CHAPTER 2—DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

This chapter provides a detailed description of the Desert Sunlight Solar Farm Project (DSSF or Project) proposed by Desert Sunlight Holdings, LLC (Sunlight or Applicant) and its alternatives. Sunlight's objective for the DSSF is to construct, operate, *maintain, and decommission* a 550-megawatt (MW) photovoltaic (PV) Solar Farm and associated generation interconnection line (Gen-Tie Line), and to facilitate the construction and operation by Southern California Edison (SCE) of the Red Bluff Substation. The Solar Farm has a minimum expected lifetime of 30 years, with an opportunity of 50 years or more with equipment replacement and repowering.

The Project has secured *a* queue position with the California Independent System Operator (CAISO) to interconnect with the existing 500-kilovolt (kV) SCE Devers-Palo Verde No. 1 (DPV1) transmission line located to the south of the Solar Farm site via the proposed Red Bluff Substation. DPV1 is the only existing transmission system in the vicinity of the proposed Project with adequate capacity to accept the projected Solar Farm output. The DPV1 transmission line runs from the Palo Verde Switchyard (in Arizona, near the Palo Verde nuclear power plant) to SCE's Devers Substation (in North Palm Springs, California). In the Project vicinity, the transmission corridor runs east-west within a half-mile south of the I-10 corridor.

This EIS analyzes the potential environmental impacts of three project alternatives, *one no action alternative, and two no project alternatives. The BLM has identified a full range of reasonable alternatives to analyze in the EIS.* The alternatives considered during the screening process include those proposed by the Applicant as part of the design of the proposed Project, those proposed by the BLM as part of environmental review, and ideas for potential alternatives suggested by *other* agencies and the public during the EIS scoping period. Retained for full analysis in the EIS were the alternatives that respond to the purpose and need *for the Proposed Action, and that otherwise meet NEPA requirements for identifying reasonable alternatives, as described in Section 6.6.1 (Reasonable Alternatives) of the BLM NEPA Handbook (H-1790-1)*. Those that did not were eliminated from further detailed analysis.

Technical information about the Project in this chapter was provided by the Applicant for the Solar Farm and Gen-Tie Line Project components and by SCE for the Red Bluff Substation. All numbers referring to land disturbance, equipment, schedule, mileage, and workforce are based on the most up-to-date engineering available from the Applicant and SCE. The numbers are based on best available information and generally represent conservative estimates for purposes of analyzing impacts*. In response to public and government agency input, the Applicant is continuing to evaluate Project design and construction methods to determine if potential environmental impacts can be further reduced. If so, the numbers may change in terms of further reductions based on the final engineering and permit requirements for the Project components.* The Applicant's information was provided primarily in the Revised Project Description for the Desert Sunlight Solar Farm, submitted on March 19, 2010, to the BLM. More detailed information has been provided from that time through January 2011. The Revised Project Description and supporting information are supplements to the Plan of Development submitted to the BLM on December 22, 2009. Initial information related to the Red Bluff Substation was provided by SCE on March 23, 2010, with supplemental information provided *through January 2011.*

This chapter provides information on the Proposed Action and Alternatives (Section 2.2), Project construction (Section 2.3), Project operation, maintenance, and decommissioning (Section 2.4), best management practices and built-in mitigation (Section 2.5), and a discussion of alternatives considered but eliminated from further analysis (Section 2.6).

Project Modifications Since Publication of the Draft EIS

Since the Project's Draft EIS was published, the Applicant has made various minor changes in the Project design that are included in this Final EIS. These changes have been made for reasons such as improving efficiency; reducing costs; avoiding and minimizing environmental impacts; and incorporating input from regulatory agencies, community members, and other stakeholders. The BLM has concluded that these revisions to the Project would not significantly increase, and in some situations would decrease, impacts compared with the impacts described in the Draft EIS.

The Project modifications include:

Solar Farm Site and Gen-Tie Line

- *A revised layout of Solar Farm facilities that reduces the footprint for Solar Farm Layout B from approximately 4,245 acres to approximately 3,912 acres while achieving the same 550-MW generating capacity. Figure ES-1 shows the change in the footprint.*
- *A revised construction approach involving the use of innovative site preparation techniques that reduce the required volume of earth movement, including (1) a "disc and roll" technique that uses farm tractors to till the soil over much of the Solar Farm site and then roll it level, and (2) "micrograding" or "isolated cut and fill and roll" of other areas of the site to trim off high spots and use the material to fill in low spots. These techniques minimize the area of the Solar Farm site where conventional cut and fill grading will occur.*
- *A modified approach to supplying water during construction for dust control and soil preparation throughout the Solar Farm site. The modified approach involves the use of several temporary construction ponds for water storage at various locations around the site.*
- *Modification of the Gen-Tie Line poles from a delta to a vertical configuration to provide the opportunity to co-locate transmission lines for possible additional projects in the area.*

Red Bluff Substation

- *An emergency diesel powered generator for a back-up power source.*
- *A well to provide dust control during construction and to serve a septic system for periodic operational visits by employees.*
- *A septic system and restroom for employees during operational activities.*
- *A material yard/staging area adjacent to the Substation footprint.*

The Project modifications, noted above, are incorporated into the action alternatives and reflected in the text, tables, and figures below and in Chapters 3 and 4, unless otherwise indicated.

2.2 PROPOSED ACTION AND ALTERNATIVES

2.2.1 Alternatives Development and Screening

Alternatives considered in the EIS were evaluated by BLM and comments received during the public scoping process. Under NEPA, the BLM is required to consider in detail a range of alternatives that are considered "reasonable," usually defined as alternatives that are realistic (not speculative), *technically* and economically feasible, and that respond to the purpose of and need for the Proposed Action. Similarly, CEQA requires a "reasonable range" of alternatives that are feasible and that satisfy most of the project sponsor's objectives. For purposes of this EIS, the alternatives provided satisfy requirements under both NEPA and CEQA.

Alternatives considered by the Applicant and the BLM, along with those suggested by the public during the scoping process, were evaluated using the following criteria:

- Does the alternative fulfill the purposes, needs, and objectives identified in Chapter 1?
- Does the alternative minimize effects on human/environmental resources?
- Is the alternative feasible to construct, operate, maintain, and decommission?

Other alternative sites and various renewable and nonrenewable generation technologies were considered but eliminated from detailed analysis under NEPA. These alternatives were eliminated from detailed analysis because one or more of the following criteria from the *BLM NEPA Handbook H-1790-1* (BLM 2008) apply:

(1) It is ineffective (it would not respond to the BLM project purpose and need);

(2) It is *technically* or economically infeasible;

(3) It is inconsistent with the basic policy objectives for the management of the area (does not conform to the California Desert Conservation Area [CDCA] Plan);

(4) Its implementation is remote or speculative;

(5) It is substantially similar in design to an alternative that is analyzed; or

(6) It would have substantially similar effects to an alternative that is analyzed.

Alternatives that met all of the criteria above were carried forward for analysis and are detailed in Section 2.2.4. Those that did not meet those criteria but met the elimination criteria above were eliminated from further analysis and are described in Section 2.6, along with the reasons for elimination.

As discussed in Section 1.1, the process for evaluating and selecting from among various areas considered for siting the Project Study Area was based on a number of criteria, considered in consultation with the BLM during the preliminary phases of the application process. These siting criteria include:

- A contiguous site, with flat topography (grade of less than three percent) large enough for siting a 550-MW solar PV facility with minimal land disturbance;

- Avoidance of areas that are pristine or biologically sensitive, such as designated Wilderness Areas, Areas of Critical Environmental Concern, and Desert Wildlife Management Areas, particularly for the Solar Farm site;
- Avoidance of high-quality habitat for listed species (e.g., choosing Project locations in Category III [lowest quality] desert tortoise habitat), particularly for the Solar Farm site;
- Avoidance of known cultural or historic sites and *high use* recreation areas;
- Proximity to transmission facilities with sufficient capacity for Project output and suitable locations for interconnection;
- Proximity to highway and road access;
- Availability of contiguous land for sale or lease at a feasible cost; and
- Location within an area identified as a California Renewable Energy Zone (CREZ) under the State's Renewable Energy Transmission Initiative (RETI) and a Solar Energy Study Area in the BLM/DOE Programmatic Solar Energy Development EIS.

Once the Project Study Area was chosen, the Applicant conducted preliminary biological, cultural, hydrological, and geological reviews to evaluate site conditions and eliminate portions of the Project Study Area considered unsuitable for developing the Project. Based on the preliminary study, more thorough and detailed biological, cultural, hydrological, and geological reviews were conducted of the portions of the Project Study Area considered suitable for development. These detailed studies were performed in order to determine the optimal configurations for alternatives to be considered for the three Project components.

Many alternative configurations for the Solar Farm site were considered for the current megawatt size, for a larger megawatt size, and for a smaller megawatt size. Alternative site configurations were developed to avoid *or* minimize impacts on sensitive environmental resources, such as biological, cultural, and visual resources, to the extent possible. Specific consideration was given to avoiding active desert tortoise areas, foxtail cactus and other sensitive plant species concentrations, burrowing owl signs, desert dry wash woodland, bighorn sheep and other wildlife corridors, major surface water drainages, including Pinto Wash, and active sand transport areas. When determining the optimum configuration for the Solar Farm site, stakeholders' comments *were also considered.*

Additional factors considered include engineering constraints, such as those for existing easements, grading, hydrological, electrical, and security; construction constraints, such as those for safety, cost, and constructability; power purchase agreement constraints; and interconnection constraints.

2.2.2 Proposed Land Use Plan Amendment Decisions and Alternatives *Considered*

This section presents an overview of the *proposed land use plan amendment decisions and* alternatives carried forward for analysis. Three full action alternatives, *one no action alternative, and two no project alternatives* are fully analyzed in the EIS. Each of the action alternatives would require an amendment to the CDCA Plan, as would the *two no project alternatives*. *The management of BLM-administered lands in the California Desert is governed by the CDCA Plan. The CDCA Plan recognizes the potential compatibility of solar generation facilities on public lands and, if the CDCA Plan does not associate a specific site with power generation or transmission, requires consideration of a CDCA Plan amendment to make that site-specific association. The planning*

criteria for considering an amendment to the CDCA Plan are discussed in CDCA Plan Chapter 4.10, Land Use and Corridor Analysis.

The location of the proposed Project includes land that is classified mostly as Multiple-Use Class M (Moderate Use) and some as Multiple-Use Class L (Limited Use) in the CDCA Plan. The Class M classification is managed to conserve desert resources and to mitigate damage to those resources which permitted uses may cause. Public lands classified as Moderate Use are managed to provide a controlled balance between higher-intensity use and protection of public lands. Lands classified as Class L are managed to protect sensitive natural, scenic, ecological, and cultural resource values. They provide for generally lower intensity, carefully controlled, multiple uses that do not significantly diminish resource values.

Energy and utility development uses are allowed in both classes. Accordingly, no re-classification of the Project area is being considered. Instead, the BLM is considering whether to amend the CDCA Plan to identify the Project area as appropriate for the development of a solar energy development. Further, regardless of whether the Project is approved, the BLM could elect to amend the CDCA Plan to associate the site with energy generation or transmission.

Each action alternative consists of three main components associated with generating and delivering electricity: Solar Farm site, Gen-Tie Line, and Substation (Red Bluff Substation). Supporting facilities for the Substation include a separate telecommunications site (the Desert Center Telecommunications Site), including microwave and fiber optics, an electric distribution line to the Substation, and an access road.

Multiple alternatives were considered for each component. For the Solar Farm, there are two alternative layouts analyzed: Solar Farm Layout B (reduces impacts on desert tortoise and preferred by Sunlight) and Solar Farm Layout C (reduces project size, further reduces impacts on desert tortoise and other environmental impacts, but delays or reduces benefits of renewable energy generation). For the Gen-Tie Line, three alternative routes were analyzed: two that exit the Solar Farm and go to Substation A (identified as GT-A-1 and GT-A-2) and one that exits the Solar Farm and goes to Substation B (identified as GT-B-2). For the Red Bluff Substation, two alternative locations were analyzed: Substation A (to the east) and Substation B (to the west). *The components were grouped into specific alternative groupings or configurations (Alternatives 1, 2, and 3) to facilitate the review and the analytical process. However, the actual alternatives analysis is not limited to these groupings or configurations since the various components can be grouped into a number of other configurations. First Solar identified and performed full technical, environmental and cultural surveys for Solar Farm A and Gen-Tie Line B-1; however, these project component alternatives were not carried forward based on BLM's conclusion regarding the severity of impacts associated with these two additional component alternatives.*

In addition, there are two access road alternatives considered for Substation A only: one coming from the west via the Kaiser Road exit off I-10 and Aztec Road along a pipeline access road (Access Road 1), and the other coming from the east via Chuckwalla Valley Road, Corn Springs Road, and a pipeline access road (Access Road 2). Substation B would require a new approximately 2,000-foot access road from Eagle Mountain Road. A map showing the location of the proposed Project components and alternatives is provided in Figure 2-1.

The *proposed land use plan amendment decisions and alternatives being considered* (three full action alternatives, *one no action alternative, and two no project alternatives),* which are described in detail in Section 2.2.4, are as follows:

- Alternative 1, Proposed Action Alternative – *The CDCA Plan of 1980, as amended, would be amended to identify the footprint of the Project site that includes Solar Farm Layout B, Gen-Tie Line GT-A-1, Red Bluff Substation A, and Access Road 2 as suitable for the proposed solar energy development. This alternative is BLM's Preferred Alternative;*
- Alternative 2, Alternate Action Alternative with Land Use Plan Amendment – *The CDCA Plan of 1980, as amended, would be amended to identify the footprint of the Project site that includes Solar Farm Layout B, and Gen-Tie Line GT-B-2 as suitable for the proposed solar energy development (Red Bluff Substation B is not subject to the plan amendment as these lands are in private ownership);*
- Alternative 3, Reduced Footprint Alternative with Land Use Plan Amendment *– The CDCA Plan of 1980, as amended, would be amended to identify the footprint of the Project site that includes Solar Farm Layout C, portions of Gen-Tie Line GT-A-2, Red Bluff Substation A, and Access Road 1 as suitable for the proposed solar energy development;*
- Alternative 4, No Issuance of a Right-of-Way Grant and No Land Use Plan Amendment (No Action) – *The CDCA Plan of 1980, as amended, would not be amended, and the Project would not be approved;*
- Alternative 5, No Issuance of a Right-of-Way Grant with Land Use Plan Amendment to Identify the Area as Unsuitable for Solar Energy Development *(No Project with Plan Amendment) – The CDCA Plan of 1980, as amended, would be amended to identify the Project application area as unsuitable for any type of solar energy development, and the Project would not be approved.; and*
- Alternative 6, No Issuance of a Right-of-Way Grant with Land Use Plan Amendment to Identify the Area as Suitable for Solar Development *(No Project with Plan Amendment) – The CDCA Plan of 1980, as amended, would be amended to identify the Project application area as suitable for any type of solar energy development, and the Project would not be approved.*

With Alternative 4, none of the Project components (Solar Farm, Gen-Tie Line, and Substation) would be built. This alternative is equivalent to the No Project Alternative under CEQA. With Alternatives 5 and 6, none of the Project components would be built (No Project), but there would be an amendment to the CDCA Plan that would identify the Solar Farm site as either unsuitable or suitable for solar development.

2.2.3 Features Common to All Action Alternatives

This section provides a detailed description of the three Project components (Solar Farm, Gen-Tie Line, and Substation) that make up the Proposed Action, regardless of the particular layout or route selected. Where necessary, differences between alternatives are identified. Details on the construction plan for each component are provided in Section 2.3. Details regarding operation and maintenance needs and the potential decommissioning of each Project component are provided in Section 2.4.

The numbers presented in the following sections are based on the most up-to-date information available. However, they are subject to change as the result of detailed engineering.

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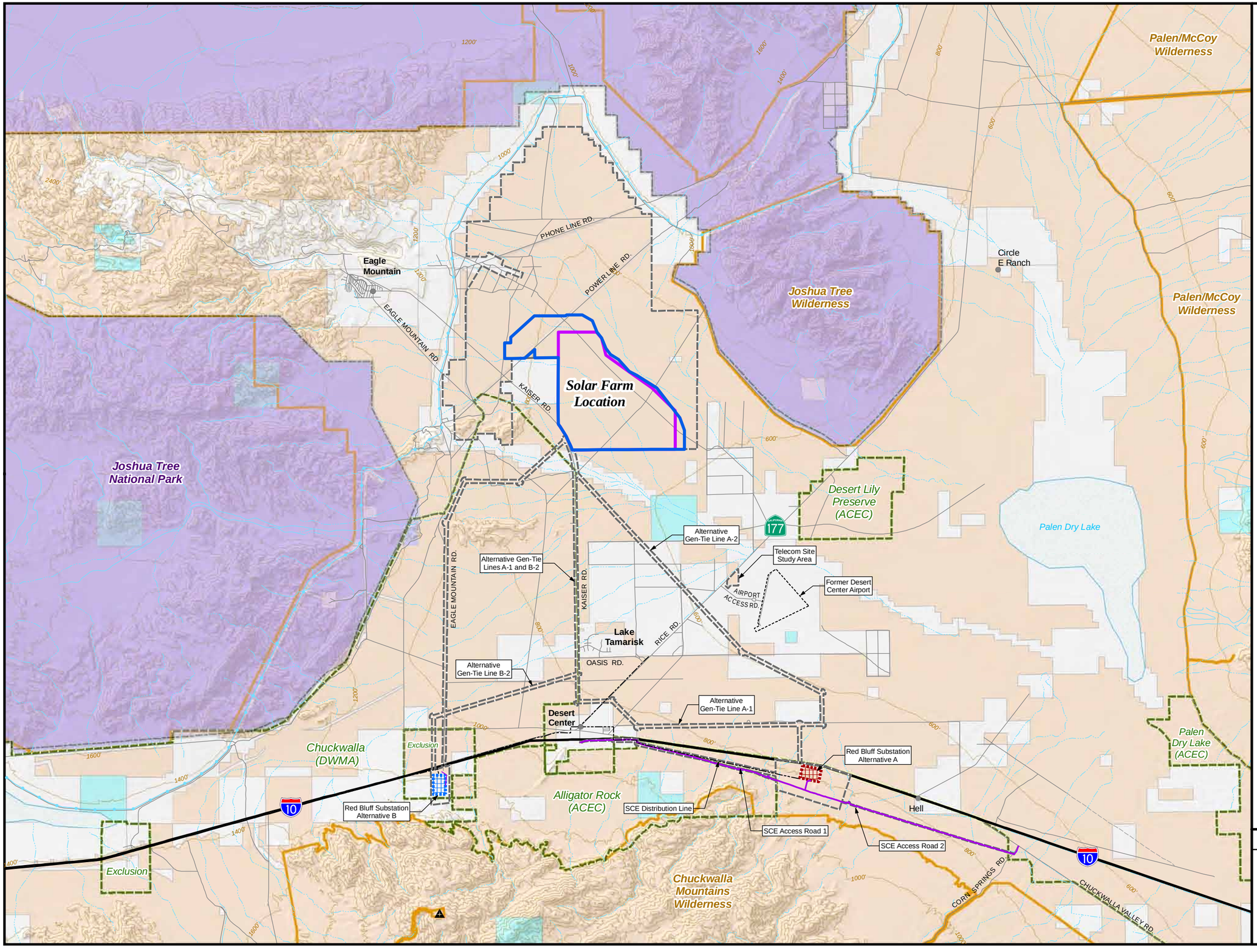

DESERT SUNLIGHT SOLAR FARM

Figure 2-1

Project Overview Map

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Solar Farm Site

The Solar Farm site would consist of several main components:

- Main Generation Area—PV arrays, combining switchgear, overhead lines, and access corridors;
- Operations and Maintenance (O&M) Facility;
- Solar Energy Visitors Center;
- On-Site Substation; and
- Site Security, Fencing, and Lighting.

Main Generation Area

The Project would utilize First Solar's technology for thin film cadmium telluride (CdTe) PV modules. First Solar began commercially producing its thin film PV technology in 2002, and since that time, the company has manufactured and sold approximately 2.2 gigawatts of modules that are in use throughout the world, including desert locations in the southwestern United States. *First Solar's manufacturing facilities are ISO 14001 and 9001 certified. First Solar PV modules conform to Underwriters Laboratories Inc. (UL) and International Electrotechnical Commission (IEC) test standards. First Solar does additional accelerated life-cycle testing of its PV modules to evaluate reliability and long-term performance characteristics. Based on the results of these tests and performance in the field, First Solar provides a 5-year workmanship warranty and a 25-year power output warranty. The company conducts routine monitoring of existing deployed panels to assess durability and longevity to meet its warranty obligations.* In 2005, First Solar established a pre-funded PV module collection and recycling program, through which any module may be returned to First Solar for recycling. *The collection and recycling is at no cost to the end user. The anticipated recycling costs are pre-funded into a trust account that is managed by a third-party trustee.* The program funds are independently managed as a trust to ensure that they will be available when they are needed, regardless of the financial status of First Solar. Approximately 90 percent of all collected modules are recycled into new products, including new First Solar modules.

At the Solar Farm site, the PV modules would be organized into arrays. Each megawatt requires approximately *seven* acres. Each array would consist of PV modules, a power conversion station (PCS), and a transformer. Figure 2-2 shows an example of a PV array, and Figure 2-3 depicts a typical array configuration. Figure 2-4 shows a photograph of a typical PCS.

As discussed in Section 2.3.1, the Applicant would use construction *site preparation* techniques that adequately prepare the site for safe and efficient installation and operation of PV arrays. It is anticipated that *over more than half of the Solar Farm site, the Applicant would use site preparation techniques that would minimize the required volume of earth movement, including (1) a "disc and roll" technique that uses farm tractors to till the soil over much of the Solar Farm site and then roll it for compaction, and (2) "micrograding" or "isolated cut and fill and roll" of other areas of the site to trim off high spots and use the material to fill in low spots. These techniques would minimize the area of the Solar Farm site where conventional cut and fill grading would occur.*

The PV arrays would be arranged in groups of PV modules. Arrays are supported by vertical steel posts, spaced at no less than *10* feet apart, and driven into the ground to a typical depth of 4 to 7 feet below grade. Once mounted, the bottom of each array would be raised approximately 1.5 to 2 feet above ground, while the top would be set at approximately *4.5* to 8 feet above grade.

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Figure 2-2

Typical Photovoltaic Array

Source: First Solar, 2010

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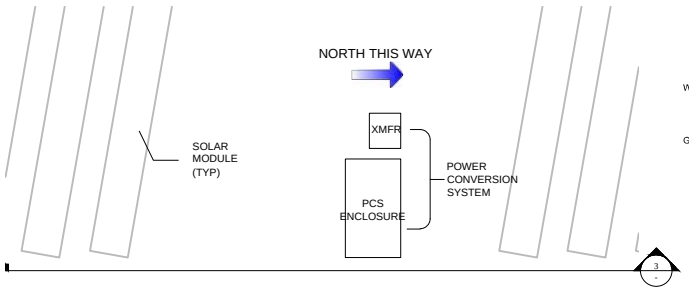
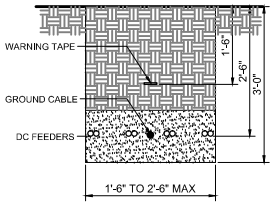
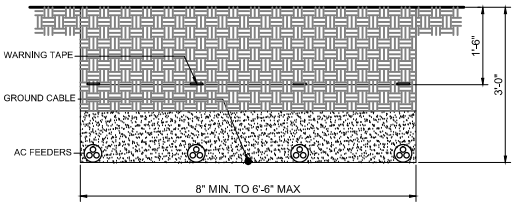


TYPICAL ARRAY CONFIGURATION



5 TYPICAL DC TRENCH
Scale: NTS



6 TYPICAL AC TRENCH
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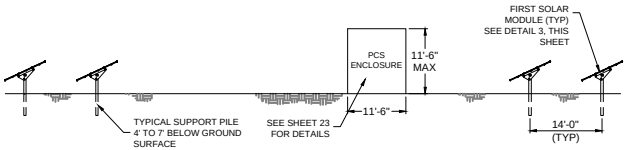

2 ARRAY ELEVATION SIDE VIEW
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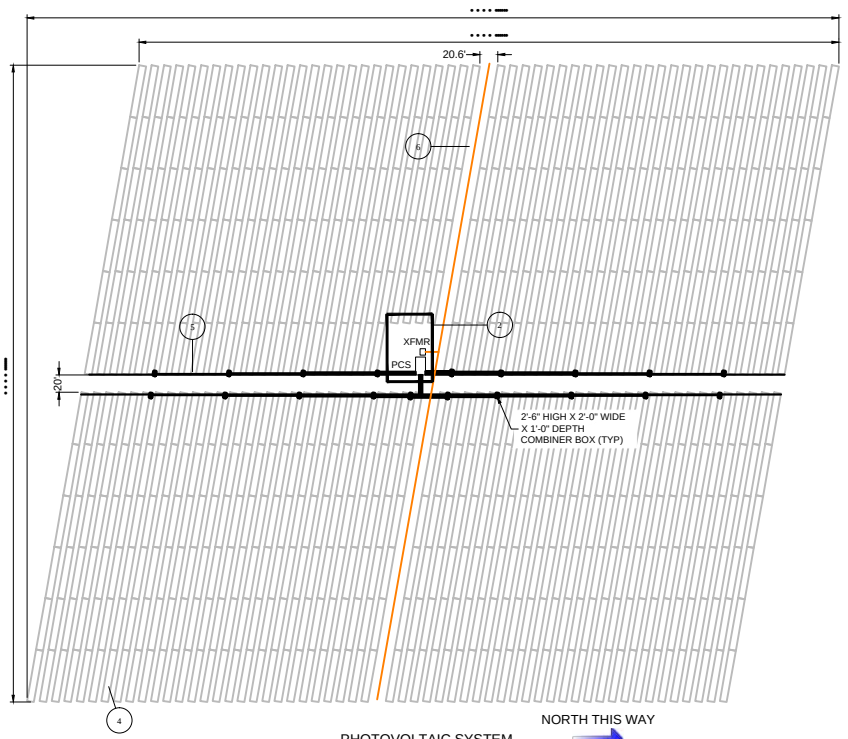

PHOTOVOLTAIC SYSTEM TYPICAL ARRAY
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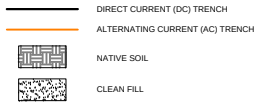
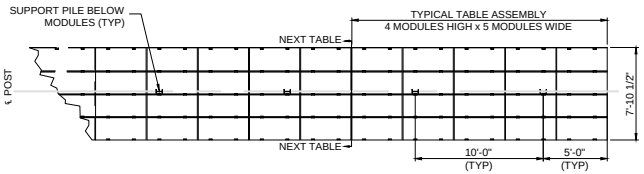
Scale: NTS

LEGEND





4 MODULE ASSEMBLY
Scale: NTS

Source: First Solar, 2011.

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Figure 2-3

Typical Array Configuration

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Figure 2-4

Typical Power Conversion Station

Source: First Solar, 2010

The arrays would be sectioned into quadrants by two access corridors of nominal 20-foot width, one running *roughly* north to south and the other east to west (see Figure 2-3). This perimeter access corridor would be shared by adjacent arrays. These access corridors would remain unpaved and un-graveled and would be used only as necessary during operations and maintenance activities. In addition, a *20*-foot gravel access road would run through portions of the Solar Farm site. These roads would be compacted to 90 percent. During operation, the access corridors and roads would be used infrequently, for inspection and maintenance activities. Best management practices (BMPs) in accordance with South Coast Air Quality Management District requirements would be used to stabilize the soil during construction, operations, maintenance, and decommissioning of the Project, as identified in the Fugitive Dust Control Plan. This and other BMPs are found in Section 2.5.

The PV modules would be electrically connected by wire harnesses and combiner boxes that would collect power from several rows of modules and feed the Project's PCS via direct current (DC) cables placed in underground covered trenches. DC trenches would be approximately 3 feet deep and from 1.5 to 2.5 feet wide. The bottom of each trench would be filled with clean fill surrounding the DC cables and the remainder of the trench would be back-filled with native soil and compacted to 90 percent (95 percent when crossing under roadways). Power screeners may be used on site for a period of time (less than one year) to extract the required clean fill from native soils for use as bedding material in the trenches. A power screener is a motorized piece of equipment that uses moving screens to filter soils to a particular granularity. Use of this equipment has been included in the air quality analysis.

Each PCS comprises an inverter located within an enclosure (shelter) and connected to a transformer. The PV inverters would convert the DC electric input into grid-quality alternating current (AC) electric output. The AC electrical output would be transmitted from the PCS to the adjacent transformer. The transformer would step up the voltage of the AC electrical input and then would transmit the power via underground lines in covered trenches to the PV combining switchgear (PVCS). AC trenches would be approximately 3 feet deep and from 8 inches to 6.5 feet wide and would also be used to house fiber optic cables. The bottoms of the trenches would be filled with sand surrounding the fiber optic cables, and the remainder of the trench would be back-filled with native soil and compacted. The PVCS would transmit the power to overhead lines within the Solar Farm site; the overhead lines would transmit the electrical output to the On-site Substation. At the On-site Substation the voltage would be stepped up to 220 kV and routed via the Gen-Tie Line to the Red Bluff Substation.

The PCS and transformer would be located within each PV array. The PCS enclosures would be approximately 11.5 feet tall. The transformers would be approximately 6.3 feet tall. The transformer would be placed on a pre-cast concrete pad. Each pad would be delivered by flatbed truck during construction, in combination with a PCS vault, and installed by crane from the truck.

Each PVCS would collect the power from a number of arrays. The PVCS cabinets would be approximately 7.5 feet tall and would be dispersed amongst the arrays. Figure 2-5 shows a photograph of a typical PVCS. Each PVCS would be placed on pre-cast 32-foot by 14.5-foot concrete pads, delivered and installed in the same manner as transformer pads and PCS vaults.

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Figure 2-5

Typical Photovoltaic Combining Switchgear

Source: First Solar, 2010

High-capacity 34.5-kV collection system lines would connect the power output from the PVCS to the On-site Substation via overhead lines. These overhead lines would be supported by wooden poles approximately 52 feet above finished grade (Figure 2-6). The overhead lines would span a distance of approximately 150 feet from pole to pole. The on-site electrical collection system would be designed to minimize electrical losses within the Solar Farm site prior to delivery to the On-site Substation.

One or more meteorological stations would be installed at the Solar Farm site prior to construction in order to track weather patterns. Figure 2-7 depicts a typical meteorological station. The meteorological station(s) would be attached to the data acquisition system (DAS) to collect data for analysis and system monitoring.

Operations and Maintenance Facility

The O&M facility would be located near the On-site Substation in the southwestern portion of the Solar Farm site. This and other facilities at the Solar Farm are shown on Figure 2-19 in Section 2.2.4. The O&M facility would be designed for employee offices, parts storage, plant security systems, and Project monitoring equipment. The O&M facility would consist of an Americans with Disabilities Act-(ADA) compliant structure that would contain facilities for 15 full-time staff members. It would consist of a 120-foot-wide by 240-foot-long (approximately 0.7 acres) prefabricated building set on concrete slab-on-grade poured in place. The building would be approximately 19 feet tall at its highest point. The O&M facility would be surrounded by a path and parking area surfaced with aggregate. The path and parking area would occupy approximately 0.5 acres.

During Project operations, Sunlight currently plans to install one permanent, above-ground water storage tank (approximately 5,000 gallons) on a concrete pad adjacent to the O&M facility. A septic system and leach field would serve the Project's sanitary wastewater treatment needs and would be sited south of the O&M facility and Solar Energy Visitors Center. The specifications for the septic system would be determined by engineering code and county permit requirements. Preliminary estimates assume the septic tank would sit on a 4-foot by 5-foot concrete pad and the leach field would be approximately 4,000 square feet.

Solar Energy Visitors Center

A Solar Energy Visitors Center (Visitors Center) would be located just off the road at the main entrance to the Solar Farm site. The Visitors Center would consist of an approximately 50-foot-by-50-foot (approximately 0.06 acre) building on a concrete pad that would include items such as a scale model of the Project and exhibits on solar power designed for both students and members of the general public. The facility would comply with ADA requirements.

On-Site Substation

The On-site Substation facility would be located in an approximately *6.3*-acre fenced area in the southwest corner of the Solar Farm site. The electrical plan for the On-Site Substation is shown in Figure 2-8 and a section view of it is provided in Figure 2-9. The footprint of the Substation structure itself would be approximately *3.9* acres. At the On-site Substation, the voltage of the Solar Farm-generated electricity would be stepped up to 220 kV, which is the voltage of the Gen-Tie Line that would interconnect Project output with the Red Bluff Substation. The main 25-foot-wide graveled access road for the Solar Farm from Kaiser Road would run past, and provide access to, the On-site Substation.

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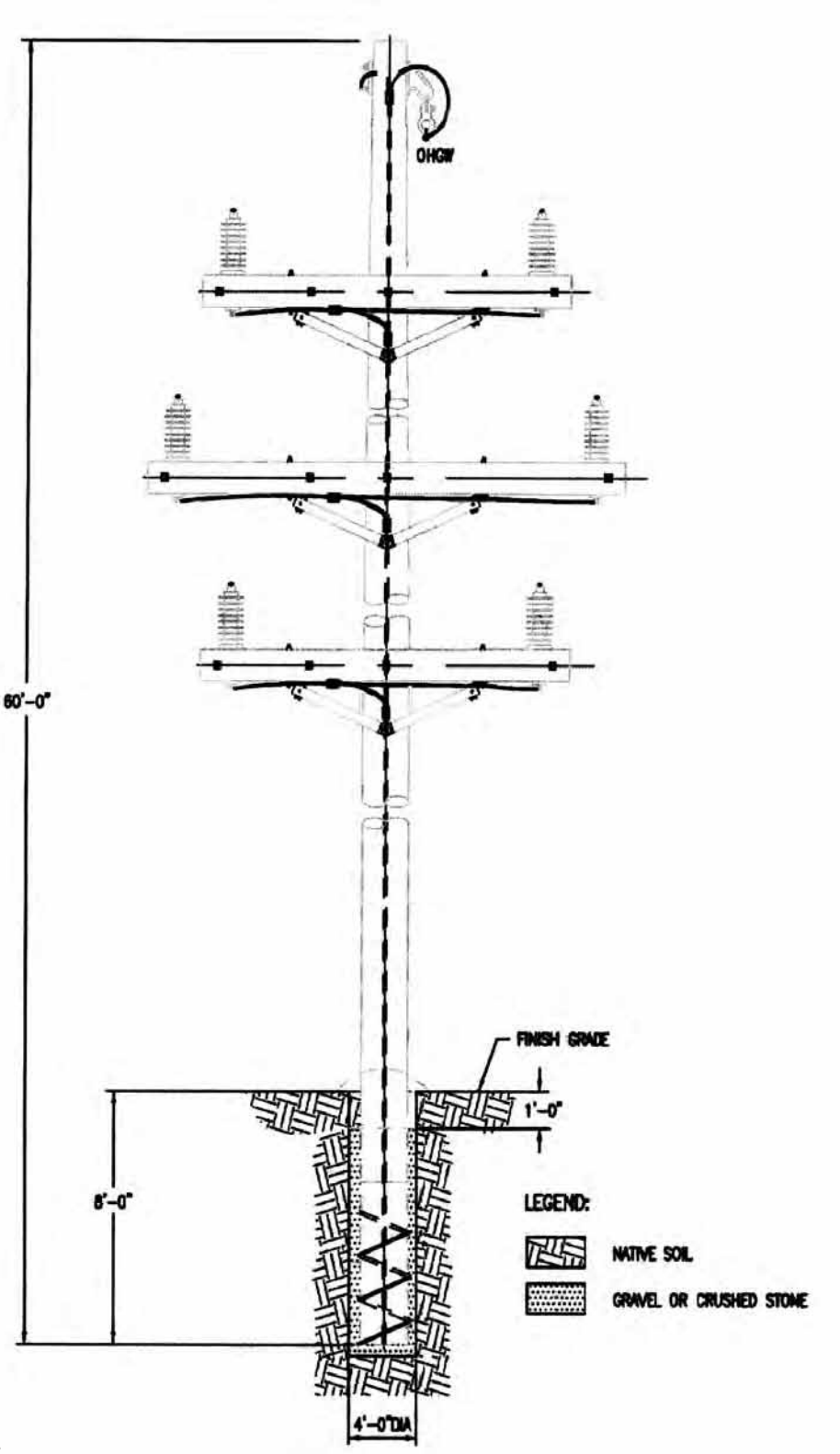

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Figure 2-6

Typical 34.5 kV Pole

Source: First Solar, 2010

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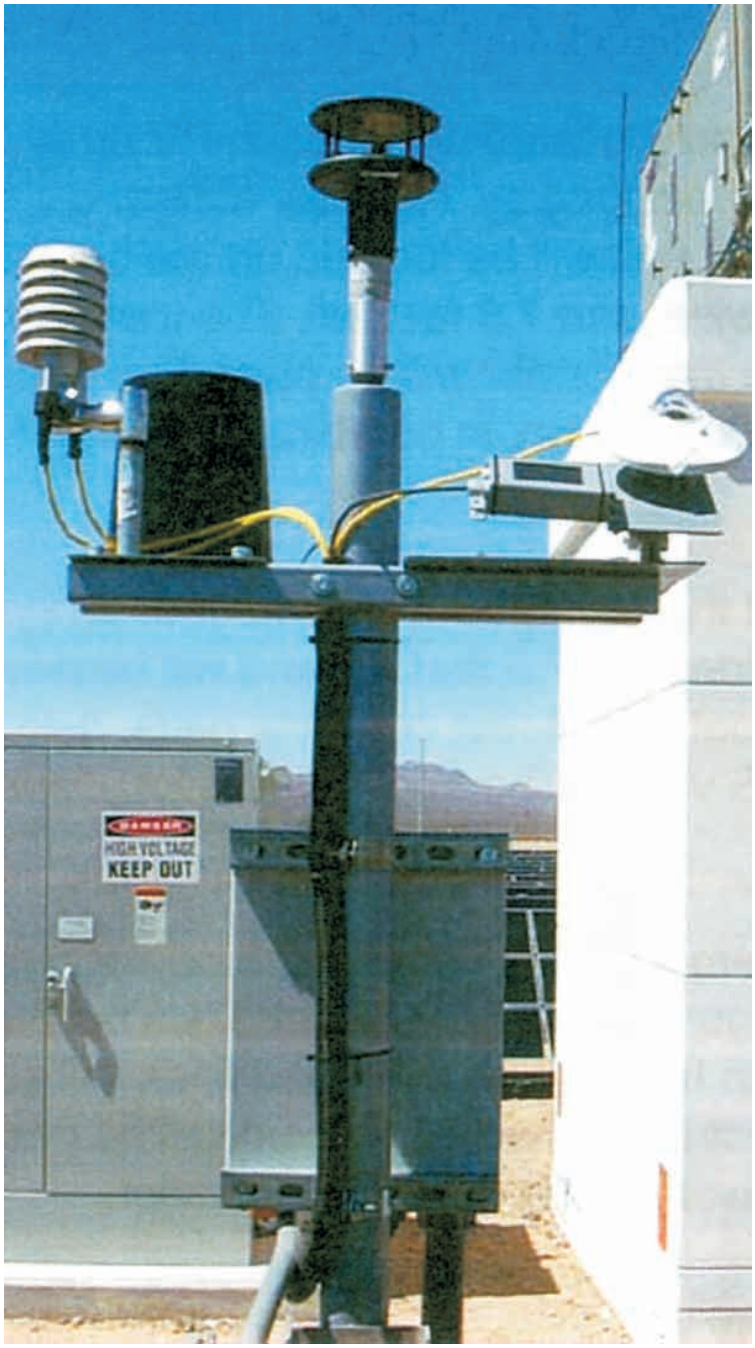

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Figure 2-7

Typical Meteorological Station

Source: First Solar, 2010

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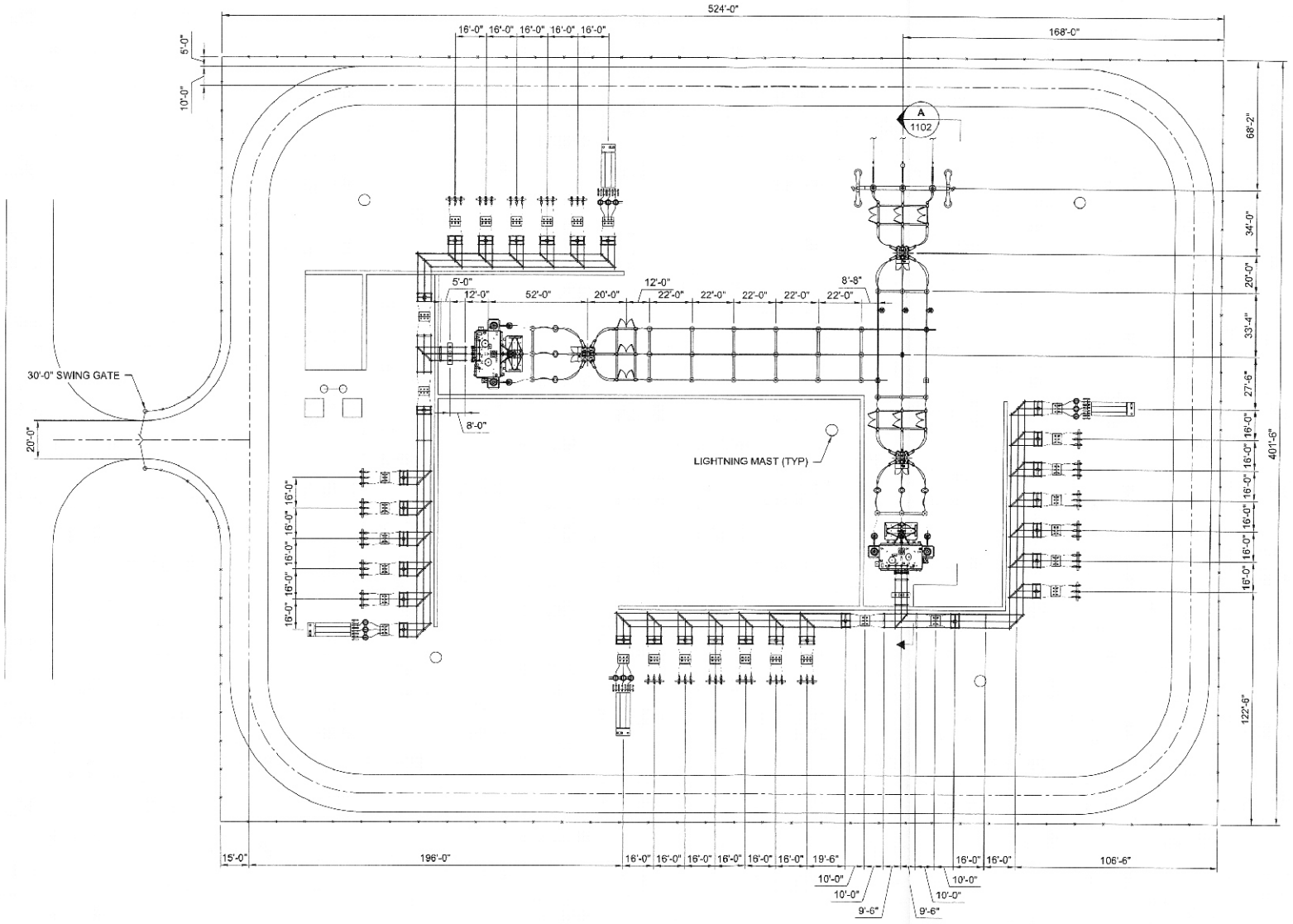

Source: First Solar, 2010

DESERT SUNLIGHT SOLAR FARM

Figure 2-8

Electrical Plan for On-Site Substation

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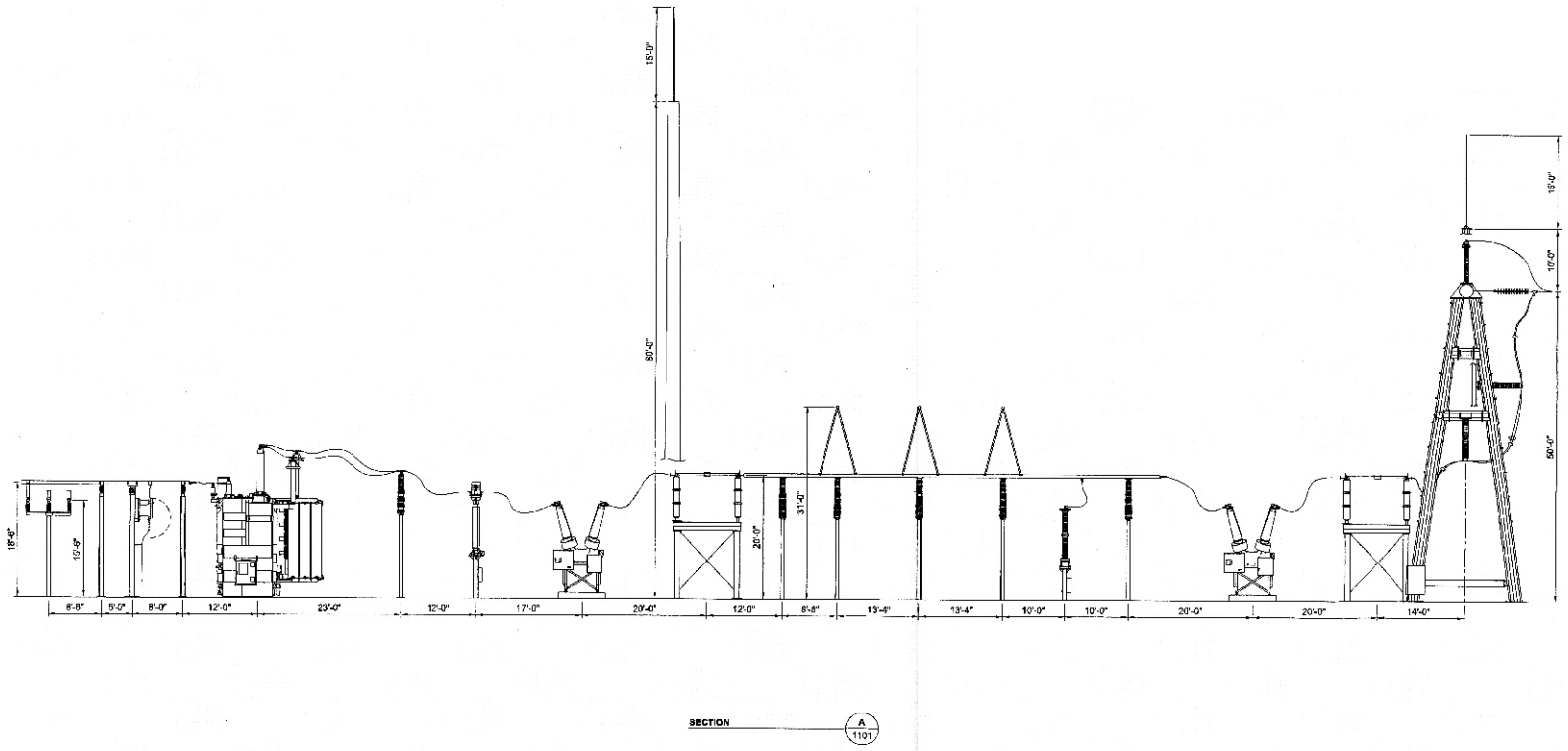

Source: First Solar, 2010

DESERT SUNLIGHT SOLAR FARM

Figure 2-9

Section View of On-Site Substation

Site Security, Fencing, and Lighting

The proposed Solar Farm site boundary would be fenced to facilitate Project and equipment security. Surveillance methods such as security cameras, motion detectors, or heat sensors may be installed at locations along the Project boundary. Gates would be installed at the roads entering or exiting the Solar Farm site. Limiting access to the Project would be necessary both to ensure the safety of the public and to protect the equipment from potential theft and vandalism. The perimeter of the Solar Farm site would be fenced with a 6-foot-tall chain-link security fence topped with barbed wire. In addition, 6- to 7-foot-tall chain-link fencing would surround the Project's On-site Substation.

A tortoise exclusion fence would be located adjacent to (and just outside) the perimeter fence. The Solar Farm site would be designed, operated, and maintained so that stormwater flow would not undermine the integrity of the perimeter fence or the desert tortoise exclusion fencing.

Except as provided below, lighting during construction would be limited to the staging area for the construction trailers, parking area, and site security facilities. Lighting would be located on temporary service poles approximately 18 feet in height. Power would come from a connection to the local distribution system or from the construction office trailer generator. While lighting is not planned for construction activities, if required, lighting would be limited to that needed to ensure safety. It would be focused downward, shielded, and directed toward the interior of the site to minimize light exposure to areas outside the construction area.

During operations, lighting would be limited to shielded area-specific lighting for security purposes for the O&M facility and the onsite Substation. Power for the lights would come from the onsite Substation and/or the existing electrical distribution service. *Service lighting would be placed in key safety-sensitive areas, such as the switchyard of the On-site Substation.* The level and intensity of lighting during operations would be the minimum needed for security and safety purposes. *Security* lights would *use* motion sensor *technology* that would be triggered by movement at a human's height during maintenance or emergency activities. There would be no lights around the Project perimeter, in order to minimize the Project's visual impact on surrounding receptors and roads. Sensors on the security fencing would alert security personnel of possible intruders. Lights on the site would be shielded and focused downward and toward the interior of the site to minimize lighting impacts on the night sky and to neighboring areas. Portable lighting may be used occasionally and temporarily for maintenance activities during operations.

Transmission Line (Gen-Tie Line)

The Project would interconnect with the regional transmission system via a 220-kV single-circuit Gen-Tie Line that would exit the southwestern portion of the Solar Farm site and follow a 160-foot-wide transmission right-of-way (ROW) to SCE's planned Red Bluff Substation to be located south of the Solar Farm site near I-10. An additional fan-shaped area with a radius of 450 feet would be required as part of the ROW (beyond the 160-foot corridor) at each turn in the Gen-Tie Line. These areas would be required during construction for wire stringing along the Gen-Tie Line.

The Applicant plans to use steel *self-weathering* monopoles for the Gen-Tie Line. Poles are expected to be approximately 135 feet tall. Typical 220-kV poles *designed with a vertical configuration* are shown in

Figure 2-10 and Figure 2-11. Typical spacing between structures would be approximately 900 to 1,100 feet. Self-weathering steel would be used for the monopoles, which would blend with the surrounding mountains better than other potential finishes. Self-weathering steel is composed of a special alloy that forms an oxide, which prevents further rusting. The finish appears as a matte patina and is commonly used in environmentally sensitive areas where a shiny appearance would be undesirable. *All towers and poles would be designed to be avian-safe in accordance with the Suggested Practices for Avian Protection on Power Lines: the State of the Art in 2006 (APLIC 2006).*

Based on the Project requirements, access, terrain, and limited available geotechnical information, it is expected that direct embedded foundations would be used for tangent structures and anchor bolted drilled shaft foundations for angle and dead-end structures. Vibrated casing foundations may also be used, depending on the results of planned further geotechnical investigation. A geotechnical investigation for the Gen-Tie Line would be completed before final design and construction of the Project.

Overland Travel (Typically 14 Feet Wide)

Temporary 14-foot-wide overland travel corridors would be used for access during construction. After construction, some of these areas would no longer be needed for access and would be decommissioned. Others of these areas would be permanent overland travel areas that would be used for ongoing maintenance access during operations. Where these areas abut existing roadways, an approach area would be constructed that is 14 feet wide by 25 feet long with 20-foot radii on each side.

Transmission Structure Footprint and Foundation Area

A 7-foot-diameter permanent footprint was assumed for estimating the Gen-Tie structure footprint for tangent structures. A 12-foot-diameter permanent footprint was assumed for estimating the Gen-Tie structure footprint for angle and dead-end structures. The structure areas for angles or dead-end structure types would have a single vertical foundation up to 12 feet in diameter by 40 feet deep. The structure areas for tangent structure types would have a single vertical foundation up to 7 feet in diameter by 25 feet deep. The temporary structure erection areas that surround each proposed Gen-Tie structure location would typically be 160 feet by 160 feet.

Splicing Area

The area needed temporarily for splicing would typically be 100 feet by 450 feet. Within this area would be a permanently graded area of approximately 75 feet by 250 feet.

Stringing Area

A temporary 450-foot radius area would be required at line stringing areas, and a 75-foot by 200-foot permanent area would also be required. The stringing area may have up to 12 galvanized-steel helical anchors that are drilled into the native soil at approximately a 45 degree angle up to 45 feet deep. These anchors are temporary during wire stringing and would be removed.

Guard structures would require the temporary use of a 50-foot by 100-foot area. They would consist of two vertical poles embedded in the ground and back-filled with native soil. The estimated depth of ground disturbance for pole embedment is up to 15 feet deep by up to a 42-inch diameter.

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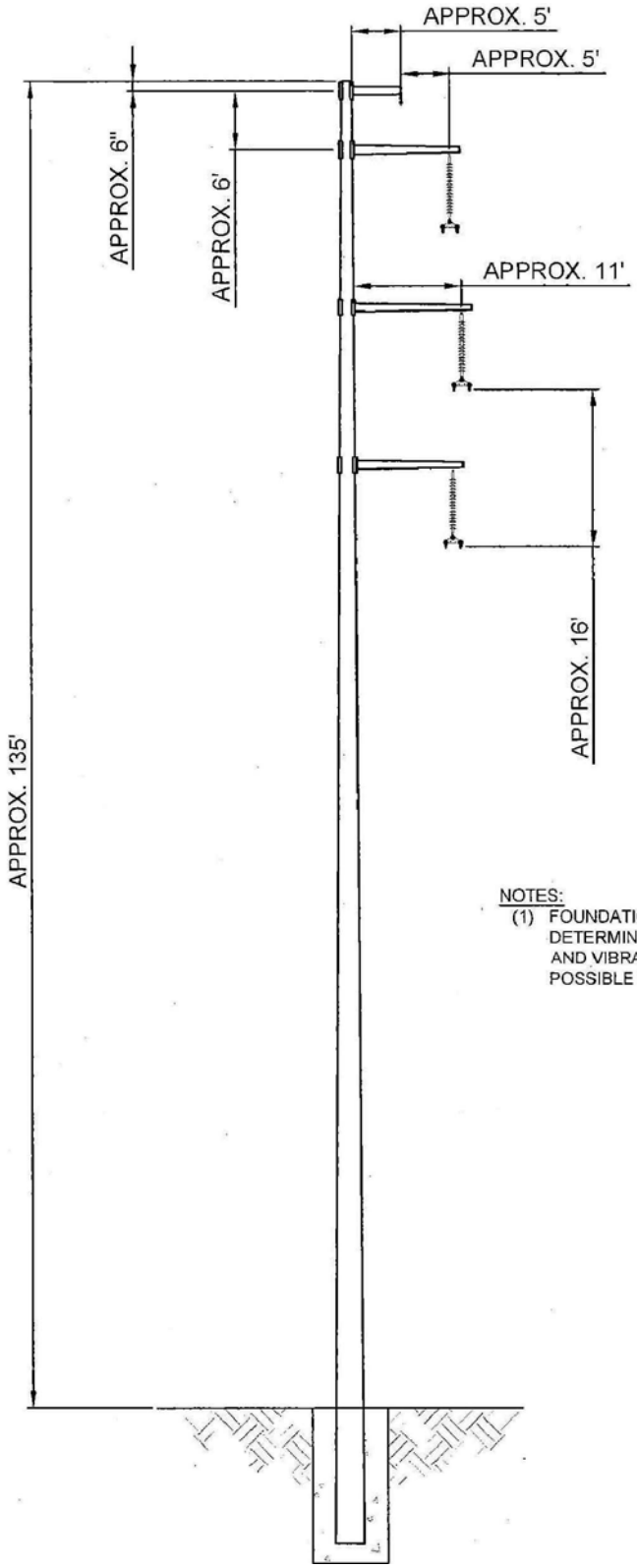

NOTES:
(1) FOUNDATION TYPE HAS NOT BEEN DETERMINED. DIRECT EMBED, DRILLED SHAFT AND VIBRATORY CAISSON FOUNDATIONS ARE POSSIBLE OPTIONS.

NOT TO SCALE

PRELIMINARY - NOT FOR CONSTRUCTION

DESERT SUNLIGHT SOLAR FARM

Figure 2-10

Typical 220-kV Line Monopole Single-Circuit Tangent Structure

Source: AECOM, 2010

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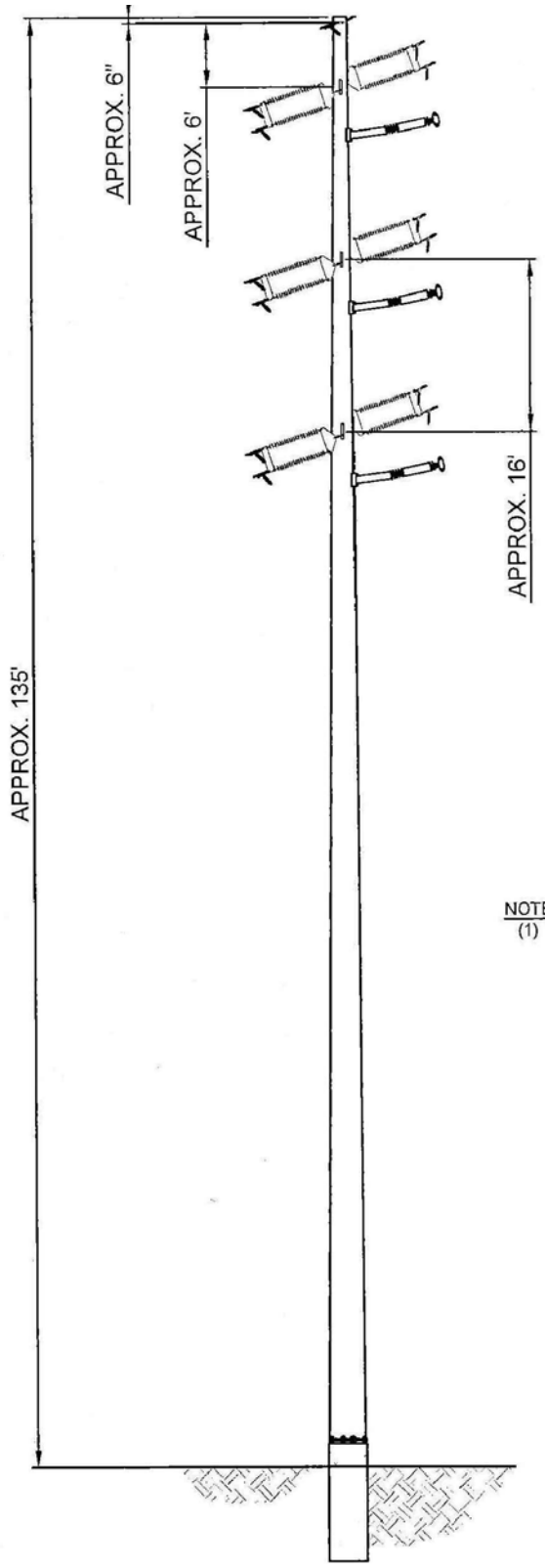

NOTES:
(1) FOUNDATION TYPE HAS NOT BEEN DETERMINED. DIRECT EMBED, DRILLED SHAFT AND VIBRATORY CAISSON FOUNDATIONS ARE POSSIBLE OPTIONS.

NOT TO SCALE

PRELIMINARY - NOT FOR CONSTRUCTION

DESERT SUNLIGHT SOLAR FARM

Figure 2-11

Typical 220-kV Line
Monopole Single-Circuit
Deadend Structure

Source: AECOM, 2010

Guard Structure

Red Bluff Substation Project

SCE proposes to construct the Red Bluff Substation to interconnect the 550-MW DSSF Project to SCE's existing Devers-Palo Verde No. 1 (DPV1) 500-kV transmission line. The Red Bluff Substation would also be used to interconnect other renewable generation facilities in the area with the transmission grid (refer to Section 3.18 for a discussion of cumulative projects and to each environmental consequences section for a discussion of impacts). The DPV1 500-kV transmission line would connect to the Red Bluff Substation by looping the line into the Substation. Additionally, based on current design information, the DSSF 220-kV Gen-Tie Line would be extended to just west of proposed Red Bluff Substation A or north of proposed Red Bluff Substation B and connect to a single dead-end structure, from where the line would be extended inside the Red Bluff Substation Site.

For the Red Bluff Substation, there are two alternative locations proposed: Substation A (to the east) and Substation B (to the west). Both Substation sites would be located approximately 7 to 8 miles from the entrance to the proposed DSSF site.

Under both alternatives, the Red Bluff Substation would consist of a number of components:

- Red Bluff Substation
- Transmission Lines (to connect Substation to DPV1)
- Gen-Tie Line Connection
- Modification of Existing 220-kV Structures
- Distribution Line for Substation Light and Power
- Telecommunications Facilities
- Drainage Facilities
- Access Road

Additional components for the Substation site include a staging area, a water well, a septic system that complies with state and county standards for septic design, and an emergency generator. Specific details, including the sizes and lengths of the Project components and access for each Substation alternative, are described in the following sections.

Red Bluff Substation

At either Substation site, the Red Bluff Substation would be a 1,120 mega-volt ampere (MVA), 500/220-kV substation measuring approximately 1,500 feet by 2,200 feet (approximately *76* acres) to loop the DPV1 500-kV transmission line and provide for Sunlight's one 220-kV Gen-Tie Line position for the DSSF Project. The entire *76* acres would be graded and leveled. The Substation would be surrounded by a wall with two gates. A schematic layout for Substation A is shown in Figure 2-12, and for Substation B in Figure 2-13.

Additional acreage would be required for drainage improvements and the access road. Additional detail is provided as part of the construction discussion in Section 2.3.2.

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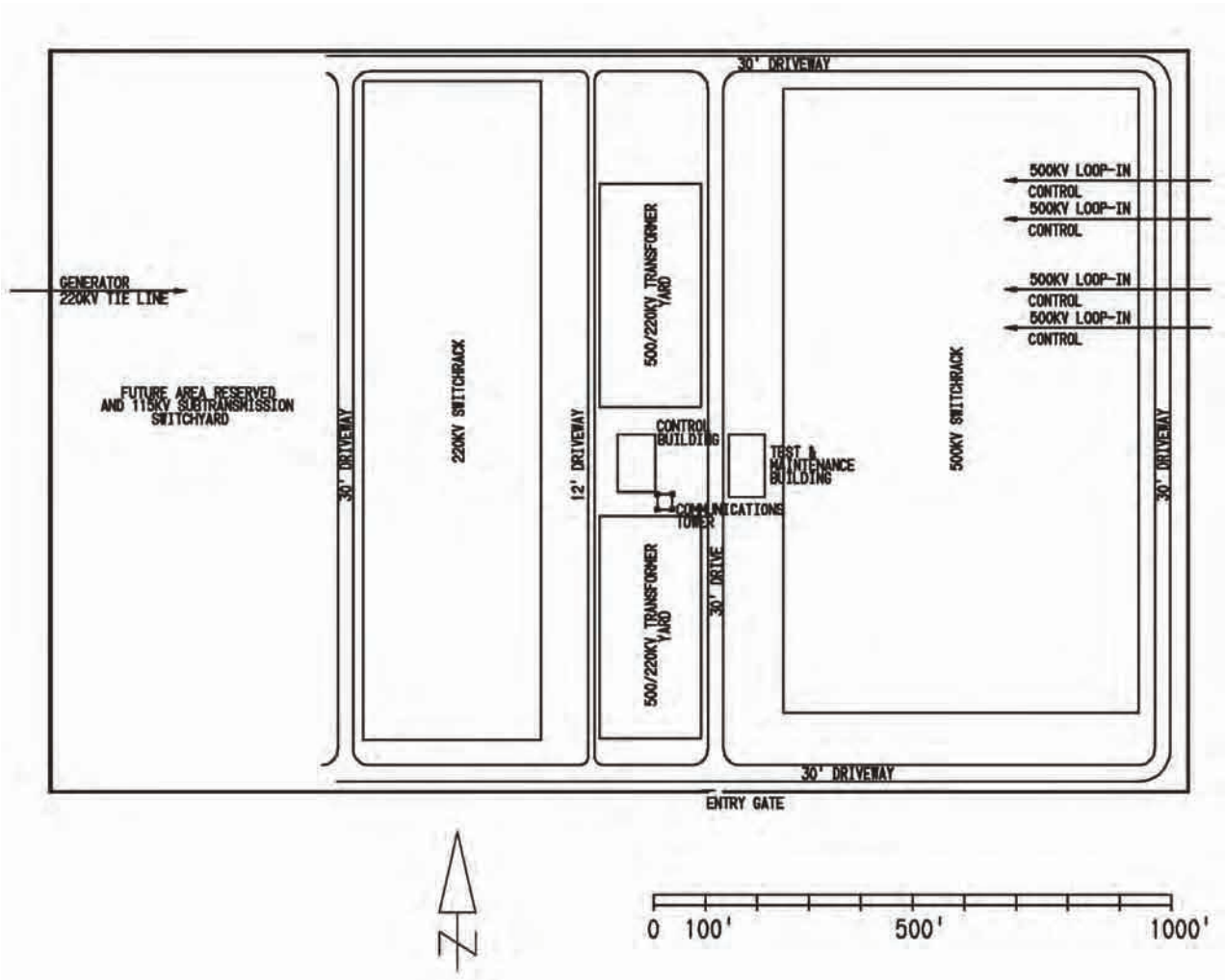

Note: Dimensions are approximate and may vary with site conditions.

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Figure 2-12

Proposed Red Bluff Substation A Layout

Source: Southern California Edison, 2010.

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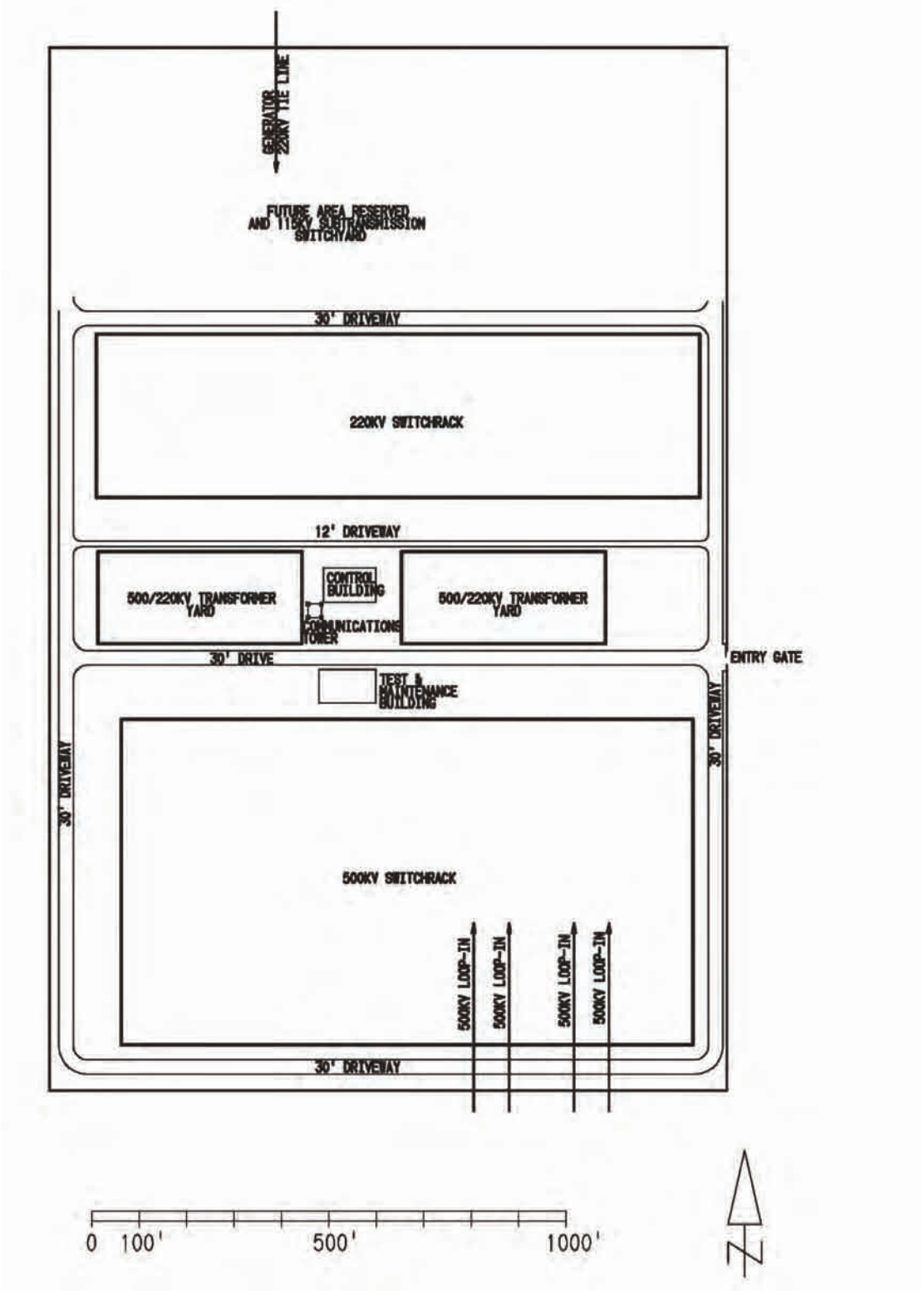

Note: Dimensions are approximate and may vary with site conditions.

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Figure 2-13

Proposed Red Bluff Substation B Layout

Source: Southern California Edison, 2010.

The 500-kV switchrack would have a total of six positions. Four positions would be utilized in the initial design: one position on a breaker and a half configuration would be to loop the existing DPV1 500-kV transmission line to create the Colorado River – Red Bluff and Devers – Red Bluff 500 kV lines, two positions would be reserved to loop the future Colorado River – Red Bluff No. 2 and Colorado River- Devers No. 2 (DPV2) 500-kV transmission lines, and one position would be for a AA-bank position for generation interconnection. The remaining two positions would be available for future expansion.

The 220-kV switchrack would have a total of four positions: one position for the AA-bank, one position for the Project Gen-Tie Line and the remaining two positions for future expansion.

Red Bluff Substation would be initially equipped with:

- Two (2) 500-kV operating buses covering six positions;
- Twenty-seven (27) single-phase 500-kV circuit breakers;
- Fifty-four (54) single-phase 500-kV disconnect switches;
- Four (4) single-phase, 373-MVA, 500-/220-kV transformers;
- Two (2) 220-kV operating buses covering four positions;
- Five (5) 220-kV circuit breakers;
- Ten (10) 220-kV group-operated disconnect switches;
- One (1) 220-kV motor-operated disconnect switch:
- A Mechanical Electrical Equipment Room (MEER);
- Station light and power transformers;
- Station lighting; and
- 750 kVA generator.

500-kV Transmission Line Loop-In

The proposed Red Bluff Substation would be connected to the existing DPV1 500-kV transmission source line via a loop-in line. The loop-in line would dissect the main line and change it into two line segments: the Colorado River-Red Bluff and the Devers-Red Bluff 500-kV transmission lines. The new piece of each line segment into the Red Bluff Substation would be approximately 2,500 feet long for Substation A and 500 feet long for Substation B.

The new 500-kV line segments would be constructed using approximately eight transmission structures for Substation A and four for Substation B. Of these, six structures for Substation A and two for Substation B would be single-circuit lattice steel tower (LST) (Figure 2-14) or tubular steel pole (TSP) (Figure 2-15), and two (either Substation) would be modified double-circuit LSTs (Figure 2-16).

The 500-kV double-circuit structures would be utilized just outside of the Substation wall (but within Red Bluff Substation Site). The purpose of the double-circuit tower is two-fold in that it requires a smaller 'footprint' in the Substation vicinity and it places the conductors in a vertical arrangement, facilitating phasing at the Substation racks. To achieve this, this tower would be approximately 40 feet taller than the single-circuit towers.

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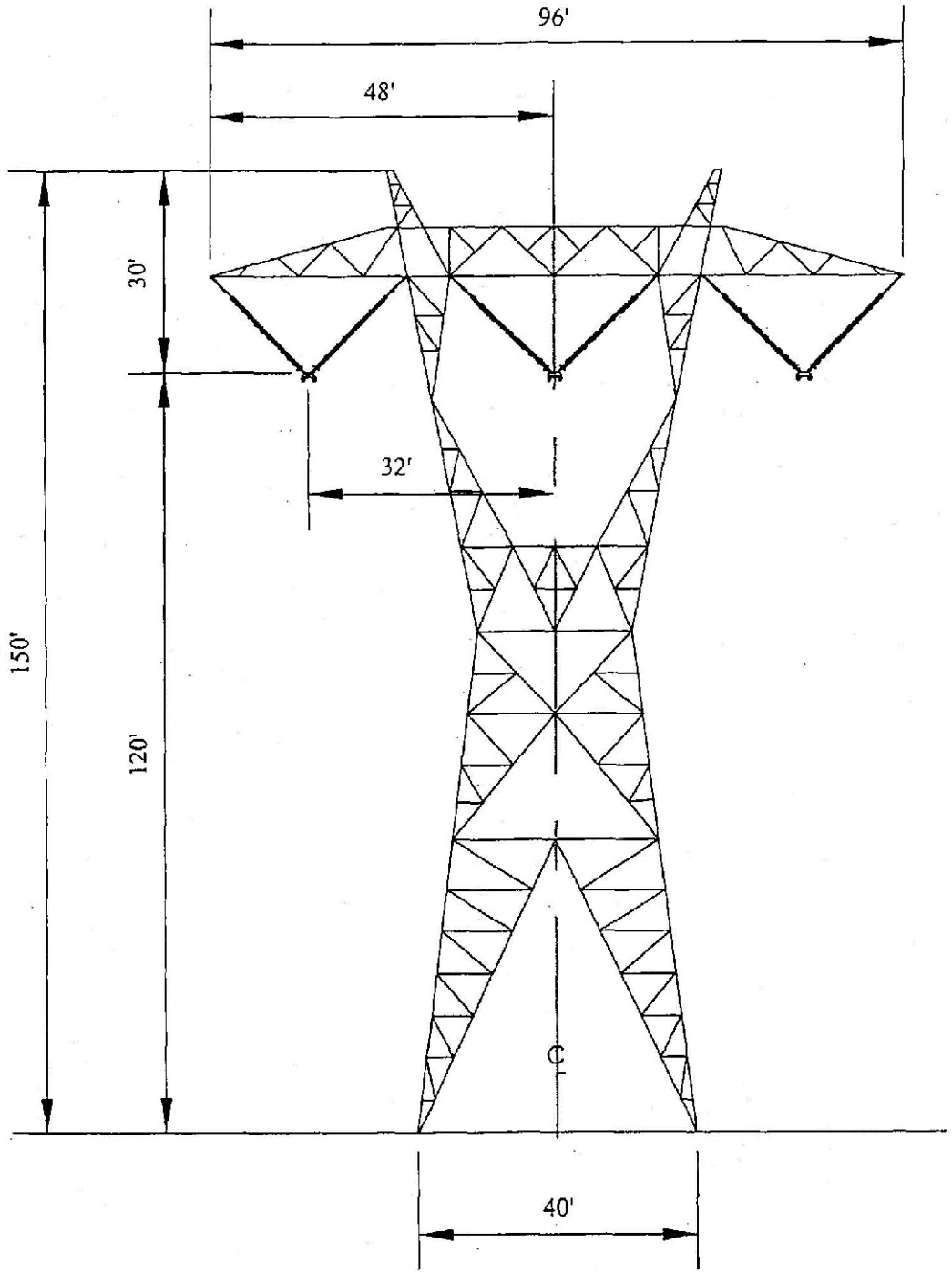

Note: Dimensions are approximate and may vary with site conditions.

DESERT SUNLIGHT SOLAR FARM

Figure 2-14

Typical 500-kV Single-Circuit Lattice Steel Tower

Source: Southern California Edison, 2010

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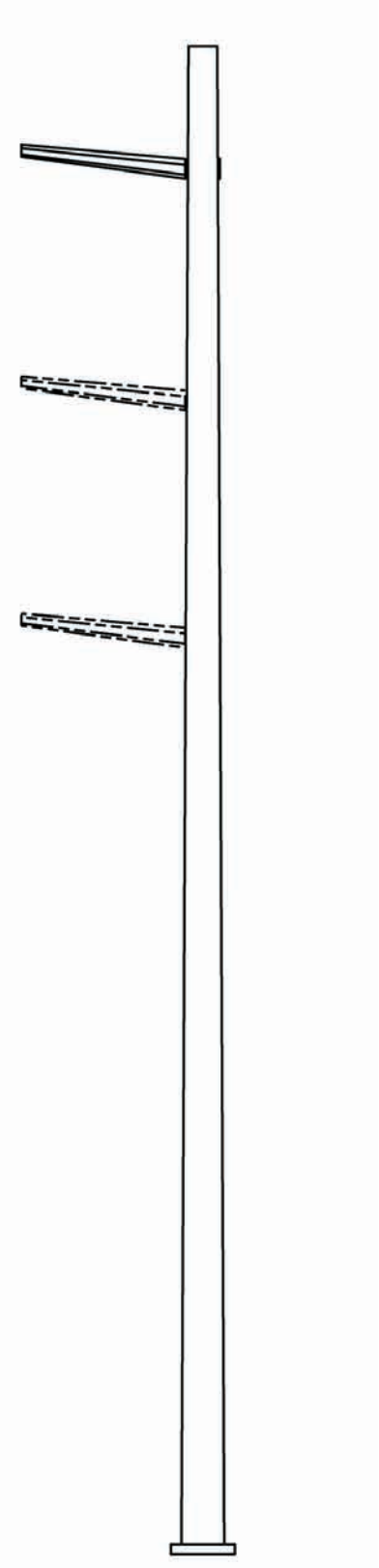

DESERT SUNLIGHT SOLAR FARM

Figure 2-15

Typical 500-kV Single-Circuit Tubular Steel Tower

Source: Southern California Edison, 2010

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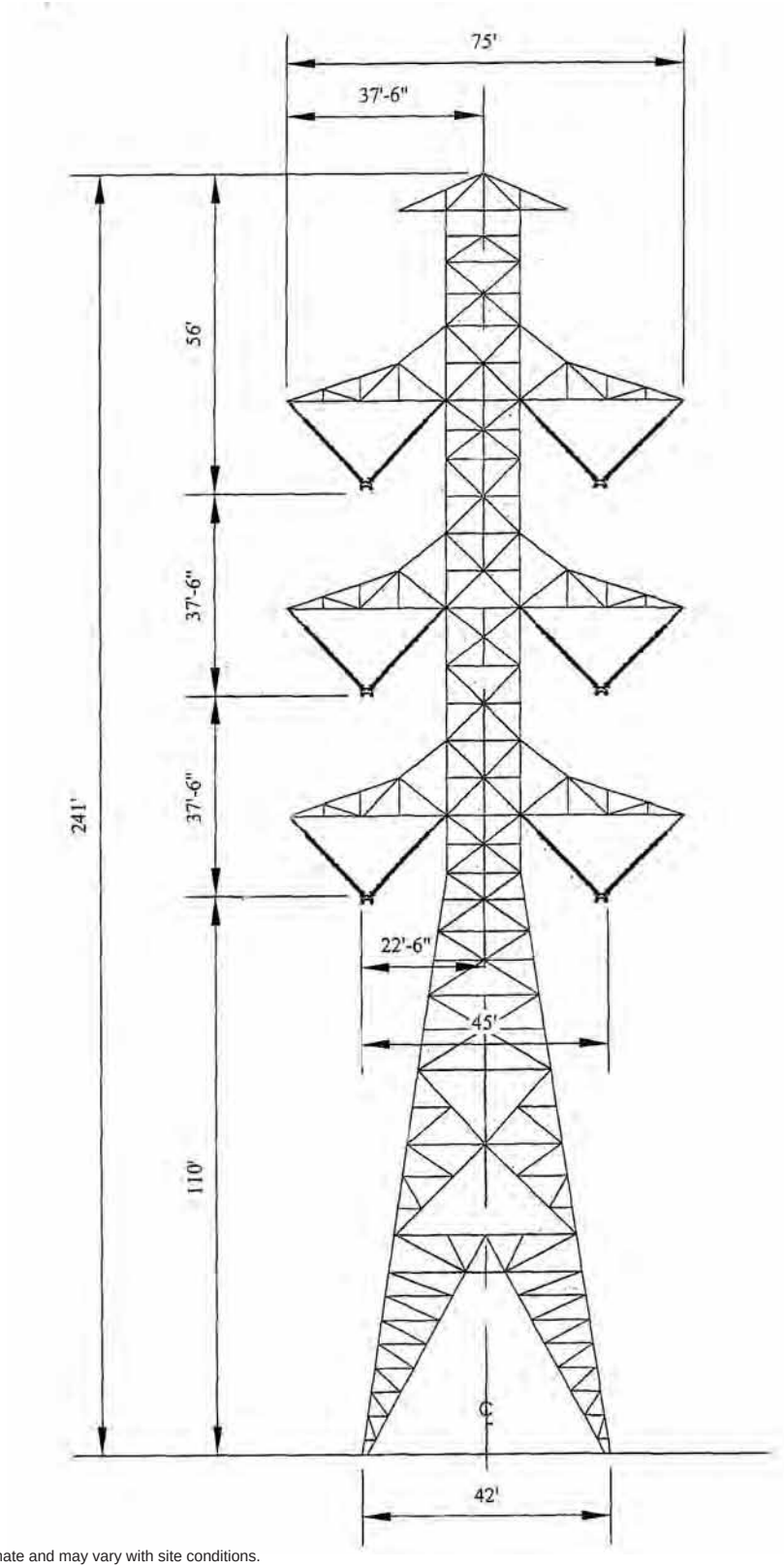

Note: Dimensions are approximate and may vary with site conditions.

Source: Southern California Edison, 2010

DESERT SUNLIGHT SOLAR FARM

Figure 2-16

Typical 500-kV Double-Circuit Lattice Steel Tower

The new single-circuit transmission structures would require a right of way, approximately 590 feet wide, along that portion of the new single-circuit transmission lines between SCE's existing DPV1 ROW and the new Red Bluff Substation Site. Other transmission structures would be within SCE's existing ROW. For Substation A, three dead-end structures and one suspension structure would be required for each line segment (a total of eight structures for both lines), to reach the edge of the Red Bluff Substation Site. Substation B would require three dead-end structures for each line segment (a total of six structures for both lines).

Gen-Tie Line Connection

The proposed Red Bluff Substation design includes bringing the final span from the DSSF 220-kV Gen-Tie Line into the switchrack, just west of the Red Bluff Substation for Substation A and just north of the Red Bluff Substation for Substation B. There would be one single-circuit lattice steel (LST) or tubular steel pole (TSP) structure just west (or north) of the Red Bluff Substation Site for the connection of DSSF's Gen-Tie Line to a 220-kV position inside Red Bluff Substation.

The last Gen-Tie structure constructed for DSSF would be located just off the Red Bluff Substation Property and would be a dead-end structure; SCE would work with Sunlight to integrate final design. SCE would construct, own, operate, and maintain the final span of the circuit from the Substation dead-end structure to the tower connection at the last DSSF structure.

Modification of Existing 220-kV Structures

The proposed routes for the new 500-kV transmission loop-in line segments would require crossing over the Florida Power & Light (FPL) Buck-Julian Hinds 220-kV transmission line. The height of the 500-kV towers would be selected to comply with the CPUC General Order No. 95 (GO 95) Grade A crossing requirement. Depending on the exact location selected for the Red Bluff Substation footprint, crossing over the FPL line with the 500-kV line loop-in segments may require tower modifications to the FPL line to comply with GO 95. If a modification to the FPL-220 kV transmission line is needed, new lower transmission structures would be inter-set within the Project Study Area along the FPL ROW, adjacent to the 500-kV loop-in line segments. The inter-set towers would lower the height of the FPL 220-kV conductors at the crossing location. If necessary, existing FPL transmission towers may be removed to provide the proper clearance between the existing 220-kV line and the new 500-kV loop-in line segments.

The detailed modifications to the FPL 220-kV transmission line, if required to accommodate the 500-kV loop-in lines, are unknown until detailed engineering is completed. The exact type and size of the inter-set towers and footings would depend on survey information, weather studies, soil analysis, and final transmission engineering. However, the inter-set structures likely would be of the same general type as the existing FPL transmission line structures. The existing FPL structures are built from spun cast pre-stressed concrete poles, with H-frame construction with a rectangular steel cross-arm attached by bolts and brackets to the poles.

Distribution Line for Substation Light and Power

An extension of the existing, SCE-owned, Desert Center 12-kV circuit would be required to provide the station light and power for the Red Bluff Substation. This line is located on BLM-administered land. Poles for this line would be single wooden poles approximately 29 to 39 feet tall (Figure 2-17).

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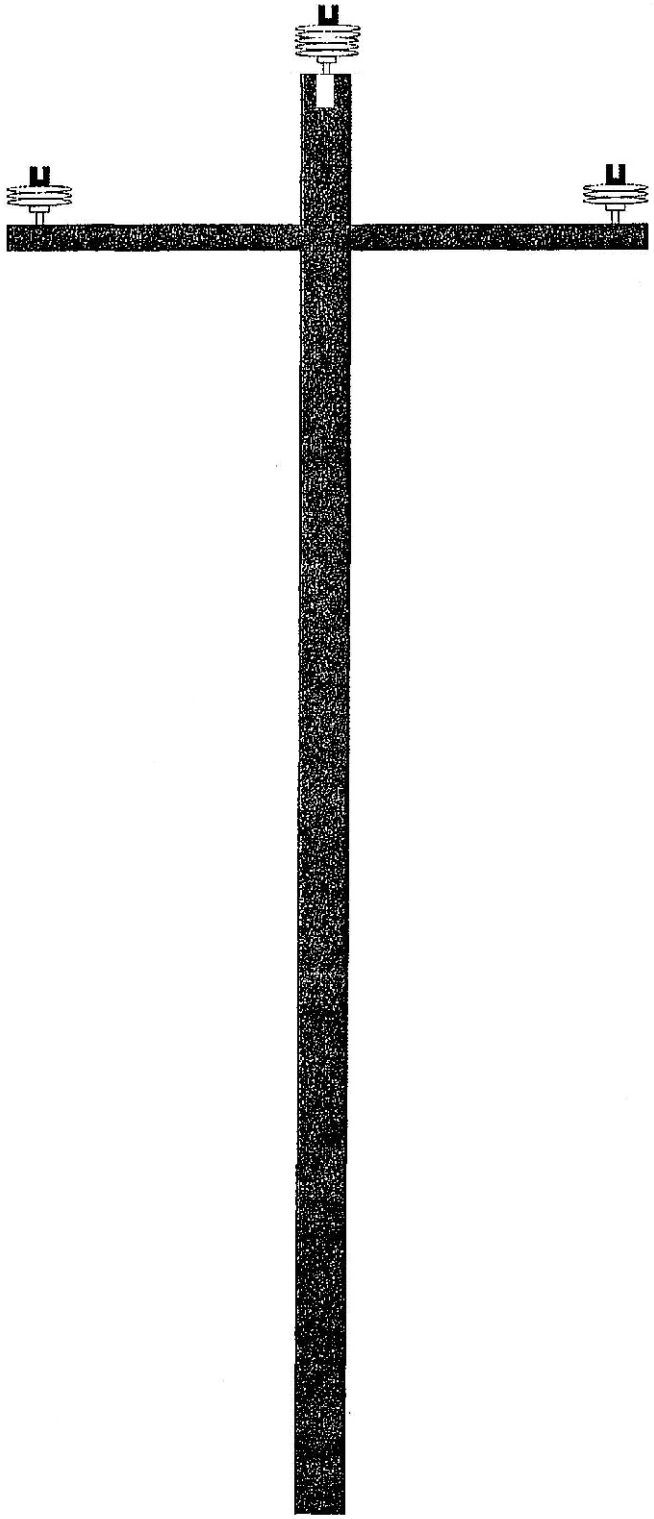

DESERT SUNLIGHT SOLAR FARM

Figure 2-17

Red Bluff Substation Distribution System Pole

Source: Southern California Edison, 2010

Additionally, a new pad-mounted 750-kVA station light and power transformer would be installed within the Substation boundaries. Details on the location and features of this line for each Substation are provided in Section 2.3.2 (Construction Plan for Red Bluff Substation Project).

Telecommunications Facilities

A telecommunication system would also be required in order to provide monitoring and remote operation capabilities of the electrical equipment at Red Bluff Substation, and for transmission line protection. This system includes electrical equipment that would be installed: at the Desert Sunlight On-Site Substation, along the Gen-Tie Line, at the Red Bluff Substation, and at the existing Chuckwalla Mountain Communications Site. In addition, a new Desert Center Communications Site (Telecom Site) would be constructed (but would not be co-located with the Red Bluff Substation). This new microwave repeater station would be located on the north side of Airport Access Road approximately 600 feet east of Rice Road, and west of the former Desert Center Airport (refer to Figure 2-1). This former Riverside County airport is currently a private special-use airport (with one operational runway) that is used in conjunction with a private road-course racing facility.

To provide this system, SCE would build and operate the following:

- Line protection, supervisory control and data acquisition (SCADA) and telecommunications circuits from the Desert Sunlight (On-Site) Substation to the Red Bluff Substation and Devers Substation utilizing optical ground wires on Sunlight's 220-kV Gen-Tie Line (note that SCE uses the term SCADA and First Solar uses the term DAS for the same equipment).
- Line protection, SCADA and telecommunications circuits from Red Bluff Substation to Devers Substation and Colorado River Substation.

SCE would build these circuits using some existing infrastructure, as well as the following new infrastructure:

- An optical system between the Desert Sunlight (On-Site) Substation and Red Bluff Substation.
- A microwave (wireless) system between Red Bluff Substation and the new Desert Center Communications Site (Telecom Site).
- A microwave system between the new Desert Center Communications Site and the existing Chuckwalla Mountain Communications Site, located 5 miles west-southwest of Desert Center. The Chuckwalla Mountain Communications Site is managed by the Metropolitan Water District of Southern California (MWD) on land administered by the BLM. The building needed for this Project is owned by SCE.

SCE would install the following equipment:

- New microwave equipment in a new 25-foot by 40-foot communications room inside the MEER at Red Bluff Substation.
- New 185-foot lattice steel microwave tower at Red Bluff Substation. This tower would be located near the communications room inside the MEER. The tower base would be a square with 35-foot sides. The concrete tower anchors would be about 6 feet in diameter.

- The new Desert Center Communications Site would have a 185-foot tower identical to the one at Red Bluff Substation. It would have microwave equipment and dishes for paths to the Red Bluff Substation and Chuckwalla Mountain Communications Site (Figure 2-18). The disturbed area for the Desert Center Communications Site, including an 8-foot-high by 10-foot-wide berm around three sides of the facility and an access road, would consist of an area approximately 150 feet by 70 feet. Enclosed within the disturbed area would be a fenced in area of 100 feet by 50 feet. Within the fenced area there would be a 12-foot by 36-foot communication room and the 185-foot-tall microwave tower and two 10-foot-diameter microwave antennas. Power would be provided from a tap into the nearest 12-kV line and would require the installation of about seven wooden poles to span about 750 feet.
- Microwave equipment and a dish at the existing Chuckwalla Mountain Communications Site. A new 120-foot tower would be constructed in order to provide a mounting space for the dish so that it can "see" the Desert Center Communications Site.

Laydown areas would include SCE's proposed Red Bluff Substation and the area adjacent to the proposed microwave repeater station. A 20-foot-wide by 30–foot-long access road would be built to this new Desert Center Communications Site.

Drainage Facilities

At both Red Bluff Substation sites, surface stormwater runoff would need to be redirected around the Substation. Drainage improvements and related grading due to topography would require between *14* and 20 acres, depending on the Red Bluff Substation alternative selected. Alterations to existing natural drainage channels within the Substation A footprint would be considerable, requiring extensive rerouting of three deep channels.

Around the Telecom Site, an 8-foot-high berm would need to be constructed on three sides, as the site is prone to flooding. This area required for the berm is included in the area previously described for the Telecom Site.

Access Roads

There are two proposed access road alternatives considered for Substation A: one coming from the west via the Kaiser Road exit off I-10 and Aztec Road along a pipeline access road (Access Road 1 – requiring approximately *31* acres of disturbance), and the other coming from the east via Chuckwalla Valley Road, Corn Springs Road, and a pipeline access road (Access Road 2 – requiring approximately *31* acres of disturbance). Substation B would require a new access road from Eagle Mountain Road, requiring approximately 1.3 acres of disturbance).

Staging Areas

Up to 10 acres may be necessary for temporary equipment storage and material staging areas associated with transmission lines and related structures. The staging area would be located adjacent to the Substation site.

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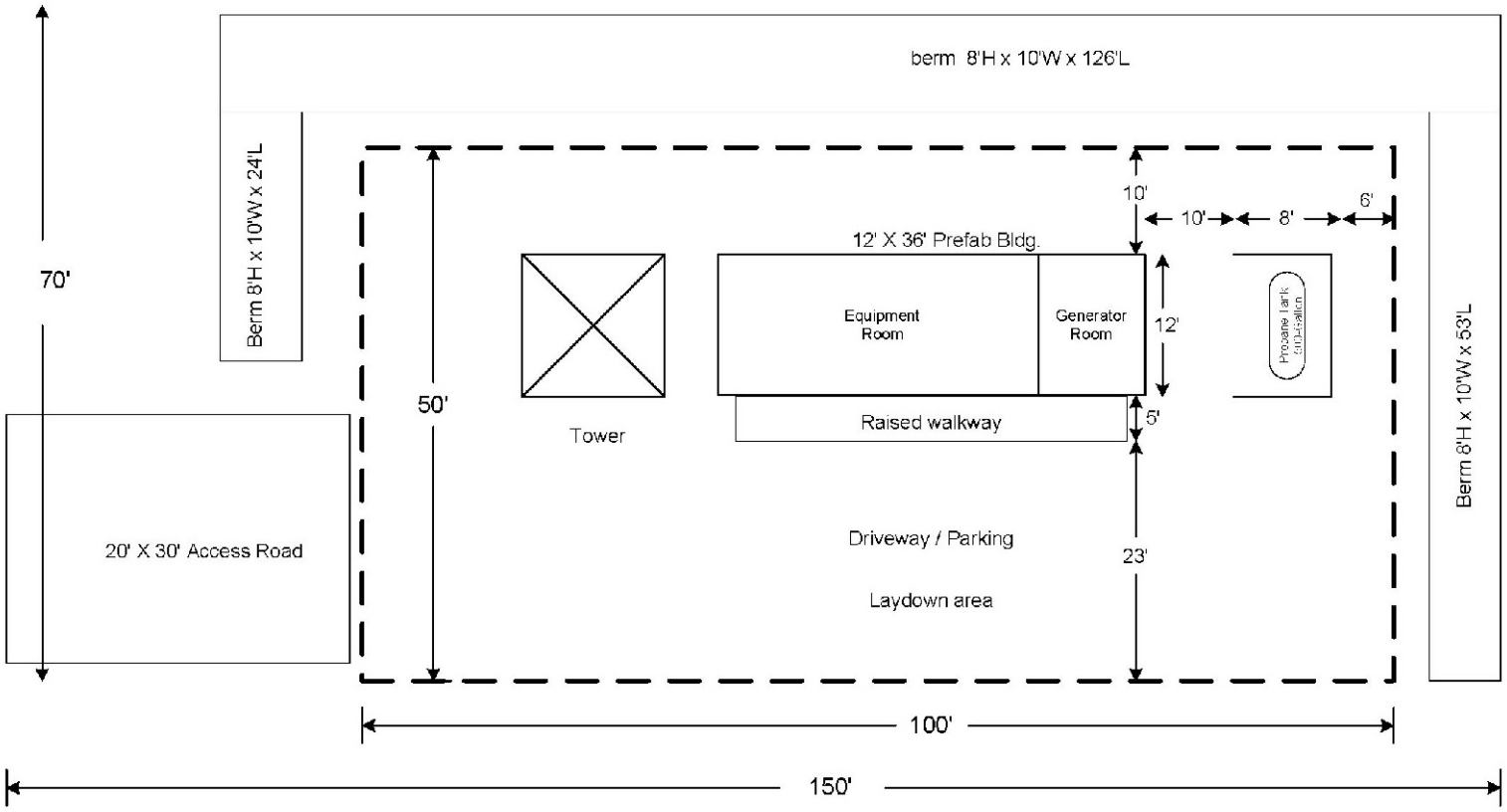
Proposed Desert Center Communications Site located on BLM land, east of Hwy 177 and north of access road to airport.
Coordinates: 33° 45' 30.4" N
-115° 20' 36.8" W



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NOT TO SCALE

Source: Southern California Edison, 2010

DESERT SUNLIGHT SOLAR FARM

Figure 2-18

Desert Center Communications Site - Microwave Repeater Site

Lighting and Perimeter Features

Lighting at the proposed Red Bluff Substation would consist of high-pressure sodium, low intensity lights located in the switchyards, around the transformer banks, and in areas of the yard where operating and maintenance activities may take place during evening hours for emergency/scheduled work. Maintenance lights would be controlled by a manual switch and would normally be in the "off" position. The lights would be directed downward, and shielded to reduce glare outside the facility.

The proposed Substation would be enclosed on four sides by an 8-foot-high wall with two 24-foot-wide rolling gates. A band of at least three strands of barbed wire would be affixed near the top of the perimeter wall inside of the Substation and would not be visible from the outside.

Additional Features

A water well would be drilled on or adjacent to the Substation site. The final location of the well would be identified by future testing. Water would be used for construction purposes, including dust control, and as potable water during the life of the Substation. A septic system that meets state and county regulations for septic design would also be installed on the Substation site for employee use during operations and maintenance. An emergency diesel-powered generator would also be installed at the Substation.

Operations and Maintenance

Once constructed, the Red Bluff Substation would be unmanned, and electrical equipment within the Substation would be remotely monitored. SCE personnel would visit the Substation three to four times a month for routine maintenance purposes. Routine maintenance would include equipment testing, monitoring, and repair.

The SCE transmission lines would be maintained in a manner consistent with CPUC General Order No. 165. SCE maintains an inspection frequency of the energized overhead facilities a minimum of once per year via ground and/or aerial observation. Maintenance would include activities such as repairing conductors, replacing insulators, and access road maintenance.

2.2.4 Alternatives Analyzed

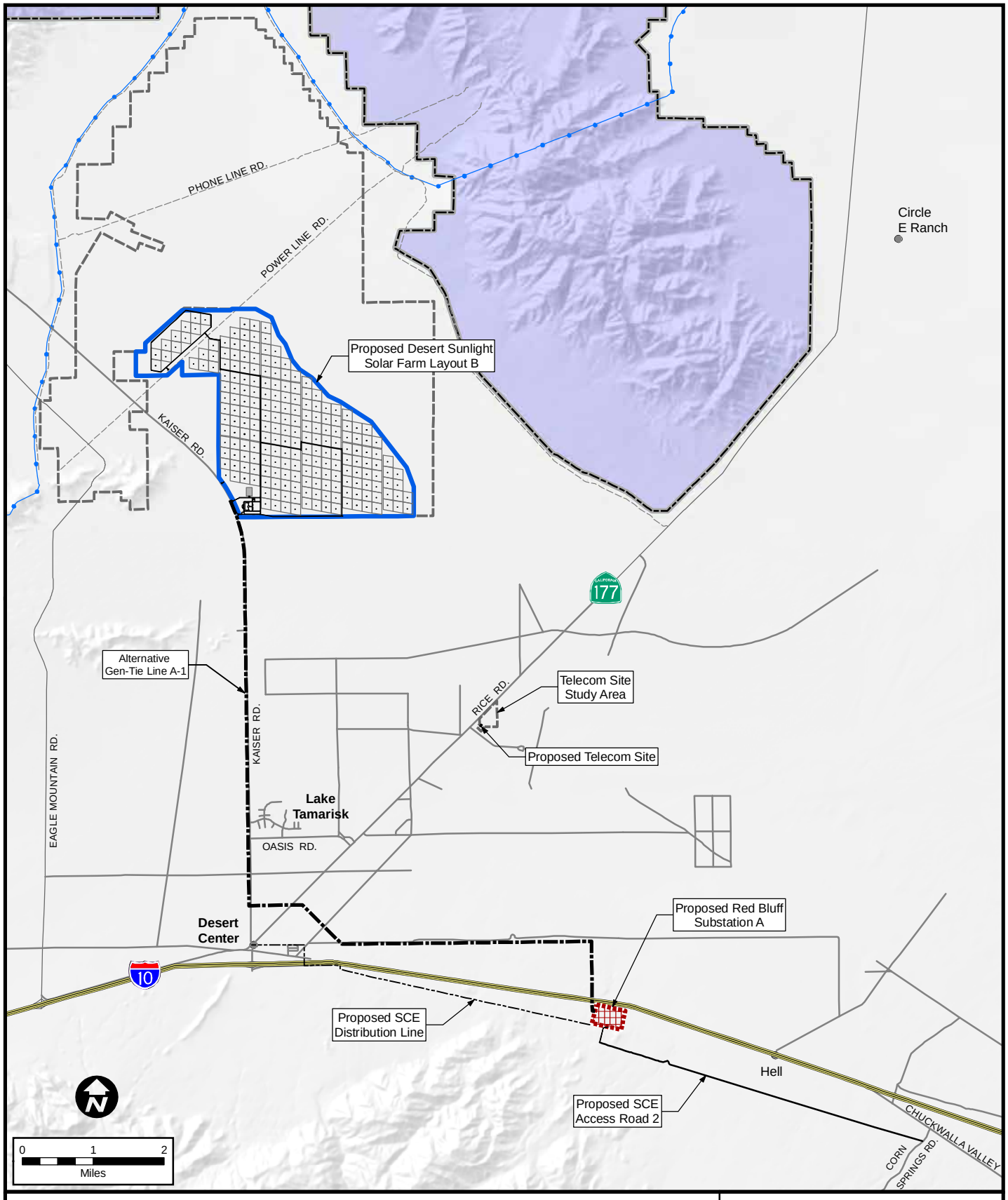
Alternative 1 – Proposed Action Alternative with Land Use Plan Amendment: Solar Farm Layout B, Gen-Tie Line Route GT-A-1, Red Bluff Substation A, and Access Road 2

With the Proposed Action, shown on Figure 2-19, the Applicant is requesting a ROW grant for the following configurations of the three Project components:

- Solar Farm Layout B (SF-B);
- Gen-Tie Line A-1 (GT-A-1);
- Red Bluff Substation A, with Access Road 2.

This alternative would require an amendment to the CDCA Plan. *This alternative is BLM's Preferred Alternative.*

This section includes a brief overview of each Project component. Project details are provided in Section 2.2.3 (Features Common to All Action Alternatives). Construction, operation, and maintenance, and decommissioning information is provided in Sections 2.3 and 2.4.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PHONE LINE RD.
POWER LINE RD.
Circle
E Ranch
Proposed Desert Sunlight
Solar Farm Layout B
KAISER RD
177
Alternative
Gen-Tie Line A-1
KAISER RD.
EAGLE MOUNTAIN RD.
RICE RD.
Telecom Site
Study Area
Proposed Telecom Site
Lake
Tamarisk
OASIS RD.
Desert
Center
10
Proposed Red Bluff
Substation A
Proposed SCE
Distribution Line
Hell
Proposed SCE
Access Road 2
CHUCKWALLA VALLEY
CORN
SPRINGS RD.
0
1
2
Miles
LEGEND
Proposed Gen-Tie
Line A-1
SCE Access Road
SCE Distribution Line
Study Area Boundary
for Solar Farm
Solar Farm Boundary
(Alternative B)
Red Bluff Substation
(Alternative A)
Joshua Tree National
Park Boundary
Aqueduct
Source: First Solar, 2010.
DESERT SUNLIGHT SOLAR FARM
Figure 2-19
Alternative 1:
Proposed Action Layout

Table 2.2-1 provides a summary of permanent ground disturbance associated with each Project component and related element for Alternative 1. Table 2.2-2 provides a summary of water use during construction and operation for each major Project component.

Table 2.2-1
Summary of Permanent Ground Disturbance for Alternative 1 – Proposed Action Alternative

Project Component/Element	Approximate Acreage
Solar Farm Layout B[1]	*3,912*
Gen-Tie Line A-1[2]	*92*
Red Bluff Substation A	*76*
Red Bluff Substation-related features	-
- Drainage/Sideslopes	*14*
- Access Road[3]	*31*
- Transmission System[4]	*33*
- *Material Yard/Staging Area*	*9*
- Distribution Line System[5]	*8*
- Telecom Site[6]	*<1*
TOTAL	***4,176***

[1]Includes area for all Solar Farm-related facilities.
[2]Permanent disturbance of 92 acres occurs within the ROW corridor totaling 256 acres (12.1 miles long by 160 feet wide with additional fan-shaped areas at corners for stringing).
[3]Assume 24,000-foot by 30-foot-wide road from Corn Springs Road.
[4]Includes transmission system associated with connecting Red Bluff Substation to Gen-Tie Line and DPV1.
[5]Distribution system for Substation power and light, including new access road.
[6]New Desert Center Communications Site.

Table 2.2-2
Summary of Water Use for Alternative 1 – Proposed Action Alternative

Project Component/Element	Construction		Operation	
	Total (acre-feet)	Peak Daily (gpd)[1]	Annual (acre-feet)	Peak Daily (gpd)
Solar Farm B	*1,200 to 1,300*	252,000 to 1.3 million	0.2	<300
Gen-Tie Line A-1	6.25	40,000	0	0
Red Bluff Substation A	*300*	*330,000*	*<0.1*	<100
TOTAL	***1,506 to 1,606***	***622,000 to 1.67million***	***<0.3***	***<400***

Note: (1) Demand would vary over the construction period and (2) water use estimates are preliminary and based on current information.

Solar Farm Layout B is six miles north of the Desert Center and four miles north of Lake Tamarisk, northwest of and next to Kaiser Road, and southwest of Pinto Wash. SF-B encompasses approximately *3,912* acres entirely on BLM-administered land. Elevation at SF-B varies from

approximately 619 to *845* feet above mean sea level. Access would be provided by Kaiser Road. Once fully operational, it would produce 550 MW of power.

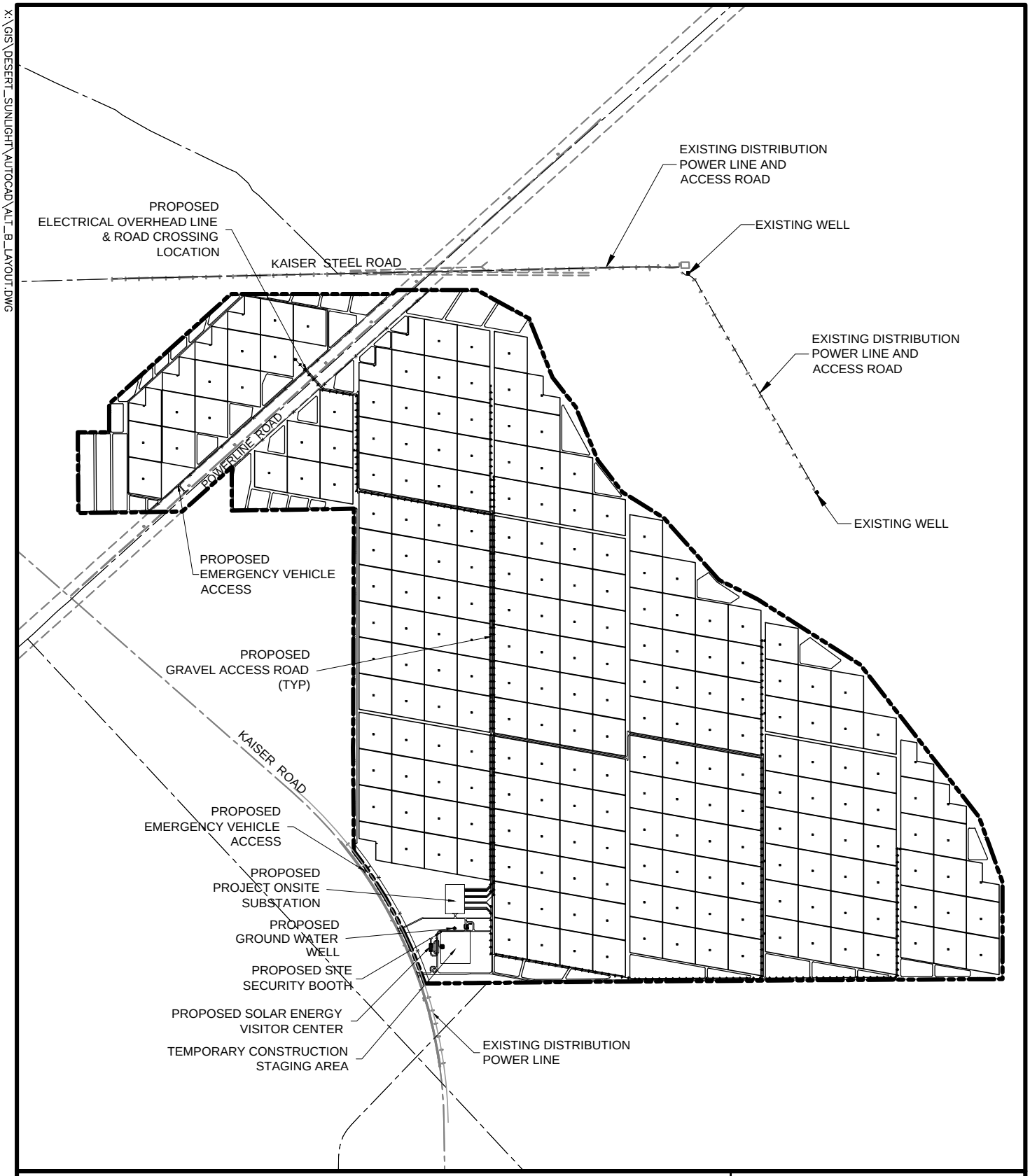
Table 2.2-3 provides a general list of Solar Farm components along with the acreage they would require for SF-B. Figure 2-20 shows a schematic layout of SF-B. In addition to the main generation area, which takes up most of the Project acreage, the largest permanent land uses on the Solar Farm site are internal access corridors, the O&M facility, the On-Site Substation, and the Visitors Center. Security and desert tortoise fencing would require *14.4* miles of fencing.

Table 2.2-3
Solar Farm Layout B – Dimensions of Project Facilities

Project Facility or Component	Approximate Total Area	Percent of Total Solar Farm Site (3,912 acres)
Total Project Footprint	***3,912 acres***	**100**
Total footprint of piles	*0.3 acre*	<0.1
Access Corridors	*162.7 acres*	*4.2*
Gravel Access Roads	*25.4 acres*	0.7
O&M Facility	0.7 acre	<0.1
Solar Energy Visitors Center	0.06 acre	<0.1
On-Site Substation	*6.3 acres*	0.2
Area Disturbed by Trenching	*30.6 acres*	0.8
Area Permanently Covered by At-Grade items (footprint of piles, PCS, transformer, PVCS, On-Site Substation, On-Site Overhead Line poles, Visitors Center, M&M Facility)	*9.2 acres*	*0.2*
Total footprint for on-site overhead line poles	0.1 acre	<0.1
Area shaded by PV modules (indirect disturbance) (at solar noon)	*2,869 acres*	*73*
Area shaded by PV modules (indirect disturbance) (Scenario – Dec. 21, 9:00 am)	*2,917 acres*	*75*
Security Fencing	Length: *14.4* miles	N/A

Gen-Tie Line A-1

As shown in Figure 2-21, GT-A-1 exits the southwest of the Solar Farm site, runs south along the west side of Kaiser Road, turns east just north of Desert Center, and then runs south across I-10 to the eastern location being considered for the Red Bluff Substation (Red Bluff Substation A). Along Kaiser Road, the center of the 160-foot transmission line ROW would be located approximately 120 to 130 feet from the centerline of the paved roadbed, within the county road ROW on BLM land. Approximately 1 mile south of Oasis Road, the line turns east, running along the north side of the section lines dividing BLM-managed land from private land. After approximately 0.7 mile, the line turns southeast for approximately 0.7 mile, then due east for approximately 3.5 miles, then south for approximately 0.8 mile to the Substation. The transmission line travels parallel and to the south of an existing BLM open route, along BLM-administered land. The access road would be adjacent to the Gen-Tie Line and within the ROW.



DESERT SUNLIGHT SOLAR FARM

Figure 2-20

Solar Farm Layout B

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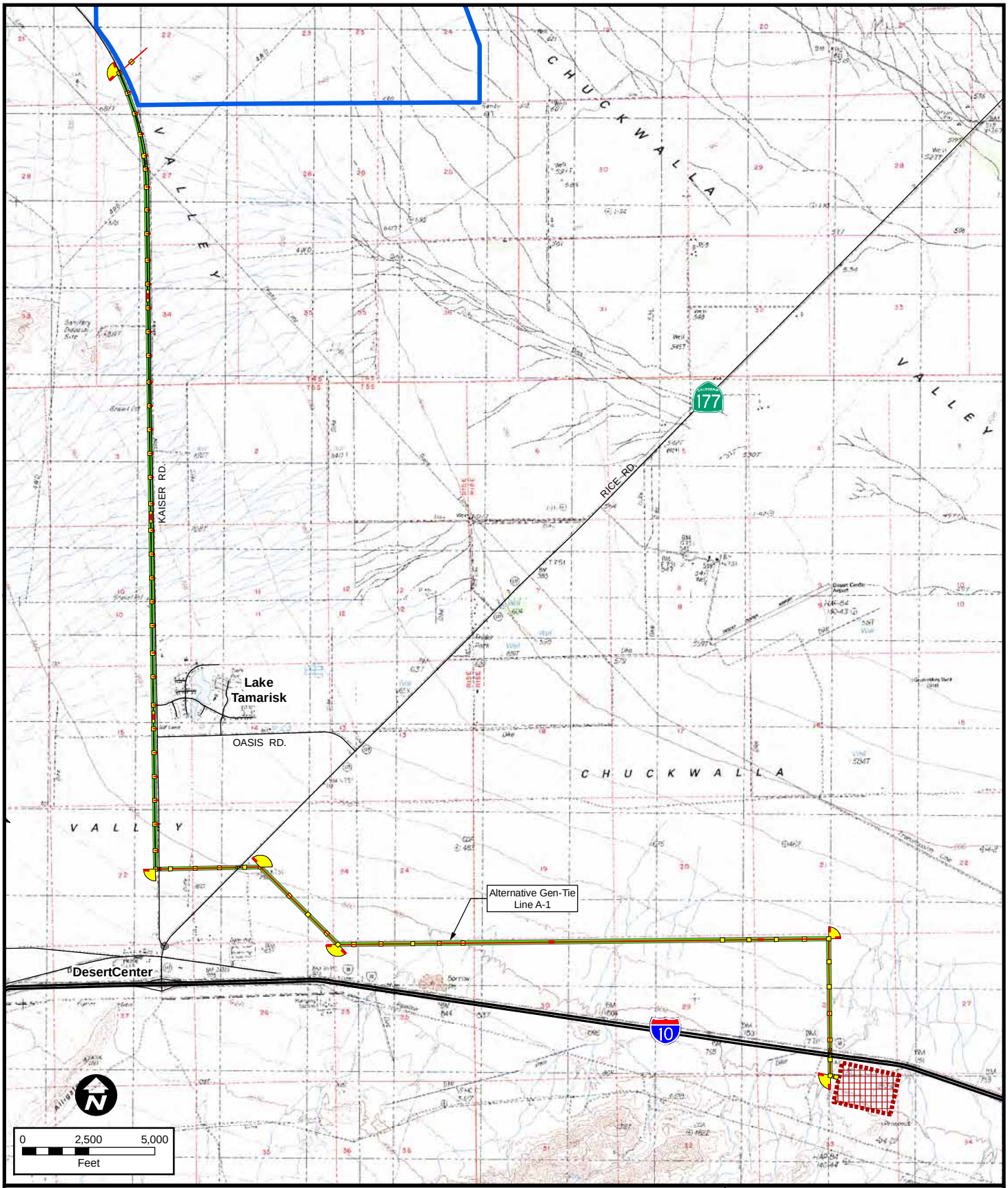

LEGEND

- Solar Farm Boundary (Alternative B)
- Red Bluff Substation (Alternative A)
- Permanent Disturbance Area
- Temporary Disturbance Area
- Alternative Gen-Tie Line A-1 Corridor

Source: First Solar, 2010.

DESERT SUNLIGHT SOLAR FARM

Figure 2-21

Gen-Tie Line A-1

Of the 12.*1*-mile ROW, approximately 11.4 miles would be on BLM land, approximately 0.6 mile would be on land owned in fee by MWD *and approximately 0.5 mile would be on land owned in fee by Riverside County.* First Solar would enter into a land license agreement, *lease, or permanent easement* with MWD for the portions on land owned in fee by MWD, which would rely on this EIS to satisfy the CEQA obligations of MWD. *Riverside County would issue an Encroachment Permit for the portions on land owned in fee by the County and for access into the County road ROW, in addition to issuing a Public Use Permit for the MWD land. Riverside County would rely on this EIS to satisfy the CEQA obligations of the County.*

The 160-foot-wide corridor and additional fan-shaped areas at corners used for wire stringing for GT-A-1 would encompass approximately 256 acres. The total length of GT-A-1 is approximately 12.1 miles. The elevation of GT-A-1 varies from approximately 690 to 833 feet above mean sea level. Approximately 73 transmission structures would be required for this alternative, including 65 tangents and 8 dead-ends. Five splicing locations and 20 guard structures would be used during construction. Permanent access roads would be constructed in order to provide access for maintenance of the Gen-Tie, as needed. Table 2.2-4 provides a list of major Gen-Tie components, along with the acreage required for each component.

Table 2.2-4
Gen-Tie Line A-1 – Project Facilities, Components, and Percent of Gen-Tie Corridor

Project Facility or Component	Dimensions	Percent of Gen-Tie Corridor
Gen-Tie Line Corridor	Width: 160 feet plus additional fan-shaped areas at corners Length: 12.1 miles *ROW* Area: *up to* 256 acres	100
Permanent disturbance *(within corridor)*	*92 acres*	*35.9*
Total transmission structure footprint	2,743 square feet (0.06 acres)	<0.1
Individual transmission structure footprint	Tangent structure: 28.3 square feet; dead-end: 113.1 square feet.	<0.1
Permanent access roads	Width: 14 feet Length: 7.3 miles 12.4 acres	4.8
Temporary access roads	Width: 14 feet Length: *13.1* miles *22.2* acres	*8.7*

The Applicant proposes to use steel monopoles for the Gen-Tie Line. Poles are expected to be approximately 135 feet tall. Typical spacing between structures would be approximately 900 to 1,100 feet. Self-weathering steel would be used for the monopoles, which are intended to blend with the surrounding mountains.

Based on the Project requirements, access, terrain, and limited available geotechnical information, it is expected that direct embedded foundations would be used for tangent structures and anchor-bolted drilled shaft foundations for angle and dead-end structures. Vibrated casing foundations may also be used, depending on the results of planned further geotechnical investigation.

Red Bluff Substation A

Red Bluff Substation A (Figure 2-22) would be on approximately *76* acres of BLM-administered land approximately four miles southeast of California State Route 177, just south of I-10. The Substation would be constructed within the central portion of the parcel. Other Substation-related Project elements would require additional acreage, as summarized in Table 2.2-1 and as described in more detail below.

The following is a summary of the Red Bluff Substation components:

- Red Bluff Substation: Construct a 500-/220-kV substation on approximately *76* acres of land.
- Transmission Lines: Loop the existing DPV 500-kV transmission line into Red Bluff Substation A by adding a total of approximately 5,000 feet of new transmission lines (two lines of approximately 2,500 feet each), creating the Colorado River-Red Bluff and Devers-Red Bluff 500-kV transmission lines.
- Gen-Tie Line Connection: Connect the Sunlight-built Gen-Tie Line into the Red Bluff Substation property.
- Modification of Existing 220-kV Structures: The necessary crossing of the new FPL Buck-Julian Hinds 220-kV transmission lines under the proposed SCE 500-kV loop-in lines may require tower modifications. New tubular steel poles (types to be determined) to modify the construction at the crossing location may replace the existing poles.
- Electric Distribution Line for Substation Light and Power: Rebuild the Desert Center 12-kV circuit overhead distribution line along the south frontage of I-10, approximately 20,000 feet, to upgrade the circuit from single-phase to three-phase construction and then extending approximately 1,000 feet underground toward the Substation. This rebuild would require the replacement of approximately 100 poles, assuming the span between each pole is approximately 200 feet.
- Telecommunications Facilities: Install optical ground wire (OPGW) on the Gen-Tie Line and connect to associated equipment installed inside both Red Bluff and Sunlight's On-Site Substation. Construct new Desert Center Communications Site (not co-located with the Substation), which includes new microwave repeater equipment, consisting of a new 12-foot by 36-foot communications room and associated equipment, along with a new 185-foot-tall lattice steel microwave communications tower and two 10-foot-diameter microwave antennas.

Additional Project components for the Substation site include a water well, a septic system that meets state and county regulations for septic design, and an emergency generator. A material yard/staging area would be located adjacent to the Substation footprint. Two alternative access roads are being considered for Substation A: one from the west via Kaiser Road and Aztec Road (Access Road 1), and the second from the east via Corn Springs Road and Chuckwalla Valley Road (Access Road 2).

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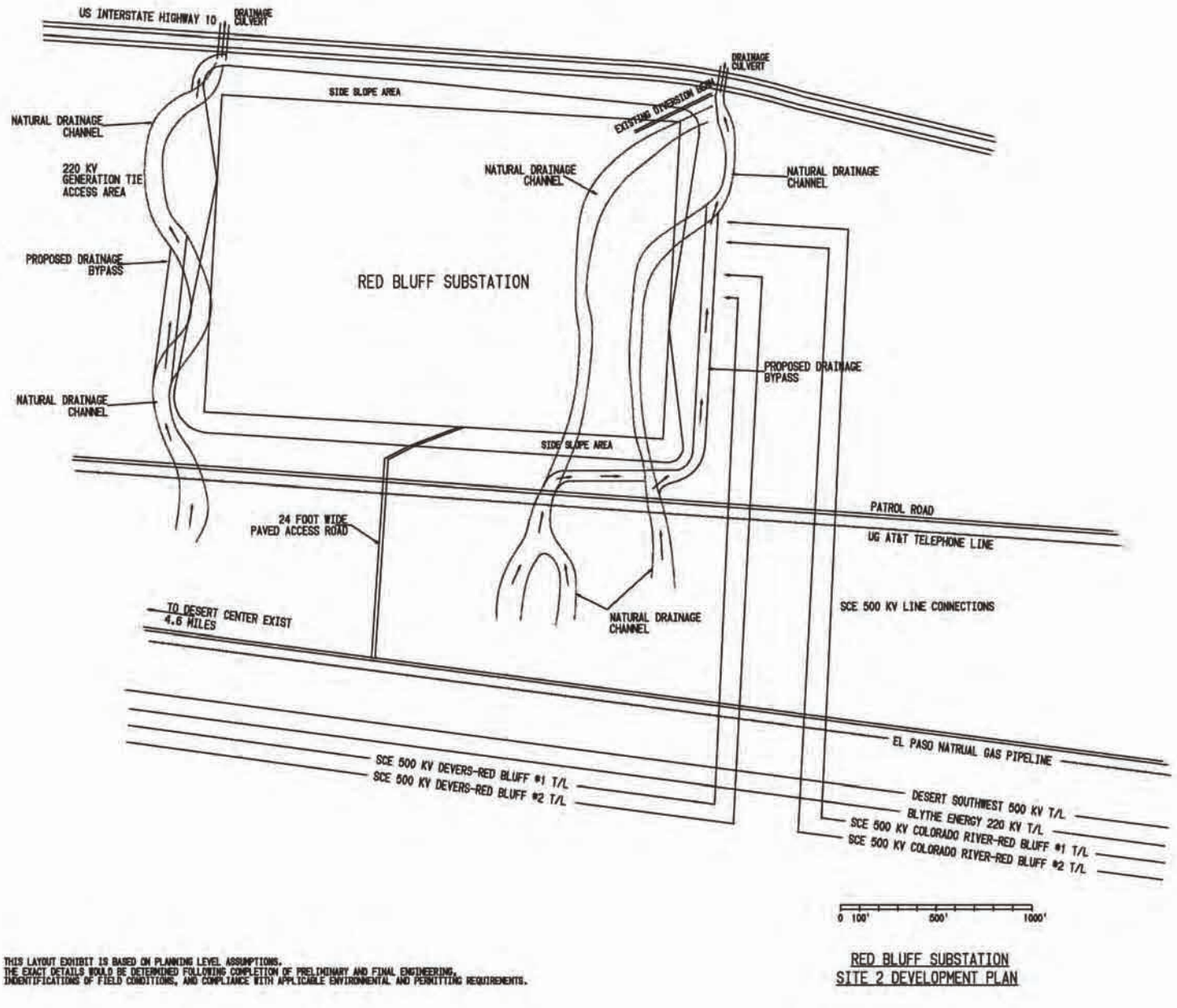

Source: Southern California Edison, 2010.

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Figure 2-22

Red Bluff Substation A

Access Road 2 to Substation A via Corn Springs Road and Chuckwalla Valley Road

Access to Substation A under this alternative would be provided from the Corn Springs exit off I-10 via a 3,800-foot-long paved section of Chuckwalla Valley Road, heading east along the southern frontage of the freeway (refer to Figure 2-23). From this point, the access would head south along a 1,100-foot-long section of Corn Springs Road, then would turn west through 30-foot wide roadway improvements to approximately 24,000 feet of the existing dirt pipeline patrol road to the Substation site. As a result of the potential for surface flooding over a 17,000-foot portion of the gas line patrol road, additional improvements may be necessary to protect the road. The resulting land disturbance would be approximately *31* acres.

Land Disturbance

Estimated land disturbance for Substation A is presented in Table 2.2-5. Factors used to estimate land disturbance for Substation A are presented in Table 2.3-9, Table 2.3-11, Table 2.3-14, Table 2.3-19, and Table 2.3-23 in Section 2.3.2 (Construction Plan for Red Bluff Substation). Land disturbance estimates are based on planning level assumptions. Additional details would be determined following completion of preliminary and detailed engineering, identification of field conditions, labor availability, equipment, and compliance with applicable environmental and permitting requirements. A detailed discussion of Red Bluff Substation B is included under Alternative 2 in this section of the EIS.

Table 2.2-5
Red Bluff Substation A Estimated Land Disturbance Summary

PROJECT ELEMENT	SUBSTATION SITE A (acres)
	Permanent
Substation System[1]	*130*
Transmission System[2]	*32.83*
Distribution System[3]	*8.31*
Telecommunication System[4]	*<0.25*
Total Disturbance	***171.39***

[1]Refer to Tables 2.3-9 and 2.3-11 for more detailed information *(permanent disturbance includes 76 acres for the Substation, 14 acres for drainage control, and 31 acres for access road, and 9 acres for a material laydown yard)*
[2]Refer to Table 2.3-14 for more detailed information.
[3]Refer to Table 2.3-19 for more detailed information.
[4]Refer to Table 2.3-23 for more detailed information.

Site Drainage

Because the Red Bluff Substation A is downslope of the Chuckwalla Mountains, surface runoff in the form of eroded channels traverses the site. Three of these channels would need to be altered in order to protect the Substation's southern exposure from flooding. Preliminary engineering suggests that a trapezoidal channel would be required to convey the stormwater runoff around both sides of the Substation, discharging the flow through two existing culverts under I-10. Other surface flow at the south end of the Substation would be directed into the new trapezoidal channels by earthen berms placed along the southern edge of the Substation wall. These drainage improvements would disturb an area of approximately *14* acres.

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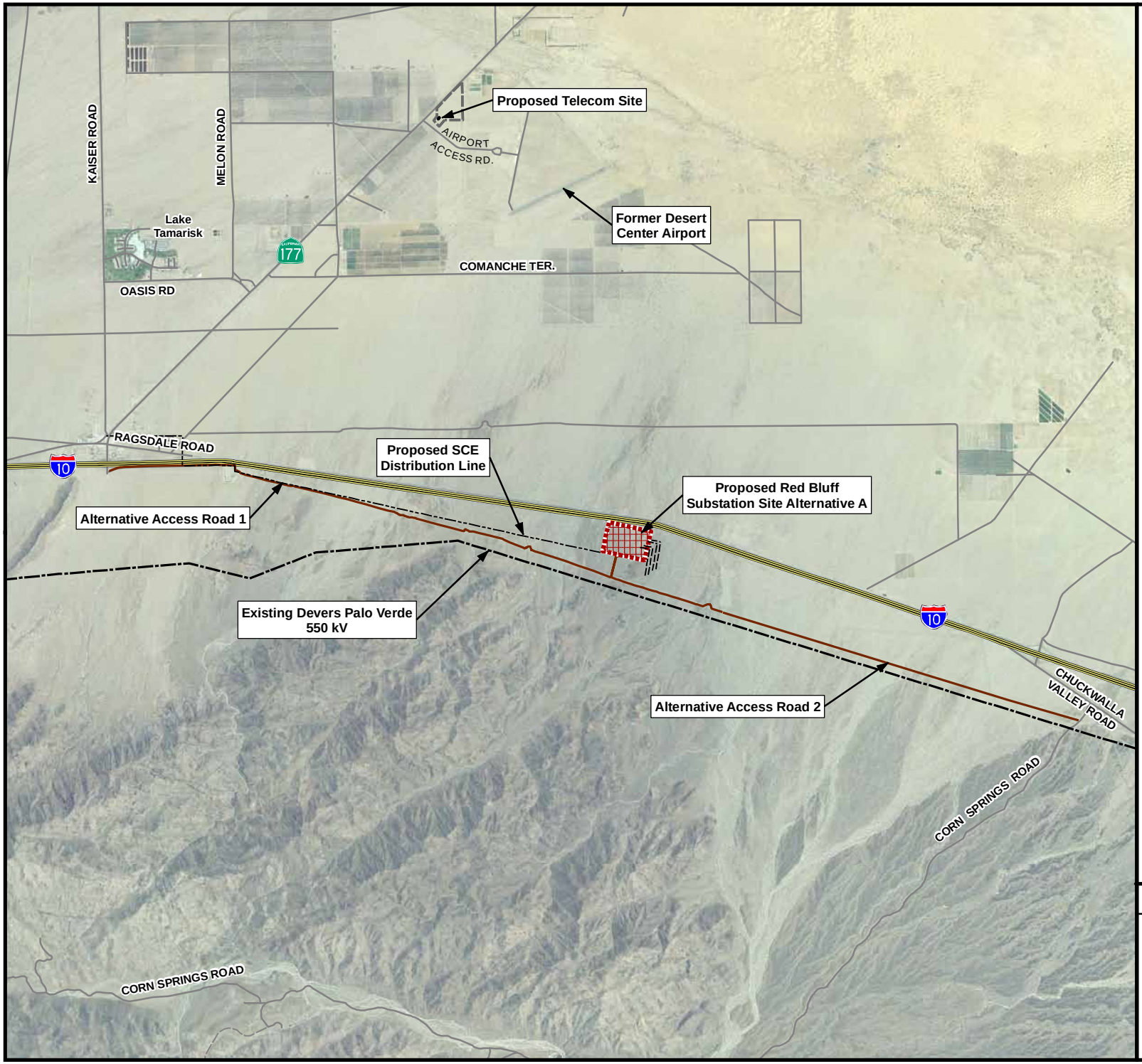

N

0 3,500 7,000 Feet

LEGEND

- Alternative Access Roads 1 and 2
- SCE Distribution Line
- Transmission Loop-In Line
- Devers-Palo Verde Transmission Line (DPV1)
- Interstate Highway
- State Highway/Local Road
- Unimproved Road
- Red Bluff Substation (Alternative A)

Source:
Southern California Edison, 2010.

DESERT SUNLIGHT SOLAR FARM

Figure 2-23

Access Road Alternatives for Substation A

Alternative 2—Alternate Action Alternative with Land Use Plan Amendment: Solar Farm Layout B, Gen-Tie Line GT-B-2, and Red Bluff Substation B

With the Alternate Action Alternative, shown on Figure 2-24, the following configurations of the three Project components are proposed:

- Solar Farm Layout B (SF-B);
- Gen-Tie Line B-2 (GT-B-2); and
- Red Bluff Substation B.

This alternative would require an amendment to the CDCA Plan.

This section includes a brief overview of each Project component. Project details are provided in Section 2.2.3 (Features Common to All Action Alternatives). Construction, operation and maintenance, and decommissioning information is provided in Sections 2.3 and 2.4. Table 2.2-6 provides a summary of permanent ground disturbance associated with each Project component and related element for Alternative 2. Table 2.2-7 provides a summary of water use during construction and operation for each major Project component.

Table 2.2-6
Summary of Permanent Ground Disturbance for
Alternative 2 – Alternate Action Alternative

Project Component/Element	Approximate Acreage
Solar Farm Layout B[1]	*3,912*
Gen-Tie Line B-2[2]	*68*
Red Bluff Substation B	*76*
Red Bluff Substation-related features	-
- Drainage/Sideslopes	*20*
- Access Road[3]	*1*
- Transmission System[4]	*22*
- Material Yard*/Staging Area*	*10*
- Distribution System[5]	*<1*
- Telecom Site[6]	<1
TOTAL	***4,110***

[1]Includes area for all Solar Farm-related facilities.
[2]Permanent disturbance *of 68 acres occurs within a corridor totaling 203 acres* (10 miles *long* by 160 *feet* wide plus additional fan-shaped areas at corners *for stringing*).
[3]Assume 2,000-foot by 18-foot-wide road from Eagle Mountain Road.
[4]Includes transmission system associated with connecting Red Bluff Substation to Gen-Tie Line and DPV1.
[5]Distribution system for Substation power and light.
[6]New Desert Center Communications Site.

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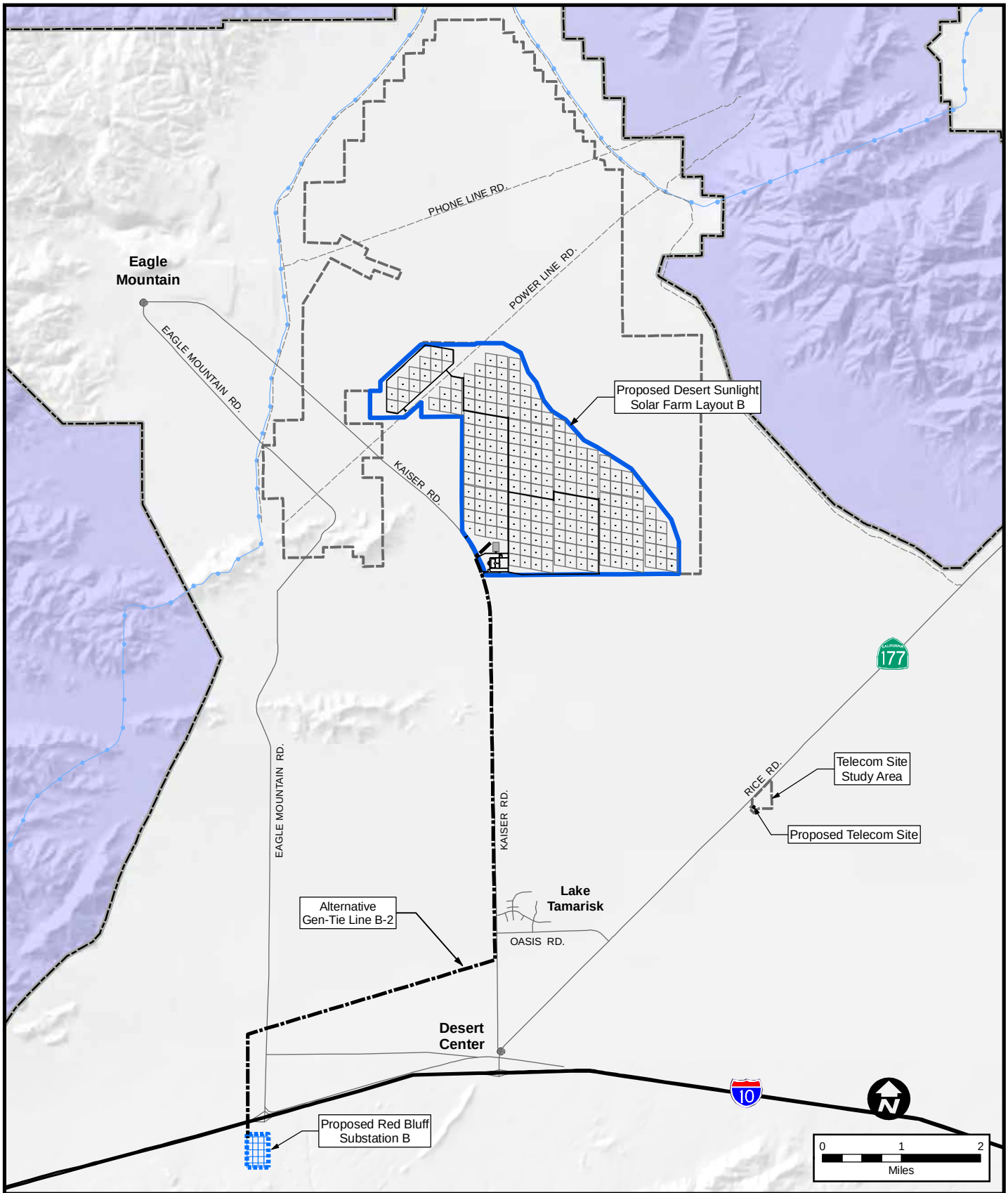

LEGEND

- Proposed Gen-Tie Line B-2
- Study Area Boundary for Solar Farm
- Solar Farm Boundary (Alternative B)
- Red Bluff Substation (Alternative B)
- Joshua Tree National Park Boundary
- Aqueduct

Source: First Solar, 2010.

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Figure 2-24

Alternative 2: Alternate Action Layout

Table 2.2-7
Summary of Water Use for Alternative 2 – Alternate Action Alternative

Project Component/Element	Construction	Operation		
	Total (acre-feet)	Peak Daily (gpd)[1]	Annual (acre-feet)	Peak Daily (gpd)
Solar Farm B	*1,200 to 1,300*	252,000 to 1.3 million	0.2	<300
Gen-Tie Line B-2	3.3	40,000	0	0
Red Bluff Substation B	*300*	*330,000*	*<0.1*	*<100*
TOTAL	***1,503 to 1,603***	***622,000 to 1.67 million***	***<0.3***	*<400*

Notes: (1) Demand would vary over the construction period and (2) Water use estimates are preliminary and based on current information.

Solar Farm Layout B

SF-B would be as described under Alternative 1 above.

Gen-Tie Line B-2

As shown in Figure 2-25, GT-B-2 would exit the southwest corner of the Solar Farm site, run south along the west side of Kaiser Road, then turn southwest, approximately 1.2 miles north of Desert Center, traveling across Eagle Mountain Road, finally turning south across I-10 to the location of the Red Bluff Substation B (Figure 2-24). Along Kaiser Road, the center of the 160-foot transmission line ROW would be located approximately 120 to 130 feet from the centerline of the paved roadbed, within the county road ROW on BLM land. Approximately 0.3 mile south of Oasis Road, the line turns southwest, running along an existing BLM-designated open route. After approximately 3.2 miles, the line crosses Eagle Mountain Road then turns south for approximately 1.3 miles to the Substation. The transmission line travels through BLM-administered land. Once the Gen-Tie Line leaves the Kaiser Road ROW, the access road would be adjacent to the Gen-Tie Line and within the ROW.

Of the 10-mile ROW, approximately 9.4 miles would be on BLM land, approximately 0.6 mile would be on land owned in fee by the MWD, *and approximately 0.5 mile would be on land owned in fee by Riverside County.* First Solar would enter into a land license agreement, *lease, or permanent easement* with MWD for the portions on land owned in fee by MWD, which would rely on this EIS to satisfy the CEQA obligations of MWD. *Riverside County would issue an Encroachment Permit for the portions on land owned in fee by the County and for access into the County road ROW, in addition to issuing a Public Use Permit for the MWD land. Riverside County would rely on this EIS to satisfy the CEQA obligations of the County.*

The 160-foot-wide Gen-Tie corridor and additional fan-shaped areas at corners used for wire stringing would encompass approximately 203 acres. The total length of GT-B-2 would be approximately 10 miles. The elevation of GT-B-2 varies from approximately 690 to 1,192 feet above mean sea level. Approximately 58 transmission structures would be required for this alternative, including 53 tangents and 5 dead-ends. Five splicing locations and 18 guard structures would be used during construction of the line. Permanent access roads would be constructed in order to provide access for maintaining the Gen-Tie, as needed. Table 2.2-8 below provides a list of major Gen-Tie components, along with the acreage requirements for each component.

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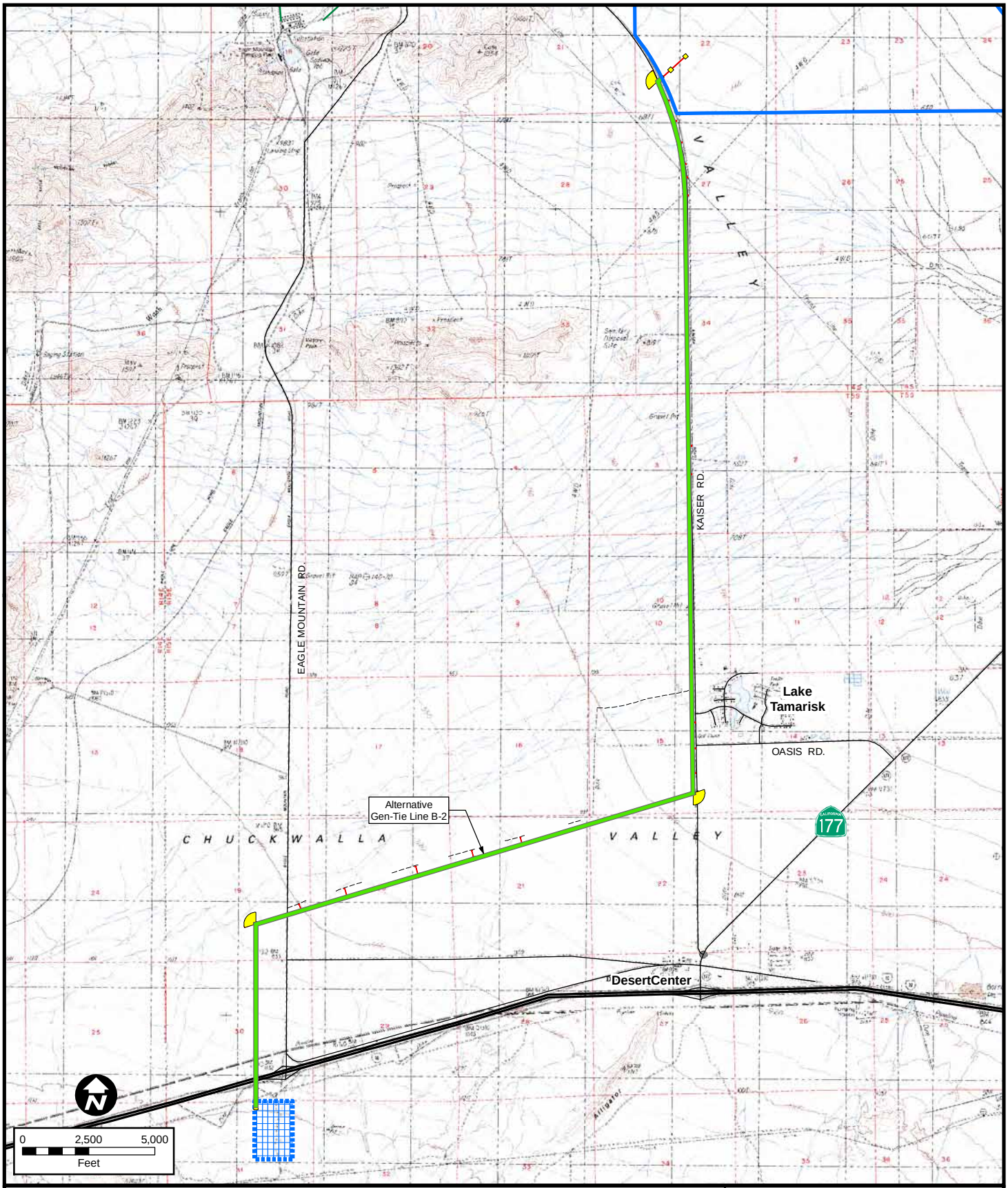

LEGEND

- Alternative Gen-Tie Line B-2 Corridor
- Temporary Disturbance Area
- Permanent Disturbance Area
- Solar Farm Boundary (Alternative B)
- Red Bluff Substation (Alternative B)

Source: First Solar, 2010.

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Figure 2-25

Gen-Tie Line B-2

Table 2.2-8
Gen-Tie Line B-2—Project Facilities, Components, and Percent of Gen-Tie Corridor

Project Facility or Component	Dimensions	Percent of Gen-Tie Corridor
Gen-Tie Line Corridor	Width: 160 feet and additional fan-shaped areas at corners Length: 10 miles Area: 203 acres	100
Permanent Disturbance	*68 acres*	*33.5*
Total transmission structure footprint	2,065 square feet (0.05 acre)	<0.1
Individual transmission structure footprint	Tangent structure = 28.3 square feet Dead-end = 113.1 square feet	<0.1
Permanent access roads	Width: 14 feet Length: 4.3 miles Area: 7.3 acres	3.6
Temporary access roads	Width: 14 feet Length: *11.7* miles Area: *19.8* acres	*9.8*

Red Bluff Substation B

Red Bluff Substation B would be within a 160-acre parcel of land south of I-10 at Eagle Mountain Road. This Substation is expected to require approximately *76* acres and would be generally located in the center of the parcel (Figure 2-26). Other Substation-related elements would require additional acreage, as summarized in Table 2.2-1, and as described in more detail below.

This Substation site is on a parcel of privately-owned land that would be acquired and owned by SCE. The land is zoned Controlled Development, which allows for two single-family dwellings per 10 acres. The General Plan Designation is Open Space – Rural. The surrounding land use is Vacant – Open Space.

The components of Red Bluff Substation B are identical to those previously described for Substation A (under Alternative 1), except for two components:

- Transmission Lines: Loop the existing DPV 500-kV transmission line into Red Bluff Substation B by adding a total of approximately 1,000 feet of new transmission lines (two lines of approximately 500 feet each), creating the Colorado River-Red Bluff and Devers-Red Bluff 500-kV transmission lines.
- Electric Distribution Line for Substation Light and Power: Construct approximately 750 feet of 12-kV overhead distribution line and approximately 1,000 feet of underground distribution line (connecting the existing distribution system along Eagle Mountain Road to Red Bluff Substation) to provide Substation light and power.

Access from Eagle Mountain Road

Access to the Red Bluff Substation B would be from the Eagle Mountain exit from I-10. A new 18-foot wide access road would be constructed from the highway off-ramp angling approximately 800 feet toward the northeast Substation corner, then would continue south approximately

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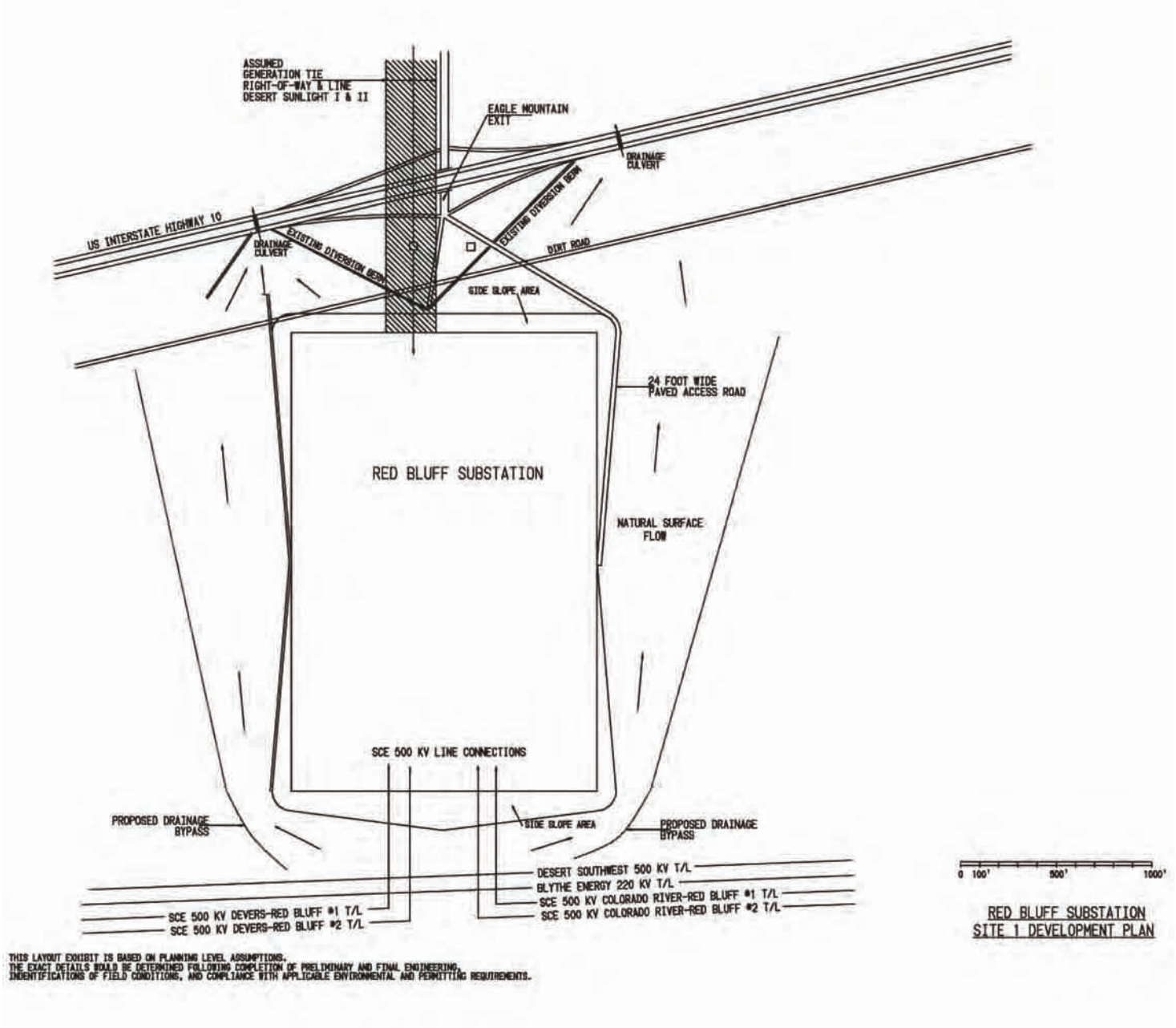

Source: Southern California Edison, 2010.

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Figure 2-26

Red Bluff Substation B

1,200 feet to the main Substation entry gate. A description of access road construction and permanent roadway disturbance is in Section 2.3.2 (Construction Plan for Red Bluff Substation Project).

Land Disturbance

Estimated land disturbance for the Red Bluff Substation B site is presented in Table 2.2-9. Factors used to estimate land disturbance for the two alternate sites are presented in Tables 2.3-9, 2.3-12, 2.3-15, 2.3-21, and 2.3-23 in Section 2.3.2 (Construction Plan for Red Bluff Substation Project). Land disturbance estimates are based on planning level assumptions. Additional details would be determined following completion of preliminary and detailed engineering, identification of field conditions, labor availability, equipment, and compliance with applicable environmental and permitting requirements.

Table 2.2-9
Red Bluff Substation B Estimated Land Disturbance Summary

Project Element	Substation Site B (acres)
	Permanent
Substation System[1]	*107.3*
Transmission System[2]	*22.33*
Distribution System[3]	*0.15*
Telecommunication System[4]	*0.25*
Total Disturbance	***130.03***

[1]Refer to Tables 2.3-9 and 2.3-12 for more detailed information *(permanent disturbance includes 76 acres for the Substation, 20 acres for drainage control, and 1.3 acres for access road, and 10 acres for a material laydown yard).*
[2]Refer to Table 2.3-15 for more detailed information.
[3]Refer to Table 2.3-21 for more detailed information.
[4]Refer to Table 2.3-23 for more detailed information.

Site Drainage

The Red Bluff Substation B *would be* located *north* of the Chuckwalla Mountains, which contribute to surface stormwater runoff through the proposed site. An ephemeral drainage runs south to north through the center of the proposed Substation site. Although this appears to be a minor drainage feature, it would be necessary to redirect this flow around the Substation. The Substation's southern boundaries would be protected from surface runoff by installing a berm designed to direct the flow around both sides of the Substation pad. These drainage improvements could disturb an area approximately 80 feet wide around three sides of the fenced Substation, resulting in a total permanent disturbance area of approximately 20 acres.

Alternative 3—Reduced Solar Farm Footprint Alternative with Land Use Plan Amendment: Solar Farm Layout C, Gen-Tie Line GT-A-2, Substation A, and Access Road 1

With the Reduced Solar Farm Footprint Alternative, shown on Figure 2-27, the following configurations of the three Project components are proposed:

- Solar Farm Layout C (SF-C);

- Gen-Tie Line A-2 (GT-A-2); and
- Red Bluff Substation A, with Access Road 1.

This alternative would require an amendment to the CDCA Plan.

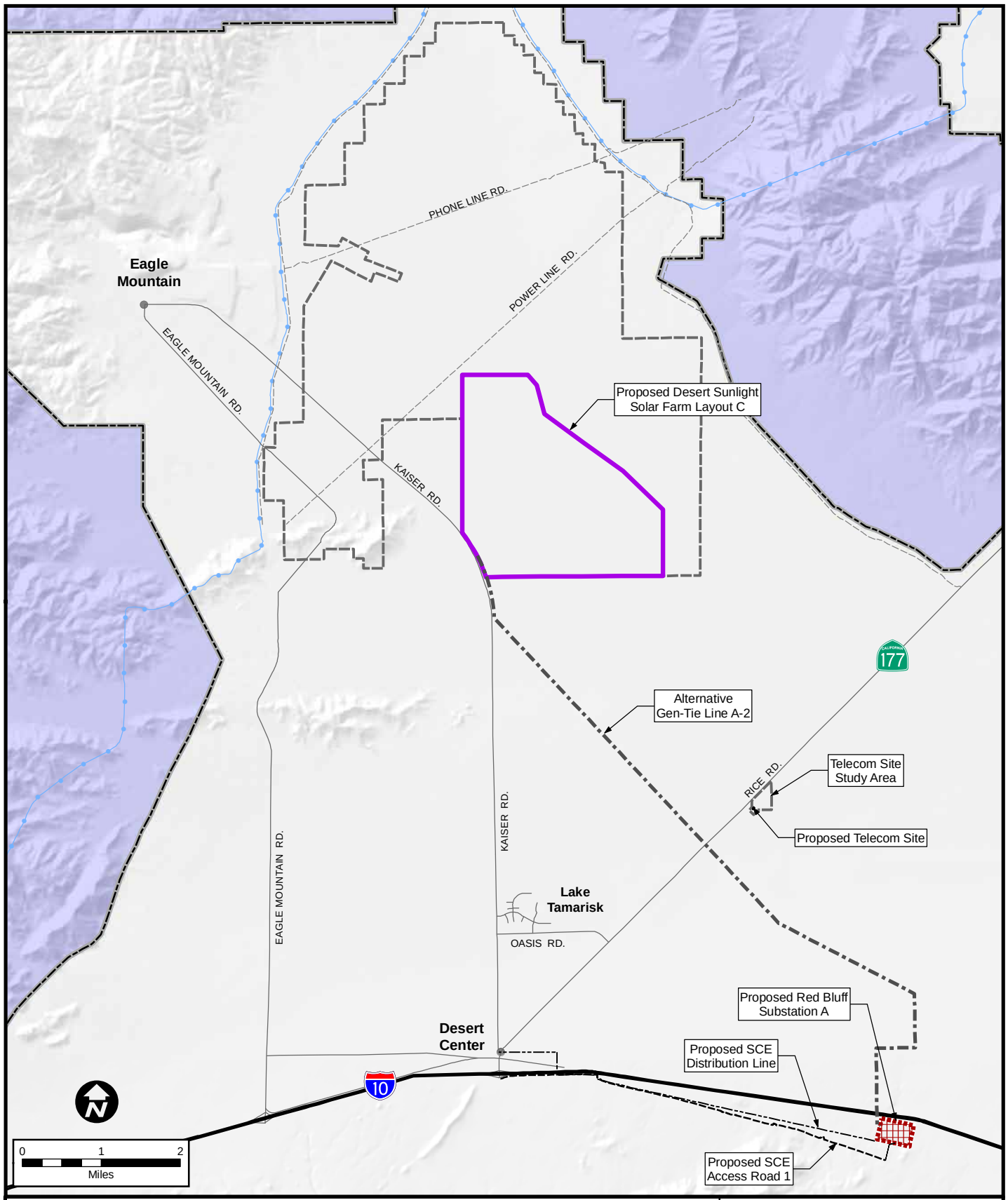
This alternative would be in the same general location as Solar Farm Site B but would be reduced in size to reduce overall environmental impacts, particularly to the desert tortoise. The acreage required for this layout would be 3,045 acres, and the power output would be 413 MW. The construction schedule would be 26 months, the same as for Solar Farm Layout B.

This section includes a brief overview of each Project component. Project details are provided in Section 2.2.3 (Features Common to all Action Alternatives). Construction, operation and maintenance, and decommissioning information is provided in Sections 2.3 and 2.4. Table 2.2-10 provides a summary of permanent ground disturbance associated with each Project component and related element for Alternative 3. Table 2.2-11 provides a summary of water use during construction and operation for each major Project component.

Table 2.2-10
Summary of Permanent Ground Disturbance for Alternative 3—Reduced Footprint Alternative

Project Component/Element	Approximate Acreage
Solar Farm Site C [1]	*3,045*
Gen-Tie Line A-2 [2]	*86*
Red Bluff Substation A	*76*
Red Bluff Substation-related features	-
- Drainage/Sideslopes	*14*
- Access Road [3]	*31*
- Material Yard	*9*
- Transmission System [4]	*33*
- Distribution System [5]	8
- Telecom Site [6]	1
TOTAL	***3,303***

[1]Includes area for all Solar Farm-related facilities.
[2]Permanent disturbance *of 86 acres occurs within a corridor totaling 226 acres* (10.5 mile*s long* by 160 *feet* wide plus additional fan-shaped areas at corners *for stringing*).
[3]Assume 24,000-foot by 30-foot-wide road improvements from *Kaiser Road and Aztec* Road.
[4]Includes transmission system associated with connecting Red Bluff Substation to Gen-Tie Line and DPV1.
[5]Distribution system for Substation power and light, including new access road.
[6]New Desert Center Communications Site.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Eagle Mountain
PHONE LINE RD.
POWER LINE RD.
EAGLE MOUNTAIN RD.
KAISER RD.
Proposed Desert Sunlight Solar Farm Layout C
177
Alternative Gen-Tie Line A-2
RICE RD.
Telecom Site Study Area
Proposed Telecom Site
EAGLE MOUNTAIN RD.
KAISER RD.
Lake Tamarisk
OASIS RD.
Proposed Red Bluff Substation A
Desert Center
Proposed SCE Distribution Line
10
Proposed SCE Access Road 1
0
1
2
Miles
LEGEND
Proposed Gen-Tie Line A-2
SCE Access Road
SCE Distribution Line
Study Area Boundary for Solar Farm
Solar Farm Boundary (Alternative C)
Red Bluff Substation (Alternative A)
Joshua Tree National Park Boundary
Aqueduct
Source: First Solar, 2010.
DESERT SUNLIGHT SOLAR FARM
Figure 2-27
Alternative 3: Reduced Footprint Layout

Table 2.2-11
Summary of Water Use for Alternative 3—Reduced Footprint Alternative

Project Component/Element	Construction Total (acre-feet)	Construction Peak Daily (gpd)[1]	Operation Annual (acre-feet)	Operation Peak Daily (gpd)
Solar Farm C	900 to 1,000	252,000 to 1.3 million	0.2	<300
Gen-Tie Line A-2	8.6	40,000	0	0
Red Bluff Substation A	*300*	*330,000*	*<0.1*	*100*
TOTAL	***1,209 to 1,309***	***622,000 to 1.67 million***	***<0.3***	*<400*

[1]Demand Notes: (1) Demand would vary over the construction period, and (2) water use estimates are preliminary and based on current information.

Solar Farm Layout C

SF-C is approximately six miles north of Desert Center and four miles north of Lake Tamarisk, northwest of and next to Kaiser Road and southwest of Pinto Wash. SF-C encompasses approximately 3,045 acres, located entirely on BLM land. Elevation at SF-C varies from approximately 622 to 766 feet above mean sea level. Access would be provided by Kaiser Road. Once fully operational, it would produce 413 MW of power.

Table 2.2-12 provides a general list of Solar Farm components, along with the acreage they would require for SF-C. Figure 2-28 shows a schematic layout of SF-C. In addition to the main generation area, which takes up most of the Project acreage, the largest permanent land uses on the Solar Farm site are access corridors, the O&M facility, the On-Site Substation, and the Visitors Center. Security and desert tortoise fencing would require 9.5 miles of fencing.

Table 2.2-12
Solar Farm Layout C—Dimensions of Project Facilities

Project Facility or Component	Approximate Total Area	Percent of Total Solar Farm Site (3,045 acres)
Total project footprint	3,045 acres	100
Total footprint of piles	0.2 acres	<0.1
Access corridors	273 acres	9
Gravel access roads	23.9 acres	0.8
O&M facility	0.7 acre	<0.1
Solar energy Visitors Center	0.06 acre	<0.1
On-site Substation	9.3 acres	0.3
Area disturbed by trenching	33.2 acres	1.1
Area permanently covered by at-grade items (footprint of piles, PCS, transformer, PVCS, On-Site Substation, On-Site Overhead Line poles, Visitors Center, O&M Facility)	12.6 acres	0.4
Total footprint for On-Site Overhead Line Poles	0.05 acre	<0.1
Areas of decompaction between the rows	1,192.4 acres	39.2
Area shaded by PV modules (indirect disturbance) (at solar noon)	1,037.2 acres	34.1
Area shaded by PV modules (indirect disturbance) (scenario – Dec. 21, 9:00 am)	2,024 acres	66.5
Security fencing	Length: 9.5 miles	N/A

X:\DESERT SUNLIGHT\Site C layout.CDR

NORTH

2000' 1000' 0 2000'

LEGEND

- SOLAR FARM SITE BOUNDARY *
- FENCE LINE
- GABION WALL *
- EXISTING ROAD
- EXISTING TRANSMISSION LINE
- EXISTING DISTRIBUTION LINE
- TYPICAL PV ARRAY

* NOTE:

1. THE SOLAR FARM SITE WILL INCLUDE APPROXIMATELY 3,045 ACRES.
2. REFERENCE GRADING AND COMPACTIONS PLANS FOR DETAILS OF GABION WALL.
3. REFERENCE FENCE PLAN FOR TYPES OF FENCING.

Source: Southern California Edison, 2010

30% DESIGN

THIS PRINT IS NOT TO BE USED FOR CONSTRUCTION UNLESS NOTED AND SIGNED OK FOR CONSTRUCTION ABOVE LAST REVISION

NOT TO SCALE

DESERT SUNLIGHT SOLAR FARM

Figure 2-28

Solar Farm Layout C

Gen-Tie Line A-2

As shown on Figure 2-29, GT-A-2 would exit the southwest corner of the Solar Farm site and run for approximately 4,400 feet along the east side of Kaiser Road, until it intersects with the ROW of an existing SCE transmission line. Then it would run to the southeast along the existing transmission ROW for approximately 7.2 miles, then turn south for approximately 0.6 mile, continuing due west for approximately 0.5 mile until it finally turns south across I-10 and continues approximately 1,000 feet (not along any existing feature) to Red Bluff Substation A. The center of the new line would be located approximately 140 to 150 feet from the centerline of the existing SCE line, but would not be within the SCE ROW.

Along Kaiser Road, the center of the 160-foot transmission line ROW would be located approximately 120 to 130 feet east from the center of the paved roadbed, on BLM land. The new transmission line would cross over or under the existing SCE line, subject to agreement with SCE, and then turn southeast along the south side of the corridor. The land ownership of the 160-foot-wide transmission easement would be as follows:

- The first approximately 0.4 mile on BLM land;
- From approximately mile 0.4 to approximately mile 0.9 on MWD land;
- From approximately mile 0.9 to approximately mile 2.7 on BLM land;
- From approximately mile 2.7 to approximately mile 5.4 on private land;
- From approximately mile 5.4 to approximately mile 6.0 on BLM land;
- From approximately mile 6.0 to approximately mile 7.0 on private land; and
- From approximately mile 7.0 to approximately mile 10.5 on BLM land into the Substation.

Of the 10.5-mile ROW, a total of 6.5 miles would be on BLM land and 4.0 miles would be on private land. For the portions on private land, 21 separate parcels would be crossed. First Solar has not acquired land rights for *all* of these parcels, *and is continuing to* pursue easements through negotiations with the owners. Title review has commenced for these parcels. *Riverside County would issue a Public Use Permit for the MWD land and private land crossings and an Encroachment Permit for access into the County road ROW. Both MWD and the County would rely on this EIS to satisfy their CEQA obligations.*

The 160-foot-wide corridor and additional fan-shaped areas at corners used for wire stringing for GT-A-2 would encompass approximately 226 acres. The total length of GT-A-2 is approximately 10.5 miles. The elevation of GT-A varies from approximately 592 to 765 feet above mean sea level. Approximately 59 transmission structures would be required for this alternative, including 51 tangents and 8 dead-ends. Four splicing locations and 16 guard structures would be used temporarily during construction. Permanent access roads would be constructed in order to provide access for maintenance of the Gen-Tie, as needed. Table 2.2-13 below provides a list of major Gen-Tie components, along with the acreage required for each component.

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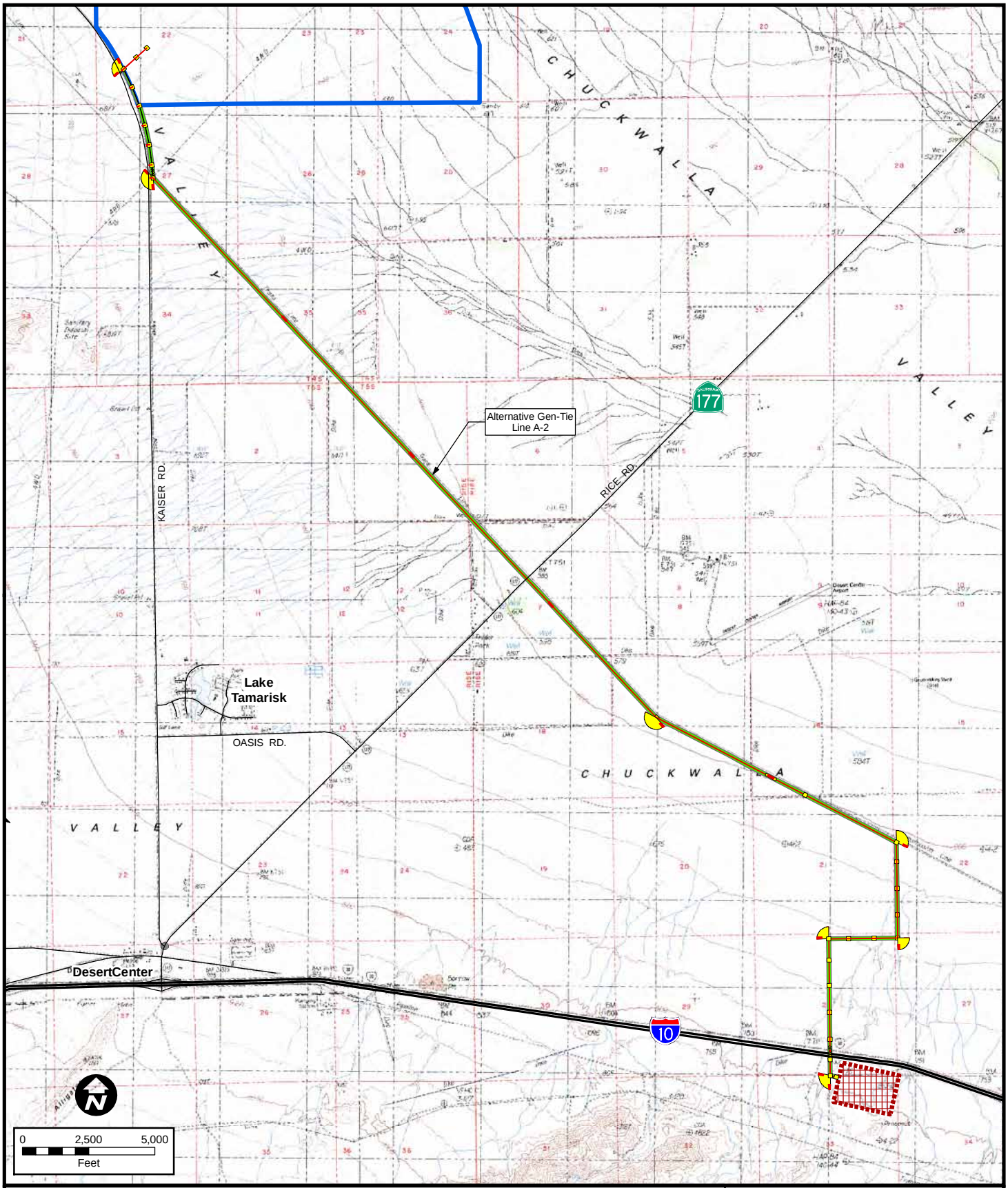


LEGEND

- Permanent Disturbance Area
- Temporary Disturbance Area
- Alternative Gen-Tie Line A-2 Corridor
- Solar Farm Boundary (Alternative B)
- Red Bluff Substation (Alternative A)

Source: First Solar, 2010.

DESERT SUNLIGHT SOLAR FARM

Figure 2-29

Gen-Tie Line A-2

Table 2.2-13
Gen-Tie Line A-2—Project Facilities, Components, and Percent of Gen-Tie Corridor

Project Facility or Component	Dimensions	Percent of Gen-Tie Corridor
Gen-Tie Line Corridor	Width: 160 feet and additional fan-shaped areas at corners Length: 10.5 miles Area: 226 acres	100
Permanent disturbance	*86 acres*	*38.1*
Total transmission structure footprint	2,345 square feet (0.05 acre)	<0.1
Individual transmission structure footprint	Tangent Structure: 28.3 square feet Dead-end: 113.1 square feet	<0.1
Permanent access roads	Width: 14 feet Length: 9.9 miles Area: 16.8 acres	7.4
Temporary access roads	Width: 14 feet Length: *10.8* mile Acres: *18.2* acres	*8.1*

Red Bluff Substation A

Red Bluff Substation A would be as described under Alternative 1 above, with the exception of the access road, as described below.

Access Road 1 to Substation A via Kaiser Road and Aztec Road

Access from I-10 is anticipated to be provided from the west via the Kaiser Road exit off I-10 and then via Aztec Road, along a pipeline access road, along the southern frontage of the freeway. This route would require approximately 24,000 feet of new access road (Access Road 1) to the Substation site, as shown in Figure 2-22, resulting in approximately *31* acres of disturbance. Access road construction and permanent disturbance are described in Section 2.3.2 (Construction Plan for Red Bluff Substation Project).

Alternative 4—No Issuance of a Right-of-Way Grant and No Land Use Plan Amendment (No Action)

Under NEPA, the No Action Alternative is used as a benchmark of existing conditions by which the public and decision makers can compare the environmental effects of the Proposed Action and the alternatives. With this No Action Alternative, the Desert Sunlight Solar Project would not be approved (all components of the Project would be denied), no ROW grant would be issued, and no CDCA Plan amendment would be approved that would make the land available for large-scale solar development. This would be the same as the No Project Alternative under CEQA.

This No Action Alternative under NEPA defines the scenario that would exist if the proposed Desert Sunlight Solar Farm Project, including the Solar Farm, Gen-Tie Line, and Red Bluff Substation, were not constructed and no plan amendment were issued. If this No Action Alternative were selected, the construction and operational impacts of the Desert Sunlight Solar Project would not occur, assuming no other project was developed at the site. There would be no

disturbance of the ground at the site, no disturbance of desert vegetation and habitat, and no installation of power generation and transmission equipment. This No Action Alternative would also eliminate the Project's contributions to cumulative impacts on natural resources and environmental parameters in Riverside County and in the Sonora Desert as a whole, associated with various projects under consideration, assuming no other project was built in Riverside County or in the Sonora Desert to replace the renewable energy generating capacity of the proposed Project.

This No Action Alternative does not preclude future solar development on the Project locations; therefore, it is possible that another solar project proponent would submit a ROW application to the BLM for use of the site. Project impacts from another project would likely be similar to those that would result from the proposed Project.

However, in the absence of the Desert Sunlight Solar Farm Project, other power plants, both renewable and nonrenewable, may have to be constructed to serve the demand for electricity and to meet the California Renewables Portfolio Standard (RPS). Existing gas-fired plants may operate longer in order to meet the demand for energy. The impacts of these other facilities may be similar to those of the proposed Project because they require land areas comparable in size and environmental impacts comparable in degree to those required for the Desert Sunlight Solar Farm, whether for energy production or fuel extraction. Additionally, the environmental impacts of developing transmission capacity for such other power plants may be greater, especially where no transmission capacity exists or where energy production cannot be geographically concentrated to minimize the number of new transmission lines needed.

If the Project were not built, California utilities would not receive the 550-MW contribution to the renewable state-mandated energy portfolio.

Governor Schwarzenegger's Executive Order S-14-08 streamlines California's renewable energy project approval process and increases its Renewable Energy Standard to 33 percent renewable energy by 2020. *Although 33 percent is not statutorily mandated or required by regulation in California (20 percent by the year 2010 is currently the law as of the date of this writing), legislation mandating 33 percent is currently pending as of the writing of this EIS. To meet this pending requirement, the investor-owned utilities (IOUs) will have to almost triple their annual renewable energy procurement, from 33 terawatt-hours (TWh) in 2010 to 87 TWh by 2020.* The Project is expected to generate at least 1 TWh of renewable energy annually over its lifetime, a small but significant portion of the necessary new generation. Under the No Action Alternative, California would not benefit from the reduction in greenhouse gases that the Project would provide, and California utilities would not receive the 550-MW contribution to the state-mandated renewable energy portfolio. The achievement of California's RPS requirements *could* be further delayed.

Less than 12,400 MW of renewable generating capacity (mostly wind), including less than 4,500 MW of solar generating capacity, are under evaluation by the CAISO in the Large Generator Interconnection Process (LGIP) serial queue for interconnection by 2015[1] *and an additional 2,200 MW of solar generating capacity that are outside the serial queue process have recently signed interconnection agreements, with dozens more in progress.* The Project, at 550 MW, represents *about 8* percent of the solar generation capacity in the CAISO's active serial queue *LGIP*, and *6* percent of the LGIP solar generation capacity that has an interconnection agreement that either has been executed or is in

[1] The California ISO Controlled Grid Generation Queue as of January 8, 2010.

process. Under the No Action Alternative, a significant portion of the solar generating capacity expected to be interconnected in the short term would be delayed.

The California RETI *was* a statewide planning process that *was* underway *from late 2007 through 2010. RETI's purpose was* to identify the transmission projects needed to accommodate anticipated renewable development in California. The RETI process garnered active participation by *diverse* stakeholders throughout the process. Phases 1 and 2 of the RETI project resulted in the identification and refinement of CREZs that hold the greatest potential for cost-effective and environmentally responsible renewable energy development.[2] The Project Study Area is in the Riverside East CREZ, *which was scored in the RETI Phase 2B report as the seventh best (for least environmental impact) out of the 32 CREZs evaluated.*

The U.S. Department of the Interior (DOI) BLM and the U.S. Department of Energy (DOE) have jointly prepared the "Draft Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States" (Solar PEIS). For the BLM, the PEIS is evaluating the agency's proposed actions to establish a new BLM Solar Energy Program applicable to utility-scale solar energy development on BLM-administered lands in six southwestern states (Arizona, California, Colorado, Nevada, New Mexico, and Utah). For DOE, the PEIS evaluated the agency's proposed action to develop new program guidance relevant to DOE-supported solar projects. The Project Study Area is also in a Draft PEIS-designated proposed Solar Energy Zone or SEZ (the Riverside East SEZ). The No Action Alternative would *result in reduced development within the Riverside East area.*

Alternative 5—No Issuance of a Right-of-Way Grant with Land Use Plan Amendment to Identify the Area as Unsuitable for Solar Development (No Project with Plan Amendment)

With this No *Project* Alternative, the Desert Sunlight Solar Project would not be approved (all components of the Project denied), no ROW grant would be issued to the Applicant, and the CDCA Plan would be amended to make the Project Study Area unavailable for large-scale solar energy development. This No *Project* Alternative has impacts similar to those described for the first No Action Alternative (described above). However, for this alternative, the CDCA Plan would be amended so that the Project locations would not be available for any future use for solar energy development. Additionally, this No Action Alternative would cause land identified as a CREZ and a Solar Energy Study Area to be unavailable for solar energy production.

As a result of this No Action Alternative, the Project locations would be available for other types of uses allowable on BLM land. This may include mining, recreation, utilities, and other energy development allowed on lands classified as Multiple Use Class M (Moderate Use), which constitutes most of the Project locations, and lower-intensity uses in the areas designated as Multiple Use Class L (Limited Use).

Alternative 6—No Issuance of a Right-of-Way Grant with Land Use Plan Amendment to Identify the Area as Suitable for Solar Development (No Project with Plan Amendment)

Under this No Project Alternative, the Desert Sunlight Solar Project is not approved (all components of the Project denied), and no ROW grant is issued to the Applicant, but the CDCA Plan is amended to make the Project Study Area available for large-scale solar energy development. In this case, the impacts described for the No Action Alternative would initially be similar to those for this No *Project* Alternative. However, because the CDCA Plan would be amended to allow for

[2] Renewable Energy Transmission Initiative Phase 2B Draft Report, April, 2010, p. 1-1.

solar energy development at this site, *a similar solar project could be proposed on the project site.* Project impacts associated with such a future project would *be analyzed at the time a project is proposed through submission of a ROW grant.*

2.2.5 Identification of the BLM's Preferred Alternative

The BLM's preferred alternative is the Proposed Action without modification.

2.2.6 Identification of the CPUC Environmentally Superior Alternative

CEQA Guidelines Section (§)15126.6 requires an Environmental Impact Report (EIR) to consider a range of reasonable alternatives to the proposed project, or to the location of the project, that would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. The Red Bluff Substation alternatives evaluated in Chapter 4 of this EIS were compared because this EIS may be used by the CPUC in lieu of an EIR in determining whether to issue a permit for the Red Bluff Substation. In addition, because CEQA §15378(a) requires the lead agency to consider the whole of an action, not simply its constituent parts, when determining whether it will have a significant environmental effect (*Citizens Assoc. For Sensible Development of Bishop Area v. County of Inyo* (1985) 172 Cal.App.3d 151), the effects of the Gen-Tie route alternatives were compared with the Solar Farm site alternatives. The details of this comparison are provided in Appendix C. In addition, the discussion in Appendix C identifies the environmentally superior action alternative and compares it with the CEQA No Project Alternative (No Action Alternative, identified as Alternative 4), as required by CEQA §15126.6(e)(1).

Based on the comparisons provided in Appendix C, the CPUC believes the environmentally superior action alternative under CEQA is a combination of Substation A with Access Road 2, Gen-Tie GT-A-2, and either Solar Farm Layout B or C. As previously described in this chapter, three full action alternatives (representing three of seven possible combinations of all Solar Farm site, Gen-Tie, and Substation alternatives) were considered in full detail in the EIS.

The remaining four combinations of project components were not identified or compared by environmental discipline in Chapter 4. However, the other four combinations are technically feasible. As described in Appendix C, none of the three combinations of alternatives defined in the Project Description (Alternatives 1 through 3) is considered the environmentally superior action alternative. In addition, the No Project Alternative is not found to be superior, as described in Section C.2.7.

2.2.7 Comparison of Alternatives

Table 2.2-14 provides a comparison summary of the expected permanent footprint for each of the three action alternatives. A summary of impacts and mitigations for each alternative is provided in the Executive Summary.

Table 2.2-14
Comparison Summary of Permanent Ground Disturbance for Action Alternatives 1, 2, and 3 (Acres)

Project Component/Element	Alternative 1: Proposed Action	Alternative 2: Alternate Action	Alternative 3: Reduced Solar Farm Footprint Alternative
Project Power Output	550 MW	550 MW	314 MW
Solar Farm Layout B (1)	*3,912*	*3,912*	-
Solar Farm Layout C (1)	-	-	3,045
Gen-Tie Line A-1 (2a)	*92*	-	-
Gen-Tie Line A-2 (2b)	-	-	*86*
Gen-Tie Line B-2 (2c)	-	*68*	-
Red Bluff Substation A	*76*	-	76
Red Bluff Substation-related features	-	-	-
- Drainage/Sideslopes	*14*	-	*14*
- Access Road (3a)	*31*	-	*31*
- Material Yard*/Staging Area*	*9*		*9*
- Transmission System (4)	*33*	-	*33*
- Distribution System (5)	8	-	8
- Telecom Site (6)	<1	-	<1
Red Bluff Substation B	-	*76*	-
Red Bluff Substation-related features	-	-	-
- Drainage/Sideslopes	-	*20*	-
- Access Road (3b)	-	*1*	-
- Material Yard*/Staging Area*		*10*	
- Transmission System (4)	-	*22*	-
- Distribution System (5)	-	*<1*	-
- Telecom Site (6)	-	<1	-
TOTAL ACREAGE	***4,176***	***4,110***	***3,303***

Notes: (1) Includes area for all Solar Farm-related facilities

(2a) Permanent disturbance *of 92 acres occurs within the ROW corridor totaling 256 acres (*12.1 miles *long* by 160 *feet* wide with additional fan-shaped areas at corners *for stringing).*

(2b) Permanent disturbance *of 68 acres occurs within a corridor totaling 203 acres (*10 miles *long* by 160 feet wide plus additional fan-shaped areas at corners *for stringing).*

(2c) Permanent disturbance *of 86 acres occurs within a corridor totaling 226 acres* (10.5 miles *long* by 160 *feet* wide plus additional fan-shaped areas at corners *for stringing*).

(3a) Assume 24,000-foot by 30-foot-wide road from Kaiser Road for Alternative 1 and 24,000 by 30-foot wide road from Chuckwalla Valley Road/Corn Springs Road for Alternative 2; although acreage amount allows for additional disturbance for adequate engineering and unknown site constraints

(3b) Assume 2,000-foot by 18-foot road from Eagle Mountain Road

(4) Includes transmission system associated with connecting Red Bluff Substation to Gen-Tie Line and DPV1

(5) Distribution system for Substation power and light, including new access road

(6) New Desert Center Communications Site

2.3 PROJECT CONSTRUCTION

The construction of the Project would begin once all applicable approvals and permits have been obtained. Project construction is expected to take approximately 26 months. Appendix B provides a construction schedule showing sequencing and overlapping of tasks. The Red Bluff Substation would be constructed on a schedule that allows interconnection and partial energization of the Solar Farm before Project construction is complete.

Separate construction crews are expected to build the Solar Farm, the Gen-Tie Line, the On-Site Substation, and the Red Bluff Substation (and associated facilities). Sunlight-managed construction crews would be responsible for completing the Solar Farm and Gen-Tie Line. Construction of the Solar Farm and Gen-Tie Line is discussed in Section 2.3.1. SCE-managed construction crews would be responsible for the Red Bluff Substation and associated elements and the interconnection from the Gen-Tie Line to the Red Bluff Substation. Construction of the Red Bluff Substation is discussed in Section 2.3.2.

2.3.1 Construction Plan for Solar Farm and Gen-Tie Line

Construction Workforce

The majority of the Project construction workforce would be employed to construct the Solar Farm. The Solar Farm construction workforce is expected to average approximately 350 to 400 craft workers over the 26-month Solar Farm construction period, with a peak on-site craft workforce of approximately 500 craft workers during Months 5 through 16 of the construction period. In addition to craft workers, an average of 40 management and non-craft employees are expected on site. This equates to an average of 390 to 440 and a peak of 540 total on-site workers for the Solar Farm construction.

The workforce for the Gen-Tie Line is expected to average 25 employees over the 20-month Gen-Tie construction period, with a peak of approximately 60 employees (during Months 6 to 8), including both craft and non-craft workers. The workforce for the On-site Substation is expected to average 10 people, with a peak of 30 employees (during Months 6 to 7).

Including the crews for all the separate tasks, excluding construction of the Red Bluff Substation (see Section 2.3.2), the total Project workforce is expected to peak at around 630 employees. The peak would likely occur during Months 6 to 8 of the 26-month construction period. The construction workforce would be recruited from within Riverside County and elsewhere in the surrounding region as much as practicable.

Typical construction work schedules are expected to be 8 hours per day Monday through Friday. Typically, the work day would consist of one shift beginning at 7:00 AM and ending at 3:30 PM. The work schedule may be modified throughout the year to account for changing weather conditions (e.g., starting the work day earlier in summer months to avoid work during the hottest part of the day for health and safety reasons).

Construction Workforce Vehicles

Project construction workforce traffic would involve construction worker commuting vehicles and miscellaneous trips by Project staff. Peak vehicular traffic volumes on the roads leading to the Solar Farm site would coincide with the peak of construction employment. Peak traffic volumes during construction of the Solar Farm site and Gen-Tie Line are provided below. The Applicant intends to use shuttle buses to transport construction workers to the site.

At the peak of construction (Months 6 to 8), it is assumed that 25 three-axle shuttle buses carrying 20 people or less each will be used and that approximately 50 to 60 employees would continue to drive personal vehicles. In total, 85 commute vehicles are expected to make one trip per day to and from the Solar Farm site for the workforce constructing the Solar Farm site, including the On-site Substation.

At the peak of Gen-Tie Line construction (Months 6 to 8), it is assumed that 40 workers from the Gen-Tie Line workforce continue to take personal vehicles and one shuttle bus with a capacity of 20 people is used; 41 commute vehicles are expected to travel to the Gen-Tie construction area each day.

Shuttle assembly areas are likely to be located in regional population centers, such as Blythe and in the Palm Springs area, at existing parking areas with sufficient parking for the number of workers expected to be taking the shuttle. Approximately 3 acres of construction parking would also be provided at the Solar Farm site.

Construction Equipment and Vehicles

Most construction equipment and vehicles would be brought to the Solar Farm site at the beginning of the construction process during construction mobilization and would remain on site throughout the duration of the construction activities for which they were needed. Generally, the equipment and vehicles would not be driven on public roads while in use for the Project. In addition to construction worker commuting vehicles, as discussed above, construction traffic would include periodic truck deliveries of materials and supplies, recyclables, trash and other truck shipments.

Solar Farm

Truck access to the site would be from I-10 and then north on Kaiser Road to the site access gate. Approximately 14,000 to 15,000 truck deliveries are expected over the 26-month Solar Farm construction period.

Table 2.3-1 provides a breakdown of material deliveries expected during construction of the Solar Farm. Construction truck deliveries and shipments would typically avoid the peak traffic hours in the morning and afternoon, so it is unlikely that Project deliveries would represent a substantial increase in traffic volumes during the morning and evening peak commuting hours. Material would typically be delivered starting two weeks before the start of the associated task with the exception of electrical gear (PCSs, PVCs, etc.), which would be drop-shipped just before installation.

Table 2.3-2 lists the type and maximum number of construction/equipment vehicles expected to be in use on the Solar Farm site, broken down by the various phases of the Solar Farm construction period.

Table 2.3-1
Material Deliveries during Construction – Solar Farm

Delivered Material	Approx. # of Truck Deliveries	Direction of Origin	Truck Type	# of axles	# per day (avg.)	Construction Phase
First Solar Modules	~6000	10W	40-ft. container trailer hitch	5	16	System Installation (Modules)
Hardware and Superstructure	2430	10E	48-53 ft. Flatbed	5	<1	System Installation (Tilt Brackets, Tables, Wire Harnesses, Combiner Boxes)
Steel Posts	1,315	10E	48-ft. Flatbed	5	4	Post Installation
Electrical Equipment (PVCS)	456	10E	48-ft. Flatbed	5	<1	System Installation (PVCS, PCS Shelters and Transformers)
Cable	172	10E	53-ft. Flatbed	5	<1	Underground work (AC/DC/Fiber trenching)
PCS Vaults and Transformer Pads	29	10E	Lowboy	5	<1	Underground work (PCS Vaults and Transformer Pads)
Construction Office Buildings	40	10W	53-ft. Flatbed	5	<1	Set-up Office & Site Services
Fencing	13	10W	53-ft. Flatbed	5	<1	Fencing
Gravel	3,500	10E/W	Dump Truck	3	10	Site Preparation, Grading, Final Soil Stabilization
Concrete	800	10E/W	10 yard Mixer	3	3	System Installation (except tilt brackets and tables), Fencing
Cardboard (off-haul)		10E/W	40 yard roll-off on flatbed	3	2	System Installation (Modules)
Equipment Deliveries	70	10E/W	48-53 ft. Flatbed	5	<1	All

Note: For each delivery, the first delivery would come 2 weeks before the corresponding construction phase and continue throughout that construction phase until the phase is complete.

Table 2.3-2
Construction Equipment & Vehicles – Solar Farm

Construction Phase	Equipment	# of pieces	Duration of Use (Hours/Day)	Purpose
Site Preparation, Initial Access Roads, and Grading	8,000-Gallon Water Truck	5	8-10	Dust Control / Compaction
	Motor Graders	5	8	Excavation
	Tractor with Disc Harrow	*2*	*8*	*Smoothing*
	25-Cubic Yard Paddle Scrapers	2	8	Excavation
	631 Scrapers	12	8	Excavation
	10-Ton Rollers	4	6	Dust Control / Compaction
	D9 Dozers	1	8	Excavation
Set up Office & Site Services	35-kW Generator	2-12	24	Power
	ATV	15	4	Transportation
Survey	ATV	6	4	Survey
	Pickup Trucks	3	4	Management Transportation

Table 2.3-2 (continued)
Construction Equipment & Vehicles – Solar Farm

Construction Phase	Equipment	# of pieces	Duration of Use (Hours/Day)	Purpose
Fencing	Skid Steer/Auger	5	8	Material Staging
	10-Yard Concrete Mixer Truck	1	2	Foundation Pours
	Pickup Trucks	4	8	Management Transportation
Post Installation	Pile Driver	10	8	Post Installation
	4-Ton Forklifts	6	8	Material Transportation
	4,000-Gallon Water truck	3	8	Dust mitigation
	Spray Truck	2	6	Dust Palliative Application
Underground work (AC/DC/Fiber trenching)	Trencher	2	8	Excavation
	3-4-Cubic Yard Front End Loader	5	8	Excavation/Processing
	Small Sheepsfoot Roller	4	6	Compaction
	Power Screener	3	6	Soil Processing
	Cable Plow	1	8	U/G Cable Installation
Underground work (PCS Vaults and Transformer Pads)	Back-hoe	1	8	Excavation
	100-Ton crane	1	4	Drop Shipping Vaults and Pads
	Small Sheepsfoot Roller	1	4	Compaction
System Installation (Tilt Brackets, Tables, Wire Harnesses, Combiner Boxes)	4-Ton 4x4 Forklift	6	8	Material Staging
	ATV	40	4	Transportation
	Pickup Trucks	15	4	Management Transportation
System Installation (Modules)	4-Ton 4x4 Forklift	4	8	Material Staging
	ATV	10	4	Transportation
	Pickup Trucks	5	4	Management Transportation
System Installation (PVCS, PCS Shelters and Transformer Pads)	Back-hoe	1	4	Excavation
	100-Ton Crane	1	4	Drop Shipping and Pads
	Small Sheepsfoot Roller	1	4	Compaction
Commissioning/pre-functional and functional testing	Pickup Trucks	10	7	Transportation
	5-kW Generator	30	7	Testing
Soil Stabilization	Spray Truck/Trailer/De-compactor	2	8	Dust Palliative/Hydroseed
	Motor Grader	2	6	Final Cleanup

Note: Two 35-kW generators would be used for the main construction site offices; up to 10 additional generators could be used for temporary construction trailers.

A total of approximately 240 material deliveries are expected during the construction period for the On-Site Substation. Material deliveries expected during construction are detailed in Table 2.3-3. All material deliveries are expected to arrive via I-10 from the west.

Table 2.3-4 provides details on the equipment to be used for construction of the On-site Substation.

Table 2.3-3
Material Deliveries during Construction – On-Site Substation

Material Delivered	Approximate # of Truck Deliveries	Truck Type
Substation Structures	14	Semi-Truck w/ Flatbed
Transformers	6	Semi-Truck w/ Flatbed
Control House	5	Semi-Truck w/ Flatbed
Major Equipment	11	Semi-Truck w/ Flatbed
Concrete	140	Concrete Truck
Grading Materials	50	Concrete Truck
Miscellaneous Materials	15	Semi-Truck w/ Flatbed

Table 2.3-4
Construction Equipment & Vehicles – On-Site Substation

Construction Phase	Equipment and Quantity	# of pieces	Duration of Use (Hours/Day)	Purpose
Site Preparation and Grading	Survey Trucks (Gasoline)	1	6	Survey
	Dozer (Diesel)	1	4	Grading
	Loader (Diesel)	2	4	
	Scraper (Diesel)	1	3	
	Grader (Diesel)	1	4	
	Water Truck (Diesel)	2	3	
	4x4 Backhoe (Diesel)	2	2	
	Tool Truck (Gasoline)	1	2	
	4x4 Pickup (Gasoline)	1	2	
	Bobcat (Diesel)	1	8	Fencing
	Flatbed Truck (Gasoline)	1	2	
	Crewcab Truck (Gasoline)	1	4	
Below-Grade Construction	Excavator (Diesel)	1	4	Civil
	Foundation Auger (Diesel)	1	5	
	Backhoes (Diesel)	2	3	
	Dump Truck (Diesel)	2	2	
	Skip Loader (Diesel)	1	3	
	Water Truck (Diesel)	1	3	
	Bobcat Skid Steer (Diesel)	2	3	
	Lull-Forklift (Diesel)	1	4	
	17-Ton Crane (Diesel)	1	3	
	Whacker (Gasoline)	1	3	
	Tool Truck (Gasoline)	1		
Above-Grade Construction	Scissor Lifts (Propane)	2	3	Electrical
	Manlifts (Propane)	4	3	
	Reach Manlift (Propane)	4	3	
	15-Ton Crane (Diesel)	1	3	
	Tool Trailer	1	3	
	Crew Trucks (Gasoline)	3	2	

Table 2.3-4 (continued)
Construction Equipment & Vehicles – On-Site Substation

Construction Phase	Equipment and Quantity	# of pieces	Duration of Use (Hours/Day)	Purpose
Control/Power Cables & Terminators	Manlift (Propane)	1		Wiring
	Tool Trailer	1	4	
	Pickups (Gasoline)	2	3	
Clean Up & Punch List	Maintenance Trucks (Gasoline)	2	4	Maintenance Crew Equipment Check
Testing & Commissioning	Crew Truck (Gasoline)	2	4	Testing

Gen-Tie Line

A total of approximately 240 material deliveries are expected during the construction period for the Gen-Tie Line. Material deliveries expected during Gen-Tie Line construction are detailed in Table 2.3-5. All material deliveries are expected to arrive via I-10 from the west. The equipment expected to be used on-site during Gen-Tie Line construction is detailed in Table 2.3-6.

Table 2.3-5
Material Deliveries during Construction – Gen-Tie Line

Material Delivered	# of Truck Deliveries	Truck Type	Duration	Construction Phase
Transmission Structures	54	Semi-Truck w/ Flatbed	1.5 months	Beginning at mobilization through Foundation Installation
Conductor, Groundwire, Optical Groundwire	27	Semi-Truck w/ Flatbed	1 month	Beginning at mobilization through Foundation Installation
Concrete	147	Concrete Truck	2 months	Foundation Installation
Miscellaneous Materials	10	Semi-Truck w/ Flatbed	1 month	Beginning at mobilization through Foundation Installation

Table 2.3-6
Construction Equipment & Vehicles – Gen-Tie Line

Construction Phase(s)	Equipment	# of pieces	Average Hours Used per Day	Purpose
Start of Foundation Installation through Wire installation	5,000-Gallon Water Truck	1	8	General Servicing and Dust Mitigation
	Service Truck	1	8	
	Mechanic Truck	2	8	
Stake Structures, and Foundation Installation	Enclosed Material Trailers	4	Parked	Material Handling and Material Yard/ Hauling Equipment
	40-Ton Crane	1	4	
	4x4 Forklifts	2	4	
Stake Structures, Foundation Installation, ROW Restoration & Cleanup	1-Ton Crew Cab	1	8	Access Road/ Clearing Crew/ ROW Restoration
	¾-Ton Pickup	2	8	
	Bulldozers	2	8	
	Backhoes	1	4	

Table 2.3-6 (continued)
Construction Equipment & Vehicles – Gen-Tie Line

Construction Phase(s)	Equipment	# of pieces	Average Hours Used per Day	Purpose
	Dump Truck	1	4	
	Steel Wheel/ Smooth Drum Roller	1	6	
	Road Grader	1	2	
	10,000-Gallon Water Truck	1	4	
Foundation Installation	1-Ton Crew Cab	4	8	Foundation Crews (2)
	¾-Ton Pickup	3	8	
	Drilling Rig	2	8	
	40-Ton Crane	2	4	
	Forklifts	2	4	
	Towed Trailers	2	Parked	
	Water Pump	2	1	
	Bulldozers	2	2	
	Front-End Wheel Loaders	2	6	
	Road Tractor w/ Lowboy Trailer	2	2	
	Air Compressors	2	2	
	Rock Hammer	1	As Required	
	Mobile Mixer	1	As Required	
	Water Truck or Transportable Holding Tank with sufficient capacity to retrieve polymer slurry	1	As Required	
	1-Ton Crew Cab	2	8	Setting Crew
	¾-Ton Pickup	1	8	
	100-Ton Crane	1	8	
	Forklift	1	6	
	Air Compressor	1	5	
	Boom Truck	1	6	
Frame Structures and Erect Structures	1-Ton Crew Cab	1	8	Framing Crew
	¾-Ton Pickup	1	8	
	Semi-Truck w/ Flatbed Trailer	2	8	
	40-Ton Crane	1	8	
	Forklift	1	5	
	Air Compressor	1	4	
	Set of Hydraulic Jacks	1	4	
Wire Installation	1-Ton Crew Cab	1	8	Grounding Crew
	¾-Ton Pickup	1	8	
	Backhoe	1	6	
	Air Compressor	1	3	
	1-Ton Crew Cab	6	8	Stringing Crew – Stringing, Splicing, Sagging, Clipping, and Dead-ending
	¾-Ton Pickup	4	8	
	Boom Trucks	4	5	

Table 2.3-6 (continued)
Construction Equipment & Vehicles – Gen-Tie Line

Construction Phase(s)	Equipment	# of pieces	Average Hours Used per Day	Purpose
	Bullwheel Tensioner	1	6	
	4-Drum Rope Machine	2	2	
	5-Drum Lead Line Machine	1	2	
	Bulldozers	2	1	
	Sleeving Rig	1	2	
	6x6 Road Trucks w/ Wire Trailers	4	4	
	5-Ton Static Reel Truck	1	2	
	Static Tensioner	1	2	
	60-ft Bucket Truck	2	5	
	105-ft. Elevator Bucket Truck	2	5	
	H/L Puller (Bundled Pulling Capacity)	1	4	
	3-Drum H/L Puller	1	4	
Erect Structures and Wire Installation	1-Ton Crew Cab	1	8	Guard Pole Crew
	¾-Ton Pickup	1	8	
	Derrick Digger	1	8	
	Semi-Truck w/ Flatbed	1	4	

Construction Approach

The procedures and sequencing of construction activities for the Solar Farm site and Gen-Tie Line are described below.

Solar Farm Site

Construction of the Solar Farm site would be completed in four phases: 1) construction mobilization and site preparation, 2) construction and installation of Project components, 3) commissioning, and 4) final soil stabilization. Construction activities would be completed in overlapping phases. The discussions below of the various phases of construction apply to all three Solar Farm alternatives being considered, unless otherwise noted.

Phase 1: Construction Mobilization and Site Preparation

Initial activities in the construction process would include installation of desert tortoise fencing and preconstruction biological resource surveys; installation of access roads and construction laydown and parking areas; and setting up offices and site services.

Desert Tortoise Exclusion Fencing and Preconstruction Surveys

Prior to beginning preconstruction surveys, desert tortoise exclusion fencing would be constructed in specified areas. Preconstruction activities would include clearance surveys for desert tortoise and other sensitive species; relocation for desert tortoise; seasonal avoidance of nesting birds, including

short-eared and burrowing owls; passive relocation of burrowing owls, as necessary; and possible transplantation of sensitive plant species including foxtail cactus.

Preconstruction survey work would also consist of staking and flagging the following: 1) ROW and construction area boundaries, 2) construction laydown, parking, and work areas, 3) final grade, 4) access and roads, and 5) foundation structures for facilities. Staking and flagging would be maintained until completion of site preparation.

Access Roads and Construction Laydown and Parking Areas

The two main access roads to the Solar Farm site would be *20* feet wide and enter the site via the southwest corner of the Solar Farm. The access roads would be cleared, graded, covered with aggregate and compacted to 90 percent. These graded, graveled, all-weather roads would also be required in selected locations within the Solar Farm site during construction to bring equipment and materials from the staging areas to the construction work areas. These roads would be maintained for long-term Project operation and maintenance. The area of road disturbance is provided in the discussion of the project alternatives in Section 2.2.4.

Four temporary construction staging areas would be utilized in phases throughout the 26-month Project construction period (Figure 2-30). Each staging area would be approximately 8 acres, for a total of 32 acres. The staging areas within the Solar Farm site would include material laydown and storage areas and an equipment assembly area. The staging areas would be un-paved and un-graveled but would be treated with a BLM-approved dust palliative and water periodically to control dust. The staging areas within the Solar Farm site, except Staging Area #2, would be replaced with PV arrays once the areas are no longer needed for staging. Staging Area #2 would be decommissioned after use.

Construction materials in the laydown areas would be stored in uncovered rows grouped according to the type of material. Heavy equipment such as transformers, PVCSs, and PCSs would be drop shipped shortly before installation to the locations where they would be installed, rather than stored in the laydown areas. Aggregate would be delivered at a rate proportional to spreading for access roads, building foundations, and other equipment foundations.

Construction Offices and Site Services

Near Staging Area #1, the Applicant would construct the main construction site offices and services area. This area would be fenced with temporary construction fencing and would include temporary construction trailers, the safety office, the Applicant's field office, recycling areas, and employee and visitor parking (Figure 2-31). Additional temporary construction trailers may be utilized, which could potentially require generators for power. No more than 10 of these temporary construction trailers/generators would be used. Approximately 3 acres would be available for employee and visitor parking. Access to the construction area would be controlled by site security. A security booth would be located near the entrance to the site. Approximately 5 acres is needed temporarily during construction for the main construction site offices and services area.

N

0 1,500 3,000 Feet

LEGEND

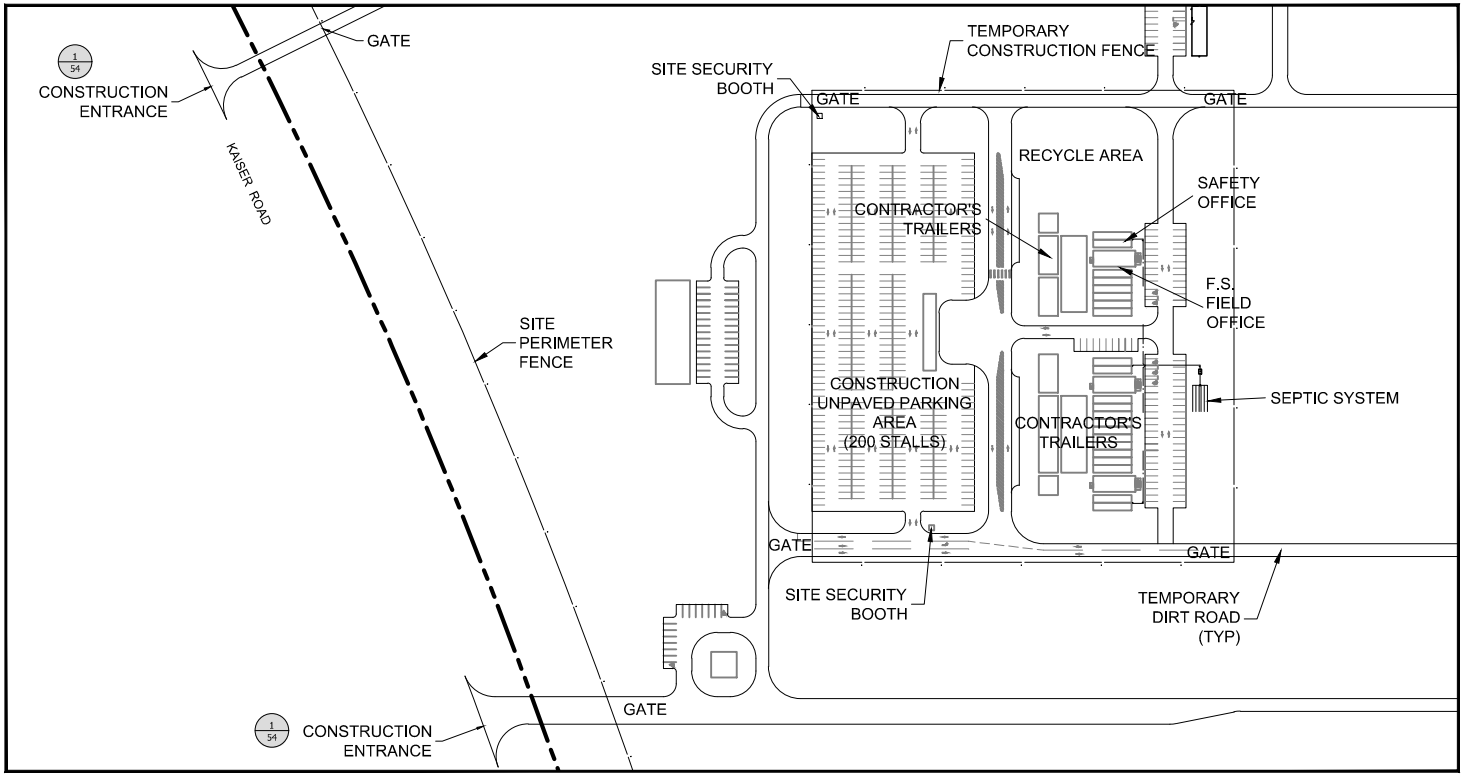
- SOLAR FARM SITE BOUNDARY
- EXISTING ROAD
- FENCE LINE
- GRAVEL ACCESS ROAD
- TRAFFIC FLOW
- STAGING AREA
- TEMPORARY WATER SUPPLY POND

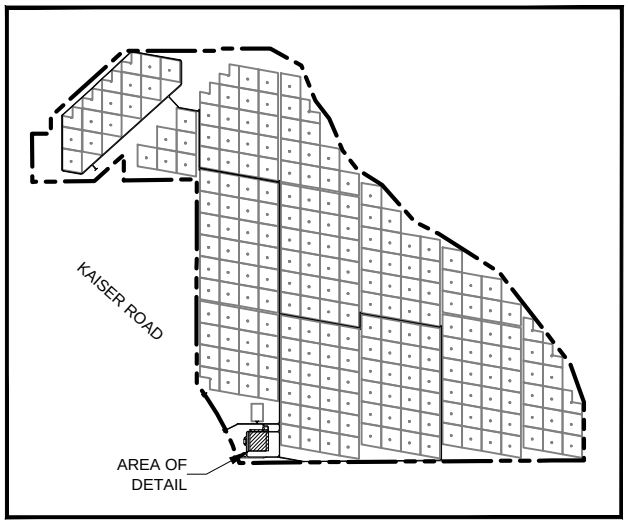
Source: First Solar, 2010.

DESERT SUNLIGHT SOLAR FARM

Figure 2-30

Preliminary Construction Staging Plan - Solar Farm Site





KEY MAP
NOT TO SCALE

0 150 300 Feet

Source: First Solar, 2010.

DESERT SUNLIGHT SOLAR FARM

Figure 2-31

Typical Construction Staging Area-Solar Farm Site

Phase 2: Construction and Installation of Solar Farm Components

After construction mobilization and site preparation, construction of the solar arrays would begin. Construction and installation activities would include surveying the array and component locations; clearing, grading, and compacting the array areas; trenching and installation of underground cables; post installation; and installation of the balance of the system. In general, the work tasks would follow in close sequence across the site, moving from south to north. The construction schedule provided as Appendix B provides detail relative to the sequencing of the overlapping tasks.

Construction Survey

Construction would include ongoing survey work similar to that described under Desert Tortoise Exclusion Fencing and Preconstruction Surveys above. This task would include survey for the locations of the fence, trenches, posts, access corridors, and electrical components such as transformers, PVCSs, and PCSs.

Clearing, Grading, and Compaction

The Applicant would utilize *site preparation* techniques that adequately prepare the site for safe and efficient installation and operation of PV arrays. The discussion below *describes the site preparation techniques currently expected to be employed at the Project site. These methods are meant to improve construction worker safety by creating a relatively level surface and eliminating trip hazards. The planned approach to Project site preparation, which involves the use of "disc and roll" and micrograding techniques, reflects the results of the Applicant's field testing of various site preparation techniques at an off-site location near the Project site, as well as their experience with construction projects in other desert locations in Southern California and Nevada. The Applicant has been using this experience to adjust and optimize its site preparation and construction methods.*

Clearing.

The Applicant prioritizes providing a safe working environment for construction personnel. In addition, construction vehicles would need to access the site for site preparation and array installation. For the reasons previously stated, the surface vegetation may need to be removed from the site. *Vegetation would not be removed until the onset of a given construction phase. Within the solar field, plant roadways, and areas around the operations and maintenance building, vegetation would be disced under, mulched or composted, and retained onsite to assist in erosion control and limit waste disposal. In some areas to be graded outside of the solar field, native vegetation may be harvested for replanting to augment soil stabilization.*

Vegetation would be cleared from roadways, access ways, and where concrete foundations are used for inverter equipment, substations, and the operations and maintenance building. Vegetation would be cleared for construction of the drainage controls. Organic matter would be mulched and redistributed within the construction area (except in trenches and under equipment foundations). Plant root systems would be left in place to provide soil stability except where grading and trenching are required for placement of solar module foundations, underground electric lines, inverter and transformer pads, road and access ways, and other facilities.

During the site clearing process, the site would also be cleared of refuse, as necessary. Materials would be recycled or disposed of.

Grading.

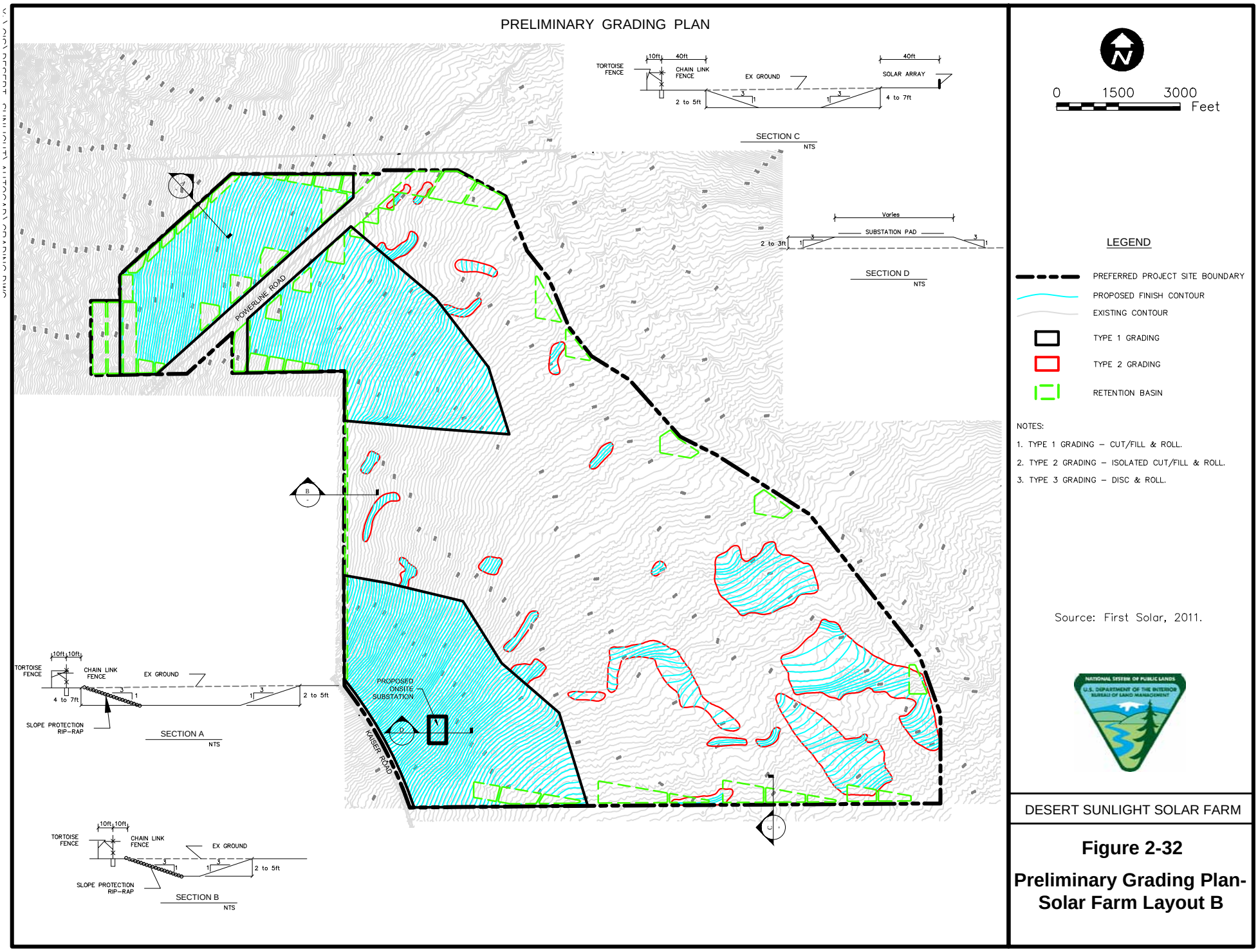
The Applicant plans to employ a low-impact design that allows water to sheet flow across the site with negligible impact on surface water flow upstream and downstream of the site. In addition, the site design must allow a smooth ground surface free of tripping hazards so workers can safely carry glass PV modules on-site. For both reasons, it is anticipated that *a combination of three site preparation techniques* would be performed across the full Solar Farm site *to prepare the site for safe and efficient installation and operation of PV arrays.*

As shown on Figure 2-32, areas that make up more than half of the solar field (approximately 2,249 acres) would be prepared using conventional farming equipment including tractors with discing equipment and vibratory rollers. This technique is referred to on Figure 2-32 as "disc and roll" or Type 3 grading. With this approach, rubber-tired farming tractors towing disc harrow equipment would disc the top 5 to 7 inches of soil. A water truck would follow closely alongside the tractor to moisten the soil to hold fugitive dust emissions to acceptable levels. The tractor may make several passes to fully disc the vegetation into the topsoil, preserving the underground root structure, topsoil nutrients and seed base; once the soil has been wetted on the first pass, additional water would not be needed for subsequent passes. A drum roller would then be used to flatten the surface and return the soil to a compaction level similar to the preconstruction stage. The intent of the roller would be to level the soil under the solar field area and even out the surface after the discing is complete.

In dispersed sections of the solar array field totaling approximately nine percent of the site (approximately 363 acres), there would be limited use of scrapers to perform micrograding. This technique is referred to on Figure 2-32 as "isolated cut/fill and roll" or Type 2 grading. In general, these portions of the site would be contour graded level; the macro-level topography and stormwater drainage would remain unchanged, but within each solar array, "high spots" would be graded and the soil cut from these limited areas used to fill "low spots" within the same array. Limited use of scrapers for micrograding would be employed only where needed to produce a more level surface than can be produced by the disc and roll technique.

Standard cut and fill techniques (shown as Type 1 grading on Figure 2-32) would be used in areas of the site where soil conditions do not lend themselves to discing. These techniques would be used over approximately 31 percent of the site (approximately 1,218 acres). The overall objective of the earth moving would be to produce a consistent grade in each solar field area. Standard cut and fill techniques would be utilized within specific arrays to limit slope to within 3.0 percent.

In total, some level of grading activities will be required on approximately 3,830 acres of the Solar Farm site (including roads). Approximately 755,000 cubic yards, or approximately 193 cubic yards per acre, would need to be cut and filled across the Solar Farm site for Solar Farm Layout B. This amount compares to an estimated 1.35 million cubic yards that would have to be cut and filled if conventional grading were used. Essentially, the Solar Farm site would be graded to a sufficiently level topography using the least practicable amount of conventional cut and fill grading. The grading plan would utilize hydrology analysis to identify and protect areas that are susceptible to scour from stormwater runoff, and otherwise manage stormwater runoff to maintain plant facilities and safety and to ensure that off-site drainage conditions upstream and downstream of the site are as close as practicable to preexisting conditions. Work over the *site preparation* period would be paced so that grading of an area takes place shortly before trenching and post installation are ready to begin. This would minimize the area of open, uncovered ground present at any one time during construction, and thereby minimize dust and erosion issues.



DESERT SUNLIGHT SOLAR FARM

Figure 2-32

Preliminary Grading Plan-Solar Farm Layout B

Compaction.

The Solar Farm construction process would require moving equipment across the site, including delivery trucks, pile driving equipment, and cranes. Soil would be compacted to a level that allows this equipment to move across the site. After grading and underground work, most areas would be compacted to approximately 85 percent. Dust palliative and water would also be applied to graded areas, as needed. Access roads would be treated with palliative and sprayed with water as needed during construction.

Trenching and Cable Installation.

After the array areas have been surveyed, cleared and graded, trenches would be dug for the underground AC and DC cabling. Trench locations and typical trench cross-sections are shown on Figure 2-3. Underground DC cables would connect rows of arrays with the PCS. Underground AC cables would connect the PCSs, transformers, and PVCSs. The total area to be disturbed for trenching would be approximately *30.6* acres for SF-B.

Post Installation.

After trenching is complete in a work area, construction crews would install vertical support posts for the module tables.

Balance of System (BOS) Installation.

After posts are installed, crews would begin to install the components comprising the BOS. PV modules and module framing assemblies would arrive at a construction staging area in containers on tractor trailers. The tractor trailers would utilize the gravel access roads to deliver the modules and the framing assemblies to the array areas. PV modules and the assemblies would be lifted from the tractor-trailers by forklifts and placed adjacent to the array locations.

Tilt brackets would be installed on the posts, and module framing assemblies would be connected to the brackets. PV modules would be installed onto the module framing assemblies and wired to the PCS.

Wiring harnesses would electrically connect several rows of modules to a combiner box. Combiner boxes would be wired via underground DC cables to the PCS enclosure. These wires then would be connected to the inverters, switchgear, and other electrical equipment inside each PCS enclosure. Each inverter would convert the DC power to three-phase AC power. Output voltage from the inverter would feed into a transformer to be stepped up for distribution.

PCS enclosures would be installed at locations within each array and then connected to incoming lines from the combiner boxes. After the arrays are installed and commissioned in a particular area, traffic is expected to be limited to infrequent low-impact traffic in the aisle ways between PV blocks for inspection, maintenance, and repair purposes.

Phase 3: Commissioning

During the final system validation and commissioning process, the DAS and monitoring systems would be brought online, the equipment tested, and operational readiness verified. Once commissioning is complete, the Project would be brought online and connected to the grid.

Phase 4: Final Soil Stabilization

In the Applicant's experience, soil in the array areas achieves stabilization after *project* installation because the PV glass acts as a windbreak, and little additional work is required in these areas. Any roads or open areas would be stabilized with palliative, as required.

Gen-Tie Line

The construction approach for the Gen-Tie Line is provided below. Construction of the Gen-Tie Line would cause both temporary and permanent disturbance within a construction corridor estimated at a width of 160 feet, plus additional fan-shaped areas at each turn in the Gen-Tie Line with radii of 450 feet needed for wire stringing. The permanent disturbance associated with the Gen-Tie Line would be limited to the foundations of the transmission structures, the footprint of the access road, and two 75-foot by 200-foot areas associated with each fan-shaped stringing area, as described previously.

Preconstruction Surveys

Preconstruction survey work would consist of preconstruction biological clearance surveys, staking structure locations, and flagging the ROW.

Construction Mobilization

Upon notice to proceed, the contractor and construction management would assemble their on-site management and construction staff at an office including phone, fax, and data lines, to be located in the Project area. The contractor and construction subcontractors would have separate field offices.

A laydown yard would be prepared for storage of materials. A material manager would inventory received material. Yard staff would load the transport trailers that will deliver the material to the field. Additional yards may be established to serve as material marshalling facilities, crew assembly locations, and equipment yards. *These yards would all be within the Project footprint and would not require any additional ground disturbance.*

Gen-Tie Access Road Clearing and Construction

Access roads would be developed to access the Gen-Tie Line facilities. This would include the permanent roads to the new transmission structure locations and temporary roads for construction. Larger temporary areas around the structures would be necessary during construction to accommodate pole assembly and erection. Clearing and grading would also be needed for wire setup sites. Puller and tensioner sites would require a large relatively level area to safely accommodate all the equipment required on a wire stringing operation. It is assumed that each location of a tensioner and conductor would occupy an area 100 feet in width by 450 feet in length. These sites may be constructed in conjunction with the access roads and would be determined once the wire pulls have been planned. A cleared area directly behind each outside angle of dead-end towers is required to maintain the 3:1 wire-stringing ratio. During the construction period, no disturbance beyond the clearing limits shall be permitted.

Preventative measures to minimize wind transport of soil would be implemented. Dust abatement would be accomplished through watering.

Foundation Installation

Three types of foundations may be used for construction of the Gen-Tie Line: drilled shaft anchor-bolted foundations, drilled shaft embedded foundations, and vibrated steel casings. The first two methods involve constructing the foundations on-site. The third method involves using pre-fabricated components for the foundation. One or more of these methods would be utilized for construction of the Gen-Tie Line.

Grounding

The grounding crew would follow behind the erection crew, installing the grounding. Grounding consists of connecting the electrically conductive elements of a transmission line to the earth. This is done in order to create a path of least resistance in case there is an electrical failure or lightning strike along the line. Typical grounding consists of installation of a ground rod and connecting the rod to the structure with a wire.

Framing Structures

Structures would be hauled, assembled and erected at the designated site in the conventional manner. Structures would be picked up from the material storage yard, hauled to various structure sites or marshalling yards and unloaded. Structures would be assembled in sections on cribbing that would provide for the proper alignment of the steel members. Steel sections would be laid out with hydraulic cranes. The pole base and top sections would be assembled at each structure site.

Setting Structure/Erection

A crane would be used for pole erection to set the pole base sections on the anchor bolts or into the drilled shaft hole, depending on the type of foundation. The crew would have an air compressor and air guns for tightening anchor bolt nuts while maintaining level and plumb.

Guard Structures

Wood pole guard structures would be erected at each road or utility line crossing or at other areas along the ROW where guard structure crossing structures are required. Guard poles would be required at all energized crossings and roads where there is a hazard to people and traffic. Guard pole structures are temporary and would be removed after the conductors have been dead-ended and clipped.

Wire Stringing

For this Project, conventional wire stringing has been assumed. Wire stringing includes all activities associated with the installation of conductors onto transmission structures and includes the installation of primary conductor, ground wire, and hardware assemblies. A standard wire stringing plan includes a sequenced program of events starting with determination of the length of wire pulls and wire pull equipment set-up positions. Wire pulling is one of the stringing activities and requires special equipment to pull the wire through wire sheaves and rollers temporarily installed on the transmission structures. Wire splicing is needed to splice together conductor wire (or ground wire) to form longer segments of conductor between pulling locations.

Final inspection and testing would need to be coordinated with functional checkout and commissioning of the Substation equipment at each end of the line.

The Gen-Tie Line ROW would be cleared of all construction materials and equipment before the Project is complete.

Aggregate and Concrete Needs

Aggregate would be used for a base for concrete pads and as road base. This is assumed for all Project alternatives. Aggregate may be processed on-site from native materials using the power screener or may be obtained from a local vendor or vendors.

Concrete would be used for foundations of Solar Farm structures, fence footings, and transmission structures, as detailed in previous sections of this document. Both pre-cast and poured-in-place concrete pads/foundations would be used. Concrete would likely be obtained from local sources, as practicable.

Table 2.3-7 provides details on the concrete and aggregate needs of the Project for Solar Farm Sites B and C, as well as for the Gen-Tie Line alternatives.

Table 2.3-7
Concrete and Aggregate Needs for Solar Farm Sites B and C and Gen-Tie Line Alternatives

Area/Purpose	Volume of Concrete (cubic yards)	Volume of Aggregate (cubic yards)
SF-B – Total	*6,687*	*22,353*
Base for Concrete Pads – SF-B	*N/A*	1,825
Road Base – SF-B	*N/A*	20,528
SF-C – Total	7,960	64,372
Base for Concrete Pads – SF-C	*N/A*	*3,285*
Road Base – SF-C	*N/A*	*61,087*
GT-A-1-Total	1,100	3,571
GT-A-2 – Total	985	3,000
GT-B-2 – Total	748.8	3,397
GT Laydown Yard – Staging Area #2	N/A	2,100

Construction Water Use and Storage

Solar Farm

Project water demand would be met by local groundwater from a new well or wells to be constructed on the Solar Farm site. Sunlight proposes to construct two wells, *one of which would continue to be used* for operation. Both wells would be available for use during construction to provide flexibility in the *water supply and in the* event of a well malfunction. *Current pumping of groundwater from the local groundwater basin has been estimated to be up to 10,000 acre-feet per year (AFY), as discussed in Sections 3.17 and 4.17 (Water Resources). Water use in the area peaked in 1986 at an estimated 21,000 AFY, primarily as the result of agricultural activities in the area.* The water usage during that period dwarfs the expected use by the DSSF, both during construction and operation. *As an alternative to new wells, Sunlight may explore using* nearby active wells that have a *reported individual (per well)* production capacity of between 800 and 2,200 AFY (First Solar 2009).

During the approximately 26-month construction period, an estimated total of between 900 and *1,300* acre-feet of water would be needed for such uses as soil compaction, dust control, and sanitary

needs for construction of the Solar Farm, depending on the configuration selected. The majority of the construction water use would occur during site grading operations. The daily water demand during construction of the Solar Farm is estimated to range from a low of 251,000 gallons per day (gpd) to a peak of approximately 1.3 million gpd. The Project's maximum well extraction rate over any 24-hour period is not expected to exceed 880 gallons per minute.

Temporary construction ponds would be used for water storage at various locations around the site. Use of temporary ponds rather than relying entirely on stand tanks and water trucks would reduce the amount of vehicle travel around the site by water trucks (and associated exhaust and dust), reduce the rate of groundwater extraction during construction, and also improve capability to respond quickly and effectively to mitigate fugitive dust emissions caused by unexpected high wind events.

A total of seven temporary water storage ponds are planned around the construction (Solar Farm) site. It is anticipated that each pond would occupy approximately one acre and would hold approximately 2 million gallons. The ponds would be connected to the supply wells and would involve 6-inch HDPE pipe runs along on-site access roads or the Solar Farm site perimeter from the wells to the ponds. No more than two or three ponds would be operating at any one time; one pond would be open for every roughly 400 acres that are actively undergoing site preparation activities at any one time. The temporary ponds would be approximately 6 to 8 feet deep and would be fenced and lined for safety. The temporary ponds would be covered with netting to deter ravens and would be designed, constructed, and operated to comply with all applicable regulatory requirements with respect to design, operation and maintenance, protection of migratory waterfowl, and raven management. To minimize earth work, most of the ponds would be co-located with planned retention basins that would be used during Project operation.

The ponds would be filled by pumps running 24 hours per day at up to 600 gallons per minute. A float valve in each pond would control overflow. Water would be pumped from the pond into large temporary storage tanks (stand tanks) using hurricane pumps. Water would be transferred directly to trucks from the stand tanks, as needed for dust control and compaction during construction.

The Applicant would perform the necessary studies and secure the necessary permissions to install the well(s). In addition, sampling and analysis in accordance with established protocols and with appropriate analytical test methods would be performed to assess water sufficiency and quality at each active well of appropriate capacity. An analysis of impacts of Project water consumption on water availability in the Chuckwalla Groundwater Basin is provided in Section 4.17 of this EIS.

Gen-Tie Line

The total amount of water needed for dust abatement and moisture conditioning of soils to facilitate overland travel during construction of the transmission line for the various alternatives is estimated to range from 1 million gallons for GT-B-1 to 2.64 million gallons for GT-A-2. The peak water use would be 40,000 gallons per day and would come during the foundation installation period (this period includes the time between mobilization and foundation installation). Water would also be used during the wire installation process, but at a lower level. Water would be collected from the Solar Farm site and transported to the work area. It is assumed there would be one 5,000-gallon water truck making four trips each working day and one 10,000-gallon water truck making two trips per day during peak use period.

Construction Waste and Hazardous Materials Handling

There would be limited hazardous materials stored or used on site. Appropriate spill containment and clean-up kits would be kept on site during construction and maintained during the operation of the DSSF. The primary chemicals/petroleum products expected to be present on the Project locations during construction are identified in Table 2.3-8.

Table 2.3-8
Chemicals/Petroleum Products at Project Locations during Construction

Product	Use
Diesel Fuel	Vehicles
Gasoline	Vehicles
Motor Oil	Vehicles
Hydraulic Fluids and Lube Oils	Vehicles and Equipment
Vegetable/Mineral Oil	Transformers
Dust Palliative	Fugitive Dust Mitigation

The DSSF would generate minimal wastes during operation. During construction of the Project, the only wastes produced would be typical construction wastes, such as wood, concrete, and miscellaneous packaging materials, in addition to broken or defective PV modules. Construction wastes would be disposed of in accordance with local, state, and federal regulations, while recycling would be used to the greatest reasonable extent. Broken or defective PV modules are not hazardous waste under federal regulations. Under California law, modules that were delivered to the Solar Farm site in a broken or defective condition or were damaged during installation would be considered retrograde materials and would be returned to First Solar's manufacturing facility for recycling within one year, in accordance with local, state, and federal regulations. Portable toilets would be used during construction. The waste from the toilets and would be regularly pumped out, hauled away, and disposed of by appropriately licensed organizations.

2.3.2 Construction Plan for Red Bluff Substation Project

This section describes the proposed construction features for the various Red Bluff Substation Project components:

- Red Bluff Substation, including an access road (two alternative access roads are being considered);
- Transmission system construction (including transmission line access road and related structures, such as modification of existing 220-kV structure, 500-kV loop-in, and Gen-Tie Line connection);
- Distribution line for Substation light and power; and
- Telecommunications facilities and access road.

For the entire Red Bluff Substation Project (the Substation itself and all related facilities), the estimated land disturbance summary is presented in Table 2.3-9. The numbers presented in this section are based on the most up-to-date information available. However, they are subject to change as the result of detailed engineering.

Table 2.3-9
Red Bluff Substation Project Estimated Land Disturbance Summary

Facility Component	Substation Site A (acres)	Substation Site B (acres)
Substation System (1)	*130*	*107.30*
Transmission System (2)	*32.83*	*22.33*
Distribution System (3)	*8.31*	*0.15*
Telecommunication System (4)	*0.25*	*0.25*
Total Disturbance	***171.39***	***130.03***

Notes: (1) Refer to Tables 2.3-11 and 2.3-12 for more detailed information
(2) Refer to Tables 2.3-14 and 2.3-15 for more detailed information
(3) Refer to Tables 2.3-19 and 2.3-21 for more detailed information
(4) Refer to Table 2.3-23 for more detailed information

Red Bluff Substation

Two potential Substation sites, Red Bluff Substation A and Red Bluff Substation B, are described in detail in Section 2.2.4 under Alternative 1 and Alternative 2, respectively. Construction of the Red Bluff Substation would be similar in scope for both alternative Substation locations. This is a general discussion of Substation construction with the differences between sites identified.

Grading and Drainage

For both Substation sites, the land would be prepared by clearing existing vegetation and installing a temporary chain-link fence to surround the construction site. The site would be graded in accordance with approved grading plans. The area to be enclosed by the proposed Substation perimeter wall would be graded to a slope that varies between one and two percent and compacted to 90 percent of the maximum dry density.

At both Substation sites, surface stormwater runoff would need to be redirected around the Substation. Drainage improvements would require 14 acres for Substation A and 20 acres for Substation B of permanent disturbance, depending on the alternative selected. This is described in more detail for each Substation in Section 2.2.4.

For both Substation sites, internal surface runoff would be directed toward *one or more* detention basins within the enclosed Substation. The basin or basins would measure approximately 120 feet by 200 feet occupying approximately one-half acre and would be enclosed by an 8-foot-high chain-link fence and one 20-foot-wide double drive gate.

If required, the final site drainage design would be subject to the conditions of the grading permit obtained from the County of Riverside.

SCE proposes to construct a new well adjacent to the perimeter fence around the Substation to be used for dust control during construction. It would be located on ground that is planned to be disturbed during grading. Water use for dust control during construction is estimated to be approximately 360 AF over the two-year construction period.

Table 2.3-10 provides the approximate volume and type of earth materials to be used or disposed of at both Substation locations (within the Substation wall and the required drainage structures outside/around the Substation).

Table 2.3-10
Substation and Access Road -
Ground Surface Improvement Materials and Estimated Volumes

Element	Material	Approximate Volume (yd3) Substation A	Approximate Volume (yd3) Substation B
Site Cut (1)	Soil	*800,000*	*800,000*
Site Fill (1)	Soil	*600,000*	*600,000*
Waste Removal (export)	Soil/Vegetation	23,000	23,000
Substation Equipment Foundations	Concrete	14,000	14,000
Equipment and cable trench excavations (2)	Soil	15,500	15,500
Cable Trenches (3)	Concrete	200	200
Internal Driveway	Asphalt concrete	3,200	3,200
	Class II aggregate base	4,800	4,800
External Driveway	Asphalt concrete	12,000	700
	Class II aggregate base	12,000	1,100
	Concrete for culverts	2,000	
Substation Rock Surfacing	Rock, nominal 1 to 1-1/2 inch per SCE Standard	33,000	33,000

Notes: (1) The design concept would be intended to balance the earthwork quantities, utilizing the site cut as site fill.
(2) Excavation "spoils" would be placed on site during the below-ground construction phase and used to the extent possible for the required on-site grading.
(3) Standard cable trench elements are factory fabricated, delivered to the site and installed by crane. Intersections are cast in place concrete.

Staging Areas

Land disturbance (up to approximately 10 acres) adjacent to the Red Bluff Substation property may be necessary for temporary equipment storage and material staging areas associated with transmission lines and related structures.

Geotechnical Studies

Prior to the start of construction, SCE would prepare a geotechnical study of the Red Bluff Substation site and the transmission line routes that would include an evaluation of the depth to the water table, evidence of faulting, liquefaction potential, physical properties of subsurface soils, soil restivity, slope stability, and the presence of hazardous materials.

Below Grade Construction

After the Red Bluff Substation site is graded, below grade facilities would be installed. Below grade facilities include a ground grid, underground conduit, trenches, and all required foundations.

Equipment Installation

Above grade installation of Substation facilities (i.e., buses, circuit breakers, steel structures, and the MEER) would commence after the below grade structures are in place.

Hazards and Hazardous Materials

Construction of the Red Bluff Substation and related elements would require the limited use of hazardous materials, such as fuels, lubricants, and cleaning solvents. All hazardous materials would be stored, handled and used in accordance with applicable regulations.

The Stormwater Pollution Prevention Plan (SWPPP) prepared for the Red Bluff Substation Project would provide the locations for storage of hazardous materials during construction, as well as protective measures, notifications, and cleanup requirements for any incidental spills or other potential releases of hazardous materials.

Waste Management

Construction of the Red Bluff Substation Project would result in the generation of various waste materials that can be recycled and salvaged. Waste items and materials would be collected by construction crews and separated into roll off boxes at the materials staging area. All waste materials that are not recycled would be categorized by SCE in order to assure appropriate final disposal. Non-hazardous waste would be transported to local authorized waste management facilities.

The Red Bluff Substation grading plan is designed to balance cut and fill quantities, so that soil excavated for the Red Bluff Substation would be used as fill on-site. In the unlikely event that there is excess soil from grading, it would be disposed of off-site at an approved licensed facility.

Post-Construction Cleanup

Any damage to existing roads as a result of construction would be repaired once construction is complete, in accordance with local agency requirements.

Following completion of construction activities, SCE would also restore all areas that were temporarily disturbed by construction of the Red Bluff Substation Project to as close to preconstruction conditions as possible, or, where applicable, to the conditions agreed upon between the landowner (or land manager) and SCE. In addition, all construction materials and debris would be removed from the area and recycled or properly disposed of off-site at local authorized waste management facilities. SCE would conduct a final inspection to ensure that cleanup activities were successfully completed.

Access and Land Disturbance

Table 2.3-11 and Table 2.3-12 provide an estimate of permanent land disturbance related to construction of the Substation *site* at both Substation A and B, respectively, including required drainage structures, access road, and a *material yard* (staging area) outside/around the Substation, based on the most current information available. *This does not include disturbance associated with the transmission and distribution system, and telecommunication site.*

Table 2.3-11
Substation Site A Construction – Estimated Land Disturbance

Construction Activity	Acres Permanently Disturbed
Substation grading	*76*
Drainage/side slopes	*14*
Preferred access road (1)	*31*
Material Yard/Staging Area	*9*
Total Acres Disturbed	***130***

Notes: (1) Both alternate access roads would require grading of an area at least *24,000* feet long by 30 feet wide. With additional grading possibly needed for an adequate road, it is assumed that approximately *31* acres of total disturbance would be required.

Table 2.3-12
Substation Site B Construction – Estimated Land Disturbance Summary

Construction Activity	Acres Permanently Disturbed
Substation Grading	*76*
Drainage/Side Slopes	*20*
Access Road	*1.3*
Material Yard/Staging Area	*10*
Total Acres Disturbed	*107.3*

Notes: (1) Based on road dimensions of about 2,000 feet long by 30 feet wide.

Some additional grading would be required at Substation A due to site topography and a longer access road. Two options are proposed for access to Substation A, both of which would be relatively flat and wide enough to accommodate the delivery of transformers to the site. Both would use portions of existing roadways but would require additional grading as follows: (1) for the western access, a new approximately *24,000*-foot-long access road would be constructed; or (2) for the eastern access road, approximately 24,000 feet of improvements would be made to an existing dirt pipeline patrol roadway. With additional grading potentially needed to develop an adequate road, it is assumed that both access road alternatives would require approximately *31* acres of total disturbance.

Substation B would require a new approximately 2,000-foot access road from Eagle Mountain Road.

New access roads*, as well as improved existing roads,* are anticipated to be 24 feet in width with 3-foot-wide shoulders on each side, for a total of 30 feet. Construction would include compaction of the sub-soil and the placing a 6-inch-thick layer of compacted aggregate road-base over the 24-foot-wide road. In order to accomplish the above road improvements, an average width of 30 feet has been assumed including allowances for side slopes and surface runoff control, resulting in a total land disturbance of approximately *31* acres for either access road to Substation A (Access Road 1) and *<1* acre for Substation B (refer to Table 2.3-11 and Table 2.3-12). *For improvements to existing roads, existing culverts would be improved as necessary. For new roads, culverts would be added as necessary.*

Access road gradients would be leveled so that any sustained grade does not exceed 12 percent. At the end of Project construction, the access roads would be left in a condition equal to or better than the condition that existed prior to the start of construction. Loose rock and slide material would be removed from existing roads and used to construct dikes, fill washouts, or flatten fill slopes. All washouts, ruts, and irregularities would be filled or obliterated.

Construction Equipment and Labor

The estimated elements, materials, number of personnel and equipment required for construction of the Substation at either location are summarized in Table 2.3-13. In addition, a temporary office trailer and equipment trailer may be placed within the proposed Substation construction area during the construction phase of the Project. The numbers presented in the table are based on the most up-to-date information available. However, they are subject to change as the result of additional detailed engineering.

Table 2.3-13
Substation (both Locations) Construction Equipment and Labor Estimates

Activity and number of Personnel	Number of Work Days	Equipment and Quantity	Duration of Use (Hours/Day)
Survey (2 people)	10	2-Survey Trucks.....(Gasoline)	8
Grading (8 people)	60	1-Dozer .....(Diesel)	4
		2-Loader .....(Diesel)	4
		1-Scraper.....(Diesel)	3
		1-Grader .....(Diesel)	3
		2-Water Truck .....(Diesel)	2
		2-4X4 Backhoe.....(Diesel)	2
		1-4X4 Tamper .....(Diesel)	2
		1-Tool Truck.....(Gasoline)	2
		1-Pickup 4X4.....(Gasoline)	2
Fencing (4 people)	25	1-Bobcat .....(Diesel)	8
		1-Flatbed Truck.....(Gasoline)	2
		1-Crewcab Truck.....(Gasoline)	4
Civil (8 people)	90	1-Excavator.....(Diesel)	4
		1-Foundationauger.....(Diesel)	5
		2-Backhoes.....(Diesel)	3
		1-Dump truck.....(Diesel)	2
		1-Skip Loader .....(Diesel)	3
		1-Water Truck .....(Diesel)	3
		2-Bobcat Skid Steer.....(Diesel)	3
		1-Forklift ..... (Propane)	4
		1-17TonCrane.....(Diesel)	2 hours/day for 45 days
		1-Tool Truck.....(Gasoline)	3
MEER (6 people)	60	1-Carry-all Truck .....(Gasoline)	3
		1-tool truck .....(Gasoline)	2
		1-Stake Truck.....(Gasoline)	2
Electrical (10) people)	120	2-Scissor Lifts ..... (Propane)	3
		2-Manlifts ..... (Propane)	3
		1-Reach Manlift ..... (Propane)	4
		1-15 ton Crane..... (Diesel)	3
		1-Tool Trailer	3
		3-Crew Trucks.....(Gasoline)	2
Wiring (Substation A = 6 people) (Substation B = 2 people)	90	1-Manlift..... (Propane)	4
		1-Tool Trailer	3
Maintenance Crew Equipment Check (2 people)	30	2-MaintenanceTrucks .....(Gasoline)	4
Testing (2 people)	90	1-Crew Truck..... (Gasoline)	3
Asphalting (6 people)	40	2-Paving Roller .....(Diesel)	4
		1-Asphalt Paver ..... (Diesel)	4
		1-Stake Truck..... (Gasoline)	4
		1-Tractor ..... (Diesel)	3
		1-Dump Truck..... (Diesel)	3
		2-Crew Trucks.....(Gasoline)	2
		1-Asphalt Curb Machine.....(Diesel)	3

SCE anticipates a total of approximately 25 construction personnel working on any given day. SCE anticipates that crews would work concurrently whenever possible; however, the estimated deployment and number of crew members would be dependent upon governing agency permitting requirements, material availability, and construction scheduling. For example, electrical equipment (such as Substation MEER, wiring, and circuit breaker) installation may occur while transmission line construction proceeds.

Construction activities would generally be scheduled during daylight hours in accordance with applicable noise abatement ordinances. In the event construction activities needed to occur on different days or hours, SCE would obtain variances as necessary from appropriate jurisdiction where the work would take place.

Transmission System Construction (including Transmission Line and Related Structures, such as Modification of Existing 220-kV Structure, 500-kV Loop-in, and Gen-Tie Line Connection)

Staging Areas

For the transmission line and related structures, a temporary equipment and material staging area would be established for short-term utilization within the Red Bluff Substation property.

Equipment and materials to be stored at the temporary equipment and material staging area may include:

- Construction trailer;
- Construction equipment;
- Conductor/wire reels;
- Transmission structure components;
- Overhead ground wire/Optical ground wire cable;
- Hardware;
- Insulators;
- Consumables, such as fuel and joint compound;
- Portable sanitation facilities;
- Waste materials for salvaging, recycling, and/or disposal; and
- Commonly used Best Management Practices materials such as straw wattles, gravel, sandbags, and silt.

The size of the temporary equipment and material staging area would be dependent upon a detailed site inspection. An area of approximately 0.5 to 1.5 acres may be required. Additional temporary areas may be required for crew assembly yards and would be used for temporary parking. Following completion of construction, land disturbed at the temporary equipment and material staging area would be restored to as close to preconstruction conditions as possible *or, where* applicable, to the conditions agreed upon by the BLM and SCE following the completion of construction.

Access and Spur Roads

This Substation portion of the Project involves construction within existing and new ROWs. It is assumed that existing public roads as well as existing transmission line roads would be used as much as possible during construction of this Project. Construction of the Substation may also require new transmission line roads to access the new transmission line segments and structure locations. Transmission line roads are classified into two groups: access roads and spur roads. Access roads are through roads that run between tower sites along a ROW and serve as the main transportation route along line ROWs; spur roads are roads that lead from access roads and terminate at one or more structure sites. *Access or spur roads will be identified in the Plan of Development prior to an issuance of a Notice to Proceed for this portion of the Project.*

Rehabilitation work may be necessary in some locations along the existing transmission line roads to accommodate construction activities. This work *would* include the re-grading and repair of existing access roads, spur roads and associated drainage hardware. The graded road would have a minimum drivable width of 14 feet, with 2 feet of shoulder on each side (depending upon field conditions) for a total road width of 18 feet.

Similar to rehabilitation of existing roads, all new road alignments would first be cleared and grubbed of vegetation. Roads would be blade-graded to remove potholes, ruts, and other surface irregularities, soil would be re-deposited where necessary, and roads would be recompacted to provide a smooth and dense riding surface capable of supporting construction equipment. The graded road would have a minimum drivable width of 14 feet, with 2 feet of shoulder on each side but may be wider depending on final engineering requirements and field conditions. New road gradients would be *constructed* so that any sustained grade does not exceed 12 percent. All curves would have a radius of curvature of not less than 50 feet, measured at the center line of the usable road surface. The new roads would typically have turnaround areas near the structure locations.

Modifications of Existing Transmission Structures

Any LST or TSP modifications would begin with hauling and stacking bundles of steel at tower locations per engineering drawing requirements. This activity requires use of several tractors with 40-foot trailers and a rough terrain forklift. After steel is delivered and stacked, crews would proceed with the structure modifications, as necessary. Grading may be necessary to establish a temporary laydown area approximately 150 feet by 150 feet (0.52 acre) adjacent to the existing structure for equipment and material staging during the structure modification process.

Removal and Replacement of Existing 500-kV Transmission Structures

Transmission line facilities to be removed include existing 500-kV transmission structures and associated hardware. The existing access routes would be used to reach structure sites, but some rehabilitation work on these roads may be necessary before removal activities begin. In addition, grading may be necessary to establish a temporary laydown area approximately 150 feet by 150 feet (0.52 acre) adjacent to the existing structure for equipment and material staging during the structure removal. For each structure, a crane truck or rough terrain crane would be used to support structure during dismantle and removal. A crane pad would be located within the laydown area used for structure assembly. If the existing terrain is not suitable to support crane activities, a temporary 50-foot by 50-foot (0.06-acre) crane pad would be constructed. The existing structure footings would

be removed to a depth of approximately 2 feet below ground level. Holes would be filled, compacted, and the area would be smoothed to match surrounding grade.

SCE may temporarily transfer the existing 500-kV conductor to temporary structures during the removal and replacement of the existing 500-kV structures. Upon completion of the construction of the 500-kV replacement structures and dismantling of the existing 500-kV structure to a level below the conductor attachment height, the existing conductor would be transferred over from the temporary structures and attached to the new 500-kV structures.

Construction of New 500-kV and 220-kV Transmission Structures and 220-kV Gen-Tie Line Structure

The new 500-kV and 220-kV structure locations and 220-kV Gen-Tie Line structure locations would first be graded and/or cleared of vegetation as required to provide a reasonably level and vegetation-free surface for footing and structure construction. Site preparation for the temporary laydown area required for the assembly of the 500-kV and 220-kV structures would also be cleared of vegetation and graded as required. This area is approximately 200 feet by 200 feet (0.92 acre). A crane pad would be located within the laydown area used for structure assembly. If the existing terrain is not suitable to support crane activities, a temporary 50-foot by 50-foot (0.06-acre) crane pad would be constructed.

The structures would require drilled, poured-in-place, concrete footings that would form the structure foundation. Actual footing diameters and depths for each of the structure foundations would depend on the soil conditions and topography at the site and would be determined during detailed engineering.

A typical transmission structure would require approximately 50 to 80 cubic yards of concrete delivered to the structure location depending upon the type of structure being constructed, soil conditions, and topography at each site. The transmission structure footings would project approximately 1 to 4 feet above the ground level.

During construction, existing commercial ready-mix concrete supply facilities would be used where feasible. If commercial ready-mix concrete supply facilities do not exist within the general area of need, a temporary concrete batch plant would be set up. If necessary, approximately two acres of property would be sub-partitioned from the temporary equipment and material staging area within the Red Bluff Substation Site for a temporary concrete batch plant.

The assembly would consist of hauling the structure components from the staging yard to their designated structure location using semi-trucks with 40-foot trailers. Crews would then assemble portions of each structure on the ground at the structure location, while on the ground, the top section may be pre-configured with the necessary insulators and wire-stringing hardware before being set in place. An 80-ton all-terrain or rough terrain crane would be used to position the base section on top of previously prepared foundation. When the base section is secured, the remaining portions of the structure would then be placed upon the base section and bolted together.

After construction is completed, the transmission structure site would be graded such that water would run toward the direction of the natural drainage. In addition, drainage would be designed to

prevent ponding and erosive water flows that could cause damage to the structure footing. The graded area would be compacted and would be capable of supporting heavy vehicular traffic.

SCE's water usage estimates presented in Tables 2.2-2 and 2.2-7 are preliminary and are based on current information. *SCE is proposing to install a well to supply water needed for construction and operation of the Substation.*

Wire Stringing of 500-kV and 220-kV Conductor

Wire stringing includes all activities associated with the installation of conductors. This activity includes the installation of primary conductor and overhead ground wire (OHGW), vibration dampeners, weights, spacers, and suspension and dead-end hardware assemblies. Insulators and stringing sheaves (rollers or travelers) are typically attached during the steel erection process.

A standard wire-stringing plan includes a sequenced program of events starting with determination of wire pulls and wire pull equipment set-up positions. Advanced planning by supervision determines circuit outages, pulling times, and safety protocols needed for ensuring that safe and quick installation of wire is accomplished.

The dimensions of the area needed for the stringing setups associated with wire installation are variable and depends upon terrain. The preferred minimum area needed for tensioning equipment set-up sites requires approximately an area of 150 feet by 500 feet (1.72 acres); the preferred minimum area needed for pulling equipment set-up sites requires approximately an area of 150 feet by 300 feet (1.03 acres); however, crews can work from within slightly smaller areas when space is limited. Each stringing operation would include one puller positioned at one end and one tensioner and wire reel stand truck positioned at the other end.

An OHGW for shielding would be installed on the transmission line. The OHGW would be installed in the same manner as the conductor.

Housekeeping and Construction Site Cleanup

Any damage to existing roads as a result of construction would be repaired once construction is complete.

SCE would restore all areas that are temporarily disturbed by Project activities (including equipment and material staging yard, pull and tension sites, and structure laydown and assembly sites) to as close to preconstruction conditions as possible or, where applicable, to the conditions agreed on between the landowner (or land manager) and SCE. Restoration may include grading and restoration of sites to original contours and reseeding where appropriate. In addition, all construction materials and debris would be removed from the area and recycled or properly disposed of at an off-site disposal facility in accordance with all applicable laws. SCE would conduct a final inspection to ensure that cleanup activities are successfully completed.

Land Disturbance

Table 2.3-14 and Table 2.3-15 provide estimates of temporary and permanent land disturbance areas related to construction of the transmission lines for both Substation sites.

Table 2.3-14
Red Bluff Substation A
Transmission System Construction – Land Disturbance

Project Feature	Site Quantity (Estimated)	Disturbed Acreage Calculation (L x W)	Acres Permanently Disturbed
Modify Existing 500 kV Lattice Steel Tower (1)	2	150' x 150'	1.03
Remove Existing 500 kV Lattice Steel Tower (1)	2	150' x 150'	1.03
Temporary Conductor Field Snub/Transfer Area (2)	8	200' x 150'	5.51
Construct New 500 kV Lattice Steel Tower (3)	8	200' x 200'	*7.36*
Construct New 220 kV Lattice Steel Tower (4)	2	200' x 200'	*1.84*
Conductor & OPGW Stringing Setup Area - Puller (5)	4	300' x 150'	4.13
Conductor & OPGW Stringing Setup Area - Tensioner (5)	4	500' x 150'	6.89
New Access/Spur Roads (6)	2	linear miles x 14' wide	*1.70*
Red Bluff Sub - Material & Equipment Staging Area	1	approx. 1.5 acres	1.50
Guard Structures	8	100' x 100'	1.84
Total Estimated Disturbed Acres (7)			***32.83***

Notes: 1. Includes the removal of existing conductor, teardown of existing structure, and removal of foundation 2 feet below ground surface.
2. Includes area needed for temporary conductor transfer towers and/or conductor removal, field snubs, and splicing new conductor; area to be restored after construction.
3. Includes foundation installation, structure assembly & erection, and conductor and OHGW attachment; a majority of the area to be restored after construction; a portion of ROW beneath and within 35 feet of the LST to remain permanently cleared of vegetation and access area of 25 feet around structures; area to be permanently disturbed for each 500 kV LST equals 0.32 acres.

Table 2.3-15
Red Bluff Substation B
Transmission System Construction – Land Disturbance

Project Feature	Site Quantity	Disturbed Acreage Calculation (L x W)	Acres Permanently Disturbed
Modify Existing 500-kV Lattice Steel Tower (1)	2	150' x 150'	1.03
Remove Existing 500-kV Lattice Steel Tower (1)	2	150' x 150'	1.03
Temporary Conductor Field Snub/Transfer Area (2)	8	200' x 150'	5.51
Construct New 500-kV Lattice Steel Tower (3)	2	200' x 200'	*1.84*
Construct New 220-kV Lattice Steel Tower (4)	2	200' x 200'	*1.84*
Conductor & OPGW Stringing Setup Area - Puller (5)	3	300' x 150'	3.10
Conductor & OPGW Stringing Setup Area - Tensioner (5)	3	500' x 150'	5.17
New Access/Spur Roads (6	0.5	linear miles x 18' wide	*0.85*
Red Bluff Sub - Material & Equipment Staging Area	1	approx. 1.5 acres	*1.50*
Guard Structures	2	100' x 100'	0.46
Total Estimated Disturbed Acres (7)			***22.33***

Notes: 1. Includes the removal of existing conductor, teardown of existing structure, and removal of foundation 2' below ground surface.
2. Includes area needed for temporary conductor transfer towers and/or conductor removal, field snubs, and splicing new conductor; area to be restored after construction.
3. Includes foundation installation, structure assembly & erection, and conductor & OHGW attachment; a majority of the area to be restored after construction; a portion of ROW beneath and within 35' of the LST to remain permanently cleared of vegetation and access area of 25' around structures; area to be permanently disturbed for each 500-kV LST equals 0.3183 acres.
4. Includes foundation installation, structure assembly & erection, and conductor & OHGW attachment; a majority of the area to be restored after construction; a portion of ROW beneath and within 25' of the LST to remain permanently cleared of vegetation; area to be permanently disturbed for each LST equals 0.2173 acres.
5. Based on 9,000' conductor reel lengths, number of circuits, and route design.
6. Based on length of road in miles x road width of 18'.
7. The disturbed acreage calculations are estimates based upon SCE's preferred area of use for the described Project feature, the width of the existing ROW, or the width of the proposed ROW and, they do not include any new access/spur road information.

Construction Equipment and Labor

Construction of the Project would be performed by SCE crews or contract personnel, with SCE responsible for Project administration and inspection. The estimated number of persons and types of equipment required for each phase of transmission line construction for the Red Bluff Project is shown in Tables 2.3-16, 2.3-17, and 2.3-18. The equipment and workforce estimates presented in these tables are approximately the same for construction of the transmission line and related structures on both Site A and Site B since the line construction areas of disturbance and associated work activities would be approximately the same.

Table 2.3-16
Red Bluff Substation A
Construction Equipment and Workforce Estimates by Activity
to Construct New 500-KV Loop-in Lines

Work Activity				Activity Production			
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**	**Estimated Workforce**	**Estimated Schedule (Days)**	**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
Survey (1)				**4**	**4**		**0.5 Mile**
3/4-Ton Pick-up Truck, 4x4	200	Gas	2		4	8	1 Mile/Day
Temporary Equipment & Material Staging Area (2)				**4**			
1-Ton Crew Cab, 4x4	300	Diesel	1		Duration of Project	2	
30-Ton Crane Truck	300	Diesel	1			2	
Water Truck	350	Diesel	1				
10,000 lb Rough Terrain Fork Lift	200	Diesel	1			5	
Truck, Semi, Tractor	350	Diesel	1			1	
Roads & Landing Work (3)				**5**	5		**0.5 Mile & 8 Pads**
1-Ton Crew Cab, 4x4	300	Diesel	2		5	2	
Road Grader	350	Diesel	1		5	4	
Backhoe/Front Loader	350	Diesel	1		5	6	
10-cu. yd. Dump Truck	350	Diesel	2		5	8	0.5 Mile/Day & 0.66 Structure Pads/Day
Drum Type Compactor	250	Diesel	1		5	4	
Track Type Dozer	350	Diesel	1		5	6	
Lowboy Truck/Trailer	500	Diesel	2		2	2	
Install LST Foundations (4)				**9**	**12**		**8 LSTs**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		12	2	
30-Ton Crane Truck	300	Diesel	1		10	5	

Table 2.3-16 (continued)
Red Bluff Substation A
Construction Equipment and Workforce Estimates by Activity
to Construct New 500-KV Loop-in Lines

Work Activity				Activity Production			
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**	**Estimated Workforce**	**Estimated Schedule (Days)**	**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
Backhoe/Front Loader	200	Diesel	1		12	8	0.50 LST/Day
Auger Truck	500	Diesel	1		10	8	
10-cu. yd. Dump Truck	350	Diesel	2		10	8	
10-cu. yd. Concrete Mixer Truck	425	Diesel	4		10	5	
LST Steel Haul (5)				**6**	**8**		**8 LSTs**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		8	2	
10,000 lb Rough Terrain Fork Lift	200	Diesel	1		8	6	1 LST/Day
40' Flat Bed Truck/ Trailer	350	Diesel	1		8	8	
LST Steel Assembly (6)				**7**	**64**		**8 LSTs**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	3		64	4	0.25 LST/Day
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		64	4	
10,000 lb Rough Terrain Fork Lift	200	Diesel	1		64	6	
30-Ton Crane Truck	300	Diesel	2		64	8	
Compressor Trailer	350	Diesel	2		64	6	
LST Erection (7)				**8**	**47**		**8 LSTs**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		47	5	0.25 LST/Day
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		47	5	
Compressor Trailer	120	Diesel	1		47	6	
80-Ton Rough Terrain Crane	350	Diesel	1		47	6	
Guard Structure Installation (8)				**6**	**2**		**8 Structures**
3/4-Ton Pick-up Truck, 4x4	300	Gas	1		2	6	4 Structures/Day
1-Ton Crew Cab, 4x4	300	Diesel	1		2	6	
Compressor Trailer	120	Diesel	1		2	6	
Auger Truck	500	Diesel	1		2	6	
Extendable Flat Bed Pole Truck	350	Diesel	1		2	6	
30-Ton Crane Truck	500	Diesel	1		1	8	
80ft. Hydraulic Man-lift/Bucket Truck	350	Diesel	1		1	4	

Table 2.3-16 (continued)
Red Bluff Substation A
Construction Equipment and Workforce Estimates by Activity
to Construct New 500-KV Loop-in Lines

Work Activity				Activity Production			
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**	**Estimated Workforce**	**Estimated Schedule (Days)**	**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
Install Conductor & OPGW *(9)*				***16***	***27***		***1.5 Circuit Miles***
3/4-Ton Pick-up Truck, 4x4	*300*	*Diesel*	*2*		*27*	*8*	
1-Ton Crew Cab Flat Bed, 4x4	*300*	*Diesel*	*2*		*27*	*8*	
Wire Truck/Trailer	*350*	*Diesel*	*2*		*27*	*2*	
Dump Truck (Trash)	*350*	*Diesel*	*1*		*27*	*2*	
20,000 lb. Rough Terrain Fork Lift	*350*	*Diesel*	*1*		*27*	*2*	
22-Ton Manitex	*350*	*Diesel*	*1*		*27*	*8*	
30-Ton Manitex	*350*	*Diesel*	*2*		*27*	*6*	
Splicing Rig	*350*	*Diesel*	*1*		*24*	*2*	
Splicing Lab	*300*	*Diesel*	*1*		*24*	*2*	*0.25 mile/day*
Spacing Cart	*10*	*Diesel*	*1*		*24*	*8*	
Static Truck/ Tensioner	*350*	*Diesel*	*1*		*27*	*2*	
3 Drum Straw line Puller	*300*	*Diesel*	*1*		*27*	*4*	
60lk Puller	*525*	*Diesel*	*1*		*27*	*3*	
Sag Cat w/ 2 winches	*350*	*Diesel*	*1*		*27*	*2*	
580 Case Backhoe	*120*	*Diesel*	*1*		*27*	*2*	
D8 Cat	*300*	*Diesel*	*1*		*24*	*3*	
Lowboy Truck/Trailer	*500*	*Diesel*	*1*		*4*	*2*	
Restoration *(10)*				***7***	***4***		***0.5 Miles***
1-Ton Crew Cab, 4x4	*300*	*Diesel*	*2*		*4*	*2*	*0.5 Mile/Day*
Road Grader	*350*	*Diesel*	*1*		*4*	*6*	
Backhoe/Front Loader	*350*	*Diesel*	*1*		*4*	*6*	
Drum Type Compactor	*250*	*Diesel*	*1*		*4*	*6*	
Track Type Dozer	*350*	*Diesel*	*1*		*4*	*6*	
Lowboy Truck/Trailer	*300*	*Diesel*	*1*		*4*	*3*	

Notes on Crew Size Assumptions:

#1 Survey = one 4-man crew
#2 Temporary Equipment & Material Staging Area = one 4-man crew; note this information is duplicated on the 220 kV Loop-in & 500kV & Gen-Tie WF & E Tables
#3 Roads and Landing work = one 5-man crew
#4 Install Foundations for LSTs = one 9-man crew
#5 LST Steel Haul = one 4-man crew
#6 LST Steel Assembly =one 7-man crew
#7 LST Erection = one 8-man crew
#8 Guard Structure Installation = one 6-man crew
#9 Conductor & OPGW Installation = two 8-man crews
#10 Restoration = one 7-man crew

Note: All data provided in this table is based on planning level assumptions and may change following completion of more detailed engineering, identification of field conditions, availability of labor, material, and equipment, and any environmental and permitting requirements.

Table 2.3-17
Red Bluff Substation B
Construction Equipment and Workforce Estimates by Activity
to Construct New 500-kV Loop-In Lines

Work Activity				Activity Production			
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**	**Estimated Workforce**	**Estimated Schedule (Days)**	**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
Survey (1)				**4**	*4*		**0.5 Miles**
3/4-Ton Pick-up Truck, 4x4	200	Gas	2		*4*	8	1 Mile/Day
Temporary Equipment & Material Staging Area (2)				4			
1-Ton Crew Cab, 4x4	300	Diesel	1		Duration of Project	2	
30-Ton Crane Truck	300	Diesel	1			2	
Water Truck	350	Diesel	1				
10,000 lb Rough Terrain Fork Lift	200	Diesel	1			5	
Truck, Semi, Tractor	350	Diesel	1			1	
Roads & Landing Work (3)				**5**	*2*		**0.5 Miles & 4 Pads**
1-Ton Crew Cab, 4x4	300	Diesel	2		*2*	2	0.5 Miles/Day & 0.66 Structure Pads/Day
Road Grader	350	Diesel	1		*2*	4	
Backhoe/Front Loader	350	Diesel	1		*2*	6	
10-cu. yd. Dump Truck	350	Diesel	2		*2*	8	
Drum Type Compactor	250	Diesel	1		*2*	4	
Track Type Dozer	350	Diesel	1		*2*	6	
Lowboy Truck/ Trailer	500	Diesel	2		*2*	2	
Install LST Foundations (4)				**9**	*8*		**4 LSTs**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		*8*	2	0.50 LST/Day
30-Ton Crane Truck	300	Diesel	1		*8*	5	
Backhoe/Front Loader	200	Diesel	1		6	8	
Auger Truck	500	Diesel	1		6	8	
10-cu. yd. Dump Truck	350	Diesel	2		*8*	8	
10-cu. yd. Concrete Mixer Truck	425	Diesel	4		6	5	

Table 2.3-17 (continued)
Red Bluff Substation B
Construction Equipment and Workforce Estimates by Activity
to Construct New 500-kV Loop-In Lines

Work Activity				Activity Production			
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**	**Estimated Workforce**	**Estimated Schedule (Days)**	**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
LST Steel Haul (5)				***6***	***6***		***6* LSTs**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		*6*	2	1 LST/Day
10,000 lb Rough Terrain Fork Lift	200	Diesel	1		*6*	6	
40' Flat Bed Truck/ Trailer	350	Diesel	1		*6*	8	
LST Steel Assembly (6)				**7**	***21***		***6* LSTs**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	3		*21*	4	0.28 LST/Day
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		*21*	4	
10,000 lb Rough Terrain Fork Lift	200	Diesel	1		*21*	6	
30-Ton Crane Truck	300	Diesel	2		*21*	8	
Compressor Trailer	350	Diesel	2		*21*	6	
LST Erection (7)				**8**	***15***		***6* LSTs**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		*15*	5	*0.4* LST/Day
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		*15*	5	
Compressor Trailer	120	Diesel	1		*15*	6	
80-Ton Rough Terrain Crane	350	Diesel	1		*15*	6	
Guard Structure Installation (8)				**6**	**1**		***8* Structures**
3/4-Ton Pick-up Truck, 4x4	300	Gas	1		*2*	6	4 Structures
1-Ton Crew Cab, 4x4	300	Diesel	1		*2*	6	
Compressor Trailer	120	Diesel	1		*2*	6	
Auger Truck	500	Diesel	1		*2*	6	
Extendable Flat Bed Pole Truck	350	Diesel	1		*2*	6	
30-Ton Crane Truck	500	Diesel	1		*2*	8	
80ft. Hydraulic Man-lift/Bucket Truck	350	Diesel	1		*2*	4	
Install Conductor & OPGW (9)				**16**	***13***		***1.5* Circuit Miles**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		*13*	8	0.25 miles/day
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		*13*	8	
Wire Truck/Trailer	350	Diesel	2		*13*	2	

Table 2.3-17 (continued)
Red Bluff Substation B
Construction Equipment and Workforce Estimates by Activity
to Construct New 500-kV Loop-In Lines

Work Activity				Activity Production			
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**	**Estimated Workforce**	**Estimated Schedule (Days)**	**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
Dump Truck (Trash)	350	Diesel	1		*13*	2	
20,000 lb. Rough Terrain Fork Lift	350	Diesel	1		*13*	2	
22-Ton Manitex	350	Diesel	1		*13*	8	
30-Ton Manitex	350	Diesel	2		*13*	6	
Splicing Rig	350	Diesel	1		*13*	2	
Splicing Lab	300	Diesel	1		*13*	2	
Spacing Cart	10	Diesel	1		*13*	8	
Static Truck/ Tensioner	350	Diesel	1		*13*	2	
3 Drum Straw line Puller	300	Diesel	1		*11*	4	
60lk Puller	525	Diesel	1		*11*	3	
Sag Cat w/ 2 winches	350	Diesel	1		*11*	2	
580 Case Backhoe	120	Diesel	1		*11*	2	
D8 Cat	300	Diesel	1		*11*	3	
Lowboy Truck/Trailer	500	Diesel	1		*4*	2	
Restoration (10)				**7**	**3**		**0.5 Miles**
1-Ton Crew Cab, 4x4	300	Diesel	2		3	2	
Road Grader	350	Diesel	1		3	6	
Backhoe/Front Loader	350	Diesel	1		3	6	
Drum Type Compactor	250	Diesel	1		3	6	0.5 Mile/Day
Track Type Dozer	350	Diesel	1		3	6	
Lowboy Truck/ Trailer	300	Diesel	1		3	3	

Notes on Crew Size Assumptions:

#1 Survey = one 4-man crew
#2 Temporary Equipment & Material Staging Area = one 4-man crew; note this information is duplicated on the 220-kV Loop-in & 500-kV & Gen-Tie WF & E Tables
#3 Roads and Landing work = one 5-man crew
#4 Install Foundations for LSTs = one 9-man crew
#5 LST Steel Haul = one 4-man crew
#6 LST Steel Assembly =one 7-man crews
#7 LST Erection = one 8-man crew
#8 Guard Structure Installation – one 6-man crew
#9Conductor & OPGW Installation = two 8-man crews
#10 Restoration = one 7-man crew

Note: All data provided in this table is based on planning level assumptions and may change following completion of more detailed engineering, identification of field conditions, availability of labor, material, and equipment, and any environmental and permitting requirements.

Table 2.3-18
Red Bluff Substation Sites A and B
Construction Equipment and Workforce Estimates by Activity
for 500-kV and 220-kV Transmission Line Structure Modification/Replacement

Work Activity				Activity Production			
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**	**Estimated Workforce**	**Estimated Schedule (Days)**	**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
Survey (1)				**4**	**2**		**3 Structures**
3/4-Ton Pick-up Truck, 4x4	200	Gas	2		2	8	2 Mile/Day
Temporary Equipment & Material Staging Area(2)				**4**			
1-Ton Crew Cab, 4x4	300	Diesel	1		Duration of Project	2	
30-Ton Crane Truck	300	Diesel	1			2	
Water Truck	350	Diesel	1			8	
10,000 lb Rough Terrain Fork Lift	200	Diesel	1			5	
Truck, Semi, Tractor	350	Diesel	1			1	
Roads & Landing Work (3)				**5**	**3**		**.5 Miles & 3 Pads**
1-Ton Crew Cab, 4x4	300	Diesel	2		3	2	0.5 Miles/Day & 2 Structure Pads/Day
Road Grader	350	Diesel	1		2	4	
Backhoe/Front Loader	350	Diesel	1		2	6	
Drum Type Compactor	250	Diesel	1		2	4	
Track Type Dozer	350	Diesel	1		2	6	
Lowboy Truck/Trailer	500	Diesel	1		2	2	
LST Removal (4)				**8**	**4**		**3 LSTs**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		4	6	0.75 LST/Day
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		4	6	
Compressor Trailer	120	Diesel	1		4	6	
80-Ton Rough Terrain Crane	350	Diesel	1		4	6	
Install LST Foundations (5)				**9**	**8**		**3 LSTs**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		8	2	0.50 LST/Day
30-Ton Crane Truck	300	Diesel	1		8	5	
Backhoe/Front Loader	200	Diesel	1		6	8	
Auger Truck	500	Diesel	1		8	8	

Table 2.3-18 (continued)
Red Bluff Substation Sites A and B
Construction Equipment and Workforce Estimates by Activity
for 500-kV and 220-kV Transmission Line Structure Modification/Replacement

Work Activity				Activity Production			
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**	**Estimated Workforce**	**Estimated Schedule (Days)**	**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
10-cu. yd. Dump Truck	350	Diesel	2		8	8	
10-cu. yd. Concrete Mixer Truck	425	Diesel	3		8	5	
LST Steel Haul (6)				**4**	**3**		**3 LSTs**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		3	2	
10,000 lb Rough Terrain Fork Lift	200	Diesel	1		3	6	1 LST/Day
40' Flat Bed Truck/ Trailer	350	Diesel	1		3	8	
LST Steel Assembly (7)				**7**	**14**		**3 LSTs**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		14	4	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		14	4	
10,000 lb Rough Terrain Fork Lift	200	Diesel	1		12	6	0.25 LST/Day
30-Ton Crane Truck	300	Diesel	1		14	8	
Compressor Trailer	350	Diesel	1		12	6	
LST Erection (8)				**8**	**5**		**3 LSTs**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		5	5	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		5	5	
Compressor Trailer	120	Diesel	1		3	6	1 LST/Day
80-Ton Rough Terrain Crane	350	Diesel	1		5	6	
Conductor Transfer (9)				**16**	**5**		**.5 Circuit Miles**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		5	8	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		5	8	
Wire Truck/Trailer	350	Diesel	2		3	2	
Dump Truck (Trash)	350	Diesel	1		5	2	1 tower/day
20,000 lb. Rough Terrain Fork Lift	350	Diesel	1		5	2	
22-Ton Manitex	350	Diesel	1		5	8	
30-Ton Manitex	350	Diesel	2		5	6	

Table 2.3-18 (continued)
Red Bluff Substation Sites A and B
Construction Equipment and Workforce Estimates by Activity
for 500-kV and 220-kV Transmission Line Structure Modification/Replacement

Work Activity				Activity Production			
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**	**Estimated Workforce**	**Estimated Schedule (Days)**	**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
Splicing Rig	350	Diesel	1		5	2	
Splicing Lab	300	Diesel	1		3	2	
Spacing Cart	10	Diesel	1		3	8	
Static Truck/ Tensioner	350	Diesel	1		3	2	
3 Drum Straw line Puller	300	Diesel	1		3	4	
60lk Puller	525	Diesel	1		3	3	
Sag Cat w/ 2 winches	350	Diesel	1		3	2	
580 Case Backhoe	120	Diesel	1		5	2	
D8 Cat	300	Diesel	1		5	3	
Lowboy Truck/ Trailer	500	Diesel	1		2	2	
Restoration (10)				**7**	**3**		**.5 Miles**
1-Ton Crew Cab, 4x4	300	Diesel	2		3	2	
Road Grader	350	Diesel	1		1	6	
Backhoe/Front Loader	350	Diesel	1		1	6	
Drum Type Compactor	250	Diesel	1		1	6	0.5 Mile/Day
Track Type Dozer	350	Diesel	1		3	6	
Lowboy Truck/Trailer	300	Diesel	1		2	3	

Notes on Crew Size Assumptions:

#1 Survey = one 4-man crew
#2 Temporary Equipment & Material Staging Area = one 4-man crew, this information is duplicated on 220kV Loop-in & Gen-Tie modification WF&E Tables
#3 Roads & Landing Work = one 5-man crew
#4 LST Removal = one 8-man crew
#5 Install Foundations for LSTs = one 9-man crew
#6 LST Steel Haul = one 4-man crew
#7 LST Steel Assembly =one 7-man crews
#8 LST Erection = one 8-man crew
#9 Conductor Transfer = two 8-man crews
#10 Restoration = one 7-man crew

Note: All data provided in this table is based on planning level assumptions and may change following completion of more detailed engineering, identification of field conditions, availability of labor, material, and equipment, and any environmental and permitting requirements.

Distribution Line for Substation Light and Power

Substation Site A

Placement of the Substation at Site A would require rebuilding the Desert Center 12-kV circuit overhead along the south frontage of the freeway approximately 20,000 feet to upgrade the circuit from single-phase to three-phase construction and then extending approximately 1,000 feet underground (south) towards the Substation. This rebuild would require replacement of approximately 100 poles, assuming each span of 200 feet.

Table 2.3-19 provides an estimate of the permanent land disturbance related to construction of the distribution system for station light and power at the Red Bluff Substation Site A. The estimated number of workers and equipment required to construct the distribution system for station light and power is presented in Table 2.3-20.

Table 2.3-19
Distribution System for Station Power and
Light Construction Substation Site A – Estimated Land Disturbance

Construction Activity	Acres Permanently Disturbed
Access Road (1)	8.26
12 kV Overhead Circuit on 100 poles (2)	0.02
Underground 12 kV line (3)	0.03
Total disturbance	**8.31**

Notes: (1) Based on road dimensions of 20,000 feet long by 18 feet wide.
(2) Each pole requires a land disturbance of approximately one square foot.
(3) 12-kV underground line is 1,000 feet long by 1.5 feet wide.

Table 2.3-20
Construction Equipment and Workforce and Estimates by Activity to Construct the Distribution System for Station Light and Power – Substation Site A

Work Activity						Activity Production	
Primary Equipment Description	Estimated Horse-Power	Probable fuel type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Estimated Average Duration of Use (Hrs/Day)	Estimated Production Per Day
Trenching, Structure Excavation (1)				4	2		
1-ton crew cab	300	Diesel	1			2	
Backhoe front loader	300	Diesel	1			6	
Overhead Line (2)				8	30		
1-ton crew cab 4x4	300	Diesel	2	5		2	
55-foot double bucket truck	350	Diesel	2			6	
50-foot digger derrick	350	Diesel	2			4	
Underground Cable Pulling (3)				4	1		
1-ton crew cab, 4x4	300	Diesel	1			2	
Router placer truck	350	Diesel	1			6	

Table 2.3-20 (continued)
Construction Equipment and Workforce and Estimates by Activity to Construct the Distribution System for Station Light and Power – Substation Site A

Work Activity						Activity Production	
Primary Equipment Description	Estimated Horse-Power	Probable fuel type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Estimated Average Duration of Use (Hrs/Day)	Estimated Production Per Day
Hydraulic rewind puller	300	Diesel	1		1	6	
Underground Cable Makeup				4	5		
1-to crew cab, 4x4	300	Diesel	1			2	
55-foot double-bucket truck	350	Diesel	1			4	

Notes: (1) Trenching and conduit installation = one 4-man crew
(2) Overhead Line Work = one 4-man crew
(3) Underground Cable Pulling – one 4-man crew

Substation Site B

The Red Bluff Substation B requires extending the existing Desert Center 12-kV circuit overhead south on Eagle Mountain Road approximately 750 feet by installing approximately 7 poles outside of the Substation perimeter wall. The line would then be extended north underground along Red Bluff Substation driveway approximately 1,000 feet to Red Bluff Substation.

A laydown area within the Red Bluff Substation Site *would* be required to store any materials needed during construction. Crews would work Monday through Friday in one 8- to 10-hour shift each day. Two line trucks with 3-person crews (6 people total) would be called upon to perform the work. A new access road may be required to support the new over head distribution lines along Eagle Mountain Road from the existing Desert Center 12-kV circuit to Red Bluff Substation. The access road would be approximately 300 feet long and approximately 18 feet wide.

Table 2.3-21 provides an estimate of the permanent land disturbance related to construction of the distribution system for station light and power. The estimated number of workers and equipment required to construct the distribution system for station light and power is presented in Table 2.3-22.

Table 2.3-21
Distribution System for Station Power and Light Construction Substation Site B – Estimated Land Disturbance

Construction Activity	Acres Permanently Disturbed
Access road (1)	0.12 acres
12kV overhead circuit on 7 poles (2)	0.00 acres
Underground 12kV line (3)	*0.03 acres*
Total Disturbance	*0.15 acres*

Notes: (1) Based on road dimensions of 300 feet long x 18 feet wide.
(2) Each pole requires a permanent land disturbance of 1 square foot.
(3) 12kV underground line is a 1,000-foot long by 1.5-foot wide trench.

Telecommunications Facilities

As previously discussed, a telecommunication system would be required in order to provide monitoring and remote operation capabilities of the electrical equipment at the Red Bluff Substation and transmission line protection. Sunlight would be responsible for constructing the duct bank from the last transmission tower on the Gen-Tie Line to the MEER building within the Red Bluff Substation. The construction activities associated with the duct bank have been incorporated into Sunlight's Gen-Tie Line numbers. SCE would be responsible for constructing the new Desert Center Communications Site (also referred to as a microwave repeater site) located on a BLM parcel adjacent to State Route 177 to house microwave transmission equipment. The total area needed for the site, access road and surrounding berm would be approximately 150 feet by 70 feet. Within that parcel, a 100-foot by 50-foot area would be fenced and graded. It would consist of a 12-foot by 36-foot prefabricated building with a 5-foot by 30-foot raised concrete walkway, and a 499-gallon propane tank on a 12-foot by 8-foot concrete pad. The building would have a separate generator room containing a 20-kW propane-powered generator to ensure safe operation of the Desert Sunlight 220-kV Gen-Tie Line in the event of an outage on the Desert Center 12-kV distribution line (refer back to Figure 2-11).

Table 2.3-22
Construction Equipment and Workforce and Estimates by Activity to Construct the Distribution System for Station Light and Power – Substation Site B

Work Activity						Activity Production	
Primary Equipment Description	Estimated Horse-Power	Probable fuel type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Estimated Average Duration of Use (Hrs/Day)	Estimated Production Per Day
Trenching, Structure Excavation (1)				4	2		
1-ton crew cab	300	Diesel	1			2	
Backhoe front loader	300	Diesel	1			6	
Overhead Line (2)				6	5		
1-ton crew cab 4x4	300	Diesel	1			2	
55-foot double bucket truck	350	Diesel	1			6	
50-foot digger derrick	350	Diesel	1			4	
Underground Cable Pulling (3)				4	2		
1-ton crew cab, 4x4	300	Diesel	1			2	
Router placer truck	350	Diesel	1			6	
Hydraulic rewind puller	300	Diesel	1			6	
Underground Cable Makeup				4	5		
1-to crew cab, 4x4	300	Diesel	1			2	
55-foot double-bucket truck	350	Diesel	1			4	

Notes: Trenching and conduit installation = one 4-man crew
Overhead Line Work = one 4-man crew
Underground Cable Pulling – one 4-man crew

A 185-foot microwave communications tower would be constructed, requiring four concrete anchors for support, which would typically be 6 feet in diameter and 40 feet deep.

The access road from the site to Airport Access Road would be a graded dirt road, 20 feet wide, and 30 feet long. Since the site would be located in an area subject to flooding, an 8-foot-high berm would be constructed on the north, west and south sides. Soil from excavation of the site would be used to construct the berm.

The primary source of electrical service would be from a tap into the nearest 12-kV line, which would require the installation of about 7 wooden poles for approximately 730 feet to the northeast.

Table 2.3-23 provides estimates of temporary and permanent land disturbances related to construction of the telecommunication system.

Table 2.3-23
Telecommunication System Construction –
Estimated Land Disturbance (Sites A and B)

Construction Activity	Acres Permanently Disturbed
Duct from Red Bluff MEER to first 220kV tower outside station (1)	*0.03*
Desert Center Microwave Repeater Site (2)	0.19
Access Road (3)	0.01
12 kV Distribution Line (4)	0.02
Total Acres Disturbed	***0.25***

Notes: (1) 1,000 feet long by 1.5-foot wide trench.
(2) Based on a graded site area of 120 feet by 70 feet.
(3) Based on road dimensions of 30 feet long by 20 feet wide.
(4) Based on 730-foot long line with one pole per 100 feet and 1.5 square feet of disturbance per pole

Table 2.3-24 provides estimates for the construction workforce and type of equipment expected to be used in constructing the proposed telecommunications facilities.

Table 2.3-24
Construction Equipment and Workforce Estimates by Activity to
Construct the Telecommunication System (Sites A and B)

Construction Activity	Number of Personnel	Number of Days	Equipment Requirements
Building and Tower Foundation	6	10	2-crew trucks (gas/diesel) 1-backhoe (diesel) 1-stakebed truck (diesel) 1-concrete mixer (diesel)
Building Shell	4	2	2-crew trucks (gas/diesel) 1-crane (diesel) 1-lowbed truck (diesel)
Tower Construction Crew	4	10	2-crew trucks (gas/diesel) 1-100 ft crane (diesel) 1-100 ft bucket truck (diesel)
Microwave Dish Installation Crew	4	10	2-crew trucks (gas/diesel) 1-100 ft crane (diesel) 1-100 ft bucket truck (diesel)
Telecommunications Installation Crew	2	10	1-2 ton truck (gas/diesel) 1-crew truck (gas)

2.4 PROJECT OPERATION, MAINTENANCE, AND DECOMMISSIONING

2.4.1 Operation and Facility Maintenance Needs for Solar Farm and Gen-Tie Line

Solar Farm

The DSSF is designed to have essentially no moving parts, no thermal cycle, and no water use for electricity generation or PV module cleaning. After completion of the construction phase of the DSSF, the only water use would be for domestic purposes (drinking, washing, toilets) in the O&M Facility and the Solar Energy Learning Center (Visitors Center). This simple design would require only limited maintenance throughout its lifetime. A discussion of anticipated maintenance activities is provided below.

Maintenance Activities

It is not anticipated that the PV modules themselves would require cleaning. First Solar studies have shown that the PV modules function within acceptable design parameters without cleaning. Therefore, DSSF maintenance activities are contemplated to be limited to all-weather road maintenance; vegetation management; scheduled maintenance of inverters, transformers, and other electrical equipment; and occasional replacement of faulty modules or other site electrical equipment. The DSSF's all-weather access roads would be regularly inspected, and any degradation due to weather or wear and tear would be repaired. The Applicant would apply a dust palliative on dirt access roads. This is expected to be needed only once every two to five years. Except as needed to mix the palliative, no water would be needed for dust control during operations.

Operations and Workforce and Equipment

After the construction period, the workforce for O&M and security is estimated at 10 to 15 full-time workers. A work week would likely be composed of seven or eight employees working 10 hours per day. If night-time work is required, the shifts would be adjusted to assign the required number of personnel to 10-hour evening shifts. In addition, there would be 24-hour on-site security, likely consisting of two employees on the day shift and two on the night shift (12 hours each).

During operations, potable water would be drawn from the on-site well installed during construction of the Solar Farm. The water would be stored in a permanent, approximately 5,000-gallon, aboveground potable water storage tank would be installed adjacent to the O&M facility. The water storage tank would be covered. Because of the DSSF's small operating workforce, water demand would be no more than a few hundred gallons per day (approximately 0.2 acre-feet per year). The O&M workforce would generate small amounts of sanitary wastewater that would be handled by an on-site septic system and leach field. It is expected that sanitary water demand during operations would be obtained from the on-site well.

Only limited deliveries will be necessary for replacement PV modules and equipment during DSSF operation. For PV module replacement, six 53-foot-long trailers (5 axles) per year are assumed. Garbage and recycling would be collected by truck once per week each (two trucks per week total). Delivery of mail is expected once or twice a day, and delivery of miscellaneous supplies and spare parts is expected once a week, or as needed.

Waste and Hazardous Materials Management during Operations

First Solar PV modules and other products used during operation of the DSSF are not hazardous and are not subject to California or Federal hazardous material management regulations.

There would be limited hazardous materials stored or used on site as shown in Table 2.4-1. Appropriate spill containment and clean-up kits would be kept on site during construction and maintained during the operation of the DSSF.

Table 2.4-1
Chemicals at DSSF Locations during Operations

Product	Use
Diesel Fuel	Vehicles
Gasoline	Vehicles
Motor Oil	Vehicles
Mineral Oil	Transformers

The DSSF would generate minimal wastes during operation. Electrical generating activities would not produce hazardous or other industrial waste. Small amounts of universal waste and recycled batteries are expected to be stored on site during operations. PV modules that become damaged or defective would be identified through periodic inspections and routine power performance monitoring and recycled at an off-site recycling facility in accordance with local, state, and federal regulations.

An on-site septic system and leach field near the on-site O&M facility would be used to manage sanitary waste during DSSF operation. Permits for the septic system would be obtained, as needed. Soil percolation tests would be performed in order to demonstrate that an on-site septic system and leach field is feasible at the planned location. Additional testing may be performed in accordance with applicable regulations prior to final leach field design. The specific location of the leach field and septic system may be adjusted based on the results of preliminary percolation tests.

Gen-Tie Line and On-Site Substation

DSSF operations and maintenance personnel would perform periodic maintenance of the proposed Gen-Tie Line and On-site Substation. The proposed Project would not require any additional personnel. The Project's operation and maintenance personnel would operate and maintain all of the proposed Project Gen-Tie Line and On-Site Substation components in accordance with procedures consistent with recommendations in the vendor reference manuals.

Operation and maintenance of the proposed Project Gen-Tie Line would involve periodic inspection via helicopter or truck. The transmission lines would be maintained on an as-needed basis and would include maintenance of access roads and erosion/drainage control structures.

The proposed On-Site Substation would be unmanned, and the electrical equipment within the Substation would be monitored and controlled remotely by a power management system from the DSSF control room or a centrally located operation control center. Due to the remote operation of the On-Site Substation, personnel would generally visit for electrical switching and routine

maintenance. Routine maintenance would include equipment testing, equipment monitoring and repair, as well as emergency and routine procedures for reliability and preventive maintenance. Operations and maintenance personnel would generally visit the On-Site Substation two to three times per week. The Project would also implement a stormwater management plan and hazardous materials business plan to minimize the potential for accidental release of hazardous materials during operation of the Substation.

The installation of telecommunications infrastructure would not change staffing for the existing telecommunication sites. All telecommunications equipment would be operated and maintained by site personnel. Preventative maintenance of telecommunications infrastructure, which would be located at the On-Site Substation and on the Gen-Tie Line between the On-Site Substation and Red Bluff Substation, would typically be scheduled every year to ensure system reliability and performance.

2.4.2 Operation and Facility Maintenance Needs for Red Bluff Substation

The Red Bluff Substation would be unmanned, and electrical equipment within the Substation would be remotely monitored. SCE personnel would visit for routine maintenance purposes. Routine maintenance would include equipment testing, monitoring, and repair. SCE personnel would generally visit the Substation three to four times per month*. The well that would be used for dust control during construction would also be used as potable water for the life of the Substation. A septic system would also be installed to manage the sanitary waste of employees during operation and maintenance of the Substation. Water demand associated with the periodic visits by Substation employees is estimated at no more than 100 gallons per month. The septic system would be located inside the perimeter fencing.*

The transmission lines would be maintained in a manner consistent with CPUC General Order No. 165. SCE maintains an inspection frequency of the energized overhead facilities a minimum of once per year via ground and/or aerial observation. The frequency of inspection and maintenance activities would depend upon weather effects and any unique problems that may arise due to such variables as substantial storm damage or vandalism. Maintenance would include activities such as repairing conductors, replacing insulators, and access road maintenance.

An emergency diesel-powered generator would be installed inside the perimeter fencing and remotely tested once a month. The generator would be a 500-kV generator and would meet all Air Quality Control District regulations for emergency generators of this size and type.

2.4.3 Decommissioning of Facilities

The DSSF has a minimum expected lifetime of 30 years, with an opportunity for a lifetime of 50 years or more with equipment replacement and repowering. When the DSSF concludes operations, the wire, steel, and modules of which the system is comprised would be recycled to the extent feasible. The DSSF components would be deconstructed and recycled or disposed of safely, and the Solar Farm site could be converted to other uses in accordance with applicable land use regulations in effect at the time of closure. As required by BLM ROW regulations, a detailed Decommissioning and Reclamation Plan (Decommissioning Plan) will be developed in a manner that both protects public health and safety and is environmentally acceptable.

Decommissioning Plan

Solar Farm and Gen-Tie Line

Conditions are likely to change over the course of a DSSF lifespan of 30 years or more, and a final Decommissioning Plan would be developed in the future prior to facility closure based on conditions as they occur at that time. The reclamation measures provided in the Decommissioning Plan would be developed to ensure protection of the environment and public health and safety and to comply with applicable laws, ordinances, regulations, and standards.

In general, the Project Decommissioning Plan would address:

- Proposed decommissioning and reclamation measures for the Project and associated facilities;
- Activities necessary for site restoration/re-vegetation, if removal of equipment and facilities is needed;
- Procedures for reuse, recycling, or disposal of facility components; collection and disposal of hazardous wastes; and use or disposal of unused chemicals;
- Costs associated with the planned decommissioning activities and the source of funding for these activities; and
- Conformance with applicable laws, ordinances, regulations, and standards.

The Decommissioning Plan would be developed in coordination with the BLM and submitted to the BLM for review and approval prior to final closure of the facility.

Red Bluff Substation

Before decommissioning the SCE facilities (Red Bluff Substation and related elements) or within a reasonable timeframe following termination of the BLM ROW grant, SCE would prepare a decommissioning plan for BLM review and approval. The decommissioning plan would address the following:

- The decommissioning of SCE facilities from the permitted area;
- Any requirements for habitat restoration and revegetation;
- Activities and procedures for proper disposal of materials associated with the removal effort (if required); and
- Compliance with applicable laws, regulations, and policies.

Temporary Reclamation of Disturbed Areas

After closure, measures would be taken to stabilize disturbed areas once equipment and structures are decommissioned and removed from the Project locations. These measures would be outlined fully in the Decommissioning Plan. When Project structures are removed upon facility closure, the resulting disturbed soil would be stabilized using standard erosion control BMPs (e.g., use of mulch, fiber rolls, silt fences, reseeding, etc., as applicable) until final reclamation measures may be implemented. Only a small portion of the Solar Farm site contains structures that would be in direct contact with the ground and thus would create surface disturbance during removal; these include

access roads, the O&M facility, the Visitors Center, septic system and leach field, and associated parking areas. Removal of the solar arrays would create minimal ground disturbance due to the small footprint of their pile foundation design. Final reclamation measures would be implemented as soon as practicable after facility closure.

Removal of Power Generation and Substation Facilities

The PCSs, PV combing switchgear cabinets, a Gen-Tie Line, the On-Site Substation, and the Red Bluff Substation would be de-energized, decommissioned, dismantled, and removed in accordance with all federal, state, and local regulatory requirements. Where feasible, Project components would be recycled or reused. PV modules would be recycled at an off-site recycling facility, in accordance with local, state, and federal regulations.

Performance and Reclamation Bond

If the Project is approved, any ROW authorizations would include a required "Performance and Reclamation" bond to ensure compliance with the terms and conditions of the ROW authorization, consistent with the requirements of 43 CFR 2805.12(g). The "Performance and Reclamation" bond would consist of three components. The first component would be hazardous materials, the second component would be decommissioning and removal of improvements and facilities, and the third component would address reclamation, revegetation, restoration and soil stabilization.

2.5 BEST MANAGEMENT PRACTICES AND BUILT-IN MITIGATION

This section describes those features of the Project that, when implemented as part of Project construction or operation, would reduce or eliminate potential significant impacts of the Project. In addition, as part of the analysis for each resource topic discussed in Chapter 4, Applicant Measures and Mitigation Measures have been identified to reduce impacts. Applicant Measures (AMs) are defined as those proposed by Sunlight or SCE as part of the Project and those measures required by law, regulation, or policy. Mitigation Measures (MMs) are additional measures required by BLM to further reduce impacts. The specifics of these measures are provided in each relevant environmental resource discussion in Chapter 4. *A list of the Applicant Measures is provided in Table 2.5-1 below, and a complete list of the Applicant Measures and Mitigation Measures is provided in the Executive Summary.*

Solar Farm and Gen-Tie Line

Stormwater Pollution Prevention Plan

Sunlight prepared a hydrology study for the Project, which includes a drainage and stormwater analysis. The study modeled pre- and post-development stormwater flows under various conditions, up to and including 10-year and 100-year floods. First Solar is preparing an SWPPP for Project construction and coordinating with the Colorado River Basin RWQCB regarding potential coverage under the general permit for Stormwater Discharges Associated with Construction Activities, the Construction General Permit (Water Quality Order 2009-0009-DWQ, effective July 1, 2010). The SWPPP would identify structural and non-structural BMPs to manage the offsite discharge of stormwater from the Solar Farm site. Structural BMPs are devices such as silt fences, de-silting basins or swales; non-structural BMPs refer to operating practices on the site, such as covering and storing potential pollutant source materials in a manner that avoid discharges to the stormwater system. A Post-Construction Stormwater Management Plan (i.e., a Site Runoff Control Plan composed of structural and non-structural BMPs) would also be prepared.

Table 2.5-1
Applicant Measures

Resource	Applicant Measures
Air Resources	
	Sunlight has designed the Project to incorporate various measures that will reduce on-site construction-related emissions and emissions from construction-related traffic. AM-AIR-1: Sunlight shall develop and implement a dust control plan that includes the use of dust palliatives to ensure compliance with SCAQMD Rule 403. The dust control plan is expected to focus on reducing fugitive dust from construction activities. AM-AIR-2: Construction activity shall be phased across the Solar Farm site in a manner that would minimize the area disturbed on any single day. AM-AIR3: Cut and fill quantities shall be balanced across the Solar Farm site to minimize emissions from grading and to avoid the need to import fill materials or to remove excess spoil. AM-AIR-4: Sunlight shall use power screeners to obtain sand and gravel requirements on-site, rather than having construction sand and gravel delivered to the Solar Farm site by truck. AM-AIR-5: Sunlight shall arrange a shuttle bus program for construction workers, with assembly points in the Palm Springs and Blythe areas. Sunlight expects this shuttle bus system to be heavily used by construction workers, with an average of 89.5 percent of construction workers accessing the Solar Farm site by shuttle bus. SCE has identified two applicant measures that will be implemented during construction of the Red Bluff Substation: AM-AIR-6: SCE shall develop and implement a dust control plan to ensure compliance with SCAQMD Rule 403 during Substation construction. AM-AIR-7: SCE would require bidders for the construction contract to submit a transportation plan describing how workers would travel to the Project site.
Vegetation	
	AM-BIO-1. A Habitat Compensation Plan is being prepared and will be implemented by the Applicant to compensate for the loss of creosote desert scrub, desert dry wash woodland, and jurisdictional resources. Compensation will be accomplished by acquisition of mitigation land or conservation easements or by providing funding for specific land acquisition, endowment, restoration, and management actions under one of several programs including the recently approved mitigation program created by SB 34 and as required under MM-BIO-2, Off-site Compensation. The Habitat Compensation Plan will be reviewed and approved by BLM, USFWS, and CDFG. The precise details of the mitigation, including mitigation ratios, will be established in the BLM ROW grant, USFWS Biological Opinion, and CDFG 2080.1 Consistency Determination. The draft plan is provided in Appendix H. At a minimum, mitigation ratios required in the NECO Plan/EIS are 1:1 for permanent impacts to creosote bush scrub, 3:1 for permanent impacts to desert dry wash woodland, and 5:1 for permanent impacts to the Chuckwalla DWMA and Chuckwalla CHU). Mitigation ratios may be greater based on the requirements of USFWS and CDFG. Finally, areas occupied by the burrowing owl will be mitigated at 6.5 acres per occupied burrow (which will be covered by mitigation of creosote bush scrub habitat) and creation or enhancement of two burrows will be implemented for every active burrow. AM-BIO-2. A Draft Integrated Weed Management Plan (IWMP) has been prepared pursuant to BLM's Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States (BLM 2007) and the National Invasive Species Management Plan (The National Invasive Species Council 2008), and will be implemented by the Applicant to reduce the potential for the introduction of invasive species during construction, operation and maintenance, and decommissioning of the Project. The draft plan is in Appendix H of this document and will be reviewed and approved by the BLM.

Table 2.5-1 (continued)
Applicant Measures

Resource	***Applicant Measures***
Vegetation (cont.)	
	The following measures are required in the Plan and will be implemented by the Applicant to monitor and control invasive species (details associated with these measures are provided in Section 4.3): • *Preventative Measures During Construction* • *Containment and Control Measures* • *Monitoring* • *Reporting* • *Success Criteria* *AM-BIO-3. Preconstruction Surveys for Special Status Plant Species and Cacti. Before construction, the Applicant will stake and flag the construction area boundaries, including the construction areas for the Solar Farm site, Gen-Tie Lines, and Red Bluff Substation; construction laydown, parking, and work areas; and the boundaries of all temporary and permanent access roads. A BLM-approved biologist will then survey all areas of proposed ground disturbance for special status plant species and cacti during the appropriate blooming period for those species having the potential to occur in the construction areas. All special status plant species and cacti observed will be flagged for transplantation. All cacti observed will be flagged for transplantation and special status plant species observed will be flagged for salvage.* *AM-BIO-4. Worker Environmental Awareness Program (WEAP). The Applicant will implement a WEAP to educate on-site workers about sensitive environmental issues associated with the Project. The program will be administered to all on-site personnel including surveyors, construction engineers, employees, contractors, contractor's employees, supervisors, inspectors, subcontractors, and delivery personnel. The program will be implemented during site mobilization, ground disturbance, grading, construction, operation, and closure. Details of the program are provided in Section 4.3.* *The training will place special emphasis on the special status species that have been observed in the Project locations or have a high likelihood to occur, including special status plant species, desert tortoise and other special status reptile species, Palm Springs round-tailed ground squirrel, burrowing owl, golden eagle, nesting bird species and bat species, and the American badger.* *BLM will be responsible for ensuring that each construction worker at the site, throughout the duration of construction activities, receives the above training.* *AM-BIO-5. The Applicant will prepare and implement a Vegetation Resources Management Plan that contains the following components (additional detail is provided in Section 4.3):* • *A Vegetation Salvage Plan which discusses the methods that will be used to transplant cacti present within the Project locations following BLM's standard operating procedures, as well as methods that will be used to transplant special status plant species that occur in the Project locations if feasible.* • *A Restoration Plan which discusses the methods that will be used to restore creosote bush scrub and desert dry wash woodland habitat that is temporarily disturbed by construction activities.* *The Vegetation Salvage Plan and Restoration Plan will specify success criteria and performance standards as required per MM-BIO-4, Salvage and Restoration Plan Performance Standards. BLM will be responsible for reviewing and approving the plan and for ensuring that the Applicant implements the plan including maintenance and monitoring required in the plan.*

Table 2.5-1 (continued)
Applicant Measures

Resource	***Applicant Measures***
Wildlife	
	Implementation of Applicant Measures AM-BIO-1, AM-BIO-2, AM-BIO-4, and AM-BIO-5 discussed in Section 4.3, Vegetation, would reduce impacts on wildlife as well. Where there is a conflict between provisions of the Mitigation Measures recommended for wildlife impacts and the following Applicant Measures, the Mitigation Measures take precedence. *AM-WIL-1. A Draft Desert Tortoise Translocation Plan has been prepared for the Project and will be implemented by the Applicant to ensure that construction monitoring will be conducted by a BLM-, USFWS-, and CDFG-approved biologists during all construction activities and that any desert tortoise found with the construction zone will be translocated to a suitable location outside of the Project footprint. The draft plan is in Appendix H and will be reviewed and approved by BLM. The final plan will conform to the 2010 USFWS desert tortoise relocation guidelines entitled Translocation of Desert Tortoise (Mojave Population) From Project Sites: Plan Development Guidance. Unpublished Report dated August 2010.* *The Desert Tortoise Translocation Plan contains an analysis of several recipient sites for desert tortoises to be translocated from the Solar Farm site and Red Bluff Substation. The final recipient site will be selected by BLM, the USFWS, and CDFG.* *Desert tortoises found along the linear components of the Project, including the Gen-Tie Line, Telecommunications site, and access roads will be relocated out of harm's way pursuant to USFWS guidance (U.S. Fish and Wildlife Service. 2009. Desert Tortoise Field Manual. Ventura Fish and Wildlife Office, Ventura, California). Specifically, biological monitors will be present during all construction activities to ensure that active burrows are avoided. If a desert tortoise is found, the tortoise will be allowed to passively traverse the site while construction in the immediate area is halted. If the tortoise does not move out of harm's way after approximately 20 minutes, a biologist authorized to handle desert tortoise, will actively move the animal out of harm's way. Vehicles parked in desert tortoise habitat will be inspected immediately before they are moved. If a tortoise is found beneath a vehicle, a biologist authorized to handle desert tortoise will be contacted to move the animal out of harm's way, or the vehicle will not be moved until the desert tortoise leaves of its own accord.* *For desert tortoises in the Solar Farm site and Red Bluff Substation, they will be relocated using the following phased translocation process (additional details are provided in Section 4.4):* • *Installation of Perimeter Fencing* • *Clearance Surveys and Translocation* • *Long-term Monitoring* • *Reporting* *During the construction and operations and maintenance phases of the Project, additional BMPs will also be implemented by the Applicant, as described in Section 4.4.* *AM-WIL-2. Contribute to a USFWS Regional Raven Management Plan. The Applicant shall contribute to the U.S. Fish and Wildlife Service (USFWS) Regional Raven Management Program by making a one-time payment of $105 per acre of project disturbance to the national Fish and Wildlife Federation Renewable Energy Action Team raven control account.* *A Raven Management Plan (Ironwood Consulting 2010e) has been prepared and will be implemented by the Applicant to minimize the potential to attract ravens to the Project site. Additional details are provided in Section 4.4 and in Appendix H.*

Table 2.5-1 (continued)
Applicant Measures

Resource	Applicant Measures
Wildlife (cont.)	
	AM-WIL-3. A Draft Avian and Bat Protection Plan has been prepared and will be implemented by the Applicant to specify necessary actions to be taken to protect nesting bird and bat species, including burrowing owls, nesting birds, and roosting bats. The draft plan is in Appendix H and will be reviewed and approved by BLM. The final plan will conform to the 2010 USFWS avian and bat guidelines entitled Considerations for Avian and Bat Protection Plans U.S. Fish and Wildlife Service White Paper. Additional details are provided in Section 4.4. AM-WIL-4. Construction Water Storage Pond Design. The temporary construction water ponds shall be designed, constructed, and operated in compliance with all applicable regulatory requirements with respect to design, operation, and maintenance, protection of migratory waterfowl, and raven management. Additional details are provided in Section 4.4.
Climate Change	
	Three of the five applicant measures adopted by Sunlight for Air Resources would help reduce greenhouse gas emissions in addition to reducing criteria pollutant emissions (AM-AIR-3, AM-AIR-4, and AM-AIR-5).
Cultural Resources	
	AM-CUL-1: A cultural resources monitoring and mitigation plan has been included as a Project design feature to minimize impacts. The plan will include a description of areas to be monitored during construction, a discovery plan that will address unanticipated cultural resources, and provisions for the education of construction workers. Responsible parties for mitigation measures will be identified.
Paleontological Resources	
	AM- PR-1. The Applicant shall be responsible for the following mitigation (more details are provided in Section 4.7): • A qualified paleontologist will conduct a study to characterize the paleontological sensitivity of the Project Study Area. Should the site characterization and or the site reconnaissance identify areas of high potential for paleontological resources, an additional mitigations could be implemented, as determined by the BLM. • A qualified paleontologist will develop a monitoring and mitigation plan prior to construction to mitigate adverse impacts on paleontological resources if excavation is to occur in an area of high paleontological sensitivity. The plan will include measures to be followed in the event that fossil materials are encountered during construction.
Geology and Soil Resources	
	AM-GEO-1. The Applicant shall include, as part of the construction design plans for the Solar Farm and Gen-Tie Line, the mitigation measures provided in the Earth Systems Southwest (2010) geotechnical survey. These mitigations are summarized in Section 4.8 and in Appendix F, and are subject to BLM approval. The Applicant shall be responsible for implementing these mitigations. AM-GEO-2. The Applicant shall implement the following mitigation measures to reduce impacts from wind and water erosion to soils (additional details are in Section 4.8): • Implement Mitigation Measures MM-WAT-6 and MM-WAT-7, discussed in Chapter 4.17, Water Resources. • Obtain coverage under the NPDES General Permit for Storm Water Discharges Associated with Construction Activity (General Permit) Water Quality Order 2009-0009 DWQ; • Use nonhazardous dust suppressants approved by the BLM and water on an as-needed basis to suppress wind-blown dust generated at the site during construction. Dust palliatives also would be applied between rows of solar panels for dust suppression during operation;

Table 2.5-1 (continued)
Applicant Measures

Resource	Applicant Measures
Geology and Soil Resources (cont.)	
	• Implement erosion control measures during construction; and • Use silt fences for erosion control in the event of a storm event along neighboring properties, Power Line Road and along the main drainage to the east of the Solar Farm site. AM-GEO-3. SCE shall undertake the following mitigation measures as part of the Substation Project: • Before the final design of the Substation, a combined geotechnical engineering and engineering geology study shall be conducted by SCE to identify site-specific geologic conditions and potential geologic hazards in sufficient detail to support sound engineering. Appropriate mitigations for identified geological hazards will be identified in the geotechnical study. • For new Substation construction, specific requirements for seismic design will be followed based on the Institute of Electrical and Electronic Engineers' 693 "Recommended Practices for Seismic Design of Substations". • New access roads, where required, will be designed to minimize ground disturbance during grading. • Cut-and-fill slopes will be minimized by a combination of benching and following natural topography where feasible. • Any disturbed areas associated with temporary construction will be returned to preconstruction conditions (to the extent feasible) after the completion of Project construction. AM-GEO-4. SCE shall implement the following mitigation measures to reduce impacts from wind and water erosion to soils (additional details are in Section 4.8): • Obtain coverage under the NPDES General Permit for Storm Water Discharges Associated with Construction Activity (General Permit) 2009-0009 DWQ. • Use nonhazardous dust suppressants approved by the BLM to suppress wind-blown dust generated at the site during construction. • Implement erosion control measures during construction.
Lands and Realty	
	AM-LAND-1. Property owners within 300 feet of the Project shall be notified of all major Project construction milestones, such as start of Project construction. Said property owners shall be provided with a detailed construction schedule at least 30 days before construction so that they are informed as to the time and location of disturbance. Updates shall be provided as necessary. AM-LAND-2. The Project shall be designed to minimize disturbance or modification of existing uses such as transmission lines, pipelines, and underground cables. If disturbance or modification of existing uses were necessary, Sunlight shall coordinate with the owners to determine an acceptable solution. Sunlight shall fund any necessary avoidance measures or modifications.
Noise and Vibration	
	AM-NZ-1: Sunlight and SCE shall limit most construction activity to daytime hours consistent with Riverside County noise ordinance limitations. Certain electrical connection activities at the Solar Farm site would occur at night for safety reasons, but would not require any heavy equipment operations. AM-NZ-2: SCE shall construct a masonry security wall around the perimeter of the Red Bluff Substation. This wall would also provide localized noise shielding for adjacent areas.

Table 2.5-1 (continued)
Applicant Measures

Resource	***Applicant Measures***
Public Health and Safety/Hazardous Materials	
	Sunlight shall be responsible for these mitigations:
	AM-HAZ-1a: Appropriate spill containment and clean-up kits shall be kept on site during construction and maintained during the operation of the Solar Farm and Gen-Tie Line.
	AM-HAZ-1b: In accordance with the Emergency Planning & Community Right to Know Act, the Applicant shall supply the local emergency response agencies with a Hazardous Materials Management Plan and an associated emergency response plan and inventory specific to the site. The Applicant shall prepare the plan for approval by the BLM and review and comment by the County of Riverside. The Applicant shall be responsible for implementing the approved plan (additional details are in Section 4.11).
	AM-HAZ-1c: During construction of the Solar Farm and Gen-Tie Line, BMPs for handling, storing, and disposing of hazardous materials and waste shall be followed (additional details are in Section 4.11).
	AM-HAZ-1d: An SPCC Plan shall be developed and implemented that would identify primary and secondary containment for oil products stored on site as well as training in spill management in the event of an unexpected release. The Applicant shall prepare the plan for approval by the BLM and review and comment by the County of Riverside. The Applicant shall be responsible for implementing the approved plan (additional details are in Section 4.11).
	AM-HAZ-1e: The Applicant shall develop an Environmental Health and Safety Plan for the construction and operation of the Project to ensure it includes all activities and compliance to all local, state and federal regulatory requirements. Illness and Injury Prevention Programs will be developed for construction and operation. The Applicant shall prepare the plan for approval by the BLM. The Applicant shall be responsible for implementing the approved plan (additional details are in Section 4.11).
	AM-HAZ-2: Based on the preliminary information provided in the Phase I ESA and the Class I cultural inventory of the Project Site, the Applicant proposes to take the following steps to better determine the nature and extent of potential MEC issues and then take appropriate corrective action measures. The first step is to better delineate the history of military activities within the proposed Project footprint. This step would include further research regarding prior MEC removals that may have been issued in the past for certain areas by military or other investigating entities, and may include consultations with DoD personnel and archival research. As a result of the historical occurrence of military training activities throughout the DTC-CAMA, potentially including the Project area, this MEC consultation and archival research will address the entire Project footprint, including the specific areas of concern identified by the Phase I ESA and cultural resource surveys. With that more comprehensive understanding, the Applicant will propose, as necessary, further appropriate above and below-ground assessments, under the direction of an expert consultant team, to delineate areas for further investigation and then removal. The Applicant, under direction from the BLM, will determine which site-specific in-field investigative techniques and methodologies will be used to investigate and resolve potential MEC issues before Project construction. Finally, all construction workers will receive appropriate MEC health and safety awareness training to ensure that they know what actions to take if unanticipated MEC or other suspicious articles are encountered during construction.
	AM-HAZ-3: The Applicant shall provide the County of Riverside with a project-specific Emergency Response and Inventory Plan before construction begins. The Applicant shall prepare the plan for approval by the BLM and review and comment by the County of Riverside. The Applicant shall be responsible for implementing the approved plan (additional details are in Section 4.11).

Table 2.5-1 (continued)
Applicant Measures

Resource	Applicant Measures
Public Health and Safety/Hazardous Materials (cont.)	
	AM-HAZ-4: Project facilities shall be designed, constructed, and operated in accordance with applicable fire protection and other environmental, health and safety requirements. In compliance with County of Riverside requirements, a project-specific fire prevention plan for both construction and operation of the Solar Farm and Gen-Tie Line will be completed prior to initiation of construction. The fire protection plan shall be approved by the BLM and provided to Riverside County for review and comment. Sunlight shall have a Project-specific fire prevention plan in place during construction, operation and decommissioning of the Project. This plan shall comply with applicable County of Riverside regulations and would be coordinated with the BLM Fire Management Officer and the local Fire Department in the Chuckwalla Valley at Tamarisk Park. AM-HAZ-5: An emergency response plan and site security plan shall be completed for the Project facilities by qualified professionals. These plans shall be developed in accordance with the BLM and DOE requirements (additional details are in Section 4.11). **SCE shall be responsible for these mitigations**: AM-HAZ-2: Same as above for Sunlight. AM-HAZ-6a: SCE shall implement standard fire prevention and response practices for the construction activities where hazardous materials are in use. SCE shall be responsible for implementing the approved plan (additional details are in Section 4.11). AM-HAZ-6b: As applicable, SCE shall follow fire codes per California Department of Forestry and Fire Protection (2008) requirements for vegetation clearance during construction of the Project to reduce the fire hazard potential. AM-HAZ-6c: Hazardous materials and waste handling shall be managed in accordance with the following plans and programs that SCE shall be responsible for implementing: • Spill Prevention, Control and Countermeasures Plan (SPCC Plan) • Hazardous Materials Business Plans (HMBPs) • Storm Water Pollution Prevention Plan (SWPPP) • Health and Safety Program • Hazardous Materials and Hazardous Waste Handling • Emergency Release Response Procedures AM-HAZ-6d: Hazardous materials shall be used or stored and disposed of in accordance with federal, state, and local regulations. AM-HAZ-6e: The Substation shall be grounded to limit electric shock and surges that could ignite fires. AM-HAZ-6f: All construction and demolition waste shall be removed and transported to an appropriately permitted disposal facility. AM-HAZ-7: SCE shall submit FAA Form 7460-1 and receive a Determination of No Hazard to Navigable Airspace and comply with any AC 70/7460-1K (Obstruction Marking and Lighting) requirements from the FAA for construction of the 185-foot microwave tower associated with the Desert Center Communications Site.

Table 2.5-1 (continued)
Applicant Measures

Resource	Applicant Measures
Public Health and Safety/Hazardous Materials (cont.)	
	AM-HAZ-8: SCE shall provide the BLM and the County of Riverside with a project-specific Emergency Response and Inventory Plan before construction begins. SCE shall be responsible for implementing the approved plan (additional details are in Section 4.11). AM-HAZ-9: Project facilities shall be designed, constructed, and operated in accordance with applicable fire protection and other environmental, health and safety requirements. In compliance with County of Riverside requirements, a project-specific fire prevention plan for both construction and operation of the Substation shall be completed by SCE prior to initiation of construction. Additional detail is provided in Section 4.11. AM-HAZ-10: Develop and implement a fire prevention plan. Before the construction permit is issued, the Applicant shall develop and implement a fire protection plan for use during construction and operation. The Applicant shall submit the fire plan, along with maps of the Project site and access roads, to CAL FIRE/Riverside County Fire Department for review and approval before construction begins. Additional detail is provided in Section 4.11
Recreation	
	No mitigation proposed.
Socioeconomic and Environmental Justice	
	AM-SOCIO-1: The public shall be notified of Project activities and scheduling to inform the public of projected impacts on the surrounding area. This notification shall provide the public with the opportunity to plan their personal and business activities appropriately. AM-SOCIO-2: Sunlight shall align Gen-Tie lines along existing linear features (such as Kaiser Road) to minimize the social effects of potential visual impacts.
Special Designations	
	AM-SD-1: During operation and maintenance of Red Bluff Substation, lights shall normally be off. Where needed during emergency and scheduled work during the night, lights shall be shielded, shall be directed downward, and shall be motion sensitive to minimize glare in surrounding areas. Mitigation measures described for Cultural Resources, would be implemented to reduce impacts on cultural resources within the Alligator Rock ACEC.
Transportation and Public Access	
	AM-TRANS-1: Sunlight shall prepare a Construction Traffic Control Plan in conjunction with Riverside County or Caltrans in accordance with Caltrans Manual on Uniform Traffic Control Devices and the California Joint Utility Traffic Control Manual (2010). Details are provided in Section 4.15. AM-TRANS-2: Sunlight shall document road conditions at the beginning and end of Project construction and decommissioning and contribute fair share cost for pavement maintenance and other needed repairs. AM-TRANS-3: Sunlight shall share Project information with the airport owners if a transmission line alternative that runs near the former Desert Center Airport's runway is selected to assure that no special precautions are needed. AM-TRANS-4: BLM shall coordinate with the DoD R-2508 Complex Sustainability Office, Region IX, based in San Diego, California, and with local regional military installations regarding low-level flight operations relative to the Project to assure that no special precautions are needed.
Visual Resources	
	No mitigation proposed.

Table 2.5-1 (continued)
Applicant Measures

Resource	Applicant Measures
Water Resources	
	AM-WAT-1 training construction staff in the management of hazardous materials and use of spill control and cleanup equipment; AM-WAT-2 having a clear chain of command within the organizational structure with responsibility for implementing, monitoring, and correcting BMPs; AM-WAT-3 covering and containing hazardous materials so that they are not in contact with precipitation or runoff; AM-WAT-4 storing hazardous materials in one or more central areas, and instituting rules requiring all hazardous materials to be secured at the end of the day; AM-WAT-5 maintaining good inventory records; storing hazardous liquids and dispensing equipment in secondary containment; AM-WAT-6 maintaining adequate quantities of spill containment and response equipment at readily accessible points throughout the site; AM-WAT-7 identifying the worst case and most likely spill scenarios, and providing spill response equipment adequate to respond to these scenarios; AM-WAT-8 using chemicals presenting the least environmental hazard wherever possible; AM-WAT-9 storing the smallest quantities of hazardous materials possible on the site; AM-WAT-10 maintaining site security to reduce vandalism; AM-WAT-11 requiring all contractors to abide by the program BMPs and to identify any hazardous materials and specific BMPs pertaining to their trade or activity. The SPCC Plan for the site would address storage of mineral oil contained in transformers. A SPCC Plan is required when 10,000 gallons or more of mineral oil in electrical equipment is contained on site, or when 1,320 gallons of petroleum is stored on the site, although an SPCC Plan can be voluntarily implemented for lesser quantities. The SPCC Plan would address methods and procedures for managing these products, lighting, security, containment requirements, training requirements, staff responsibilities for inspecting storage and dispensing equipment; and equipment and procedures for responding to a spill or release of stored petroleum products. Among the features that are incorporated into the Project design to address potential impacts on water resources are the measures identified in the Storm Water Hydrology Report for Alternative B (AECOM. 2010b; Appendix G) to reduce flooding and erosion effects associated with the 100-year design runoff event. The modeling results indicate that the most effective measure to reduce runoff depth and velocity would be AM-WAT-12 decompacting the soil between solar panels to increase infiltration potential. AM-WAT-13 Riprap increases surface roughness and slows runoff velocities, decreasing sediment transport, and increasing flow depth. Riprap would be used in conjunction with decompaction, as riprap would not mitigate flow or volume. AM-WAT-14 Retention basins could be located along the upstream western boundary of the Project site to intercept run on storm water flows. The intent of this measure is to reduce overall flow depths, velocities and outflow volume by retaining run-on storm water volume. They would also reduce sediment transport within the Project site. AM-WAT-15 Check dams can be constructed to address specific post-development hydraulic characteristics that remain after implementation of the decompaction measure. Check dams could be located near the downstream southern boundary of the Project site to intercept run off. Check dams would have an effect on the storm water upstream of each dam because the storm water would back up behind each dam. Check dams would also reduce flow velocities and would retain sediment. AM-WAT-16 Strip detention basins would be approximately six inches deep and 70 feet wide, and would be designed to follow the topographic contours of the site, so their lengths would be dependent on the locations of the basins on the site. These detention basins could be located near the downstream southern boundary of the Project site to intercept run off storm water flows. The intent of this measure is to reduce outflow volume by detaining run-off storm water volume, similar to the check dam measures. Strip detention basins would not have an effect on the storm water upstream of each basin but would reduce flow velocities and sediment transport leaving the Project site.

Dust Control Plan

Sunlight will prepare a dust control plan incorporating appropriate best practices for management of dust during construction activities for the Solar Farm site and Gen-Tie Line.

Hazardous Materials Management Plan

This plan would be prepared, if necessary, prior to construction and/or operations according to applicable regulations.

Geotechnical Investigation

Sunlight will complete a geotechnical investigation for the Gen-Tie Line before final design and construction of the Project (one has already been completed for the Solar Farm site).

Sulfur Hexafluoride (SF6) Management Plan

Sunlight will prepare a management plan, incorporating appropriate best practices for management of SF6, in accordance with EPA guidelines.

Spill Prevention Control and Countermeasure Plan

Sunlight will prepare an SPCC Plan due to the presence on the site of oil-containing transformers. Prior to Project operation, a SPCC Plan will be prepared based on current EPA 40 CFR Part 112 rule.

Waste Management Plan

All construction and operational wastes produced at the Project locations would be properly collected, recycled (if possible), treated (if necessary), and disposed of in an appropriate manner and in full compliance with all regulatory requirements. Project wastes would include sanitary wastewater, nonhazardous waste, and potentially small quantities of hazardous waste, primarily liquid. Domestic waste streams such as showers and toilets would be treated using a septic tank and leach field. Heavy solids would settle to the bottom of the septic tank to undergo anaerobic decomposition and slight compaction, and will be removed, as necessary. Liquid effluent from the septic tanks will be distributed to a leach field. It is expected that the leach field will satisfy the needs of the DSSF for its entire service life. The leach field would be constructed of open tile drains laid in trenches filled with gravel or crushed stone. The trenches permit downward percolation or upward evaporation and transpiration.

Biological Resources Plans

The following biological resources management plans are being prepared for the Project. Drafts of these plans are provided in Appendix H.

Avian and Bat Protection Plan

The Avian and Bat Protection Plan (ABPP) is intended to reduce the potential risks for avian and bat mortality caused by actions performed by Sunlight in construction and operation of the Solar Farm and Gen-Tie Line; and by SCE in construction and operation of its Project components (Red Bluff Substation and associated access road, distribution line and telecommunications site).

This plan is modeled on the recommendations of the U.S. Fish and Wildlife Service (USFWS or Service) in its *Interim Guidelines for the Development of a Project Specific Avian and Bat Protection Plan for Wind Energy Facilities*. Although this document is applicable to wind energy, rather than solar energy, projects, USFWS recommends that this template be used, to the extent appropriate, for solar projects. This plan also follows the Avian and Bat Protection Plan Guidelines developed jointly by Edison Electric Institute's Avian Power Line Interaction Committee (1994, 2006) and the USFWS (2000, 2003, 2010). Additionally, the ABPP is consistent with applicable federal and state regulations established by the BLM and other regulatory agencies such as the *Northern and Eastern Colorado Desert Coordinated Management Plan* (NECO Plan, BLM and CDFG 2002).

Common Raven Management Plan

The primary objective of this Raven Management Plan is to protect the juvenile and hatchling desert tortoises from predation by common ravens. They would be protected by eliminating or minimizing all aspects of human impact that attract ravens (garbage, surface water, animal and plant waste materials, perching sites, nesting sites, and roosting sites).

The secondary objective is to avoid lethal removal of ravens by installing passive bird deterrents. The final objective of this plan is to comply with the regional management actions of the agencies cooperating in the effort to promote tortoise recovery pursuant to the *Final Environmental Assessment to Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise* (USFWS 2008a).

Habitat Compensation Plan

The Applicant will compensate for impacts identified to sensitive biological resources either by acquiring mitigation land or conservation easements in areas accepted and approved by the relevant agencies, or by providing funding for land acquisition, endowment, restoration, and management actions under one of several programs, including the recently approved mitigation program created by California Senate Bill 34 (SB 34). The precise details of the mitigation will be established in the BLM Right of Way Grant, USFWS Biological Opinion, and CDFG 2080.1 Consistency Determination.

Desert Tortoise Translocation Plan

The desert tortoise (*Gopherus agassizii*) is a federally and state-listed threatened species known to inhabit the Proposed Action location and immediately surrounding areas. The purpose of the *Desert Tortoise Translocation Plan* is to describe the translocation effort for the Proposed Action. The goals of the plan are to (1) translocate desert tortoises from the Solar Farm site and Substation to identified recipient sites; (2) minimize take of desert tortoises from Project activities; and (3) assess the effectiveness of the translocation effort through a long-term monitoring program.

Integrated Weed Management Plan

Sunlight is currently in the process of developing a plan for vegetation management at the Solar Farm site. Several different options for revegetating the site after construction are being considered. Sunlight is coordinating with the BLM, USFWS, CDFG, Riverside County, and the California Native Plant Society to determine the best methods and species to employ in the revegetation plan. An Integrated Weed Management Plan will be developed and implemented to control invasive

exotic weeds and will comply with existing BLM plans and permits including the *Vegetation Treatments Using Herbicides* (2007) and *Vegetation Treatment Final EIS* (2007).

Health and Safety Plan

The DSSF would follow OSHA and CalOSHA requirements in its construction and operating activities. A safety and compliance director would be assigned to the DSSF to ensure that safety is given the highest priority. A site-specific Health and Safety Plan would be developed prior to construction, identifying the roles and responsibilities of every employee with respect to safety on the DSSF. The Plan would be kept on-site at all times.

Environmental Inspection and Compliance Monitoring Plan

Sunlight will develop an Environmental Inspection and Compliance Monitoring program and plan for the DSSF, covering both construction and operation. A qualified individual would be designated to serve as the DSSF's Environmental Manager. The Environmental Manager would be responsible for development and implementation of the DSSF's compliance program. They would be responsible for communication and coordination with the applicable regulatory agencies and ensuring compliance with the various conditions and requirements of the full range of Project permits and approvals. The Environmental Manager would be responsible for the necessary record keeping and reporting required by DSSF permits. They would ensure that all applicable plans are up-to-date (e.g., DSSF SPCC Plan). The Environmental Manager's role would include advising Project management of actual and potential compliance/non-compliance issues and for ensuring that Project planning takes appropriate account of compliance issues in advance.

Cultural Resources Monitoring and Mitigation Plan

A cultural resources monitoring and mitigation plan would be developed prior to construction that would identify areas to be monitored during construction by a qualified archaeologist. A discovery plan would be included in the monitoring and mitigation plan that describes procedures to be followed in the event that subsurface archaeological materials are encountered during construction. The monitoring and mitigation plan would also include provisions for the education of construction workers about the importance of preserving significant cultural properties, and a process would be established for the workers to report and protect suspected discoveries. Curation of recovered archaeological materials would be arranged with an accredited curation facility.

Paleontological Resources Monitoring and Mitigation Plan

A paleontological resources monitoring and mitigation plan would be developed prior to construction that identifies areas to be monitored during construction by a qualified paleontological professional. The plan would include measures to be followed in the event that fossil materials are encountered during construction. The plan would include worker awareness training to ensure that the construction personnel understand requirements and procedures to be followed in the event of suspected fossil discoveries. Curation of recovered fossils will be arranged with an appropriate curation facility.

Fire Protection during Construction

The Applicant would have a Project fire prevention plan in place during construction. This plan would comply with applicable Riverside County regulations and would be coordinated with the local

Fire Department in the Chuckwalla Valley at Tamarisk Park. During construction, the following steps would be taken to identify and control fires and similar emergencies:

- A network of access roads would be constructed for adequate fire control and emergency vehicle access to the construction areas.
- Electrical equipment that is part of the DSSF would only be energized after the necessary inspection and approval, so there is minimal risk of any electrical fire during construction.
- Project staff would monitor fire risks during construction and operation to ensure that prompt measures are taken to mitigate identified risks. The Applicant's staff vehicles would be equipped with fire extinguishers.
- Transformers located on site would be equipped with non-toxic, mineral-oil-based coolant that is non-flammable, biodegradable and contains no polychlorinated biphenyls or other toxic compounds.
- Nonnative species would be managed per a Weed Management Plan prepared for the Project locations.

Red Bluff Substation

Geotechnical Study

Before the start of construction, SCE would prepare a geotechnical study of the Substation site and associated elements that would include an evaluation of the depth to the water table, evidence of faulting, liquefaction potential, physical properties of subsurface soils, soil resistivity, slope stability, and the presence of hazardous materials.

Hazardous Materials and Waste Management

Construction of the Red Bluff Substation and related elements would require the limited use of hazardous materials, such as fuels, lubricants, and cleaning solvents. All hazardous materials would be stored, handled and used in accordance with applicable regulations.

The SWPPP prepared for the Red Bluff Substation Project would provide the locations for storage of hazardous materials during construction, as well as protective measures, notifications, and cleanup requirements for any incidental spills or other potential releases of hazardous materials.

Construction of the Red Bluff Substation Project would result in the generation of various waste materials that can be recycled and salvaged. Waste items and materials would be collected by construction crews and separated into roll-off boxes at the materials staging area. All waste materials that are not recycled would be categorized by SCE in order to ensure appropriate final disposal. Nonhazardous waste would be transported to local authorized waste management facilities.

Dust Control Plan

SCE will prepare a dust control plan incorporating best practices for controlling dust during construction of the Red Bluff Substation.

Health and Safety Plan

Before construction, SCE will implement a plan including a worker safety and environmental training program.

Environmental Monitoring Plan

An environmental inspection and monitoring plan for construction of the Red Bluff Substation will be developed and implemented. The plan will include a cultural resources and biological resources mitigation monitoring plan including a Workers Environmental Awareness Program.

Post-Construction Cleanup

Any damage to existing roads as a result of construction would be repaired once construction is complete, in accordance with local agency requirements.

Following completion of construction activities, SCE would also restore all areas that were temporarily disturbed by construction of the Red Bluff Substation Project to as close to preconstruction conditions as possible, or, where applicable, to the conditions agreed on between the landowner (or land manager) and SCE. In addition, all construction materials and debris would be removed from the area and recycled or properly disposed of off-site at local authorized waste management facilities. SCE would conduct a final inspection to ensure that cleanup was successfully completed.

2.6 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

An integral part of the search for a suitable site included an evaluation *by Sunlight* of the availability of electric transmission capacity throughout SCE's service territory. California's transmission grid system poses a number of challenges to the interconnection of a power plant. Many potential locations for the interconnection of a power plant would require lengthy and expensive system upgrades in order to integrate the new capacity into the transmission system. By contrast, SCE's Devers-Palo Verde transmission line provides a unique opportunity to interconnect the Project at a point on the system with available electric transmission capacity. The Devers-Palo Verde line runs from the Devers Substation located near Desert Hot Springs in Riverside County, through the Coachella Valley and along the I-10 corridor through the Chuckwalla Basin, and eventually into the Palo Verde Substation in La Paz County, Arizona.

Several factors, including incompatible uses on public land and highly subdivided private land, eliminated the western end of the Devers-Palo Verde line from consideration for the Project. Much of the area near the Devers end of the transmission line has already been developed with wind farms. The land along Devers-Palo Verde line between Desert Hot Springs and Coachella is composed of multiple, densely populated cities and productive agricultural land, and is divided into relatively small parcels. Land in that region is thus more expensive and poses challenges for assembling a contiguous site large enough for a cost-effective interconnection to the transmission line. Within the Coachella Valley itself, many of the properties are subject to agricultural conservation contracts under the Williamson Act, preventing solar development on those parcels. Together, these factors eliminated the Devers-Coachella Valley portion of the transmission line.

From the Coachella Valley east along the Devers-Palo Verde line to the Chuckwalla Valley, the I-10 corridor is characterized by steep terrain unsuitable for solar development and interrupted by scattered private parcels. As a result, the Coachella Valley to Chuckwalla Valley portion of the Devers-Palo Verde line was not considered appropriate for the proposed Project.

From the Chuckwalla Valley east toward Blythe along the I-10 corridor, most of the *unencumbered* BLM land is subject to first-in-time applications by other solar projects for rights of way, which

would take priority over the proposed Project. There is very little private land available, with the exception of the private parcels excluded from further consideration because they are contained within the Palen Dry Lake, which is a unique environmental feature that is unsuitable for development, in part due to flood hazard. The agricultural community around Blythe is almost entirely active farming land, highly subdivided and largely subject to conservation contracts under the Williamson Act, rendering much of it unavailable for renewable energy development. Much of the remainder of the land area between the Chuckwalla Valley and Blythe is within Desert Tortoise Critical Habitat or Areas of Critical Environmental Concern. One alternative near Blythe on BLM-administered land was eliminated from further consideration, for reasons described below.

Alternatives not carried forward did not meet *one or more of the criteria identified above. They include alternative solar field layouts at the proposed site, other locations on private land, other locations on BLM-administered land, alternative generating technologies, alternative transmission and interconnection locations, and underground gen-tie lines*.

2.6.1 Alternative Layouts in Solar Farm Study Area

Several additional alternatives were considered for siting of the Solar Farm site and the Gen-Tie Lines within the Solar Farm Study Area. The alternatives described below were not carried forward for analysis.

Alternative Layout within Project Study Area (Solar Farm Layout A)

An additional Solar Farm layout was considered within the Project Study Area (SF-A). SF-A is in the same general location as SF-B, though the boundaries of the site are slightly different. SF-A encompasses approximately 4,186 acres, located entirely on BLM land. Elevation at SF-A varies from approximately 619 to 880 feet above mean sea level. The primary difference is in the site's northwest boundary, which pushes farther into occupied desert tortoise habitat and areas of higher concentrations of foxtail cactus. The northwestern portion of the site also contains higher concentrations of burrowing owl. Whereas the footprint of SF-B is estimated to contain approximately 10 to 14 live tortoises, the footprint of SF-A is estimated to contain approximately 24 to 32 live tortoises. Within the footprint of SF-A, 18 individual foxtail cacti were found, whereas within SF-B, 3 were found, and for SF-C, only 1 was found.

Conclusion. Since this layout did not provide any advantage over SF-B and would result in greater impacts to the desert tortoise and foxtail cactus, it was eliminated from consideration.

Larger Project (1,000 MW Project)

Initially, Sunlight applied to the California Independent System Operator (CAISO) to interconnect 1,000 MWs. This includes the current 550MWs proposed for the Project along with additional application for a 450-MW project. A 1,000-MW project in the Project Study Area would have an approximately 8,000-acre footprint and would require land on the east side of Pinto Wash *and to the north of the existing Solar Farm alternatives, SF-B and SF-C*.

Pinto Wash is a large central drainage east of the Solar Farm site that may provide a movement corridor for numerous large mammal species. In addition, the eastern portion of the Solar Farm Study Area (east of Pinto Wash) supports pockets of Sonoran desert scrub on aeolian sand deposits that have been stabilized by shrub and herbaceous vegetation. Approximately 20 acres of active sand

dune deposits, which are relatively barren expanses of moving sand and do not support extensive stabilizing vegetation, are located approximately 1 mile east of the Solar Farm alternatives. These dunes are located at the base of the southwest-facing bajada below the Coxcomb Mountains. The 20 acres of stabilized and active sand dunes east of Pinto Wash are suitable habitat for Mojave fringe-toed lizard *and several special-status species*. The Study Area for the proposed Sunlight and SCE components, all located west of Pinto Wash, do not support aeolian sand deposits and therefore are not expected to support *these* species.

The area to the north of the Solar Farm site supports habitats and features that have been demonstrated to support higher densities of desert tortoise in the Project region. Surveys of this area conducted in 2008 determined that the area north of SF-B and SF-C supports higher numbers of desert tortoises and burrowing owls than SF-B and SF-C, and at least one large population of foxtail cactus. The area north of the Solar Farm site supports a number of deep washes with steep banks that support dry desert wash woodlands and may provide movement corridors for large mammal species.

Conclusion. Based on the environmental constraints *identified above*, *the siting of a solar farm in the area to the east and north of proposed SF-B and SF-C* would have greater environmental impacts than the proposed action alternatives *without any technological advantages and is therefore not an appropriate location for siting a large-scale solar energy development project. For this reason*, this alternative was not considered for further analysis.

Direct Desert Tortoise Avoidance Alternative

The Applicant considered a 550-MW alternative that avoided all active tortoise sign, including live tortoise and active burrows found within the area of the Solar Farm Study Area. This alternative also avoided Pinto Wash, the area east of Pinto Wash and the *possible* Bighorn Sheep Corridor located north of the aqueduct in the northern portion of the Solar Farm Study Area. This alternative required a portion of the Project arrays to be located in the southwestern portion of the Solar Farm Study Area.

During the biological surveys conducted for the Project Study Area, no active tortoise sign was found in the southwestern portion of the Solar Farm Study Area; however, just above this southwestern area the Applicant found the highest concentration of desert tortoise within the Solar Farm Study Area. The southwestern portion of the Solar Farm Study Area is located just to the north of the Chuckwalla DWMA. Siting of Project arrays within this area would effectively eliminate the majority of the wildlife corridor between the DWMA and the area of the highest concentration of desert tortoise within the Solar Farm Study Area.

Conclusion. This alternative was determined to have greater environmental impact than the currently proposed project alternatives *without any technological advantages* due to the effective elimination of the wildlife corridor. *In coordination with BLM's partner agencies, CDFG and USFWS, the impacts to the wildlife corridor were considered to be detrimental.* Therefore, this alternative was not carried forward.

2.6.2 Privately Owned Land

Private lands were considered for siting the Solar Farm as well as BLM-administered lands *(see below)*. *The BLM does not typically analyze a non-federal application on public lands because such an alternative does not respond to the BLM's purpose and need to consider an application for the authorized use of public lands for renewable energy development. However*, the use of private lands was identified during scoping. The BLM, to inform the analysis, considered them but did not analyze them in detail.

Private Land within the Chuckwalla Valley

Within the Chuckwalla Valley, three potential sites on private land were eliminated from further consideration. The first site, Desert Center West, is approximately 4 miles west of the town of Desert Center. This site consists of approximately 44 semi-contiguous parcels totaling approximately 4,000 acres and owned by approximately 36 separate owners. The average size of the parcels is approximately 160 acres. The Desert Center West site is not under cultivation and is designated as Desert Tortoise Critical Habitat, so would likely have environmental impacts similar to or greater than those of the Project Study Area. While the Desert Center West site is near the western Red Bluff Substation alternative, existing transmission lines that cross the site further decrease the acreage available for solar development. The total site area available would be less than half of the area necessary for the proposed Project. Developing a portion of the Project here and a portion at another site would *not reduce* environmental impact*s* and *would* decrease the Project's feasibility by duplicating transmission lines and interconnection facilities.

The second private site eliminated from further consideration, Desert Center Central, lies southeast of the Project Study Area, 3.5 miles northeast from the town of Desert Center, and is composed of mostly disturbed agricultural land. This site is transected by an existing SCE 161kV transmission line. Some of the land is subject to conservation contract under the Williamson Act, preventing current solar development on those parcels. The site is also part of a sand transport corridor, making it less suitable for development. Additionally, the site contains approximately 464 different parcels, owned by approximately 228 owners. The average parcel size is approximately 25 acres. Due to the small parcels and scattered ownership, it would be difficult and expensive, if not impossible, to acquire sufficient contiguous acreage at Desert Center Central for the Project, so it was eliminated from consideration.

The third private site eliminated from further consideration is Desert Center East, located 7.5 miles east of the town of Desert Center. This site consists of 14 parcels totaling approximately 1,800 acres. The average parcel size is approximately 160 acres. Although largely consisting of disturbed land, the total area available would be less than half of the area necessary for the Project. Developing a portion of the Project here and a portion at another site would *not reduce* environmental impact*s* and *would* reduce Project feasibility by duplicating transmission lines and interconnection facilities. Accordingly, this site was eliminated from further consideration.

Conclusion. *For all three private sites considered, they were eliminated because they do not meet Project objectives, the purpose and need for the Project, or are otherwise not reasonable alternatives (as described above). Therefore, they are not analyzed in further detail.*

Contaminated Sites near the Devers-Palo Verde Corridor

In response to EPA's scoping comments for the proposed Project, *sites were considered as* identified by the EPA in its Renewable Energy Interactive Mapping Tool as contaminated and potentially contaminated Renewable Energy Sites for PV Utility Solar facilities. There were only two sites in the general region of the Devers-Palo Verde line. A 43-acre site identified as "Square D Company" is located in Beaumont, CA approximately 20 miles west of the Devers Substation. A second 35-acre site, "Woten Aviation Services Inc.," is located seven miles southwest of Blythe, CA, and 5 to 10 miles from the proposed Midpoint Substation. Both sites are part of the Resource Conservation and Recovery Act (RCRA) program. However, due to their *small* size, they would not *come close to*

meeting the energy production of the Proposed Action and would require multiple additional projects to be constructed in order to achieve an amount of renewable energy generation equivalent to the proposed Project, multiplying the impacts of developing interconnection facilities for the equivalent generating capacity.

Conclusion*. The use of contaminated sites for the proposed Project was eliminated from consideration because it does not meet Project objectives, the purpose and need for the Project, or is otherwise not a reasonable alternative (as described above). Therefore, it is not analyzed in further detail.*

2.6.3 Alternative BLM-Administered Land

Much of the BLM-administered land in the areas with the highest solar energy production potential is precluded from development by special designations such as ACEC, DWMA, wilderness, etc. Many potentially suitable areas outside these designated areas are precluded because they are in use or are proposed for other energy projects (primarily solar).

As described above, most BLM-administered land along the I-10 corridor was eliminated from consideration. An alternative site was considered on BLM-administered land to the southwest of Blythe, known as the Quartzite site. However, the cost of interconnecting a project the size of Desert Sunlight to the Devers-Palo Verde line from Quartzite would have been almost $75 million more than the cost of interconnecting from the Project Study Area. A smaller project is being considered in that area. As a result, the Quartzite site (as previously proposed) was eliminated from further consideration as an alternative to the DSSF Project.

Moving the interconnection point to a different location would also require a new interconnection application, which would re-start the CAISO interconnection process and would delay the project for several years.

Conclusion. *The use of alternative BLM-administered land was eliminated from consideration because it does not meet Project objectives, the purpose and need for the Project, or is otherwise not a reasonable alternative (as described above). Therefore, it is not analyzed in further detail.*

2.6.4 Alternate Non-Renewable Power Generating Technologies

Nonrenewable generation technologies that require use of natural gas, coal, or nuclear energy *were considered as potential alternatives to the proposed Project. BLM typically does not analyze an alternative for a different technology when a ROW application is submitted for a specific technology because such an application does not respond to the BLM's purpose and need to consider an application for the authorized use of public lands for a specific renewable energy technology. In addition, these projects* would not achieve *a* key objective: to construct and operate *a* generation facility that would contribute approximately 1,000,000 megawatt hours (MWh) of clean, renewable solar energy per year to the State of California's renewable energy goals.

Conclusion. *Alternative methods of generating or conserving electricity are eliminated from detailed discussion because they would be too great a departure from the application to be considered a modification of the Applicant's proposal, and so are ineffective under NEPA. These alternative methods would not respond to the BLM's purpose and need for the Proposed Action, which is to respond to Sunlight's application for a ROW grant to construct, operate, and decommission a solar photovoltaic facility on public lands in compliance with FLPMA, BLM ROW regulations, and other federal applicable laws. Additionally, none of these alternative methods of generating electricity is within the Applicant's area of expertise; therefore, it would not likely be technically or economically feasible for the*

Applicant to implement them. Moreover, the permitting of new nuclear facilities in California is currently illegal, so this technology also is eliminated as infeasible.

2.6.5 Concentrating Solar Power Technologies

The use of alternative concentrating solar generation technologies was evaluated as potential alternatives to the proposed Project. Although the alternative solar generation technologies would achieve most of the project objectives, each would have different environmental or feasibility concerns. In particular, these technologies would require similar amounts of land as the Project, resulting in similar impacts on biological and cultural resources, and land use, and potentially greater impacts on water use and visual impacts because of towers or other structural features that would be much more visible than those for a PV project.

Conclusion. *Alternative renewable technologies, including concentrating solar power technologies, were eliminated from detailed discussion because they are ineffective. In other words, they would not respond to the BLM's purpose and need for the Proposed Action, which is to respond to Sunlight's application for a ROW grant to construct, operate, and decommission a solar photovoltaic facility on public lands in compliance with FLPMA, BLM ROW regulations, and other federal applicable laws. In addition, this technology is not within the Applicant's area of expertise, and so may not be technically or economically feasible for them to implement.*

2.6.6 Wind Energy

Wind carries kinetic energy that can be utilized to spin the blades of a wind turbine rotor and an electrical generator, which then feed alternating current (AC) into the utility grid. Most state-of-the-art wind turbines operating today convert 35 to 40% of the wind's kinetic energy into electricity. A single 1.5-MW turbine operating at a 40% capacity factor generates 2,100 MWh annually. Wind turbines currently being manufactured have power ratings ranging from 250 watts to 5 MW, and units larger than 7 MW in capacity are now under development (AWEA 2008). The average capacity of wind turbines installed in the United States in 2007 was 1.65 MW (EERE 2008). The technology is well developed and can be used to generate significant amounts of power. There are now approximately 2,490 MW of wind being generated in California (AWEA 2008).

The use of wind energy at the Project locations may be feasible at the scale of the proposed Project but it would not eliminate significant impacts caused by the Project; specifically, there would still be impacts on biological and cultural resources, and visual effects would be greater than with the proposed Project.

Conclusion. *Alternative renewable technologies, including wind energy, were eliminated from detailed discussion because they are ineffective. In other words, they would not respond to the BLM's purpose and need for the Proposed Action, which is to respond to Sunlight's application for a ROW grant to construct, operate, and decommission a solar photovoltaic facility on public lands in compliance with FLPMA, BLM ROW regulations, and other federal applicable laws. In addition, this technology is not within the Applicant's area of expertise, and so may not be technically or economically feasible for them to implement.*

2.6.7 Alternative Transmission and Interconnection Locations

An additional Gen-Tie Line, GT-B-1, was considered for the proposed Project. GT-B-1 exits the southwest corner of the Solar Farm site across Kaiser Road, then turns west and southwest until it intersects with Eagle Mountain Road, then runs south along the east side of Eagle Mountain Road

across I-10 to the western location considered for the Red Bluff Substation (Red Bluff Substation B). The transmission corridor encompasses approximately 177 acres. The total length of GT-B-1 is approximately 9.3 miles within a 160-foot-wide corridor. The elevation of GT-B varies from approximately 690 to 1,185 feet above mean sea level. With the exception of one MWD parcel, the entire length of GT-B-1 is within the Chuckwalla DWMA (7.7 miles), and 6.1 miles of it is within Desert Tortoise Critical Habitat (versus 3.5 miles in the DWMA and 3.8 miles in Critical Habitat for GT-B-2). It would also require removal of approximately 1,475 foxtail cactus (versus 575 for GT-B-2, 1 for GT-A-1, and none for GT-A-2), and could disturb more potentially significant cultural resource sites than the other Gen-Tie Lines. Since this layout did not provide any advantage over the other Gen-Tie Line that would provide a connection to Red Bluff Substation B and would result in greater impacts to the DWMA, Desert Tortoise Critical Habitat, foxtail cactus, and cultural resources, it was eliminated from consideration.

The Applicant also considered alternative locations where the Project would interconnect with the regional grid. Sunlight considered the possibility of interconnecting with the existing MWD 230-kV line at the MWD Eagle Mountain Substation that is near the Project Study Area and then interconnecting with the SCE system farther west (for example, at the Julian Hinds Substation). However, investigation revealed limited capacity at this location that rendered this alternative infeasible. Instead, SCE indicated a plan to develop a substation in the general area of Desert Center (the Red Bluff Substation). This approach, and then identifying potential transmission corridors from the Solar Farm Study Area to interconnect with the SCE system at the Red Bluff Substation with the fewest possible impacts, became the approach that the Applicant has pursued.

Conclusion. *Since the alternative transmission line (GT-B-1) did not provide any technological advantage over GT-B-2 and would result in greater impacts to the DWMA, Desert Tortoise Critical Habitat, foxtail cactus, and cultural resources, it was eliminated from consideration.*

The alternative interconnection with the regional grid was eliminated because it is technologically and economically infeasible.

2.6.8 Distributed and Rooftop Photovoltaics

A distributed solar alternative would consist of PV panels that would absorb solar radiation and convert it directly to electricity *(similar to First Solar's technology and all PV technologies)*. The PV panels could be installed on private or publicly owned residential, commercial, or industrial building rooftops or in other disturbed areas such as parking lots or disturbed areas adjacent to existing structures such as substations. To be a viable alternative to the proposed Desert Sunlight Solar Farm, there would have needed to be sufficient newly installed panels to generate 550 MW of capacity.

California currently has over 500 MW of distributed PV systems which cover over 40 million square feet (CPUC 2009). During 2008, 158 MW of distributed PV was installed in California, doubling the amount installed in 2007 (78 MW), and with 78 MW installed through May 2009, installation data suggests that at least the same amount of MW could be installed in 2009 as in 2008 (CPUC 2009).

Yet at this rate of installation, achievement of the California Renewables Portfolio Standard would be delayed well beyond the 2010 and 2020 deadlines. Even if distributed installation of 550 MW per year could be achieved, adding over 1 TWh of electricity generation capacity per year (equivalent to

the size of the proposed Project), it would take over 50 years to obtain the level of electricity generation from renewable sources that will be required to meet California's 33 percent RPS deadline in 2020. *There would have to be a significant acceleration of installation of both distributed and nondistributed generation to meet the goals defined in California's RPS. Large-scale projects play an important role in meeting these goals.*

Conclusion. *A distributed solar alternative was eliminated from detailed discussion because it does not respond to the BLM's purpose and need for the Proposed Action, which is to respond to Sunlight's application for a ROW grant to construct, operate, and decommission a solar photovoltaic facility on public lands in compliance with FLPMA, BLM ROW regulations, and other federal applicable laws. Additionally, the Energy Policy Act of 2005 established a goal for the Secretary of the Interior to approve 10,000 MW of non-hydropower renewable energy projects located on public lands. The Act reflects Congress's conclusion that installation of renewable energy technologies on public lands capable of producing at least 10,000 MW is appropriate. Given the current state of the technology, only utility-scale renewable energy generation projects are reasonable alternatives to achieve this level of renewable energy generation on public lands. Furthermore, the BLM has no authority or influence over the installation of distributed generation systems, other than on its own lands.*

2.6.9 Underground Installation of Gen-Tie Lines

Commenters on the Draft EIS suggested that an alternative be considered in which the Gen-Tie Lines are installed underground rather than overhead. This was suggested because the overhead lines would be highly visible and would be installed in areas that currently do not have high-voltage transmission lines. This section considers the environmental effects and the feasibility concerns relating to an underground line.

Underground transmission lines at 230 kV have been installed or are planned to be installed in California by Pacific Gas & Electric Company (its Northeast San Jose, Tri-Valley, and Jefferson-Martin Projects) and by San Diego Gas & Electric Company (its approved Otay Mesa and Sunrise Powerlink Projects). These lines, or portions of them, have been installed underground either due to congested urban areas where there is inadequate space for overhead high voltage lines, or (in the case of Tri-Valley and Jefferson-Martin) to reduce visual impacts in scenic areas.

Environmental Impacts. *While underground lines would reduce the visual effects of the transmission lines, they have several disadvantages with respect to their environmental impacts. The impacts are driven mostly by construction disturbance. The construction of underground transmission lines requires substantial ground disturbance to install the trench and cables. Of the approximately 30 miles of Gen-Tie Line Alternatives illustrated in Figure 2-1, about 6 miles would parallel a paved roadway (Kaiser Road). This 6-mile segment could likely be installed within the paved portion of this road so would require minimal disturbance of desert habitat, but the remainder of the route would be installed in dirt roads or in undisturbed desert.*

The trench for a 230-kV line could vary from about 3 feet to 6 feet wide depending on the configuration of the cables within the trench. A construction work area from 25 to 50 feet wide is required parallel to the trench for construction equipment, resulting in temporary disturbance to habitat. In unpaved areas, the area above the trench (generally a 20 or 25-foot-wide road) would have to remain clear and accessible for the life of the project, a permanent loss of habitat.

The environmental impacts of installing underground transmission lines have been defined in detail in several completed CPUC EIRs including the following, all of which included underground segments that have been constructed:

- *PG&E Jefferson-Martin 230 kV Transmission Project (Application No. A.02-09-043, approved in CPUC Decision D.04-08-046);*

- *PG&E Tri-Valley Capacity Increase Project (Application No. A.99-11-025, approved in CPUC Decision D.01-10-029); and*
- *SDG&E Otay Mesa Power Purchase Agreement Transmission Project (Application No. A.04-03-008, approved in CPUC Decision D.05.06.061).*

Other CPUC EIRs have evaluated underground transmission line segment alternatives and rejected them for a variety of reasons, including their potential for environmental impacts (e.g., Miguel-Mission 230 kV #2 Project, A.02-07-022, Final EIR, June 2004). As defined in those documents, the impacts resulting from construction or operation of underground transmission lines include the following:

- *Biological resources would be affected by loss of habitat due to construction required outside of paved roadways. The loss of desert tortoise habitat, and habitat for other species, would be substantially greater than that lost for overhead transmission line construction.*
- *There would be a substantially greater likelihood of encountering subsurface cultural resources.*
- *Air emissions would be greater due to the construction equipment required to construct a continuous trench, the dust from trenching and more trucks driving on unpaved roads, and increased truck trips to haul trench spoils and import thermal back-fill.*
- *Construction noise would be increased, both in time and severity.*
- *Traffic impacts would be greater because additional vehicles would be required to haul trench spoils and import back-fill. Construction in Kaiser Road would require closure of at least one lane.*

Concerns about Cost, Expansion, and Maintenance. *First Solar provided a report entitled "Gen-Tie Undergrounding Report; Desert Sunlight Solar Farm Project" (First Solar, 2011), which summarized underground installations in the U.S. and presented potential design for the underground gen-tie. The report also listed additional concerns, including the potential for third-party construction damage to the buried facilities, concerns about additional time required to repair the line in the event of an outage, and limitations on expansion for future additional lines. Cost is also a major concern to the developer, since construction of underground transmission lines costs up to 8.5 times more than overhead lines. These increased costs negatively affect the Project's financial viability, especially when coupled with the considerable technical and environmental risks involved with underground transmission line design.*

The First Solar report presents a concern about underground lines: that expansion of the capacity of a transmission line, or addition of future circuits, would be more difficult. The report also explains that the addition of future circuits could be accommodated by increasing cable spacing or constructing a larger duct bank (leaving empty spaces for future cables), or by construction of a parallel duct bank separated by an adequate distance to allow heat dissipation. These approaches would also increase construction cost.

Underground transmission lines are less accessible than overhead lines, so line maintenance is more challenging. It is more difficult to know where an outage has occurred, so outages of an underground line can be more time-consuming both to find the problem and to repair it.

Conclusion*. BLM and the CPUC have evaluated the information included in First Solar's report and have determined that, based on the Agencies' own experience, expertise and research, undergrounding Desert Sunlight's Gen-Tie Lines would be infeasible. Although the technology for underground transmission lines is available and has been used to reduce visual impacts and to avoid overhead construction through congested areas by major utilities in California, the increased environmental impacts that would result in other resource areas does not justify the use of*

undergrounding in this case. Specifically, the lack of adequate paved roadways for installation of the Gen-Tie Lines serving the Desert Sunlight Project would result in substantially greater impacts in biological resources, cultural resources, air quality, and noise than for the overhead gen-ties. The additional costs and technical risks associated with undergrounding also make it undesirable under these conditions. As a result, the underground gen-tie alternative has been eliminated from detailed consideration.