction and operation.

5.11.2.2 Farmland Conversion

Construction of the proposed project would not remove or otherwise affect any active farmland. The project site, generator tie-line route, and interconnection substation are not currently farmed and apparently have never been farmed. Furthermore, the Riverside County Integrated Project (RCIP) General Plan (2003) designates the project area as Open Space-Rural land use; there are no lands zoned for agriculture near the proposed project. Furthermore, the area has not been mapped by the state as important farmland. Therefore, because the RSEP will not remove prime farmland and is consistent with General Plan designated uses, impacts on agriculture would not occur.

5.11.2.3 Jurisdictional Wetlands and Other Waters of the U.S.

Based on the general soil units within the RSEP project area and an examination of the site's drainage characteristics, it does not appear that there are any jurisdictional wetlands or other waters of the U.S. present on or immediately surrounding the project site, generator tie-line route, or interconnection substation. Therefore, the proposed RSEP will not impact

jurisdictional wetlands or other waters of the United States. Section 5.2, Biological Resources, addresses this topic in greater detail.

5.11.2.4 Soil Erosion during Construction

Construction impacts on soil resources can include increased soil erosion and soil compaction. Soil erosion causes the loss of topsoil and can increase the sediment load in surface receiving waters downstream of the construction site. The magnitude, extent, and duration of construction-related impacts depend on the erodibility of the soil; the proximity of the construction activity to the receiving water; and the construction methods, duration, and season.

Because conditions that could lead to excessive soil erosion via water are not expected at the RSEP project site, little soil erosion from rain events is expected during the construction period. Conditions that could lead to excessive wind erosion may be present at the RSEP project site. The wind erosion potential may be very high, especially for Rositas soils. There is a close correlation between soil blowing and the size and durability of surface clodiness, rock fragments, organic matter content, and the presence of calcium carbonate. Soil moisture also influences soil blowing. The wind erodibility for Rositas and Carrizo soils is expected to be high because of their high sand content. Implementation of best management practices (BMPs) will be necessary to reduce the amount of soil loss from wind erosion.

To prevent water and wind erosion, BMPs will be implemented during construction in accordance with a site-specific Stormwater Pollution Prevention Plan (SWPPP). The California Energy Commission (CEC) also requires that project owners develop and implement a Drainage, Erosion, and Sediment Control Plan (DESCP) to reduce the impact of runoff from the construction site. Monitoring will involve inspections to ensure that the BMPs described in the SWPPP/DESCP are properly implemented and effective. With the implementation of BMPs, the impacts from soil erosion via wind and water are expected to be less than significant.

5.11.2.4.1 Water Erosion

An estimate of soil loss during construction by water erosion is found in Table 5.11-2. This estimate was developed using the Revised Universal Soil Loss Equation (RUSLE2) program using the following assumptions.

- Light grading on the RSEP construction site is expected over a total of about 1,496 acres. It is assumed that soil grading at the site will occur over a 6-month period. The soil in this area will then be exposed for the remainder of the 27-month construction period, after which most of the site will be covered with RSEP facilities and/or structures. For the RUSLE2 analysis, it is assumed that approximately 80 percent of the project site will have bare soil exposure during the construction period.

TABLE 5.11-2
RSEP Construction Soil Loss Estimates Using the Revised Universal Soil Loss Equation[a]

Feature (acreage)[b]	Activity	Duration (months)	Soil Loss (tons) without BMPs	Soil Loss (tons) with BMPs	Soil Loss (tons/year) No Project
Project Site – 1,410 acres	Grading	6	91.7	0.56	26.79
	Construction	27	126.9	2.54	
Offsite laydown, parking, office space, and heliostat fabrication area (61 acres)	Grading	2	1.3	0.0	1.16
	Construction	27	0.0	0.0	
Generator tie-line corridor, tower construction and laydown, generator tie-line access road (66.9-acre construction corridor; 0.04-acre footprint occupied by poles)	Grading	2	6.91	0.008	1.06
	Construction	10	2.09	0.042	
Perimeter drainage swale (25 acres)	Grading	2	0.5	0.0042	0.48
	Construction	31	3.2	0.065	
Project Soil Loss Estimates			**208.62**	**3.22**	**24.34**

[a]Soil losses (tons/acre/year) are estimated using RUSLE2 software available online (http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_index.htm).
[b]Acreages assume a 50-foot corridor for the generator tie-line and an additional 50x100-foot construction area for tower installation. Generator tie-line pole holes are assumed to have a 4-foot-by-4-foot excavation footprint.

- Soils of the Rositas series are assumed to occupy a large portion of the project area and vicinity; however, onsite soils have not been mapped by NRCS. For the RUSLE2 model, a proxy was used that is assumed to have physical and chemical characteristics that are similar to onsite soils. Estimates of soil loss (in tons) were made for the Rositas fine sand, 0 to 2 percent slopes, (map unit 132 from the Imperial County Soil Survey [NRCS, 2009]). Because the Preliminary Geotechnical Engineering Report (Terracon Consultants, 2009) found that surface soils primarily consist of silty sand and poorly graded sand, use of Rositas fine sand was deemed appropriate for the model.
- RUSLE2 rainfall erosivity conditions were estimated for the RSEP site using the site-specific rainfall estimate for the 2-year, 6-hour storm from online National Weather Service data (2009).
- A 150-foot slope length was assumed for all soil units. The maximum slope from the estimated slope class (0 to 2 percent) was used for the RUSLE calculations (i.e., 2 percent slope assumed).
- Soil losses are estimated using the following RUSLE2 conditions:
  - **Construction with no BMP implementation:** Soil losses were approximated using Management as "Construction Site Template/Default;" Contouring: Rows up and down hill; Diversion/Terracing: None; and Strips and Barriers: None.

- **Active grading:** Soil losses were approximated using Management as "Bare ground, rough surface" soil conditions; Contouring: Rows up and down hill; Diversion/terracing: None; and Strips and Barriers: None.
- **Construction with implementation of construction BMPs:** Soil losses were approximated using Management as "Construction Site Template/Default"; Contouring: Perfect, no row grade; Diversion/terracing: One stormwater detention basin at end of RUSLE2 slope; and Strips and Barriers: one silt fence at middle of RUSLE2 slope.
- A **"No Project"** soil loss estimate was also approximated using Management as "Multi-Year Rotation Template/Shrub-Warm Season Grass Rangeland; Contouring: Rows up and down hill; Diversion/terracing: None; and Strips and Barriers: None.

Detailed calculations and assumptions for the soil loss estimates are found in Appendix 5.11A.

With the implementation of appropriate BMPs, the total project soil loss of 3.22 tons is less than would be expected under the "no project" scenario. It also should be recognized that the results represent a conservative estimate. Multiple BMPs will be implemented to control erosion and soil loss and should effectively manage erosion to levels that are within or below the naturally occurring range.

5.11.2.4.2 Wind Erosion

The potential for wind erosion of surface material was estimated by calculating the total suspended particulates (TSP) that could be emitted as a result of grading and the wind erosion of exposed soil. The total site area and grading duration were multiplied by emission factors to estimate the TSP matter emitted from the site. Fugitive dust from site grading was calculated using the default particulate matter less than 10 microns in equivalent diameter (PM_{10}) emission factor used in URBEMIS2002 (Jones and Stokes Associates, 2003) and the ratio of fugitive TSP to PM_{10} published by the Bay Area Air Quality Management District (BAAQMD, 2005). Fugitive dust resulting from the wind erosion of exposed soil was calculated using the emission factor in AP-42 (U.S. Environmental Protection Agency, 1995; also in Table 11.9-4 in BAAQMD, 2005).

Table 5.11-3 summarizes the mitigated TSP predicted to be emitted from the site from grading and the wind erosion of exposed soil. Without mitigation, the maximum predicted erosion of material from the site is estimated at 1,152 tons over the course of the project construction cycle. This estimate is reduced to approximately 403 tons by implementing basic mitigation measures such as water application (see Section 5.11.4). These estimates are conservative because they make use of emission rates for a generalized soil rather than site-specific soil properties. Furthermore, the results are based on having 80 percent bare soil surface during project construction; actual grading will cover a lower percentage of the site than this. If vegetation is left in place, as is planned, and soil disturbance minimized further, then estimates of soil lost via wind erosion would decrease. With the implementation of mitigation measures described in Section 5.11.4.1, impacts related to soil erosion from wind will be less than significant.

TABLE 5.11-3
Soil Loss from RSEP Grading and Wind Erosion*

Emission Source	Acreage	Duration (months)	Unmitigated TSP (tons)	Mitigated TSP (tons)
Grading Dust:				
Project site	1,410	6	145.4	50.9
Offsite laydown area, parking, construction office, and heliostat fabrication area	61	2	2.10	0.73
Generator tie-line pole holes	0.04	2	0.001	0.0004
Generator tie-line laydown area	0.50	0	0.0	0
Perimeter drainage swale	25	2	0.86	0.30
Wind-blown Dust:				
Project site	1,128	27	964.4	337.6
Laydown area	0.0	27	0.0	0.0
Generator tie-line corridor	44.6	10	14.12	4.94
Generator tie-line laydown area	0.50	10	0.0	0.0
Perimeter drainage swale	25	31	24.54	8.59
Estimated Total			**1,152**	**403.0**

*Assumptions for these calculations are found in Appendix 5.11A.

5.11.2.5 Expansive Soils

An important characteristic of the proposed RSEP project site could include the potential for soils with high shrinking and swelling during cycles of wetting and drying. The RSEP site soils are estimated to have relatively low clay contents, which would likely indicate a low shrink-swell potential. An onsite geotechnical soil investigation did not identify the presence of expansive soils, and describes onsite soils as being suitable for use as engineered fill (Terracon Consultants, 2009). The Maximum Expansion Index is 20, very low (American Society of Testing and Materials [ASTM] D4829), and the estimated shrink of the near-surface alluvium is 5 to 10 (ASTM D1557). Because high shrink-swell soils are not present, it is expected that construction and operation of the RSEP would not result in a substantial risk to life or property because of the presence of expansive soils.

5.11.2.6 Compaction during Construction and Operation

Construction of the proposed project would result in soil compaction by use of heavy equipment during the construction, and the Preliminary Geotechnical Engineering Report (Terracon Consultants, 2009) indicated that soils are especially vulnerable to compaction if heavy equipment is operated on the site when soils are moist. Soil compaction increases soil density by reducing soil pore space. This also reduces the ability of the soil to absorb precipitation and transmit gases for respiration of plants and soil microfauna. Soil compaction can result in increased runoff, erosion, and sedimentation. However, because

the RSEP will be constructed in an area historically used as airplane runways, soils on the site may already be compacted. The incorporation of BMPs in accordance with the SWPPP/DESCP guidelines during construction will result in less-than-significant impacts from soil compaction.

Operation of the RSEP would entail regular traffic across the site for maintenance purposes and for washing heliostat mirrors. Long-term traffic would result in soil compaction during project operations. At project closure, soil decompaction may be required to rehabilitate soils and allow for site revegetation.

5.11.2.7 Effects of Emissions on Soil-vegetation Systems

Because the RSEP would generate electricity using a steam turbine-generator, the project would not emit significant quantities of oxides of nitrogen or other air pollutants that could have an adverse impact on soil-vegetation systems. The RSEP also will use an air-cooled condenser, rather than a cooling tower, thus eliminating the potential for cooling tower drift that could affect vegetation in environments that are highly sensitive to nutrients or salts downwind of the project.

Ozone and nitrous oxides will be emitted from monthly short-term testing of the fire pump and emergency generators during RSEP operations; however, these emissions would likely be too small to have a significant effect on sensitive habitats. Additionally, there are no sensitive habitats in or surrounding the project area; therefore, the addition of small amounts of nitrogen to the area would result in less-than-significant impacts on soil-vegetation systems.

5.11.3 Cumulative Effects

A cumulative impact refers to a proposed project's incremental effect together with other closely related past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project (Public Resources Code § 21083; CCR, title 14, § 15064(h), 15065(c), 15130, and 15355). Because the project would not have significant adverse impacts on soil resources and because there currently are no active projects or proposals within 15 miles of the project site, there would be no significant adverse cumulative impacts.

5.11.4 Mitigation Measures

BMPs in accordance with the SWPPP and DESCP will be used to minimize erosion during construction. These erosion-control measures would be required to help maintain water quality, protect property from erosion damage, and prevent accelerated soil erosion or dust generation that destroys soil productivity and soil capacity. Typically, these measures include mulching, physical stabilization, dust suppression, berms, ditches, and sediment barriers. Water erosion will be mitigated through the use of sediment barriers and wind erosion potential will be reduced significantly by keeping soil moist or by covering, mulching, applying bonded fiber, or applying dust palliatives on the soil stockpiles. After construction, land surfaces will be stabilized and maintained to limit wind-blown sediment as much as possible, both as a BMP and because wind-blown sediment affects mirror reflectivity and therefore the plant's efficiency and performance. Soil erosion losses after construction are expected to be similar to or less than pre-project erosion losses.

5.11.4.1 Temporary Erosion Control Measures

BMPs will be implemented during construction in accordance with the SWPPP required by the SWRCB's General Construction Permit for all construction projects over 1 acre in size. Additionally, the CEC requires that project owners develop and implement a DESCP to reduce the impact of runoff from the construction site.

Temporary erosion control measures required for the SWPPP and DESCP would be implemented before construction begins and would be evaluated and maintained during construction. These measures typically include mulching, physical stabilization, dust suppression, berms, ditches, and sediment barriers. These measures would be removed from the site after the completion of construction.

During construction, dust erosion control measures would be implemented to minimize the wind-blown loss of soil from the site. Groundwater would be used and would be sprayed on the soil in construction areas to control dust prior to completion of permanent control measures.

Sediment barriers would be incorporated to slow runoff and trap sediment. Sediment barriers include straw bales, sand bags, straw wattles, and silt fences. They are generally placed below disturbed areas, at the base of exposed slopes, and along streets and property lines below the disturbed area. Sediment barriers are often placed around sensitive areas to prevent contamination by sediment-laden water. Such barriers will be placed upgradient from active drainages on the site.

A drainage swale will be constructed on the outside of the perimeter fence surrounding the project. This feature will direct stormwater around the site and allow rain that is received on the site to sheet flow toward a detention basin that will be constructed near the southern boundary. These measures will ensure that concentrated sediment-laden stormwater will not discharge from the site and have an adverse impact on adjacent properties.

The site will be constructed on relatively level ground; therefore, it is not considered necessary to place sediment barriers around the entire property boundary. However, some barriers would be placed where offsite drainage could occur. If used, sediment barriers would be properly installed (e.g., silt fences would be staked and keyed), then removed or used as mulch after construction. Sediment barriers also would be installed around the base of the soil stockpiles, and stockpiles would be stabilized and covered.

Mitigation measures, such as watering exposed surfaces, are used to reduce PM_{10} emissions during construction activities. The PM_{10} reduction efficiencies are taken from the South Coast Air Quality Management District (SCAQMD) CEQA Air Quality Handbook (1993) and were used to estimate the effectiveness of the mitigation measures. Table 5.11-4 summarizes the mitigation measures and PM_{10} reduction efficiencies.

TABLE 5.11-4
Mitigation Measures for Fugitive Dust Emissions

Mitigation Measure	PM_{10} Emission Reduction Efficiency (%)
Water active sites at least twice daily	34-68
Enclose, cover, water twice daily, or apply non-toxic soil binders, according to manufacturer's specifications, to exposed piles (that is, gravel, sand, dirt) with 5 percent or greater silt content	30-74

Source: SCAQMD CEQA Handbook, Table 11-4 (1993)

5.11.4.2 Permanent Erosion-control Measures

Permanent erosion-control measures on the site will be identified in the SWPPP and DESCP and would include gravel, paving, and surface drainage systems. The perimeter drainage swale and stormwater detention basin are expected to be permanent facilities that will contribute to effective erosion and sediment controls during project operations.

5.11.4.3 Geotechnical Soil Investigation

The project owner has completed a preliminary geotechnical investigation to evaluate the characteristics of project site soils and determine remedial measures to address impacts related to soil properties (Appendix 2B). Recommendations provided in the geotechnical report will be followed to mitigate potential impacts related to soil texture, expansiveness, and compaction.

5.11.5 Laws, Ordinances, Regulations, and Standards

Federal, state, county, and local laws, ordinances, regulations, and standards (LORS) applicable to soils are discussed below and summarized in Table 5.11-5.

TABLE 5.11-5
Laws, Ordinances, Regulations, and Standards for Soils

LORS	Requirements/Applicability	Administering Agency	AFC Section Explaining Conformance
Federal			
1972 Amendments to Federal Water Pollution Control (Clean Water Act, including 1987 amendments)	Regulates stormwater discharge from construction and industrial activities	SWRCB and Colorado River Basin RWQCB; EPA has oversight authority	Section 5.11.5.1.1
NRCS, *National Engineering Handbook*, Sections 2 and 3 (1983)	Standards for soil conservation	NRCS	Section 5.11.5.1.2
Northern and Eastern Colorado Desert Coordinated Management Plan (2002)	Regulates activities on public lands in the project area	BLM	Section 5.11.5.1.3

TABLE 5.11-5
Laws, Ordinances, Regulations, and Standards for Soils

LORS	Requirements/Applicability	Administering Agency	AFC Section Explaining Conformance
State			
Porter-Cologne Water Quality Control Act	Regulates stormwater discharge	SWRCB and Colorado River Basin RWQCB	Section 5.11.5.2.1
Table 18-1-B of the Uniform Building Code (International Code Council, 1997)	Sets standards for defining expansive soils	CEC	Section 5.11.2.5
California Streets and Highways Code	Sets permit requirements for activities conducted within the right-of-way of state highways	California Department of Transportation	Section 5.11.5.2.2
Local			
Riverside County ordinances related to building, grading, and stormwater and erosion control	Requirements for grading; erosion control; and stormwater compliance for construction activities	Riverside County	Section 5.11.5.3.1

SWRCB = State Water Resources Control Board
RWQCB = Regional Water Quality Control Board
EPA = U.S. Environmental Protection Agency

5.11.5.1 Federal LORS

5.11.5.1.1 Federal Clean Water Act

The 1972 Amendments to the Federal Water Pollution Control Act, commonly referred to as the Clean Water Act (CWA), establish requirements for discharges of stormwater or wastewater from any point source that would affect the beneficial uses of waters of the United States. The CWA effectively prohibits discharges of stormwater from construction sites unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. The State Water Resources Control Board (SWRCB) is the permitting authority in California and has adopted a statewide general permit for stormwater discharges associated with construction activity (General Construction Permit; SWRCB, 1999) that applies to projects resulting in 1 or more acres of soil disturbance and directly or indirectly discharge stormwater to waters of the U.S.

The proposed project would result in disturbance of more than 1 acre of soil; however, the ephemeral desert washes on or near the site are assumed to not be waters of the U.S. The General Construction Permit only applies to construction activities that result in discharges to waters of the U.S., so the project would likely not be subject to that permit or its conditions. Nevertheless, the CEC and BLM would require development and implementation of a site-specific SWPPP consistent with the requirements of the General Construction Permit, and Riverside County also has requirements for appropriate erosion and sediment controls. Requirements are described in greater detail in Section 5.15, Water Resources.

The CWA's primary requirement for soils in the project area consists of control of soil erosion and sedimentation during and after construction, including the preparation and execution of erosion and sedimentation control plans and measures for any soil disturbance during construction.

5.11.5.1.2 U.S. Department of Agriculture Engineering Standards

Sections 2 and 3 of the NRCS National Engineering Handbook provide standards for soil conservation during planning, design, and construction activities (NRCS, 1983). The proposed RSEP project will need to conform to these standards during grading and construction to limit soil erosion.

5.11.5.1.3 BLM Northern and Eastern Colorado Desert Coordinated Management Plan

Because the project proposes to construct generator tie-lines across lands under the jurisdiction of BLM, project activities would need to be consistent with the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) and would need to comply with any requirements pertaining to land disturbance, soil compaction, and erosion and sediment controls.

5.11.5.2 State LORS

5.11.5.2.1 California Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (California Water Code, Division 7) is the state law governing water quality in California, and designates responsibilities to the SWRCB and nine Regional Water Quality Control Boards (RWQCBs) for adopting and implementing water quality standards. In 1999, the SWRCB adopted a general NPDES permit, in compliance with the CWA, to regulate stormwater discharges from construction sites greater than 1 acre in size that discharge to waters of the U.S. If an NPDES permit (i.e., General Construction Permit) is found to not apply to the proposed project, then the RWQCB may require Waste Discharge Requirements pursuant to the Porter-Cologne Water Quality Control Act, for discharges to Waters of the State. The proposed RSEP site lies within the jurisdiction of the Colorado River Basin RWQCB; this RWQCB would ensure that the project complies with applicable permit requirements for protection of water quality.

5.11.5.2.2 California Streets and Highways Code

The California Streets and Highways Code, Sections 660 to 734, gives the California Department of Transportation (Caltrans) the authority to permit improvements and other activities on the state's highway system rights-of-way. An encroachment permit would be required if construction or utility installation activities take place within the Caltrans right-of-way on SR 62. Detailed instructions for obtaining an encroachment permit are in the Encroachment Permit Application Guide (Caltrans, 2009).

5.11.5.3 Local LORS

5.11.5.3.1 Riverside County Building, Grading, and Erosion Control Ordinance

Construction requirements relevant to building, grading, and erosion and sediment control are found in Riverside County Ordinance 457, which applies to all unincorporated areas of Riverside County, unless specifically exempted.

Ordinance 457, Section 4J, provides amendments to the Uniform Building Code. This section requires grading in excess of 200 cubic yards to be performed in accordance with an

approved grading plan. Section J.7 requires the grading plan application to include plans and information related to proposed road work when the project includes grading for private roads not offered for public dedication. Grading permits require plan review, permit, and inspection fees.

Section J.10 requires stockpiles to be placed temporarily on a site for a period not to exceed 12 months. Stockpiles may not obstruct or divert natural drainage or water courses. Erosion and dust control measures must be implemented and the stockpile cannot cause any adverse effect on adjacent properties.

Section J.14 requires construction sites to minimize runoff of sediment from the site and into waters of the U.S. If practical, phased grading is to be conducted. This section requires construction activities greater than 1 acre in size to file a Notice of Intent to seek coverage under the SWRCB's General Construction Permit for discharges of stormwater from construction sites. It also requires development and implementation of a site-specific SWPPP and monitoring program, pursuant to requirements of that permit.

Section J.15 requires the Soils Grading report to comply with the guidelines set forth in Riverside County Technical Guidelines for Review of Geotechnical and Geologic Reports.

Construction requirements relevant to stormwater and urban runoff management and discharge controls are found in Riverside County Ordinance 754.2. The intent of this ordinance is to "protect and enhance the water quality of County watercourses, water bodies, groundwater, and wetlands in a manner pursuant to and consistent with applicable requirements contained in the Federal Clean Water Act, Porter-Cologne Water Quality Act, and any applicable state or federal regulations, related administrative orders or permits."

Section 1.C requires new development or redevelopment sites to control stormwater runoff to prevent deterioration of water quality. To prevent such deterioration, the Director of the County Transportation and Land Management Agency may establish BMPs and may identify the manner of implementation.

Section 1.E requires commercial and industrial facilities to comply with this and other ordinances (including 457 [outlined above] and 857 [not applicable to this section]), and establishes that these types of facilities may be subject to a regular program of inspection.

5.11.6 Agencies and Agency Contacts

Applicable permits and agency contacts for soils-related project features are shown in Table 5.11-6.

5.11.7 Permits and Permit Schedule

It is expected that all the required permits mentioned in Table 5.11-6 can be secured as long as completed applications are provided to the appropriate agency a minimum of 6 months prior to construction.

TABLE 5.11-6
Permits and Agency Contacts for Soils

Permit or Approval	Agency Contact	Applicability
Grading permit	Chandra Santiago Riverside County Transportation and Land Management Agency 4080 Lemon Street Riverside, CA 92502-1629 (951) 955-5996	Construction activities
Grading permit	Ann Iaali Associate Engineer, Air & Water Quality Regulatory Division, NPDES Section Riverside County Flood Control and Water Conservation District 1995 Market Street Riverside, CA 92501 (951) 955-1248	Stormwater and erosion control requirements
SWRCB General Construction Permit	Greg Gearheart, Sr. Water Resource Engineer State Water Resources Control Board	Construction activities with a disturbed area of 1 acre or more that discharge stormwater to waters of the U.S.
Waste Discharge Requirements	John Carmona Regional Water Quality Control Board-Colorado River Basin (760) 340-4521	Discharges into waters of the State (if General Construction Permit is not required)
Caltrans Encroachment Permit	Caltrans District 8 (909) 383-4526 Reza Moflemi (Route 62 Highway Engineer) 909-383-5955 (direct)	Utilities installation within Caltrans right-of-way in SR 62
BLM Conditional Use Permit	Cheryl Martinez, BLM, Palm Springs (760) 833-7147	Construction and operations compliance with NECO

5.11.8 References

Bay Area Air Quality Management District (BAAQMD). 2005. Permit handbook. http://www.baaqmd.gov/pmt/handbook/rev02/permit_handbook.htm. Accessed August 11, 2009.

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