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 and operate a 550-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 in order to provide renewable electric power onto California's existing transmission grid to help meet federal and state renewable energy supply requirements. 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 a secured queue position with the California Independent System Operator (CAISO) to interconnect with the existing 500-kV SCE 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 and three No Action/No Project Alternatives. The BLM and the Applicant identified a full range of reasonable alternatives to systematically analyze and screen for suitability of analysis 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 agencies and the public during the EIS scoping period. Retained for full analysis in the EIS were the alternatives that respond to the purposes and needs for the Project and that meet the NEPA reasonable range of alternatives criteria. 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. The numbers may change based on 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 July 2010. 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 in April, June, and July 2010.

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).

2.2 PROPOSED ACTION AND ALTERNATIVES

2.2.1 Alternatives Development and Screening

Alternatives considered in the EIS were evaluated as a result of the Applicant's process for evaluating and selecting Project locations, issues identified by BLM, and comments received during the public scoping process. 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), technologically 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 technologically or economically infeasible;

(3) It is inconsistent with the basic policy objectives for the management of the area (not conforming to the 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 bulleted list of 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 numbered 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 Applicant 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 recreational resource 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 and then 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, big horn 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, the Applicant also considered stakeholders' comments made during scoping.

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 Overview of Alternatives Considered in Detail

This section presents an overview of the alternatives carried forward for analysis. Three full action alternatives and three No Action/No Project alternatives are fully analyzed in the EIS. Each of the

action alternatives would require an amendment to the CDCA Plan, as would two of the three No Action Alternatives. 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. These action alternatives identify possible combinations of Project components and show a range of impacts.

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).

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 three full action alternatives and three No Action/No Project Alternatives, which are described in detail in Section 2.2.4, are as follows:

- Alternative 1—Proposed Action Alternative with Land Use Plan Amendment (Solar Farm Layout B, Gen-Tie Line GT-A-1, Red Bluff Substation A, and Access Road 2);
- 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);
- Alternative 3—Reduced Footprint Alternative with Land Use Plan Amendment (Solar Farm Layout C, Gen-Tie Line GT-A-2, Red Bluff Substation A, and Access Road 1);
- Alternative 4—No Issuance of a Right-of-Way Grant and No Land Use Plan Amendment (No Action);

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Palen/McCoy Wilderness

Joshua Tree Wilderness

Palen/McCoy Wilderness

Eagle Mountain

PHONE LINE RD.

POWER LINE RD.

EAGLE MOUNTAIN RD.

KAISER RD.

Solar Farm Location

Cirde E Ranch

Joshua Tree National Park

Desert Lily Preserve (ACEC)

Palen Dry Lake

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Alternative Gen-Tie Line A-2

Telecom Site Study Area

Former Desert Center Airport

AIRPORT ACCESS RD.

Alternative Gen-Tie Lines A-1 and B-2

EAGLE MOUNTAIN RD.

KAISER RD.

RICE RD.

Lake Tamarisk

OASIS RD.

Alternative Gen-Tie Line B-2

Alternative Gen-Tie Line A-1

Desert Center

Chuckwalla (DWMA)

Exclusion

Red Bluff Substation Alternative A

Palen Dry Lake (ACEC)

Red Bluff Substation Alternative B

Alligator Rock (ACEC)

SCE Distribution Line

SCE Access Road 1

SCE Access Road 2

Hell

10

Exclusion

Chuckwalla Mountains Wilderness

CORN SPRINGS RD.

CHUCKWALLA VALLEY RD.

0 1 2 Miles

LEGEND

- Desert Sunlight Study Area Boundary
- Solar Farm Boundary (Alternative B)
- Solar Farm Boundary (Alternative C)
- Red Bluff Substation (Alternative A)
- Red Bluff Substation (Alternative B)
- Existing Chuckwalla Mountain Communication Site
- SCE Access Road
- SCE 12 kV Distrubution Line
- Primary Highway / Interstate
- Secondary Road
- Unimproved Road
- Aqueduct
- Perennial Water Course
- Intermittent Water Course
- Topographic Elevation Contour (200' interval)
- Intermittent Water Feature
- Joshua Tree National Park
- Area of Critical Environmental Concern (ACEC) & Desert Wildlife Management Area (DWMA)
- BLM Wilderness Area

Land Ownership / Management

- Bureau of Land Management
- National Park Service
- Private/Unclassified
- State

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Figure 2-1

Project Overview Map

- 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 Action with Plan Amendment); 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 Action with Plan Amendment)

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.

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. 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 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 eight 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 grading and compaction techniques that adequately prepare the site for safe and efficient installation and operation of PV arrays. It is anticipated that the entire Solar Farm Site would be graded. The Applicant proposes to employ a low-impact design that allows water to sheet flow and minimizes cut and fill across the site.

The PV arrays would be arranged in groups of PV modules. Arrays are supported by vertical steel posts, spaced at no less than 8 feet apart, and driven into the ground to a typical depth of 4 to 10 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 5 to 8 feet above grade.

The arrays would be sectioned into quadrants by two access corridors of nominal 20-foot width, one running 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 for maintenance activities. In addition, a 25-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 bottoms 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 air-conditioned enclosure (shelter) and connected to a transformer. The PV inverters would convert the DC electric input into grid-quality AC electric output. The AC electrical output would be transmitted from the PCS to

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Figure 2-2

Typical Photovoltaic Array

Source: First Solar, 2010

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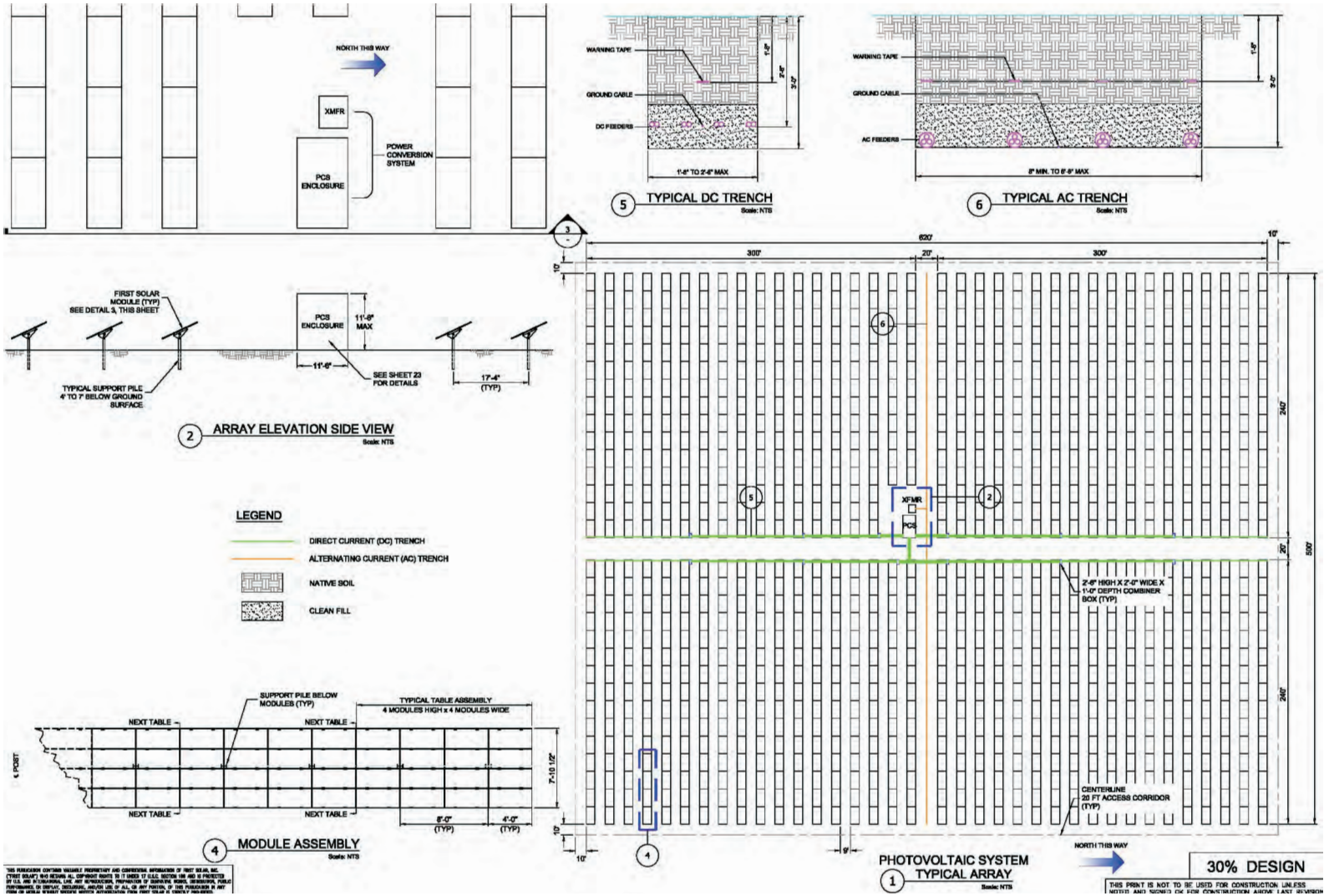

Source: First Solar, 2010

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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 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 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.

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 (approximately 0.7 acres) long 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.

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Figure 2-5

Typical Photovoltaic Combining Switchgear

Source: First Solar, 2010

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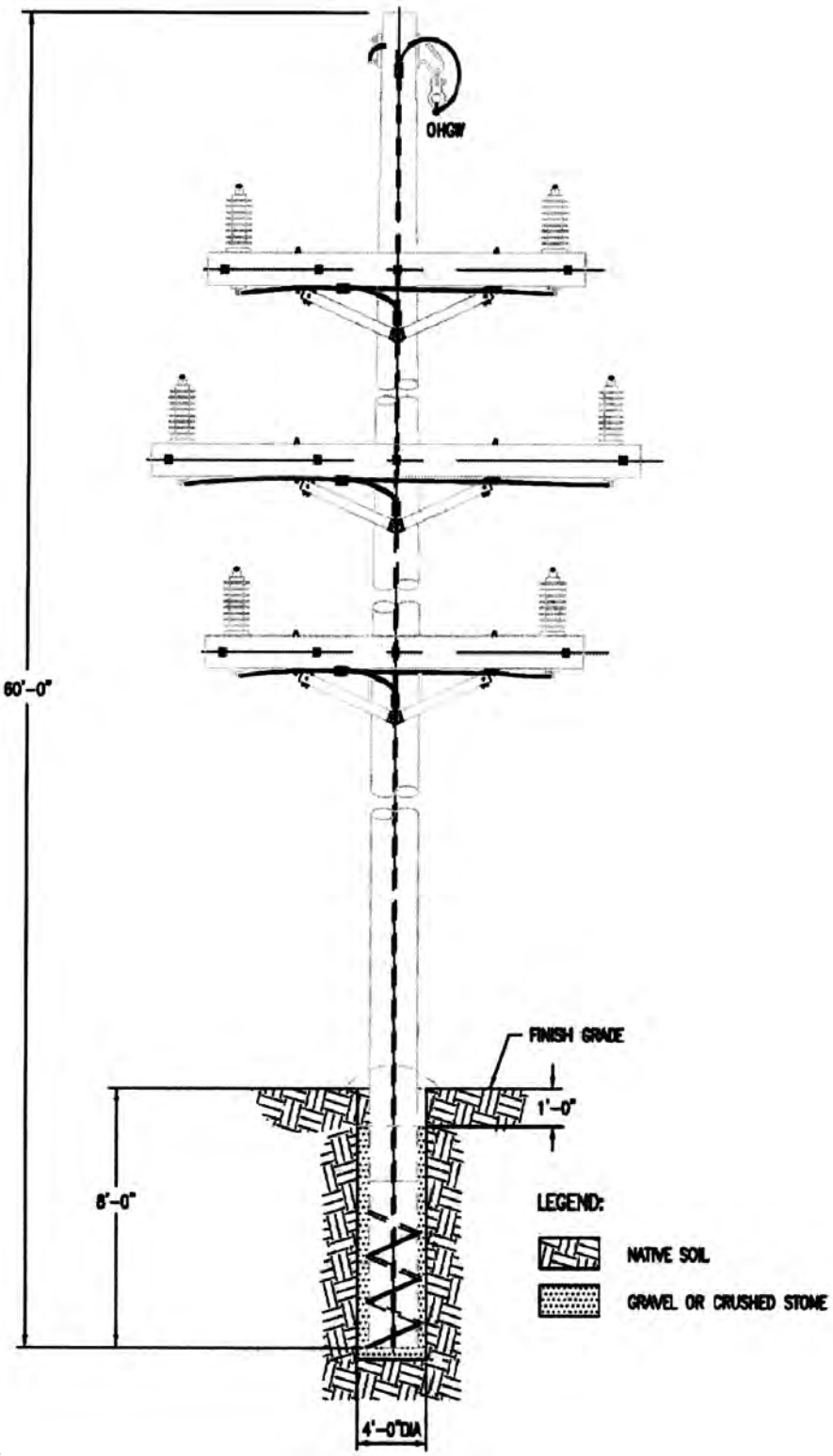

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Source: First Solar, 2010

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Figure 2-6

Typical 34.5 kV Pole

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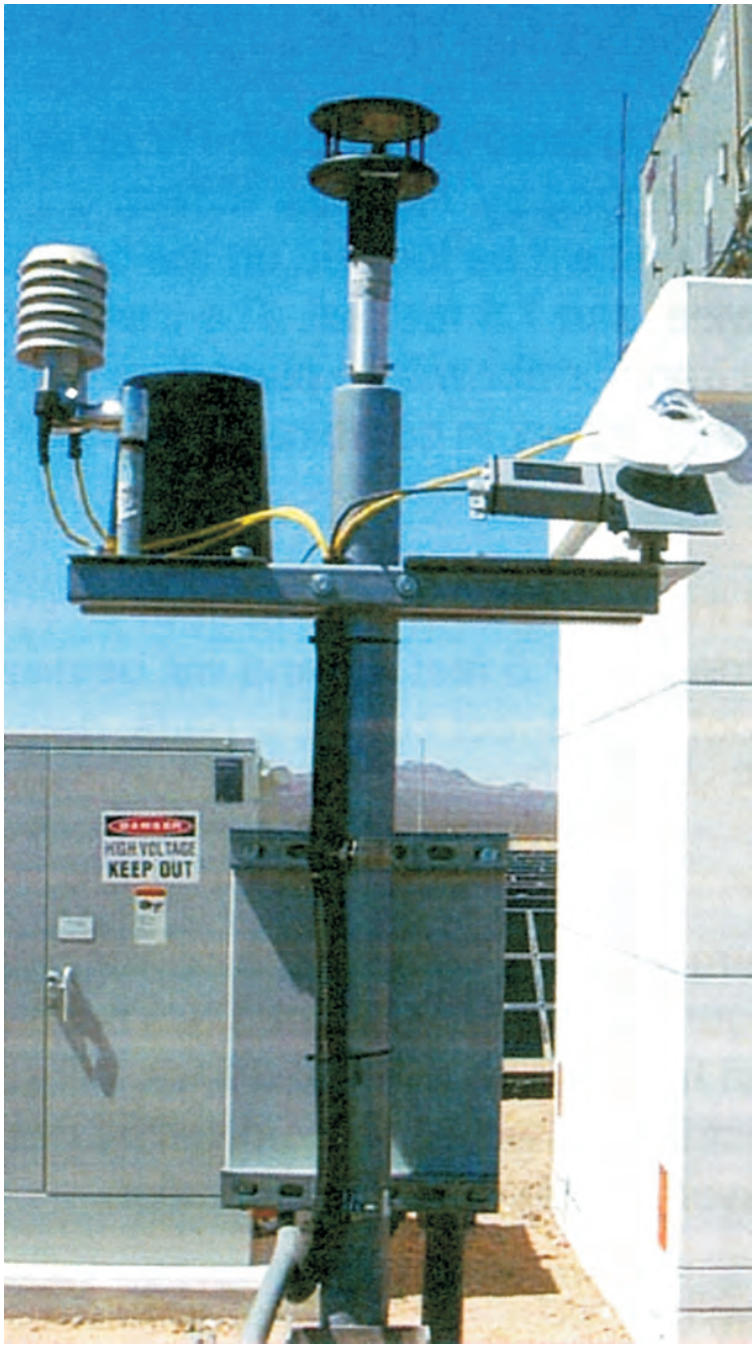

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Figure 2-7

Typical Meteorological Station

Source: First Solar, 2010

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 the requirements of the Americans with Disabilities Act.

On-Site Substation

The On-site Substation facility would be located in an approximately 9.3-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 7.2 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. During construction, an approximately 21-foot wide, 0.2-mile long road, with an area of 0.6 acres would provide access from Kaiser Road to the On-site Substation. After construction, the permanent access road to the substation would be reduced to a 14-foot wide area located within the temporary 21-foot wide road. The permanent road would be surfaced with aggregate. In addition, the main 25-foot-wide graveled access road for the Solar Farm from Kaiser Road would also run past, and provide access to, the 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 six-foot-tall chain-link security fence topped with barbed wire. In addition, six- to seven-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.

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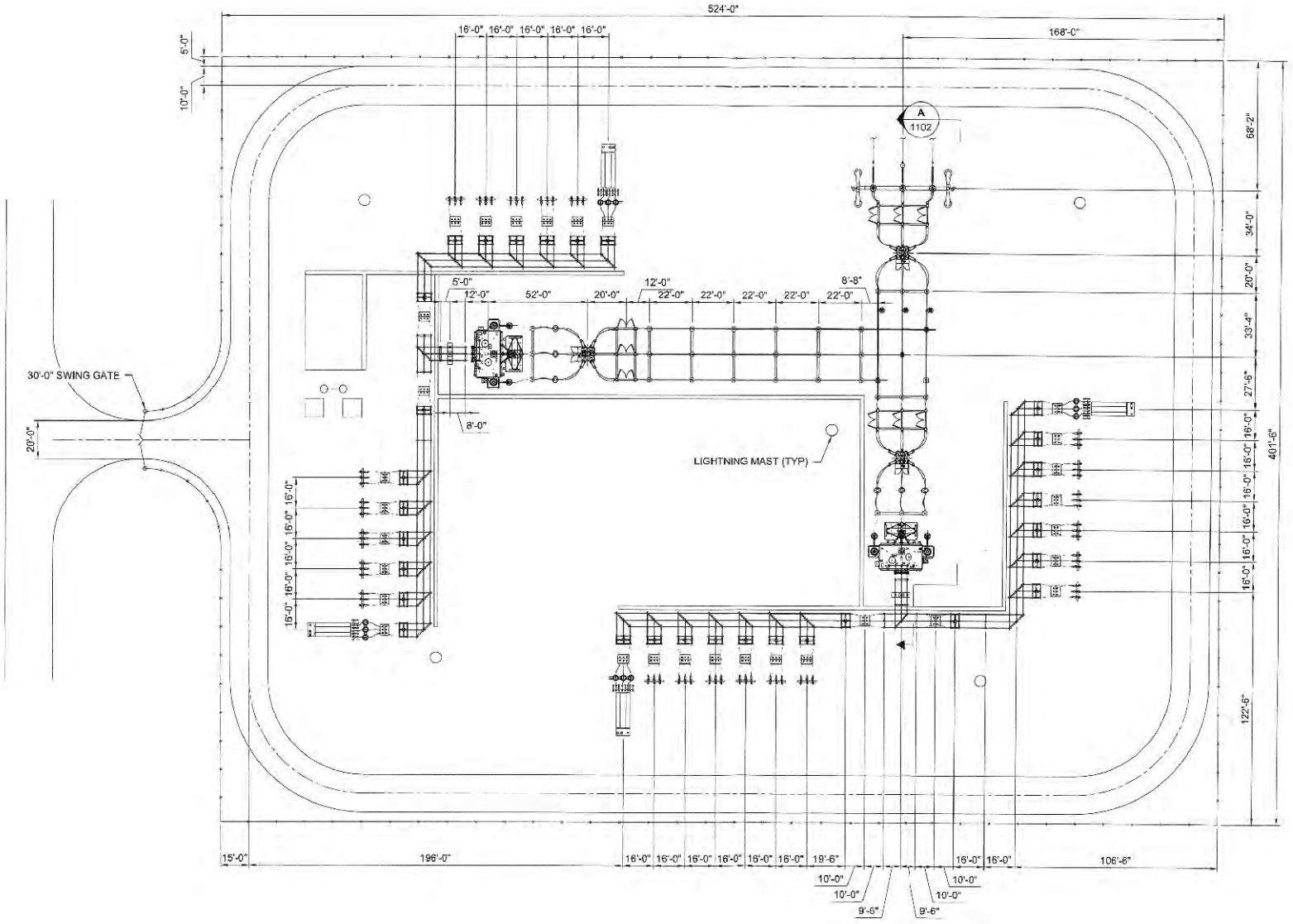

Source: First Solar, 2010

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Figure 2-8

Electrical Plan for On-Site Substation

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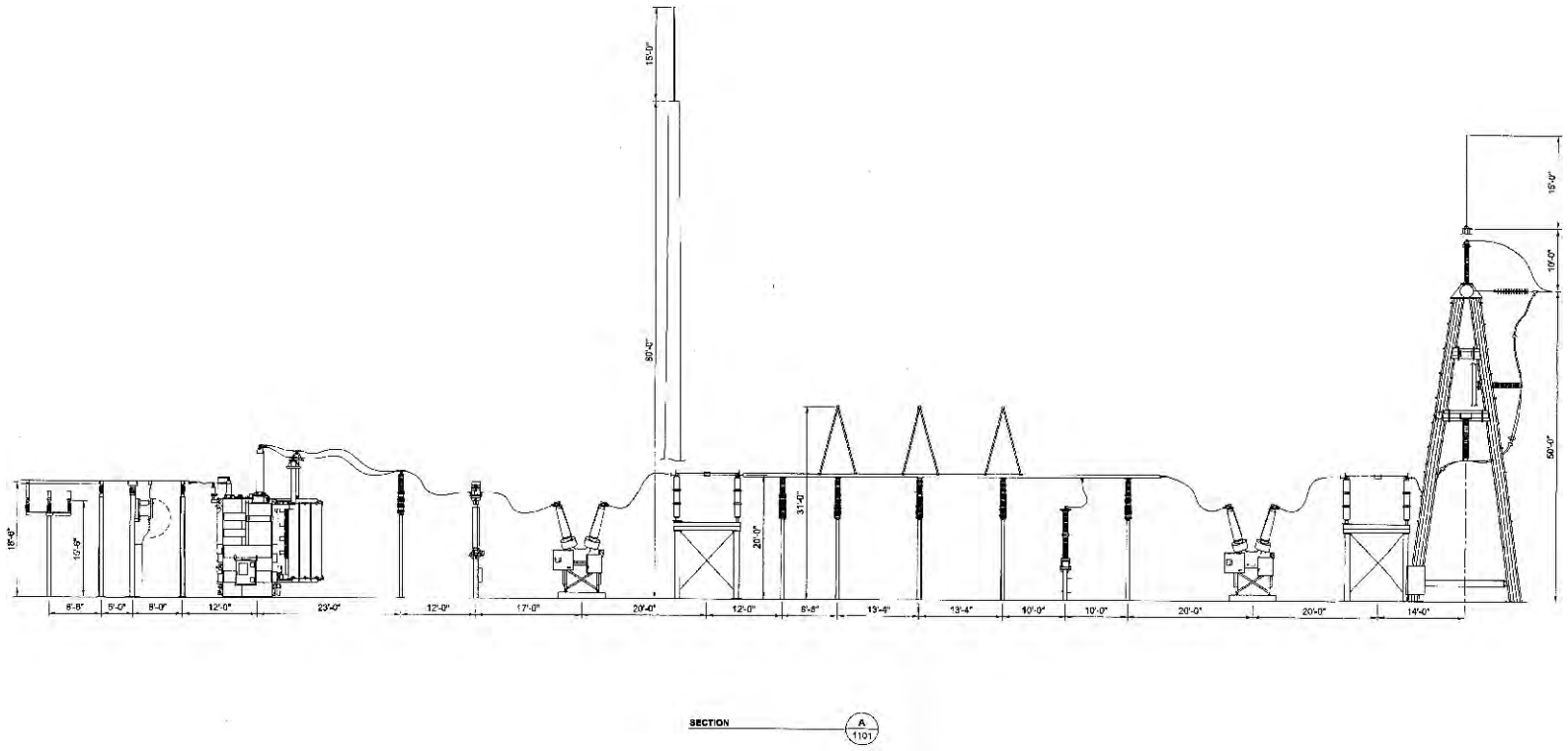

Source: First Solar, 2010

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Figure 2-9

Section View of On-Site Substation

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 and 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 On-site Substation. Power for the lights would come from the On-site Substation and/or the existing electrical distribution service. The level and intensity of lighting during operations would be the minimum needed for security and safety purposes. Lights would be turned on either by a local switch, as needed, or by motion sensors 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. Exterior 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 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 monopoles for the Gen-Tie Line. Poles are expected to be approximately 135 feet tall. Typical 220-kV poles 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.

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.

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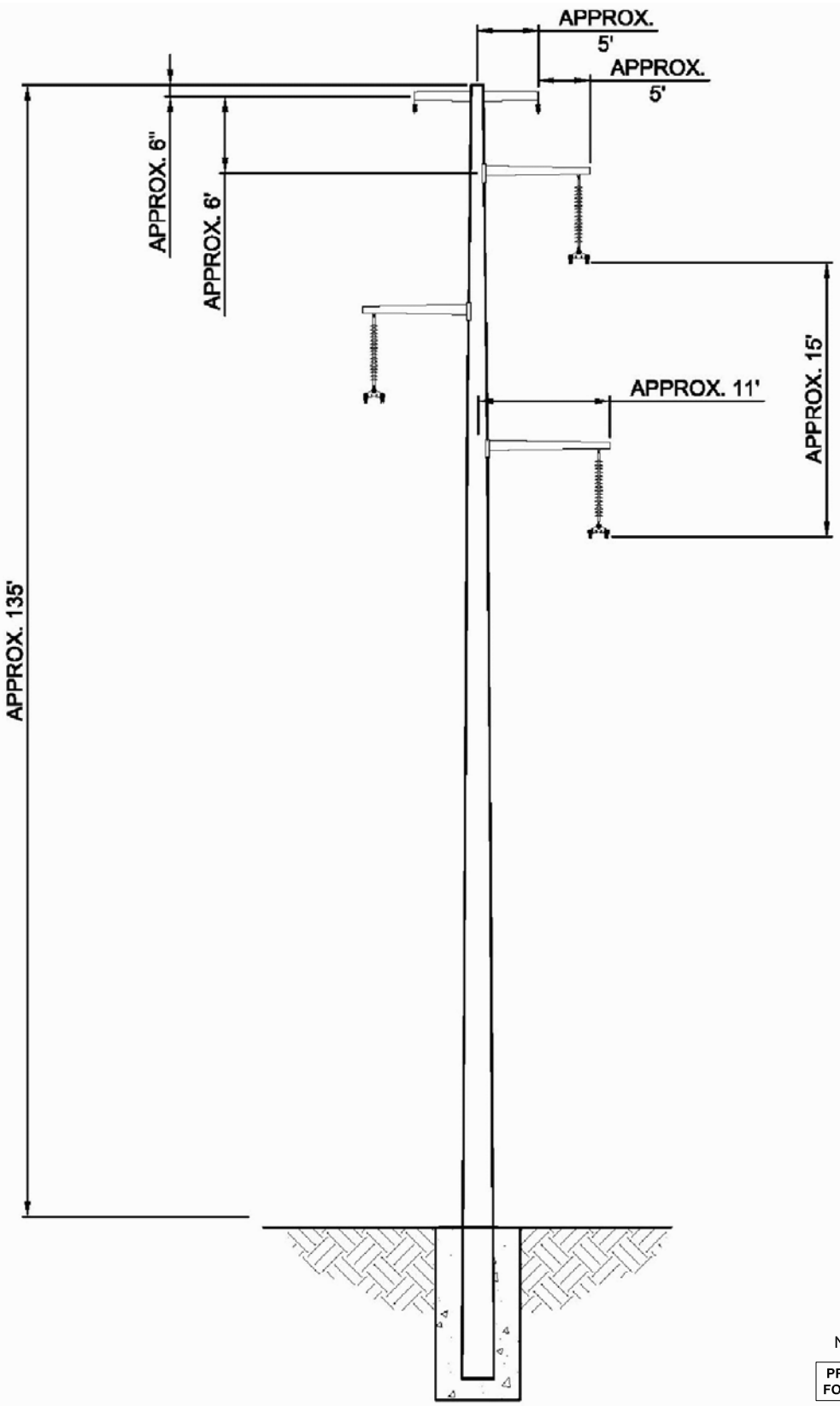

NOT TO SCALE

PRELIMINARY - NOT FOR CONSTRUCTION

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Figure 2-10

Typical 220-kV Line Monopole Delta Configuration Structure

Source: Burns & McDonnell, 2010

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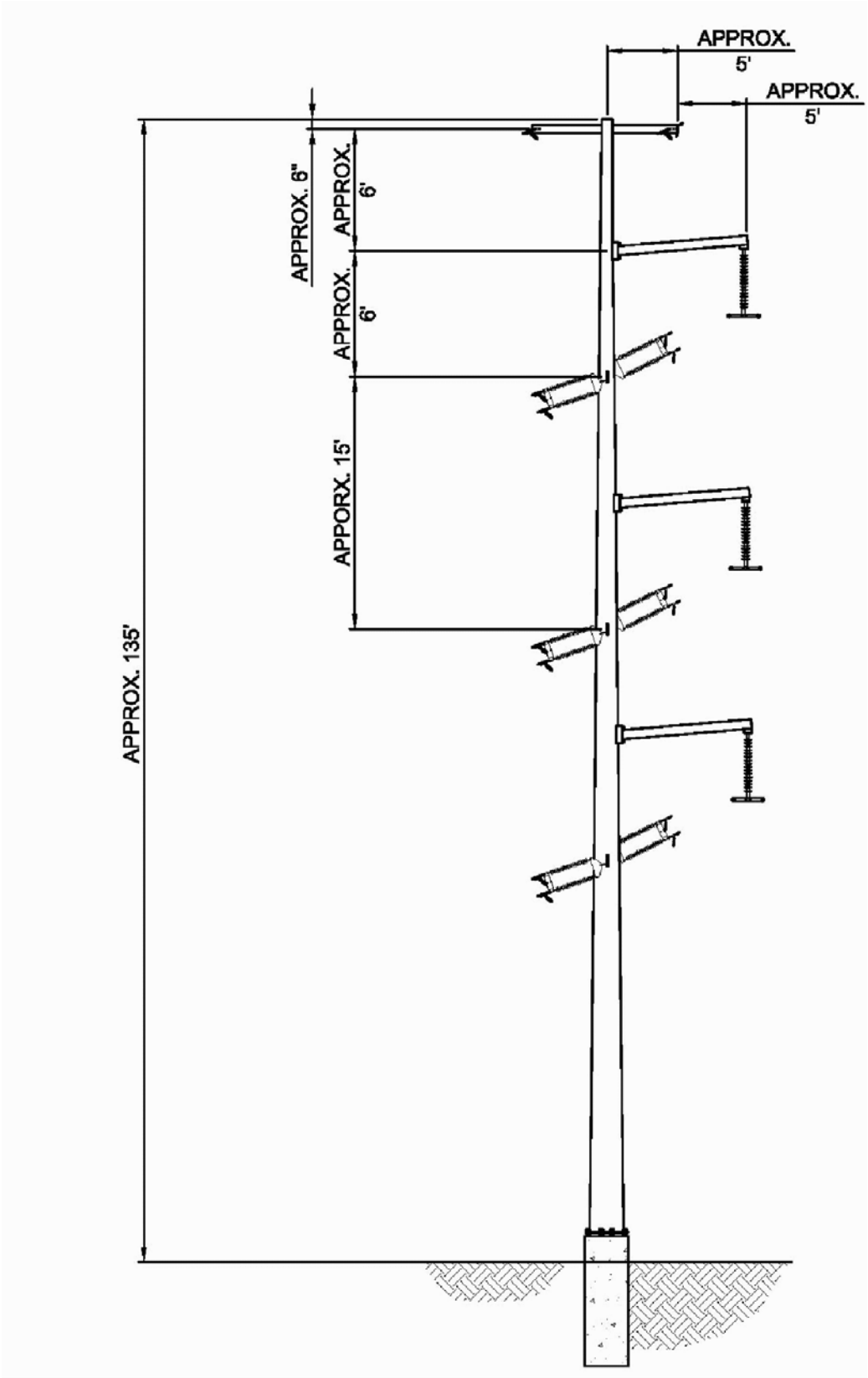

NOT TO SCALE

PRELIMINARY - NOT FOR CONSTRUCTION

Source: Burns & McDonnell, 2010

DESERT SUNLIGHT SOLAR FARM

Figure 2-11

Typical 220-kV Line Monopole Deadend Structure

Description of Permanent and Temporary Disturbance Areas

Information on permanent and temporary disturbance areas associated with the Gen-Tie Line is provided below. The permanent disturbance areas include grading and clearing areas for maintenance/access roads and areas disturbed for the Gen-Tie Line structures themselves. The temporary disturbance areas include areas used for Gen-Tie Line construction activities, including structure erection, wire stringing, pulling locations, splicing locations, and temporary access roads.

Temporary disturbance areas would be cleared of large brush that would impede travel, but the ground surface would not be bladed. Minor vegetation would remain but may be crushed during construction due to equipment travel over the corridors. Travel would be made over the existing native soils. The soils may be moisture conditioned for dust mitigation during periods of frequent travel use.

Permanent disturbance areas would be cleared of all brush and vegetation. The ground surface would be bladed to be smooth for travel. The grading would generally follow the natural contours of the land. Travel would occur over the existing native soils. The soils would be moisture-conditioned and compacted to facilitate travel.

In general, the ground surface along the Gen-Tie Line routes is rolling desert sand and gravel with sparse brush and low lying vegetation. The existing sand and gravel are expected to support construction traffic with moisture conditioning and compaction effort. Therefore, import of non-native soils for road construction is not anticipated. However, import of road base would be necessary for the construction of approaches to existing roads. Rip rap material may be required to cross washouts with construction equipment. The rip rap placement would be temporary and removed after completion of Gen-Tie Line construction. Existing roads would be used during Gen-Tie Line construction to haul equipment, materials, and personnel. No changes or improvements would be made to the existing roads.

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 Structure

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 backfilled 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.

Red Bluff Substation Project

SCE proposes to construct the Red Bluff Substation Project 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 Chapter 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 Project would consist of a number of project 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

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 75 acres) to loop the DPV1 500-kV transmission line and provide for Sunlight's one (1) 220-kV Gen-Tie Line position for the DSSF Project. The entire 75 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.

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, 373MVA, 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.

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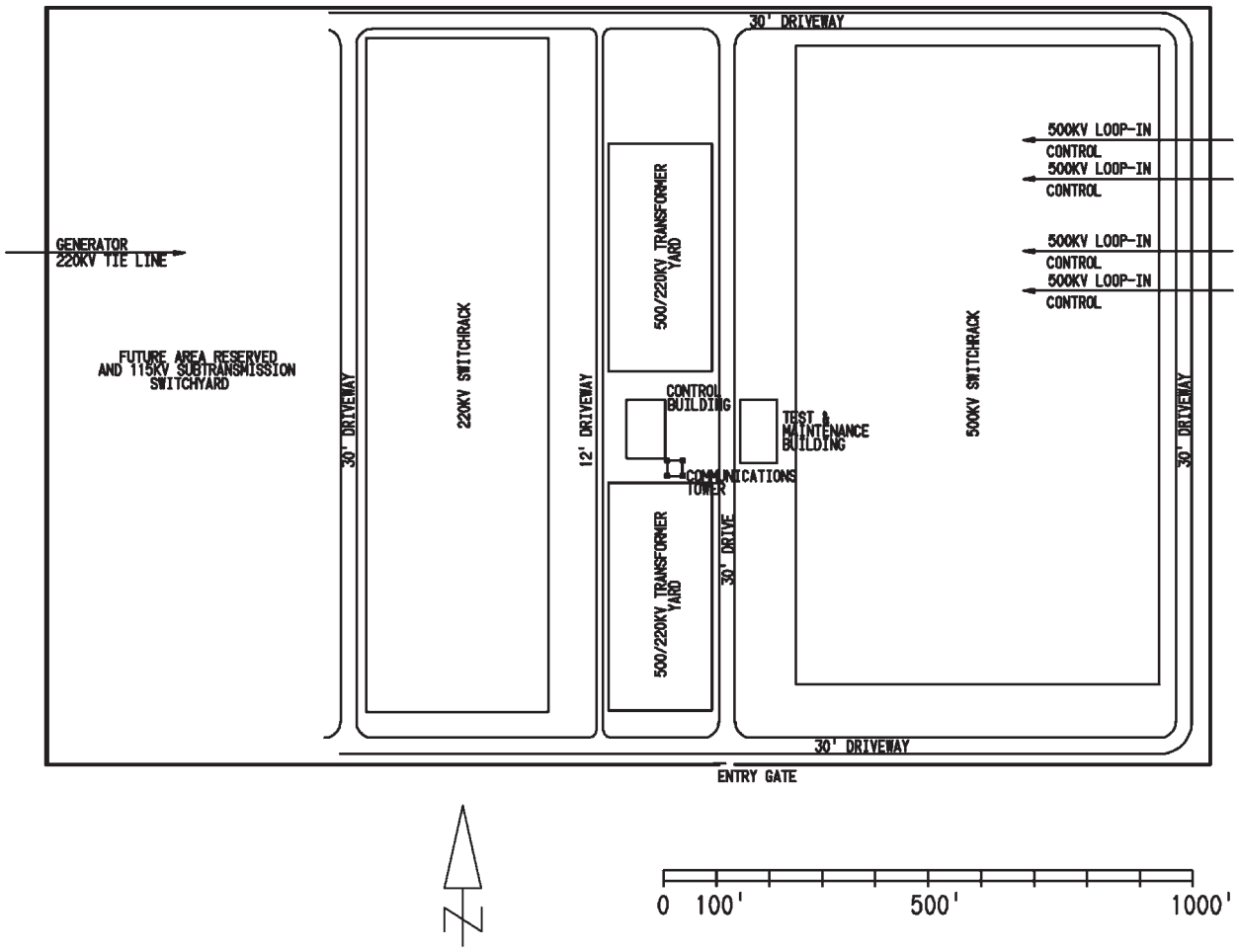

RED BLUFF SUBSTATION
INTERNAL ARRAIGNMENT

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

Source: Southern California Edison, 2010

DESERT SUNLIGHT SOLAR FARM

Figure 2-12

Proposed Red Bluff Substation A Layout

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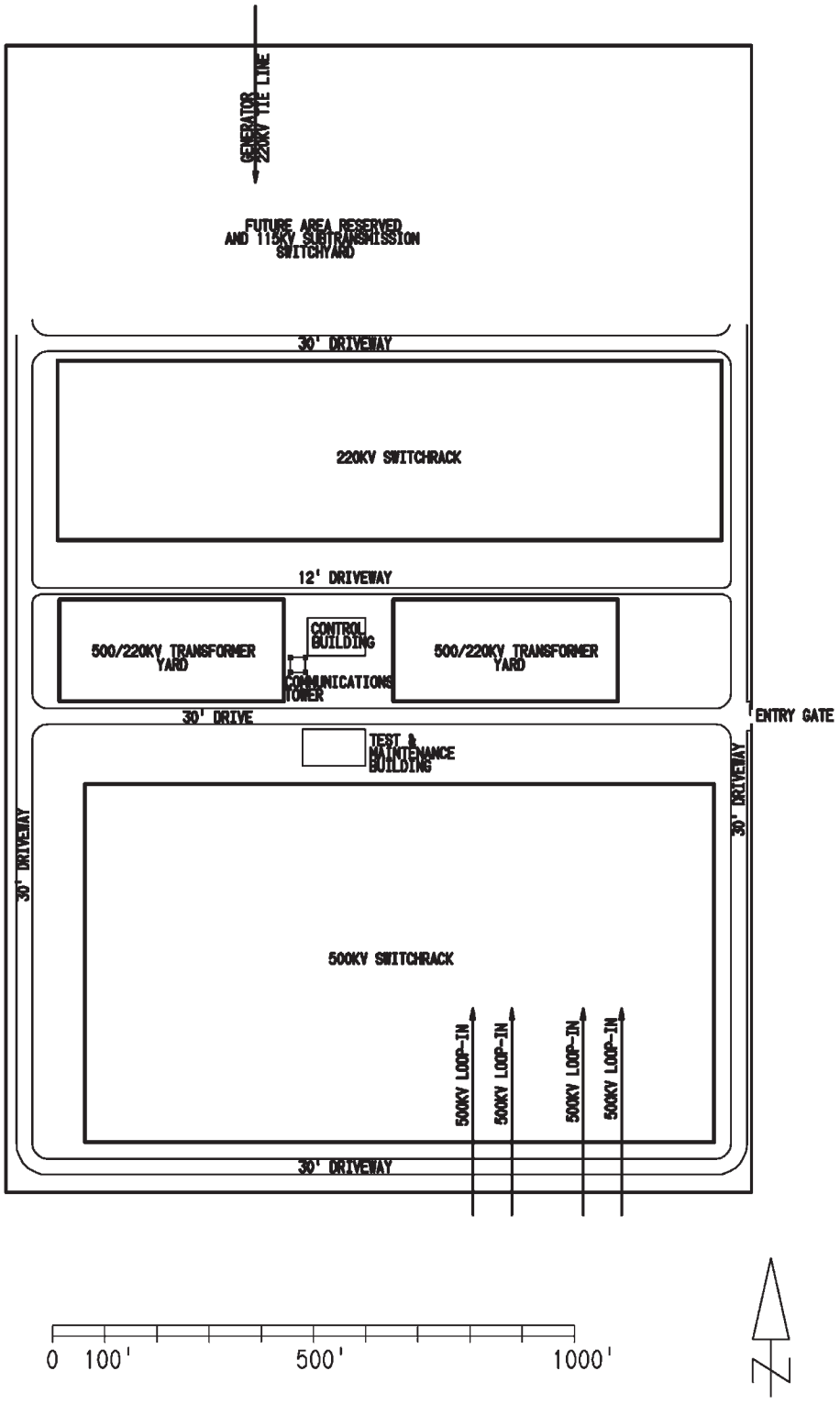

Note: Dimensions are approximate and may vary with site conditions.

DESERT SUNLIGHT SOLAR FARM

Figure 2-13

Proposed Red Bluff Substation B Layout

Source: Southern California Edison, 2010

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.

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 FPL's 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

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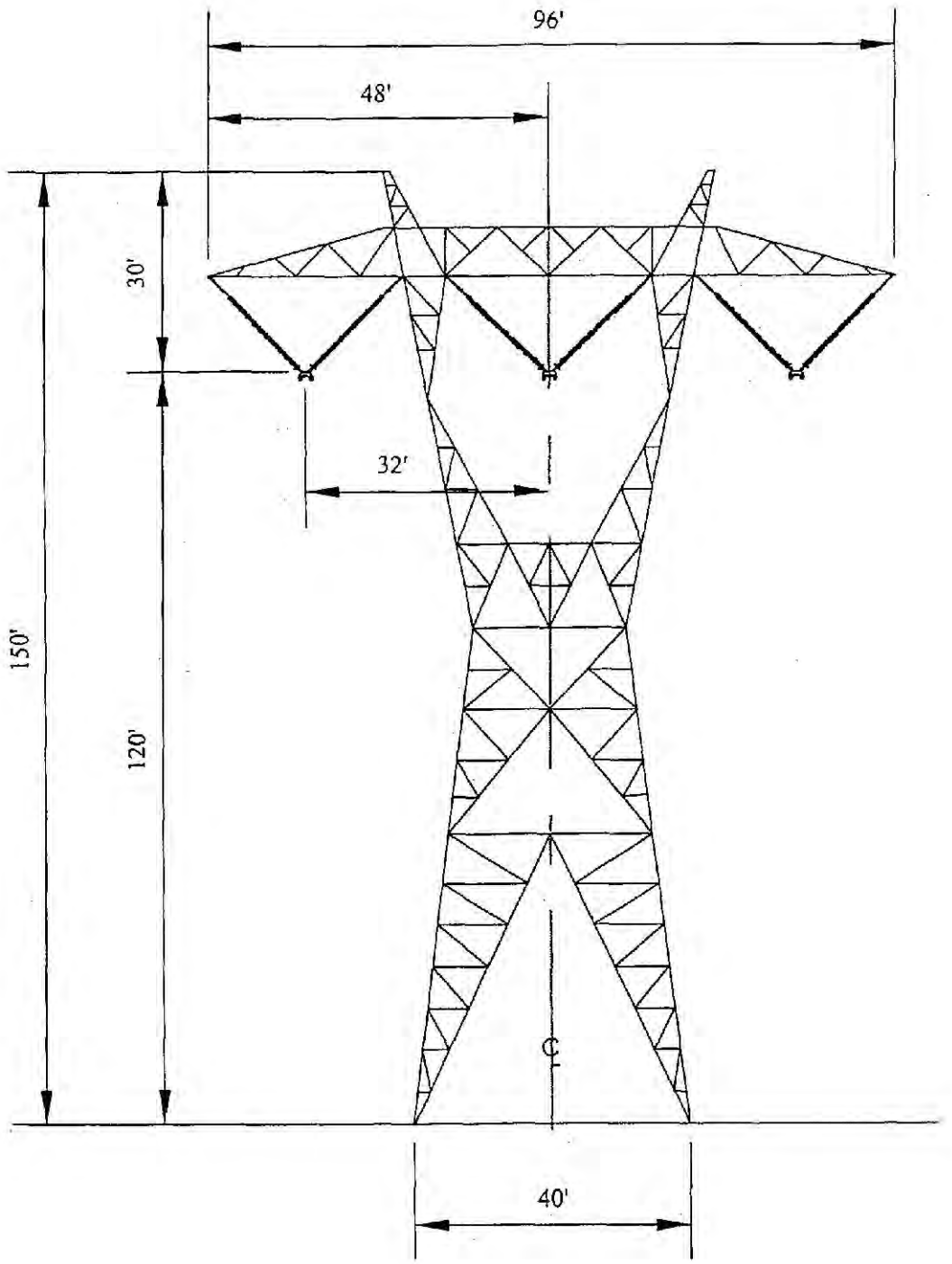

Note: Dimensions are approximate and may vary with site conditions.

Source: Southern California Edison, 2010

DESERT SUNLIGHT SOLAR FARM

Figure 2-14

Typical 500-kV Single-Circuit Lattice Steel Tower

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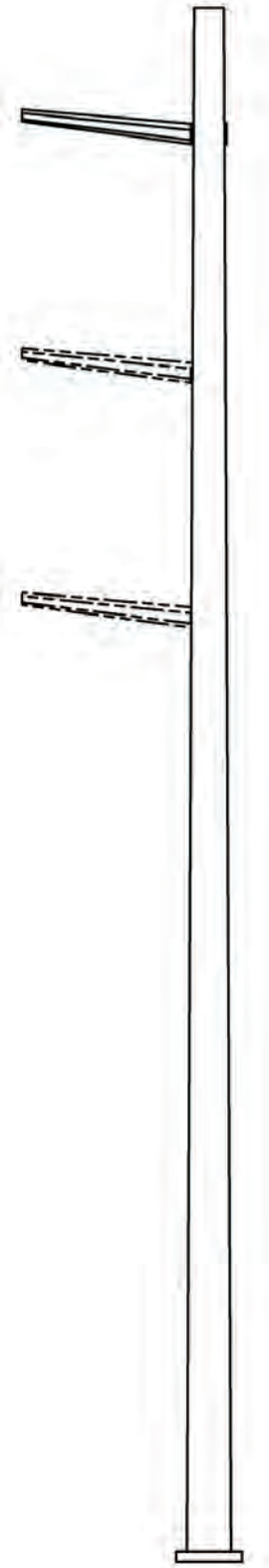

Source: Southern California Edison, 2010

DESERT SUNLIGHT SOLAR FARM

Figure 2-15

Typical 500-kV Single-Circuit Tubular Steel Tower

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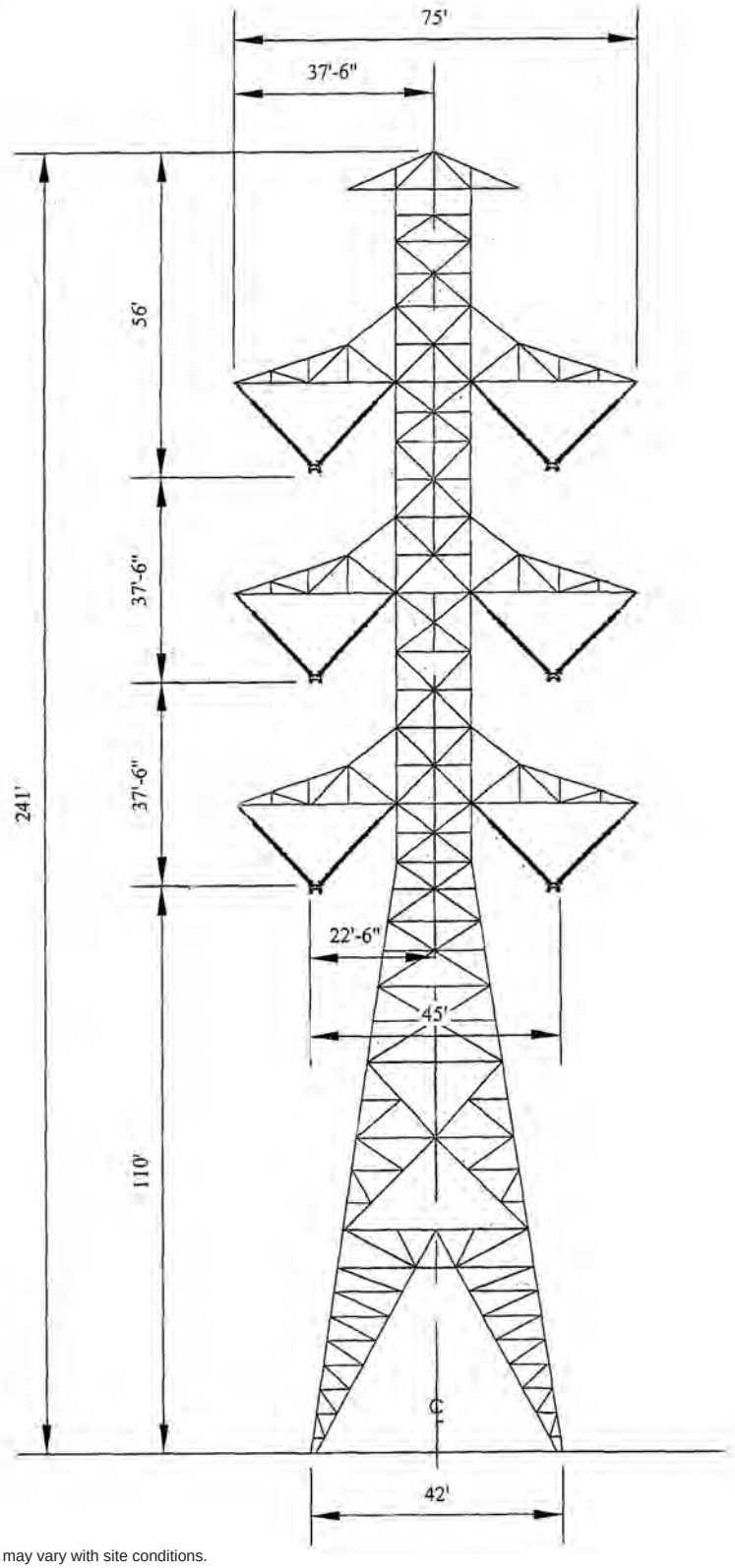

Note: Dimensions are approximate and may vary with site conditions.

Source: Southern California Edison, 2010

DESERT SUNLIGHT SOLAR FARM

Figure 2-16

Typical 500-kV Double-Circuit Lattice Steel Tower

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). 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 collocated 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).

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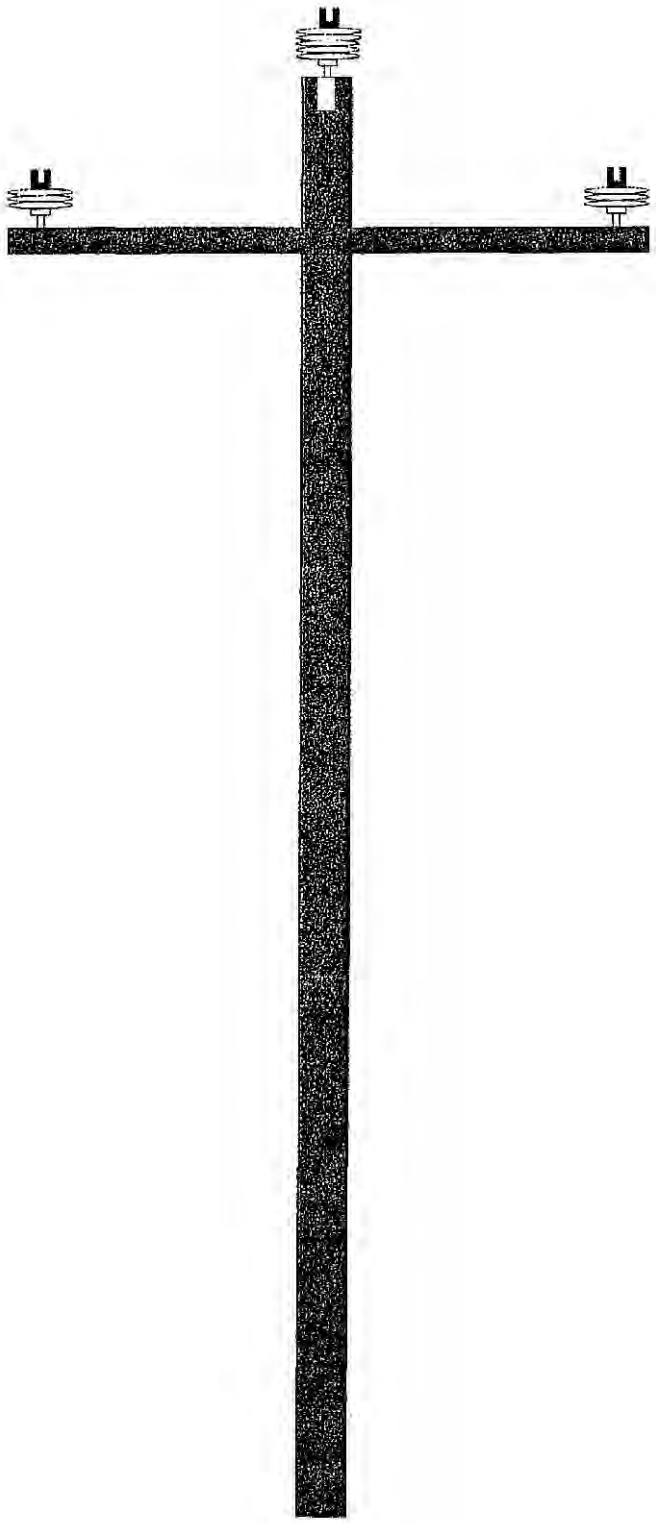


DESERT SUNLIGHT SOLAR FARM

Figure 2-17

Red Bluff Substation Distribution System Pole

Source: Southern California Edison, 2010

NATIONAL SYSTEM OF PUBLIC LANDS

- 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.

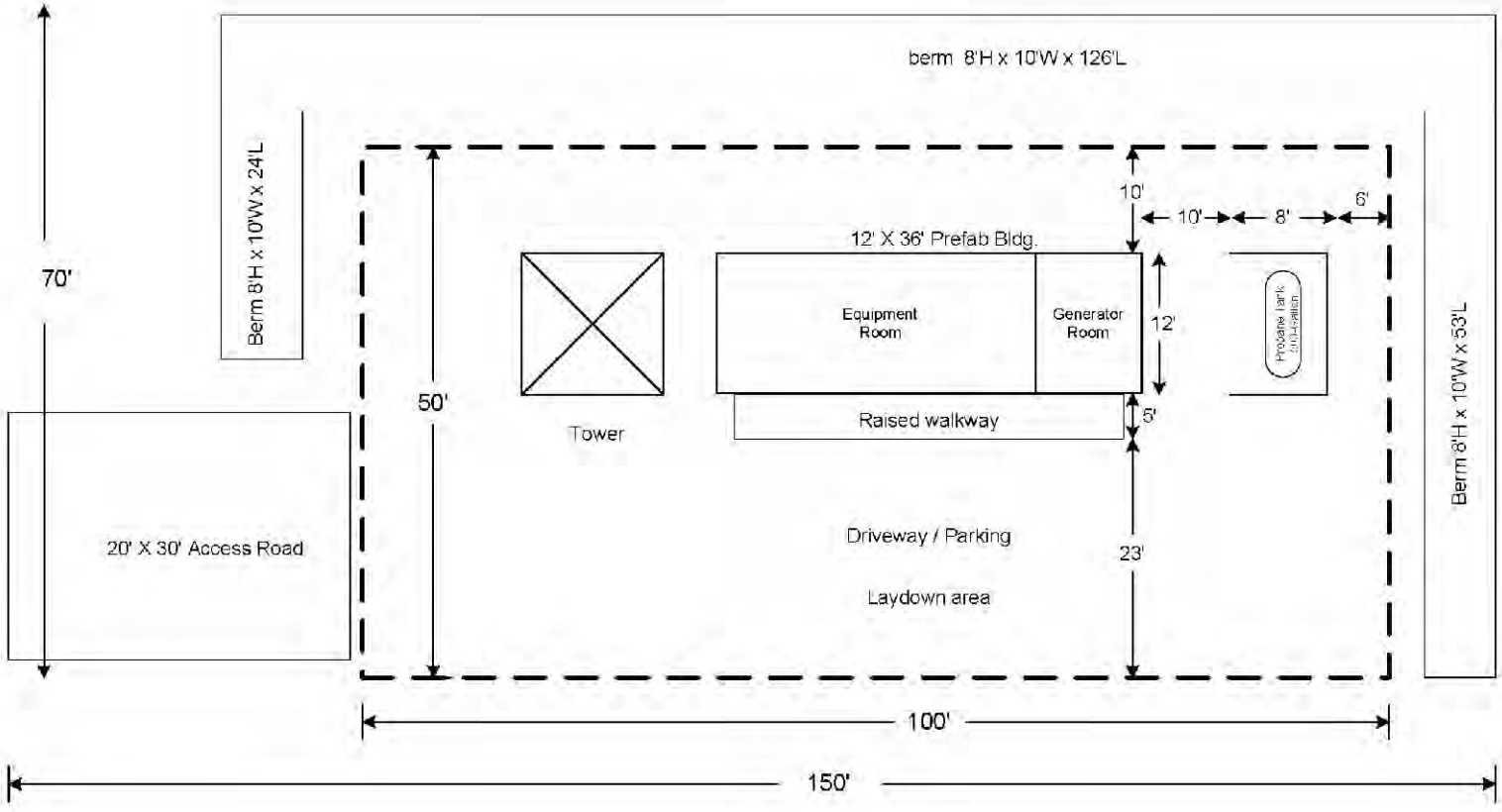
SCE would install the following equipment:

- 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 eight-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.

X:\DESERT SUNLIGHT\REPEATER_FACIL.CDR

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

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 11 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 19 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 19 acres of disturbance). Substation B would require a new access road from Eagle Mountain Road, requiring approximately 1.3 acres of disturbance).

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 eight-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.

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.

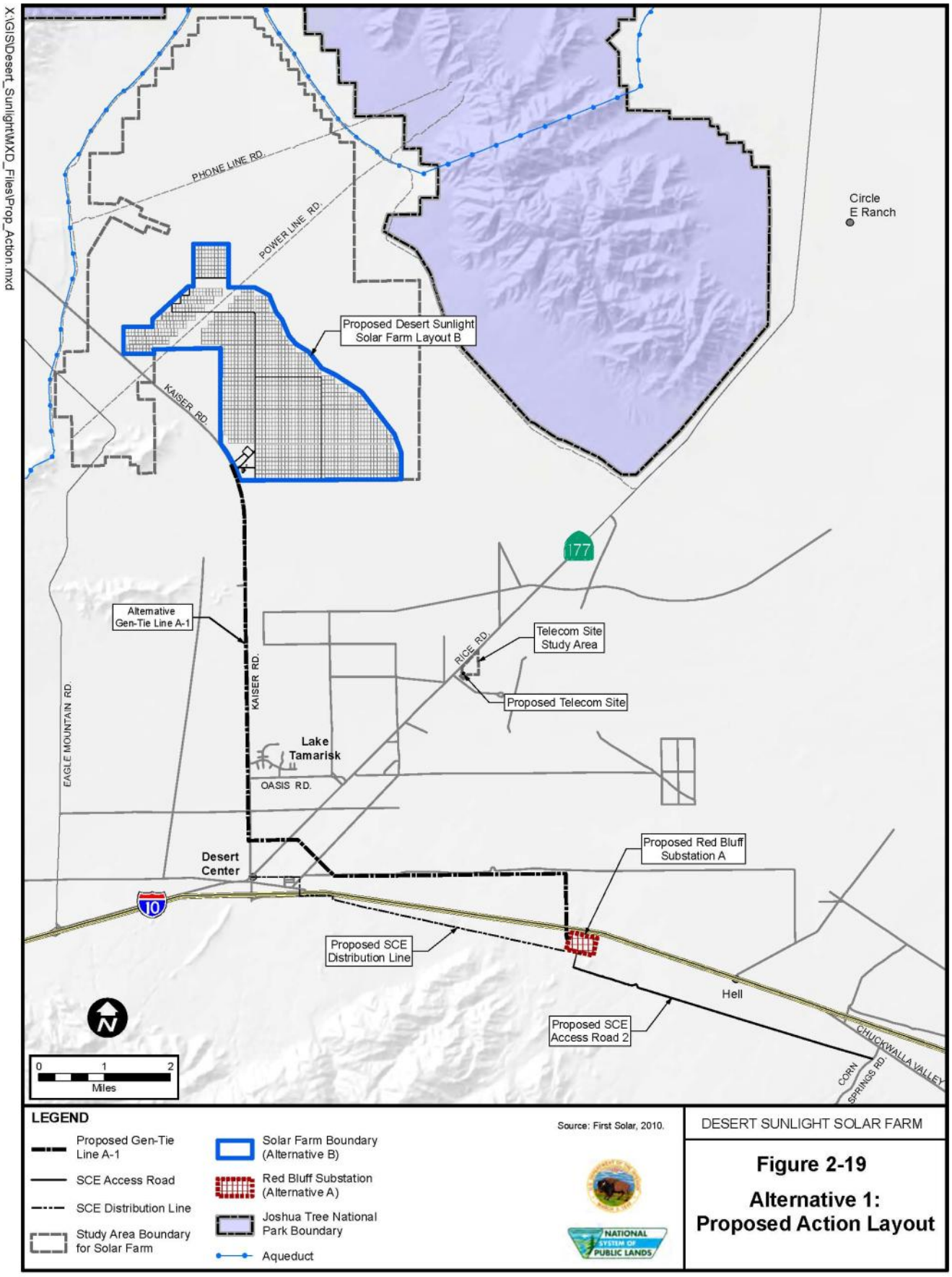
This section includes a brief overview of each project component. Project details are provided in Section 2.2.3 (Features Common to All Action Alternatives). Construction, operation, and maintenance, and decommissioning information is provided in Sections 2.3 and 2.4.

Table 2.2-1 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]	4,245
Gen-Tie Line A-1[2]	18
Red Bluff Substation A	75
Red Bluff Substation-related features	-
- Drainage/Sideslopes	20
- Access Road[3]	19
- Transmission System[4]	5
- Distribution Line System[5]	8
- Telecom Site[6]	<1
TOTAL	**4,391**

[1]Includes area for all Solar Farm-related facilities.
[2]Permanent disturbance (18 acres) occurs within a 12.1-mile by 160-footwide corridor plus additional fan-shaped areas at corners, totalling256 acres.
[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.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PHONE LINE RD.
POWER LINE RD.
KAISER RD.
Circle
E Ranch
Proposed Desert Sunlight
Solar Farm Layout B
177
Alternative
Gen-Tie Line A-1
RICE RD.
Telecom Site
Study Area
Proposed Telecom Site
EAGLE MOUNTAIN RD.
KAISER RD.
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.
N
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.
NATIONAL
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PUBLIC LANDS
DESERT SUNLIGHT SOLAR FARM
Figure 2-19
Alternative 1:
Proposed Action Layout

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

Project Component/Element	Construction: Total (acre-feet)	Operation: Peak Daily (gpd)[1]	Operation: Annual (acre-feet)	Operation: Peak Daily (gpd)
Solar Farm B	1,300 to 1,400	252,000 to 1.3 million	0.2	<300
Gen-Tie Line A-1	6.25	40,000	0	0
Red Bluff Substation A	4.30	38,000	0	0
TOTAL	**1,310.55 to 1,410.55**	**330,000 to 1.378 million**	**0.2**	<300

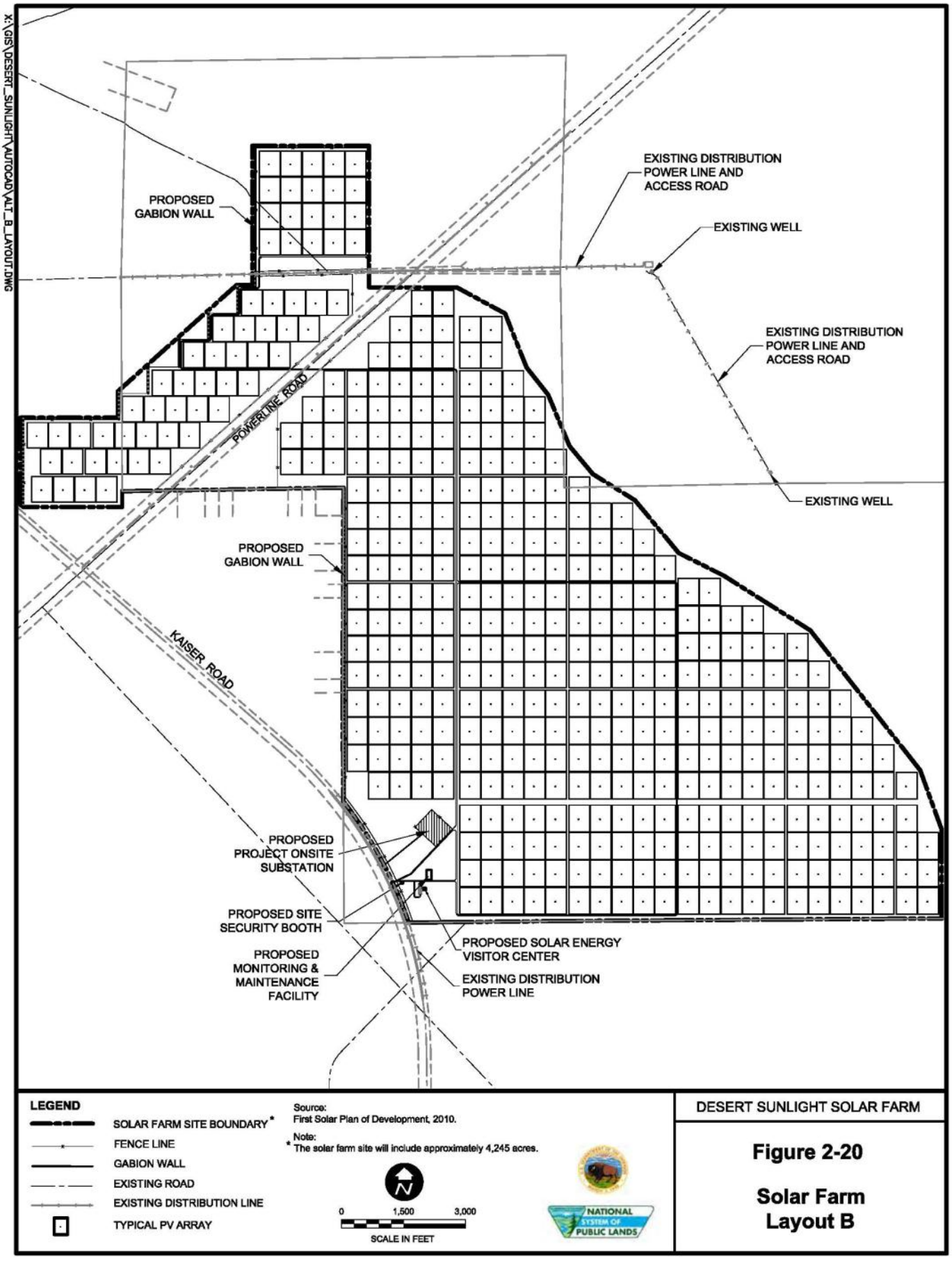
Note: (1) Demand would vary over the construction period and (2) water use estimates are preliminary and based on current information.

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 4,245 acres entirely on BLM-administered land. Elevation at SF-B varies from approximately 619 to 882 feet above mean sea level. Access would be provided by Kaiser Road. Once fully operational, it would produce 550 megawatts 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 19.9 miles of fencing.

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 right-of-way (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.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PROPOSED GABION WALL
EXISTING DISTRIBUTION POWER LINE AND ACCESS ROAD
EXISTING WELL
EXISTING DISTRIBUTION POWER LINE AND ACCESS ROAD
POWERLINE ROAD
EXISTING WELL
PROPOSED GABION WALL
KAISER ROAD
PROPOSED PROJECT ONSITE SUBSTATION
PROPOSED SITE SECURITY BOOTH
PROPOSED MONITORING & MAINTENANCE FACILITY
PROPOSED SOLAR ENERGY VISITOR CENTER
EXISTING DISTRIBUTION POWER LINE
LEGEND
SOLAR FARM SITE BOUNDARY*
FENCE LINE
GABION WALL
EXISTING ROAD
EXISTING DISTRIBUTION LINE
TYPICAL PV ARRAY
Source:
First Solar Plan of Development, 2010.
Note:
* The solar farm site will include approximately 4,245 acres.
N
0
1,500
3,000
SCALE IN FEET
NATIONAL SYSTEM OF PUBLIC LANDS
DESERT SUNLIGHT SOLAR FARM
Figure 2-20
Solar Farm Layout B

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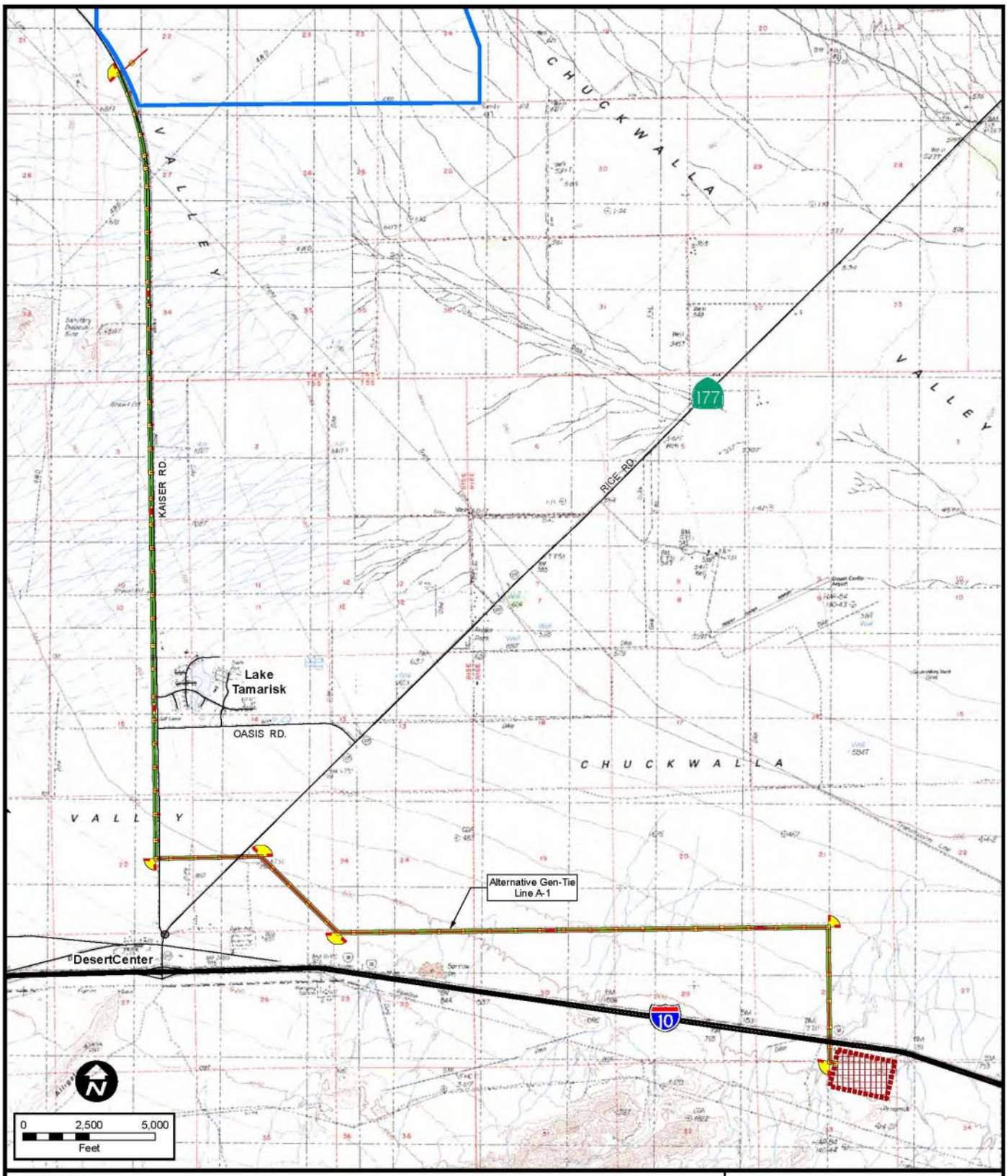

LEGEND

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

Source: First Solar, 2010.

DESERT SUNLIGHT SOLAR FARM

Figure 2-21

Gen-Tie Line A-1

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 (4,245 acres)
Total Project Footprint	**4,245 acres**	**100**
Total footprint of piles	0.6 acre	<0.1
Access Corridors	331.1 acres	8
Gravel Access Roads	28.5 acres	0.7
O&M Facility	0.7 acre	<0.1
Solar Energy Visitors Center	0.06 acre	<0.1
On-Site Substation	9.3 acres	0.2
Area Disturbed by Trenching	31.9 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)	14.2 acres	0.3
Total footprint for on-site overhead line poles	0.1 acre	<0.1
Areas of decompaction between the rows	1,535 acres	36
Area shaded by PV modules (indirect disturbance) (at solar noon)	1,400 acres	33.4
Area shaded by PV modules (indirect disturbance) (Scenario – Dec. 21, 9:00 am)	2,727 acres	64.2
Security Fencing	Length: 19.9 miles	N/A

Of the 12-mile ROW, approximately 11.4 miles would be on BLM land and approximately 0.6 mile would be on land owned in fee by MWD. First Solar would enter into a land license agreement 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.

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.

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.

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 Area: 256 acres	100
Temporary disturbance during construction	86 acres	33.6
Permanent disturbance	18 acres	7.0
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: 5.8 miles 9.8 acres	3.8

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 75 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 project components:

- Red Bluff Substation: Construct a 500-/220-kV substation on approximately 75 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.

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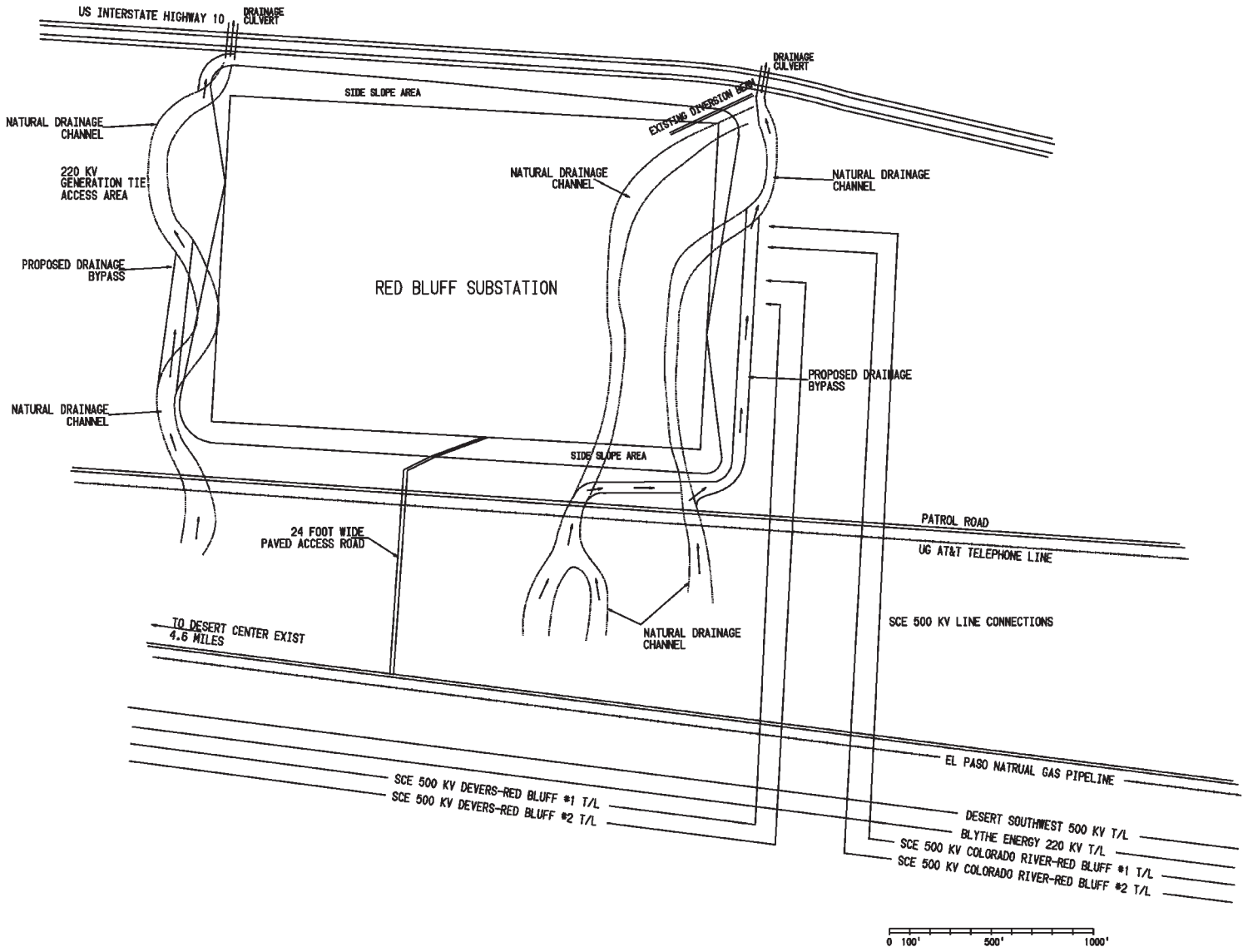


THIS LAYOUT EXHIBIT IS BASED ON PLANNING LEVEL ASSUMPTIONS.
THE EXACT DETAILS WOULD BE DETERMINED FOLLOWING COMPLETION OF PRELIMINARY AND FINAL ENGINEERING, INDENTIFICATIONS OF FIELD CONDITIONS, AND COMPLIANCE WITH APPLICABLE ENVIRONMENTAL AND PERMITTING REQUIREMENTS.

RED BLUFF SUBSTATION
SITE 2 DEVELOPMENT PLAN

Source: Southern California Edison, 2010

DESERT SUNLIGHT SOLAR FARM

Figure 2-22

Red Bluff Substation A

- 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 collocated 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.

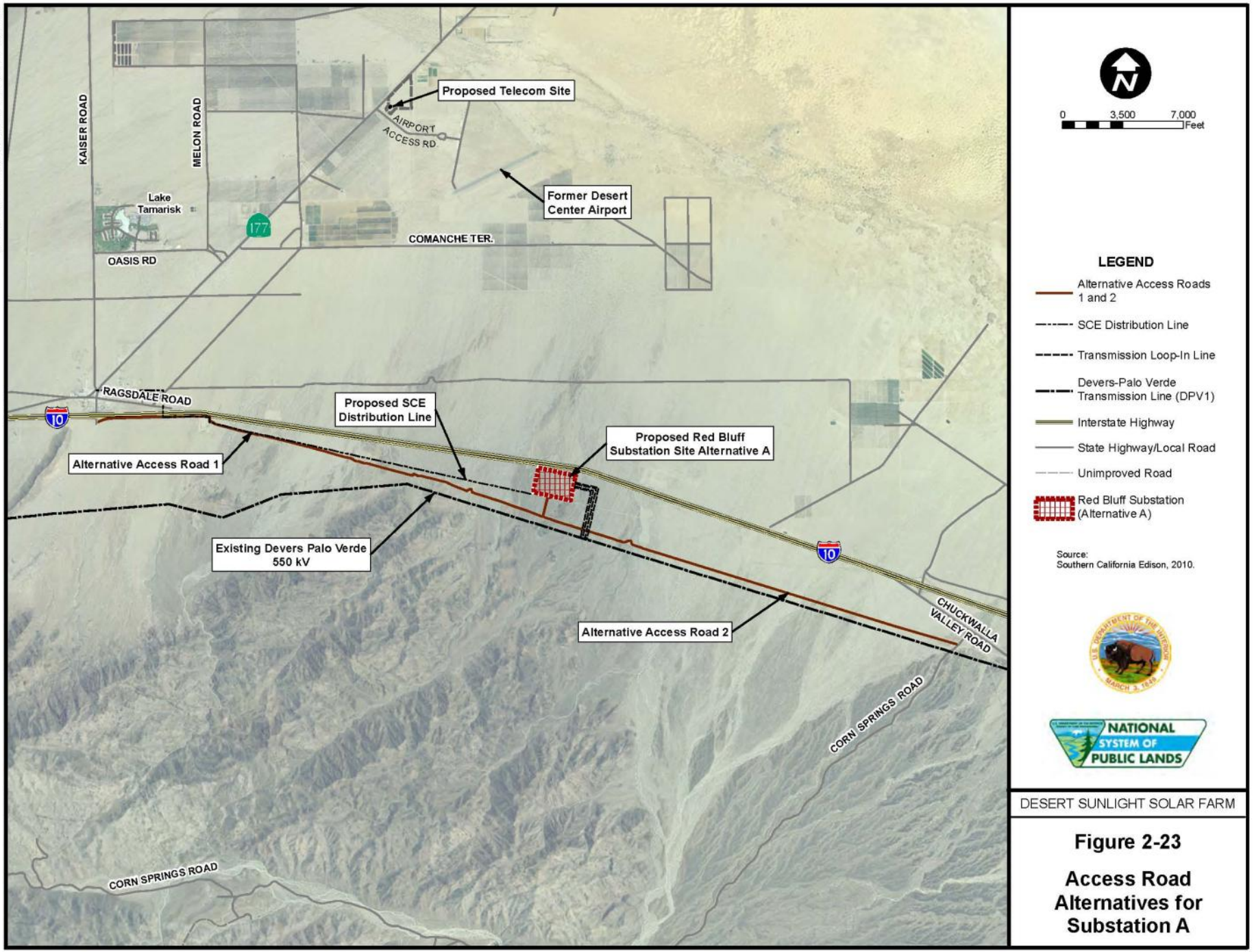
Two alternative access roads are being considered for Substation A: one from the west via Kaiser Road and Aztec Road (Access Road 1), and the second from the east via Corn Springs Road and Chuckwalla Valley Road (Access Road 2).

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 19 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.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KAISER ROAD
MELON ROAD
Proposed Telecom Site
AIRPORT ACCESS RD
Former Desert Center Airport
Lake Tamarisk
177
COMANCHE TER.
OASIS RD
RAGSDALE ROAD
10
Proposed SCE Distribution Line
Proposed Red Bluff Substation Site Alternative A
Alternative Access Road 1
Existing Devers Palo Verde 550 kV
Alternative Access Road 2
CHUCKWALLA VALLEY ROAD
CORN SPRINGS ROAD
CORN SPRINGS ROAD
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.
NATIONAL SYSTEM OF PUBLIC LANDS
DESERT SUNLIGHT SOLAR FARM
Figure 2-23
Access Road Alternatives for Substation A

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

PROJECT ELEMENT	SUBSTATION SITE A (acres) Temporary	SUBSTATION SITE A (acres) Permanent
Substation System[1]	10.00	114.00
Transmission System[2]	27.73	5.10
Distribution System[3]	0.03	8.28
Telecommunication System[4]	0.03	0.22
Total Disturbance	37.79	127.57

[1]Refer to Tables 2.3-9 and 2.3-11 for more detailed information (permanent disturbance includes 75 acres for the Substation, 20 acres for drainage control, and 19 acres for access road).
[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 20 acres.

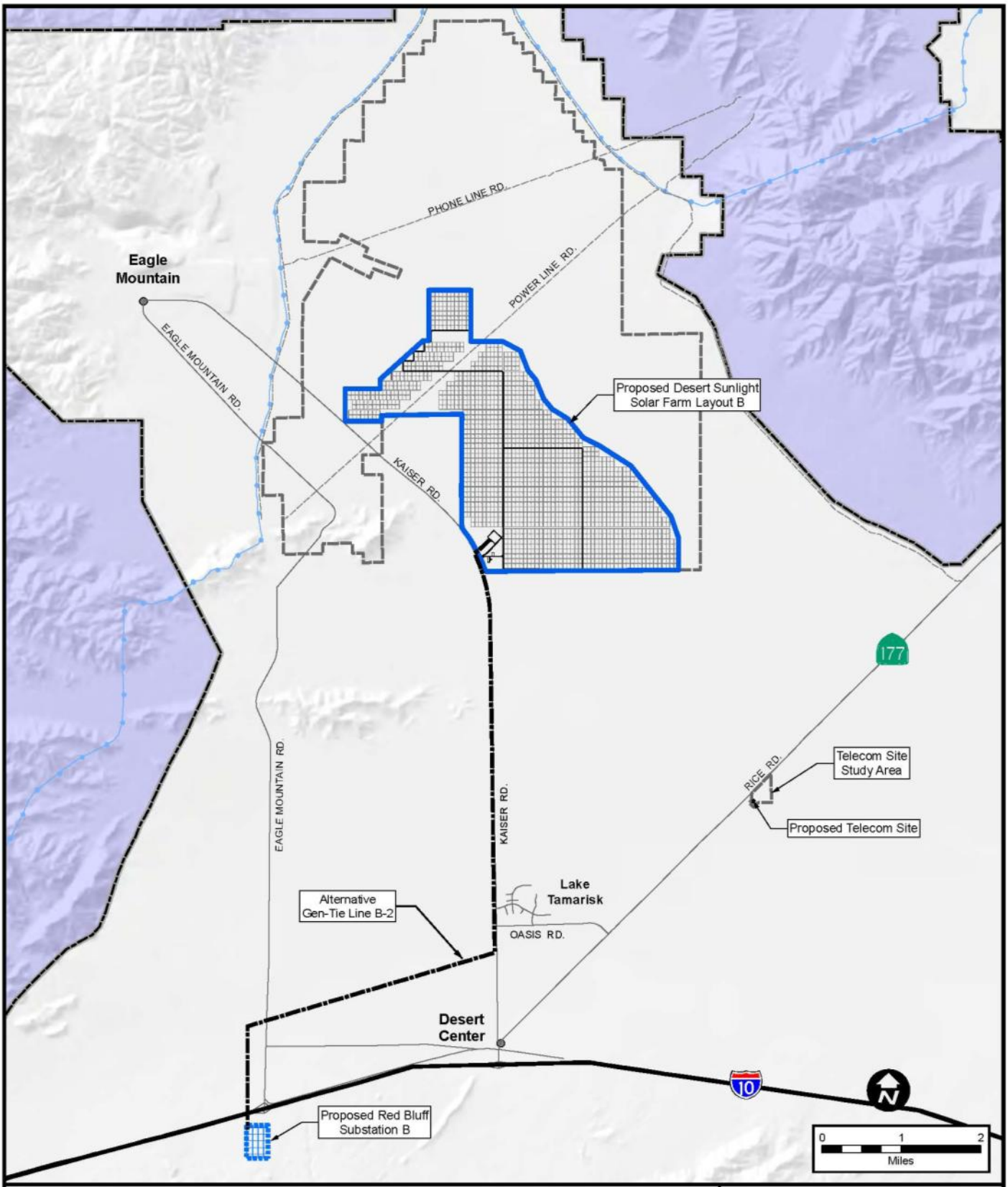
Alternative 2—Alternate Action Alternative with Land Use Plan Amendment: Solar Farm Layout B, Gen-Tie Line GT-B-2, and Red Bluff Substation B

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 5. Table 2.2-7 provides a summary of water use during construction and operation for each major project component.



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.

DESERT SUNLIGHT SOLAR FARM

Figure 2-24

Alternative 2: Alternate Action Layout

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]	4,245
Gen-Tie Line B-2[2]	11
Red Bluff Substation B	75
Red Bluff Substation-related features	-
- Drainage/Sideslopes	11
- Access Road[3]	1
- Transmission System[4]	2
- Distribution System[5]	1
- Telecom Site[6]	<1
TOTAL	**4,347**

[1]Includes area for all Solar Farm-related facilities.
[2]Permanent disturbance (11 acres) occurs within a 10-mile by 160-foot-wide corridor plus additional fan-shaped areas at corners, totaling 203 acres.
[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.

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

Project Component/Element	Construction: Total (acre-feet)	Operation: Peak Daily (gpd)[1]	Operation: Annual (acre-feet)	Operation: Peak Daily (gpd)
Solar Farm B	1,300 to 1,400	252,000 to 1.3 million	0.2	<300
Gen-Tie Line B-2	3.3	40,000	0	0
Red Bluff Substation B	4.3	38,000	0	0
TOTAL	**1,307.6 to 1,407.6**	**330,000 to 1.378 million**	**0.2**	<300

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 and approximately 0.6 mile would be on land owned in fee by the MWD. First Solar would enter into a land license agreement 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.

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.

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
Temporary disturbance during construction	67 acres	33.0
Permanent Disturbance	11 acres	5.4
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: 7.4 miles Area: 12.5 acres	6.2

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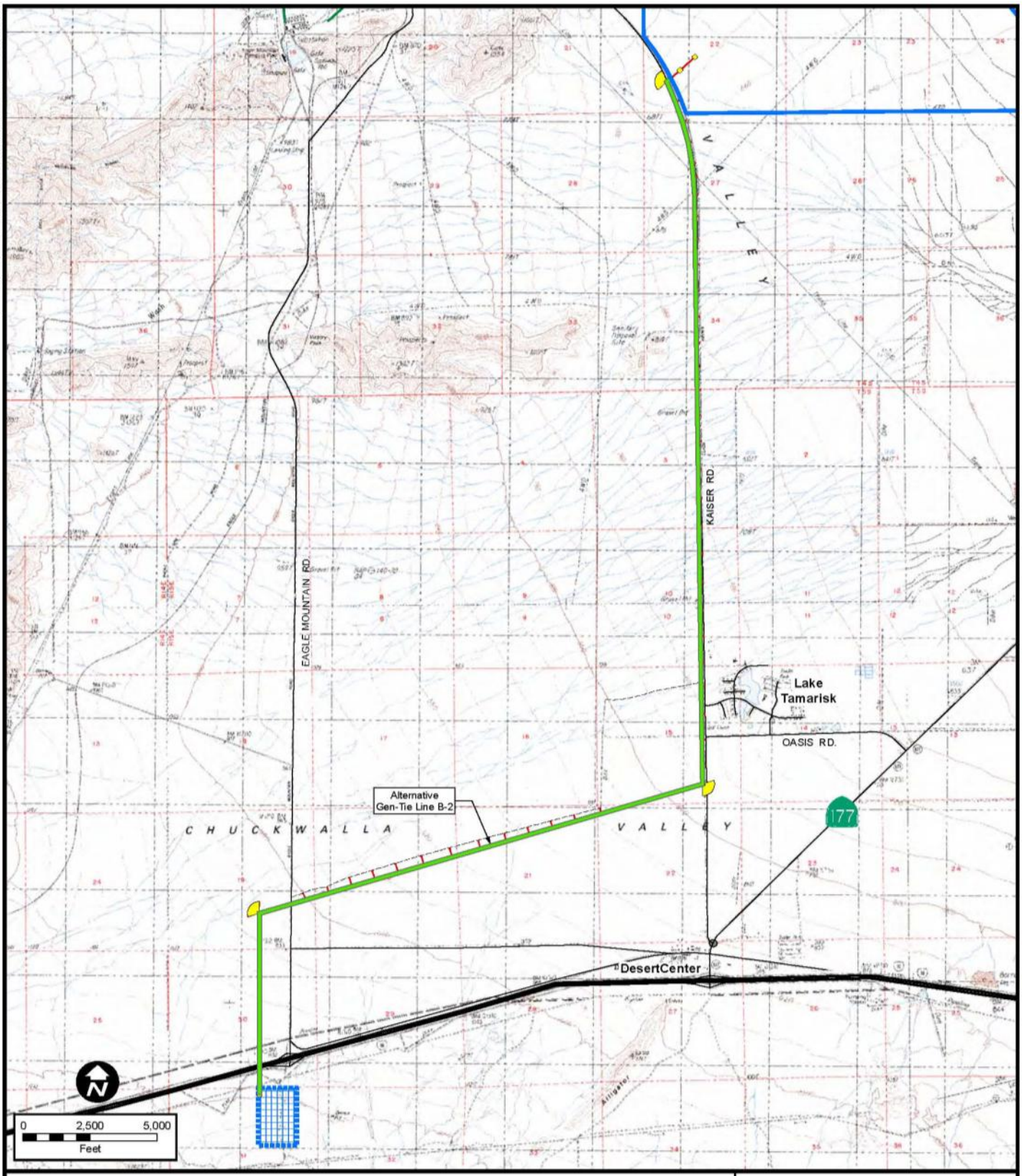

LEGEND

- 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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DESERT SUNLIGHT SOLAR FARM

Figure 2-25

Gen-Tie Line B-2

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 75 acres and would be generally located in the center of the parcel (Figure 2-25). Other Substation-related project 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 project 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 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.

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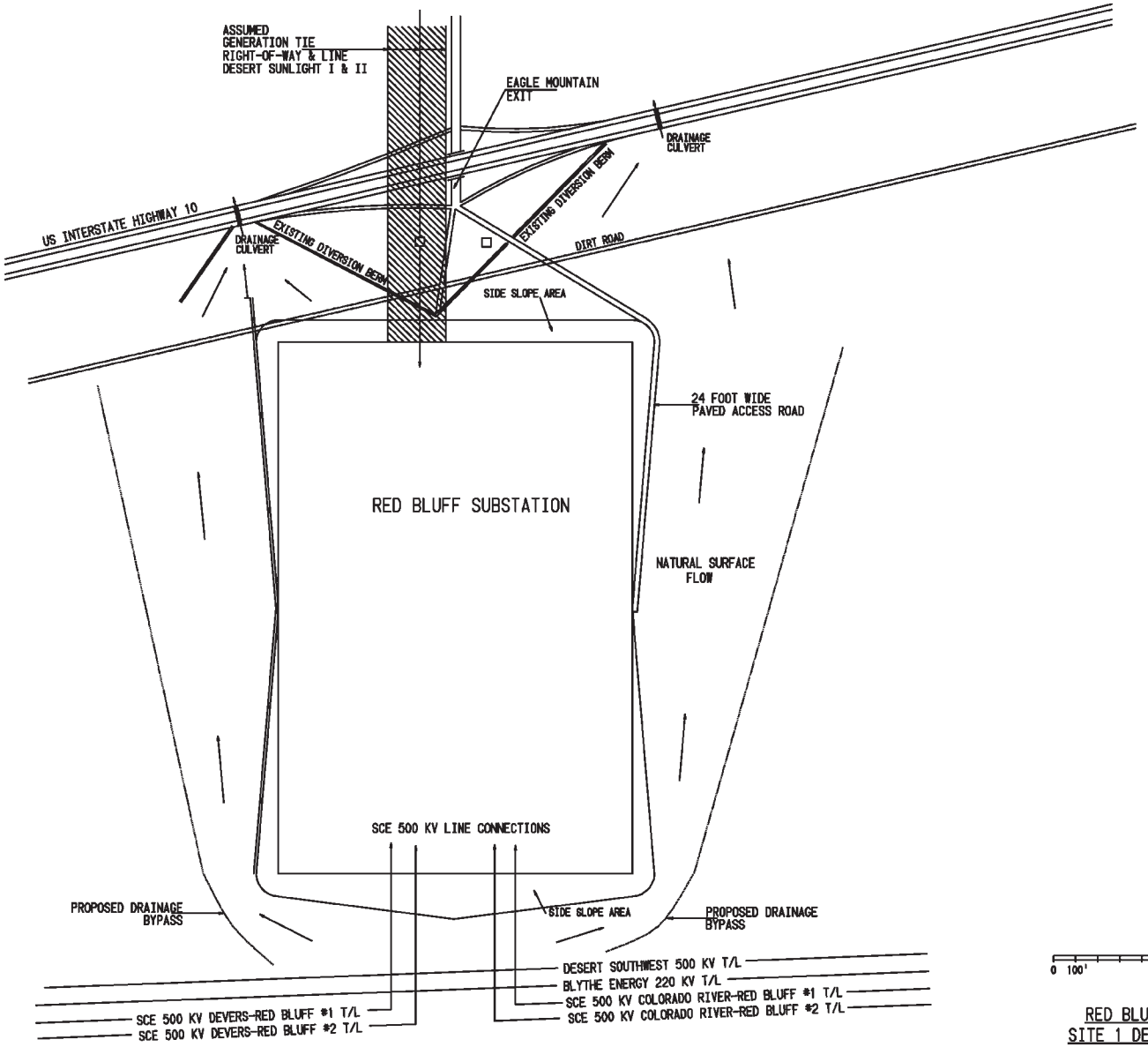


RED BLUFF SUBSTATION
SITE 1 DEVELOPMENT PLAN

THIS LAYOUT EXHIBIT IS BASED ON PLANNING LEVEL ASSUMPTIONS.
THE EXACT DETAILS WOULD BE DETERMINED FOLLOWING COMPLETION OF PRELIMINARY AND FINAL ENGINEERING,
INDENTIFICATIONS OF FIELD CONDITIONS, AND COMPLIANCE WITH APPLICABLE ENVIRONMENTAL AND PERMITTING REQUIREMENTS.

Source: Southern California Edison, 2010

DESERT SUNLIGHT SOLAR FARM

Figure 2-26

Red Bluff Substation B

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

PROJECT ELEMENT	SUBSTATION SITE B (acres) Temporary	SUBSTATION SITE B (acres) Permanent
Substation System[1]	10.00	87.30
Transmission System[2]	18.57	1.92
Distribution System[3]	0.03.	0.12
Telecommunication System[4]	0.03	0.22
Total Disturbance	28.63	89.56

[1]Refer to Tables 2.3-9 and 2.3-12 for more detailed information (permanent disturbance includes 75 acres for the Substation, 11 acres for drainage control, 1.3 acres for access road).
[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 is located south of the Chuckwalla Mountains, which contributes 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 one side of 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.

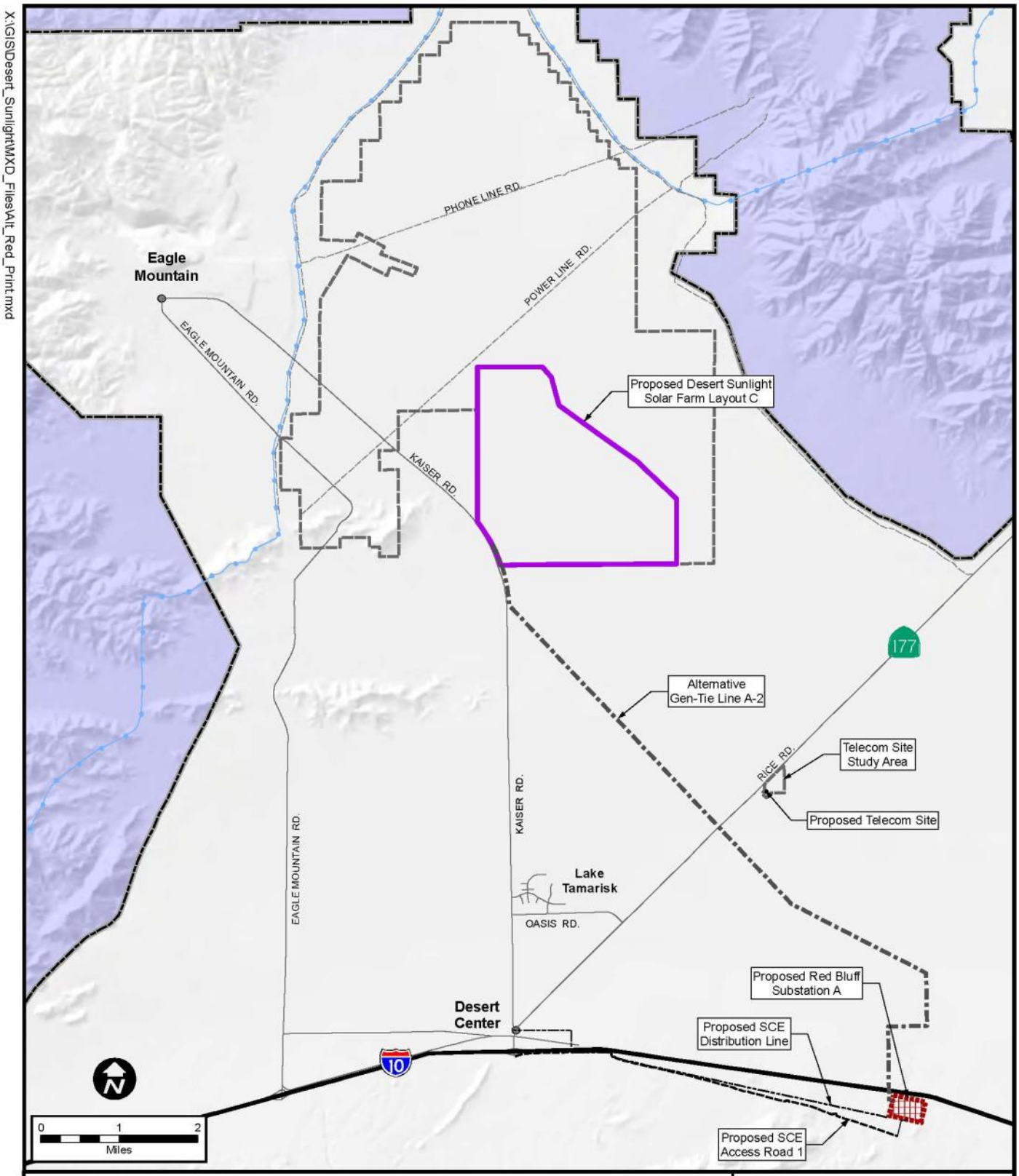
Alternative 3—Reduced Solar Farm Footprint Alternative with Land Use Plan Amendment: Solar Farm Layout C, Gen-Tie Line GT-A-2, Substation A, and Access Road 1

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 megawatts. The construction schedule would be 26 months, the same as for Solar Farm Layout B.



DESERT SUNLIGHT SOLAR FARM

Figure 2-27

Alternative 3: Reduced Footprint Layout

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)	23
Red Bluff Substation A	75
Red Bluff Substation-related features	-
- Drainage/Sideslopes	20
- Access Road (3)	19
- Transmission System (4)	5
- Distribution System (5)	8
- Telecom Site (6)	<1
TOTAL	**3,196**

[1]Includes area for all Solar Farm-related facilities.

[2]Permanent disturbance (23 acres) occurs within a 10.5-mile by 160-foot-wide corridor plus additional fan-shaped areas at corners, totaling 226 acres.

[3]Assume 24,000-foot by 30-foot-wide road improvements 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 2.2-11
Summary of Water Use for Alternative 3—Reduced Footprint Alternative

Project Component/Element	Construction: Total (acre-feet)	Operation Peak Daily (gpd)[1]	Annual (acre-feet)	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	4.3	38,000	0	0
TOTAL	**912.9 to 1,012.9**	**330,000 to 1.378 million**	**0.2**	<300

[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 megawatts 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

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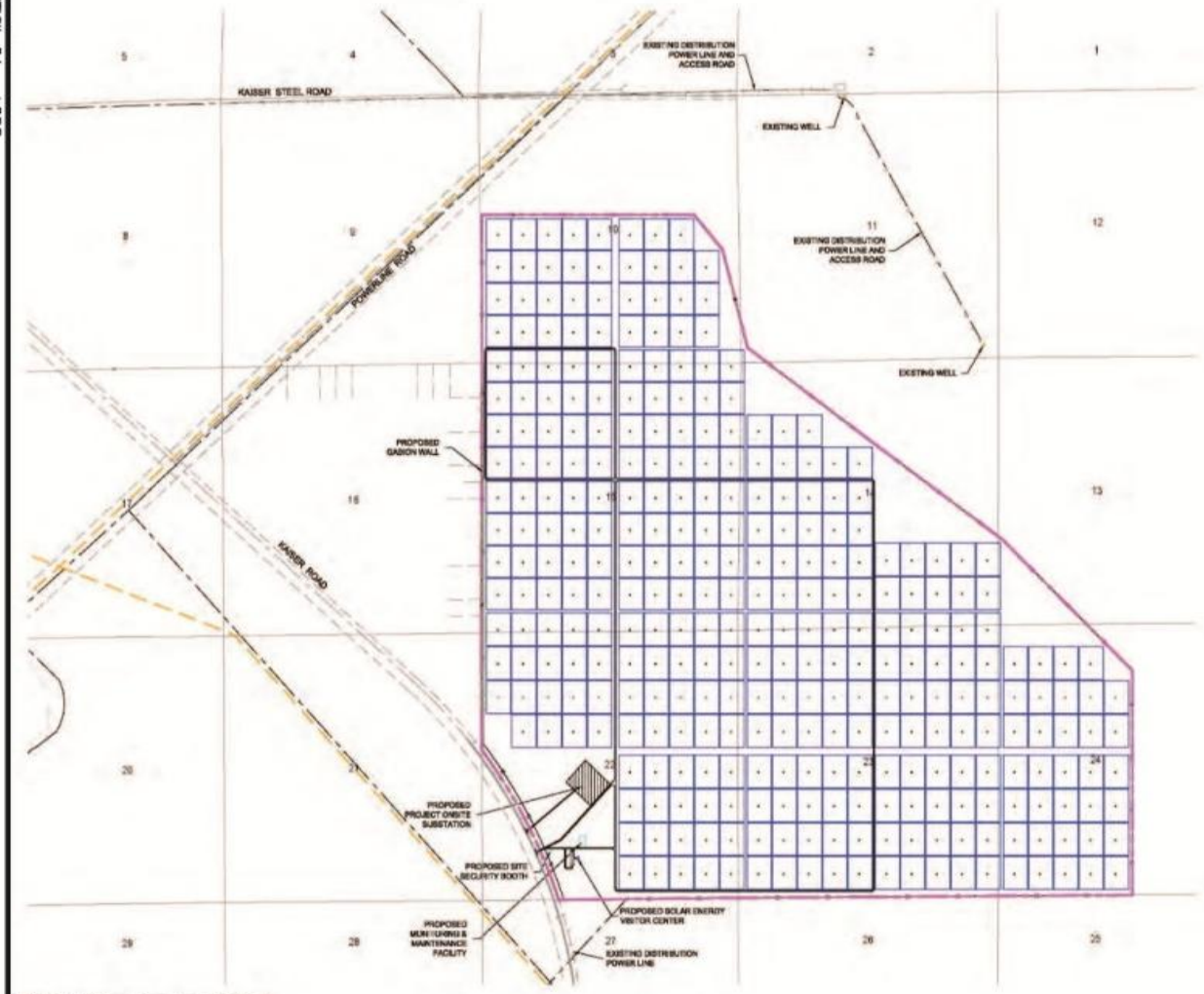

NOT TO SCALE

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

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30% DESIGN

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

DESERT SUNLIGHT SOLAR FARM

Figure 2-28

Solar Farm Layout C

Gen-Tie Line A-2

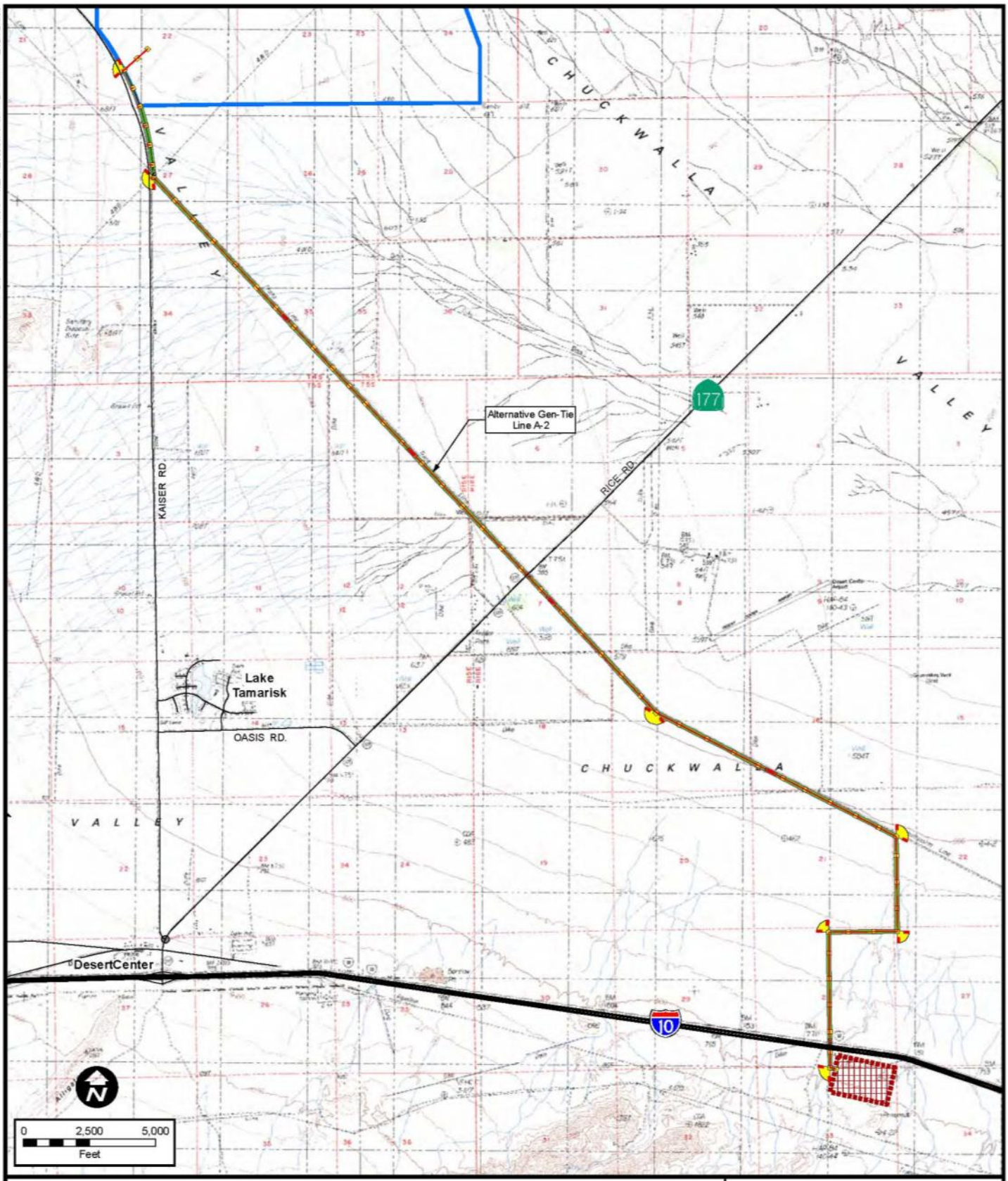
As shown on Figure 2-29, GT-A-2 would exit the southwest corner of the Solar Farm Site, would run for approximately 4,400 feet along the east side of Kaiser Road, until it intersects with the ROW of an existing SCE transmission line. Then it would run to the southeast along the existing transmission ROW for approximately 7.2 miles, then turn south for approximately 0.6 mile, continuing due west for approximately 0.5 mile it finally turns south cross I-10 and continues approximately 1,000 feet (not along any existing feature) to Red Bluff Substation A. The center of 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
- 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 any of these parcels, but would pursue easements through negotiations with the owners. Title review has commenced for these parcels.

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.



LEGEND

- Alternative Gen-Tie Line A-2 Corridor
- Temporary Disturbance Area
- Permanent Disturbance Area
- 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
Temporary disturbance during construction	75 acres	33.2
Permanent disturbance	23 acres	10.2
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: 0.9 mile Acres: 1.4 acres	0.6

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 19 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 (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 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 would not benefit from the reduction in greenhouse gases that this facility would provide, and California utilities would not receive the 550-megawatt contribution to its 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. The IOUs will have to acquire an additional approximately 75 terawatt-hours (TWh) annually of electricity from renewable generation by 2020 in order to meet this requirement, more than twice the amount currently obtained from renewable generation.[1] 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 its State-mandated renewable energy portfolio. The achievement of California's RPS requirements would be further delayed.

Less than 12,400 megawatts of renewable generating capacity (mostly wind), including less than 4,500 megawatts of solar generating capacity, are under evaluation by the CAISO in the Large Generator Interconnection Process (LGIP) serial queue for interconnection by 2015.[2] The Project, at 550 MW, represents over 12 percent of the solar generation capacity in the CAISO's active serial queue Large Generator Interconnection Process, and 22 percent of the LGIP solar generation

[1] 33% Renewables Portfolio Standard Implementation Analysis Preliminary Results, June 2009, California Public Utilities Commission, p. 8.
[2] The California ISO Controlled Grid Generation Queue as of January 8, 2010.

capacity that has an interconnection agreement that either has been executed or is in process. Projects outside the serial queue process are unlikely to obtain interconnection agreements within the next several years. 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 is a statewide planning process that has been underway for over two years to identify the transmission projects needed to accommodate California's renewable energy goals. The RETI process has garnered active participation by 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.[3] The Project Study Area is in the Riverside East CREZ. The No Action Alternative would fail to use one of the most suitable areas for renewable energy development in California.

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 Action with Plan Amendment)

With this No Action 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 Action 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 Energy Development (No Action with Plan Amendment)

Under this No Action 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 other No Action Alternatives would initially be similar to those for this No Action Alternative. However, because the CDCA Plan would be amended to allow for solar energy development at this site, electricity could be produced from the Project locations after a time. It is possible that another project proponent would submit a ROW application to the BLM for use of the site. Project impacts associated with such a future project would likely be similar to those that would result from the proposed Project. Because any new project proponent would have to apply for a new interconnection queue position, it would be unlikely to obtain interconnection agreements within the next several years. As a result, a significant portion of the

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

solar-generating capacity expected to be interconnected in California to help meet renewable energy mandates in the short term would be delayed.

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 in Chapter 2, Description of the Proposed Action and Alternatives), 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)	4,245	4,245	-
Solar Farm Layout C (1)	-	-	3,045
Gen-Tie Line A-1 (2a)	18	-	-
Gen-Tie Line A-2 (2b)	-	-	23
Gen-Tie Line B-2 (2c)	-	11	-
Red Bluff Substation A	75	-	75
Red Bluff Substation-related features	-	-	-
- Drainage/Sideslopes	20	-	20
- Access Road (3a)	19	-	19
- Transmission System (4)	5	-	5
- Distribution System (5)	8	-	8
- Telecom Site (6)	<1	-	<1
Red Bluff Substation B	-	75	-
Red Bluff Substation-related features	-	-	-
- Drainage/Sideslopes	-	11	-
- Access Road (3b)	-	1	-
- Transmission System (4)	-	2	-
- Distribution System (5)	-	1	-
- Telecom Site (6)	-	<1	-
TOTAL ACREAGE	**4,391**	**4,347**	**3,196**

Notes: (1) Includes area for all Solar Farm-related facilities
(2a) Permanent and temporary disturbance occurs within a 12.1-mile by 160-foot-wide corridor plus additional fan-shaped areas at corners, totalling256 acres
(2b) Permanent and temporary disturbance occurs within a 10-mile by 160-foot-wide corridor plus additional fan-shaped areas at corners, totaling 203 acres
(2c) Permanent and temporary disturbance occurs within a 10.5-mile by 160-foot-wide corridor plus additional fan-shaped areas at corners, totaling 226 acres
(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 2.3-1
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

Table 2.3-1 (continued)
Material Deliveries during Construction – Solar Farm

Delivered Material	Approx. # of Truck Deliveries	Direction of Origin	Truck Type	# of axles	# per day (avg.)	Construction Phase
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 (excepting 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 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 2.3-2
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
Site Preparation, Initial Access Roads, and Grading	Motor Graders	5	8	Excavation
Site Preparation, Initial Access Roads, and Grading	25-Cubic Yard Paddle Scrapers	2	8	Excavation

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

Construction Phase	Equipment	# of pieces	Duration of Use (Hours/Day)	Purpose
Site Preparation, Initial Access Roads, and Grading	631 Scrapers	12	8	Excavation
Site Preparation, Initial Access Roads, and Grading	10-Ton Rollers	4	6	Dust Control / Compaction
Site Preparation, Initial Access Roads, and Grading	D9 Dozers	1	8	Excavation
Set up Office & Site Services	35-kW Generator	2-12	24	Power
Set up Office & Site Services	ATV	15	4	Transportation
Survey	ATV	6	4	Survey
Survey	Pickup Trucks	3	4	Management Transportation
Fencing	Skid Steer/Auger	5	8	Material Staging
Fencing	10-Yard Concrete Mixer Truck	1	2	Foundation Pours
Fencing	Pickup Trucks	4	8	Management Transportation
Post Installation	Pile Driver	10	8	Post Installation
Post Installation	4-Ton Forklifts	6	8	Material Transportation
Post Installation	4,000-Gallon Water truck	3	8	Dust mitigation
Post Installation	Spray Truck	2	6	Dust Palliative Application
Underground work (AC/DC/Fiber trenching)	Trencher	2	8	Excavation
Underground work (AC/DC/Fiber trenching)	3-4-Cubic Yard Front End Loader	5	8	Excavation/Processing
Underground work (AC/DC/Fiber trenching)	Small Sheepsfoot Roller	4	6	Compaction
Underground work (AC/DC/Fiber trenching)	Power Screener	3	6	Soil Processing
Underground work (AC/DC/Fiber trenching)	Cable Plow	1	8	U/G Cable Installation
Underground work (PCS Vaults and Transformer Pads)	Back-hoe	1	8	Excavation
Underground work (PCS Vaults and Transformer Pads)	100-Ton crane	1	4	Drop Shipping Vaults and Pads
Underground work (PCS Vaults and Transformer Pads)	Small Sheepsfoot Roller	1	4	Compaction

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

Construction Phase	Equipment	# of pieces	Duration of Use (Hours/Day)	Purpose
System Installation (Tilt Brackets, Tables, Wire Harnesses, Combiner Boxes)	4-Ton 4x4 Forklift	6	8	Material Staging
System Installation (Tilt Brackets, Tables, Wire Harnesses, Combiner Boxes)	ATV	40	4	Transportation
System Installation (Tilt Brackets, Tables, Wire Harnesses, Combiner Boxes)	Pickup Trucks	15	4	Management Transportation
System Installation (Modules)	4-Ton 4x4 Forklift	4	8	Material Staging
System Installation (Modules)	ATV	10	4	Transportation
System Installation (Modules)	Pickup Trucks	5	4	Management Transportation
System Installation (PVCS, PCS Shelters and Transformer Pads)	Back-hoe	1	4	Excavation
System Installation (PVCS, PCS Shelters and Transformer Pads)	100-Ton Crane	1	4	Drop Shipping and Pads
System Installation (PVCS, PCS Shelters and Transformer Pads)	Small Sheepsfoot Roller	1	4	Compaction
Commissioning/pre-functional and functional testing	Pickup Trucks	10	7	Transportation
Commissioning/pre-functional and functional testing	5-kW Generator	30	7	Testing
Soil Stabilization	Spray Truck/Trailer/De-compactor	2	8	Dust Palliative/Hydroseed
Soil Stabilization	Motor Grader	2	6	Final Cleanup

Note: Two 35-kW generators would be used for the main construction site offices; up to ten 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 2.3-3
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 provides details on the equipment to be used for construction of the On-site Substation.

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 2.3-4
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
Site Preparation and Grading	Dozer (Diesel)	1	4	Grading
Site Preparation and Grading	Loader (Diesel)	2	4	Grading
Site Preparation and Grading	Scraper (Diesel)	1	3	Grading
Site Preparation and Grading	Grader (Diesel)	1	4	Grading
Site Preparation and Grading	Water Truck (Diesel)	2	3	Grading
Site Preparation and Grading	4x4 Backhoe (Diesel)	2	2	Grading
Site Preparation and Grading	Tool Truck (Gasoline)	1	2	Grading
Site Preparation and Grading	4x4 Pickup (Gasoline)	1	2	Grading
Site Preparation and Grading	Bobcat (Diesel)	1	8	Fencing
Site Preparation and Grading	Flatbed Truck (Gasoline)	1	2	Fencing
Site Preparation and Grading	Crewcab Truck (Gasoline)	1	4	Fencing

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

Construction Phase	Equipment and Quantity	# of pieces	Duration of Use (Hours/Day)	Purpose
Below-Grade Construction	Excavator (Diesel)	1	4	Civil
Below-Grade Construction	Foundation Auger (Diesel)	1	5	Civil
Below-Grade Construction	Backhoes (Diesel)	2	3	Civil
Below-Grade Construction	Dump Truck (Diesel)	2	2	Civil
Below-Grade Construction	Skip Loader (Diesel)	1	3	Civil
Below-Grade Construction	Water Truck (Diesel)	1	3	Civil
Below-Grade Construction	Bobcat Skid Steer (Diesel)	2	3	Civil
Below-Grade Construction	Lull-Forklift (Diesel)	1	4	Civil
Below-Grade Construction	17-Ton Crane (Diesel)	1	3	Civil
Below-Grade Construction	Whacker (Gasoline)	1	3	Civil
Below-Grade Construction	Tool Truck (Gasoline)	1		Civil
Above-Grade Construction	Scissor Lifts (Propane)	2	3	Electrical
Above-Grade Construction	Manlifts (Propane)	4	3	Electrical
Above-Grade Construction	Reach Manlift (Propane)	4	3	Electrical
Above-Grade Construction	15-Ton Crane (Diesel)	1	3	Electrical
Above-Grade Construction	Tool Trailer	1	3	Electrical
Above-Grade Construction	Crew Trucks (Gasoline)	3	2	Electrical
Control/Power Cables & Terminators	Manlift (Propane)	1		Wiring
Control/Power Cables & Terminators	Tool Trailer	1	4	Wiring
Control/Power Cables & Terminators	Pickups (Gasoline)	2	3	Wiring
Clean Up & Punch List	Maintenance Trucks (Gasoline)	2	4	Maintenance Crew Equipment Check
Testing & Commissioning	Crew Truck (Gasoline)	2	4	Testing

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

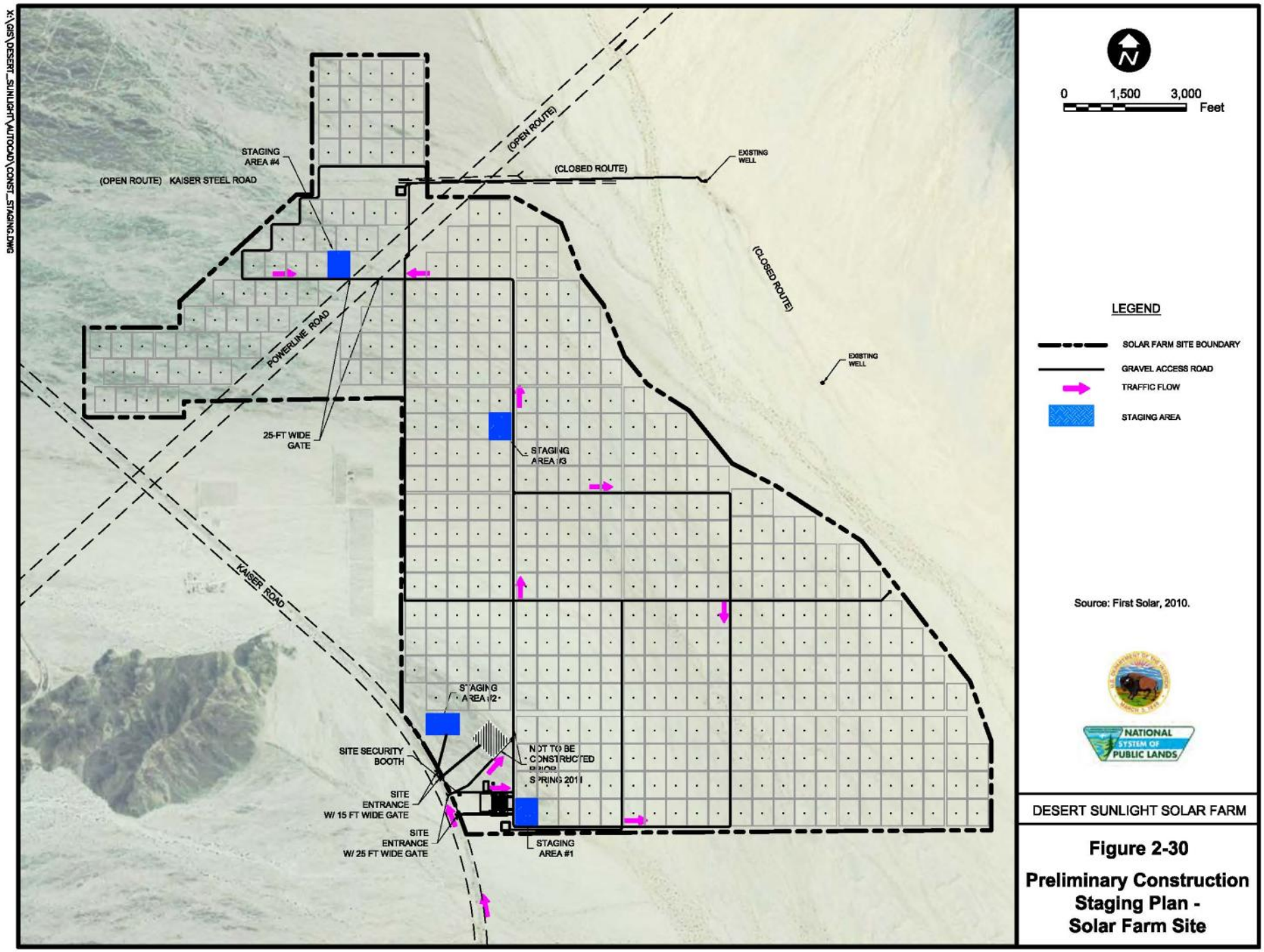
Material Delivered	# of Truck Deliveries	Truck Type	Duration	Construction Phase
Transmission Structures	54	Semi-Truck w/ Flatbed	1.5 months	Beginning at mobilization through Foundation Installation
Conductor, Groundwire, Optical Groundwire	27	Semi-Truck w/ Flatbed	1 month	Beginning at mobilization through 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
Start of Foundation Installation through Wire installation	Service Truck	1	8	General Servicing and Dust Mitigation
Start of Foundation Installation through Wire installation	Mechanic Truck	2	8	General Servicing and Dust Mitigation
Stake Structures, and Foundation Installation	Enclosed Material Trailers	4	Parked	Material Handling and Material Yard/ Hauling Equipment
Stake Structures, and Foundation Installation	40-Ton Crane	1	4	Material Handling and Material Yard/ Hauling Equipment
Stake Structures, and Foundation Installation	4x4 Forklifts	2	4	Material Handling and Material Yard/ Hauling Equipment
Stake Structures, Foundation Installation, ROW Restoration & Cleanup	1-Ton Crew Cab	1	8	Access Road/ Clearing Crew/ ROW Restoration
Stake Structures, Foundation Installation, ROW Restoration & Cleanup	¾-Ton Pickup	2	8	Access Road/ Clearing Crew/ ROW Restoration
Stake Structures, Foundation Installation, ROW Restoration & Cleanup	Bulldozers	2	8	Access Road/ Clearing Crew/ ROW Restoration
Stake Structures, Foundation Installation, ROW Restoration & Cleanup	Backhoes	1	4	Access Road/ Clearing Crew/ ROW Restoration
Stake Structures, Foundation Installation, ROW Restoration & Cleanup	Dump Truck	1	4	Access Road/ Clearing Crew/ ROW Restoration
Stake Structures, Foundation Installation, ROW Restoration & Cleanup	Steel Wheel/ Smooth Drum Roller	1	6	Access Road/ Clearing Crew/ ROW Restoration

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

Construction Phase(s)	Equipment	# of pieces	Average Hours Used per Day	Purpose
Stake Structures, Foundation Installation, ROW Restoration & Cleanup	Road Grader	1	2	Access Road/ Clearing Crew/ ROW Restoration
Stake Structures, Foundation Installation, ROW Restoration & Cleanup	10,000-Gallon Water Truck	1	4	Access Road/ Clearing Crew/ ROW Restoration
Foundation Installation	1-Ton Crew Cab	4	8	Foundation Crews (2)
Foundation Installation	¾-Ton Pickup	3	8	Foundation Crews (2)
Foundation Installation	Drilling Rig	2	8	Foundation Crews (2)
Foundation Installation	40-Ton Crane	2	4	Foundation Crews (2)
Foundation Installation	Forklifts	2	4	Foundation Crews (2)
Foundation Installation	Towed Trailers	2	Parked	Foundation Crews (2)
Foundation Installation	Water Pump	2	1	Foundation Crews (2)
Foundation Installation	Bulldozers	2	2	Foundation Crews (2)
Foundation Installation	Front-End Wheel Loaders	2	6	Foundation Crews (2)
Foundation Installation	Road Tractor w/ Lowboy Trailer	2	2	Foundation Crews (2)
Foundation Installation	Air Compressors	2	2	Foundation Crews (2)
Foundation Installation	Rock Hammer	1	As Required	Foundation Crews (2)
Foundation Installation	Mobile Mixer	1	As Required	Foundation Crews (2)
Foundation Installation	Water Truck or Transportable Holding Tank with sufficient capacity to retrieve polymer slurry	1	As Required	Foundation Crews (2)
Foundation Installation	1-Ton Crew Cab	2	8	Setting Crew
Foundation Installation	¾-Ton Pickup	1	8	Setting Crew
Foundation Installation	100-Ton Crane	1	8	Setting Crew
Foundation Installation	Forklift	1	6	Setting Crew


X:\GIS\DESERT_SUNLIGHT\AUTOCAD\CONST_STAGING.DWG
STAGING AREA #4
(OPEN ROUTE) KAISER STEEL ROAD
(OPEN ROUTE)
(CLOSED ROUTE)
EXISTING WELL
(CLOSED ROUTE)
POWERLINE ROAD
EXISTING WELL
25-FT WIDE GATE
STAGING AREA #3
KAISER ROAD
STAGING AREA #2
SITE SECURITY BOOTH
NOT TO BE CONSTRUCTED PRIOR SPRING 2011
SITE ENTRANCE W/ 15 FT WIDE GATE
SITE ENTRANCE W/ 25 FT WIDE GATE
STAGING AREA #1
N
0 1,500 3,000
Feet
LEGEND
SOLAR FARM SITE BOUNDARY
GRAVEL ACCESS ROAD
TRAFFIC FLOW
STAGING AREA
Source: First Solar, 2010.
NATIONAL SYSTEM OF PUBLIC LANDS
DESERT SUNLIGHT SOLAR FARM
Figure 2-30
Preliminary Construction Staging Plan - Solar Farm Site

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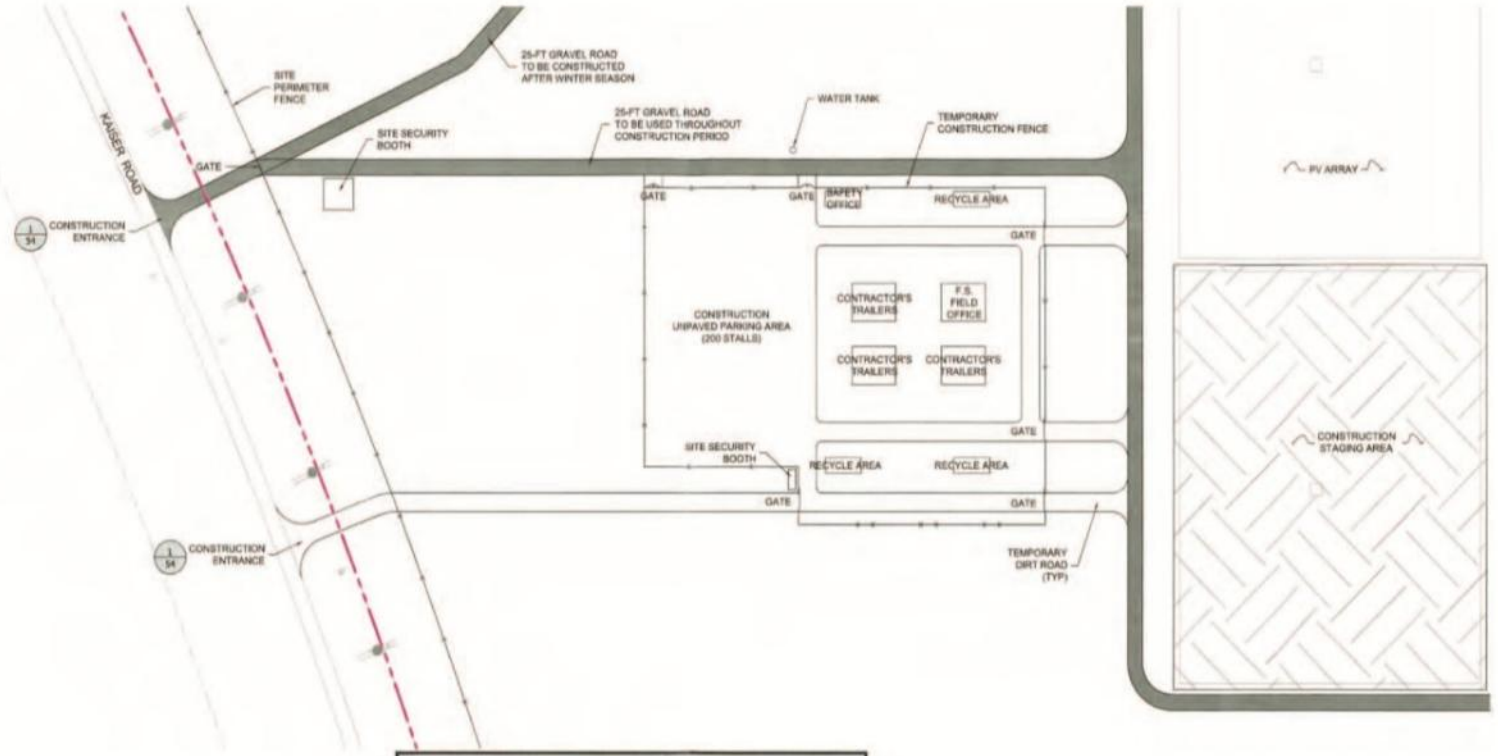

KEY MAP
NOT TO SCALE

30% DESIGN

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

Source: First Solar, 2010

NATIONAL SYSTEM OF PUBLIC LANDS

DESERT SUNLIGHT SOLAR FARM

Figure 2-31

Typical Construction Staging Area- Solar Farm Site

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

Pre-construction 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 25 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, excepting 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 un-covered 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.

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

Construction Phase(s)	Equipment	# of pieces	Average Hours Used per Day	Purpose
Wire Installation	60-ft Bucket Truck	2	5	Stringing Crew – Stringing, Splicing, Sagging, Clipping, and Dead-ending
Wire Installation	105-ft. Elevator Bucket Truck	2	5	Stringing Crew – Stringing, Splicing, Sagging, Clipping, and Dead-ending
Wire Installation	H/L Puller (Bundled Pulling Capacity)	1	4	Stringing Crew – Stringing, Splicing, Sagging, Clipping, and Dead-ending
Wire Installation	3-Drum H/L Puller	1	4	Stringing Crew – Stringing, Splicing, Sagging, Clipping, and Dead-ending
Erect Structures and Wire Installation	1-Ton Crew Cab	1	8	Guard Pole Crew
Erect Structures and Wire Installation	¾-Ton Pickup	1	8	Guard Pole Crew
Erect Structures and Wire Installation	Derrick Digger	1	8	Guard Pole Crew
Erect Structures and Wire Installation	Semi-Truck w/ Flatbed	1	4	Guard Pole Crew

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 the construction phase 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 pre-construction 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 pre-construction surveys, desert tortoise exclusion fencing would be constructed in specified areas. Pre-construction activities would include clearance surveys for desert tortoise and other sensitive species, relocation for desert tortoise; seasonal avoidance of nesting birds, including

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

Construction Phase(s)	Equipment	# of pieces	Average Hours Used per Day	Purpose
Table 2.3-Frame Structures and Erect Structures	Semi-Truck w/ Flatbed Trailer	2	8	Framing Crew
Frame Structures and Erect Structures	40-Ton Crane	1	8	Framing Crew
Frame Structures and Erect Structures	Forklift	1	5	Framing Crew
Frame Structures and Erect Structures	Air Compressor	1	4	Framing Crew
Frame Structures and Erect Structures	Set of Hydraulic Jacks	1	4	Framing Crew
Wire Installation	1-Ton Crew Cab	1	8	Grounding Crew
Wire Installation	¾-Ton Pickup	1	8	Grounding Crew
Wire Installation	Backhoe	1	6	Grounding Crew
Wire Installation	Air Compressor	1	3	Grounding Crew
Wire Installation	1-Ton Crew Cab	6	8	Stringing Crew – Stringing, Splicing, Sagging, Clipping, and Dead-ending
Wire Installation	¾-Ton Pickup	4	8	Stringing Crew – Stringing, Splicing, Sagging, Clipping, and Dead-ending
Wire Installation	Boom Trucks	4	5	Stringing Crew – Stringing, Splicing, Sagging, Clipping, and Dead-ending
Wire Installation	Bullwheel Tensioner	1	6	Stringing Crew – Stringing, Splicing, Sagging, Clipping, and Dead-ending
Wire Installation	4-Drum Rope Machine	2	2	Stringing Crew – Stringing, Splicing, Sagging, Clipping, and Dead-ending
Wire Installation	5-Drum Lead Line Machine	1	2	Stringing Crew – Stringing, Splicing, Sagging, Clipping, and Dead-ending
Wire Installation	Bulldozers	2	1	Stringing Crew – Stringing, Splicing, Sagging, Clipping, and Dead-ending
Wire Installation	Sleeving Rig	1	2	Stringing Crew – Stringing, Splicing, Sagging, Clipping, and Dead-ending
Wire Installation	6x6 Road Trucks w/ Wire Trailers	4	4	Stringing Crew – Stringing, Splicing, Sagging, Clipping, and Dead-ending
Wire Installation	5-Ton Static Reel Truck	1	2	Stringing Crew – Stringing, Splicing, Sagging, Clipping, and Dead-ending
Wire Installation	Static Tensioner	1	2	Stringing Crew – Stringing, Splicing, Sagging, Clipping, and Dead-ending

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 ten 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.

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 as 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 construction grading and compaction techniques that adequately prepare the site for safe and efficient installation and operation of PV arrays. The discussion below provides preliminary detail relative to the site preparation techniques that may be employed at the Project locations; however, the engineering contractor for the Project is conducting off-site field tests of various site preparation and revegetation techniques. The engineering contractor is exploring the use of agricultural methods for vegetation removal such as discing and mowing of vegetation, in order to minimize impacts from clearing and grading. The Applicant could use the results of the off-site testing to adjust site preparation and construction methods to minimize impacts on vegetation and facilitate site stabilization. However, at the time of the preparation of the Draft EIS, in order to be conservative in analyzing potential impacts from site preparation, the entire Solar Farm Site would be cleared and graded.

Clearing. The Applicant's 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. As part of the engineering tests mentioned above, the Applicant's engineering contractor is exploring alternatives to clearing and grubbing of vegetation. 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 grading would be performed across the full Solar Farm Site.

The cut and fill depths across the Solar Farm Site would be minimized and are expected to average approximately 5 inches. No import or export of soil material would be needed as the amount of cut and fill would be balanced on site. Current plans, which do not reflect the results of upcoming test of construction techniques, result in preliminary calculations of approximately 1.35 million cubic yards of soil, or approximately 334 cubic yards per acre, that would need to be cut and filled across the Solar Farm Site for either Solar Farm Alternative A or B. The overall amount of soil would be less for Alternative C. At a rate of 1.5 MW per day this equates to approximately 4,000 cubic yards per day. The Applicant's engineering contractor is also exploring methods of maintaining the chemical, physical, and biological viability of the topsoil in order to improve the rate of post-construction re-growth of vegetation.

Work over the grading 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.

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 31.9 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 achieve stabilization after 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.

In order to facilitate proper stormwater infiltration and promote vegetation regrowth after construction, the area between the rows of modules would be decompacted after BOS installation. A small tractor would decompact the top layer (approximately the top 6 inches) of soil in the area between the rows to compaction levels similar to those existing prior to construction. The decompaction strip would be approximately 9 feet wide.

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 addition 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.

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	7,960	64,372
Base for Concrete Pads – SF-B	*N/A*	*3,285*
Road Base – SF-B	*N/A*	*61,087*
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 for project construction and one for operation. Both wells would be available for use during construction to provide flexibility in the event of a well malfunction. Historically, local wells within the Project Study Area produced almost 6,000 acre-feet per year. The water usage during that period dwarfs expected use by the DSSF, both during construction and operation. Nearby active wells have a production capacity of between 800 and 2,200 acre-feet per year (AFY) (First Solar 2009), and alternatively, Sunlight may explore acquiring water from those wells. Large stationary temporary water storage tanks (stand tanks) would be used to store the water and water trucks would be filled from these tanks.

During the approximately 26-month construction period, an estimated total of between 900 and 1,400 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.

Stand tanks would be located in the water truck station areas and used to store water during construction in order to meet expected daily demand. The stand tanks would be charged with/connected to the wells with existing or temporary piping. 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 as shown in the tables below. 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) Temporary	SUBSTATION SITE A (acres) Permanent	SUBSTATION SITE B (acres) Temporary	SUBSTATION SITE B (acres) Permanent
Substation System (1)	10.00	114.00	10.00	96.30
Transmission System (2)	27.73	5.10	18.57	1.92
Distribution System (3)	0.03	8.28	0.03	0.12
Telecommunication System (4)	0.03	0.22	0.30	0.22
Total Disturbance	**37.79**	**127.60**	**28.63**	**89.56**

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 20 acres for Substation A and 11 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 detention basin or 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.

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).

Staging Areas

Additional temporary 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.

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	1,000,000	1,000,000
Site Fill (1)	Soil	1,000,000	1,000,000
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.

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 temporary and permanent land disturbance related to construction of the substation at both Substation A and B, respectively, including required drainage structures, access road, and a staging area outside/around the substation, based on the most current information available.

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

Construction Activity	Acres Temporarily Disturbed	Acres Permanently Disturbed
Substation grading	-	75.0
Drainage/side slopes	-	20.0
Preferred access road (1)	-	19.0
Staging area	10.0	
Total Disturbance	10.0	114.0

Notes: (1) Both alternate access roads would require grading of an area at least 20,000 feet long by 30 feet wide. With additional grading possibly needed for an adequate road, it is assumed that approximately 19 acres of total disturbance would be required.

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

Construction Activity	Acres Temporarily Disturbed	Acres Permanently Disturbed
Substation Grading	-	75.0
Drainage/Side Slopes	-	11.0
Access Road (1)	-	1.3
Staging Area	10.0	-
Total Acres Disturbed	10.0	87.3

Notes: (1) Based on road dimensions of 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 20,000-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 19 acres of total disturbance.

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

New access 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 19 acres for either access road to Substation A (Access Road 1) and 1.3 acres for Substation B (refer to Table 2.3-11 and Table 2.3-12).

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.

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.

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

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
- 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, as 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.

Rehabilitation work may be necessary in some locations along the existing transmission line roads to accommodate construction activities. This work may 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 leveled 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 identifying water sources in the area but will not be able to finalize the total amount of water needed or the amount of water needed per source until engineering becomes more final.

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 overhead ground wire (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 pre-construction 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 Disturbed During Construction (total)	Acres Temporarily Disturbed	Acres Permanently Disturbed
Modify Existing 500 kV Lattice Steel Tower (1)	2	150' x 150'	1.03	1.03	0.00
Remove Existing 500 kV Lattice Steel Tower (1)	2	150' x 150'	1.03	1.03	0.00
Temporary Conductor Field Snub/Transfer Area (2)	8	200' x 150'	5.51	5.51	0.00

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

Project Feature	Site Quantity (Estimated)	Disturbed Acreage Calculation (L x W)	Acres Disturbed During Construction (total)	Acres Temporarily Disturbed	Acres Permanently Disturbed
Construct New 500 kV Lattice Steel Tower (3)	8	200' x 200'	7.36	4.40	2.96
Construct New 220 kV Lattice Steel Tower (4)	2	200' x 200'	1.84	1.40	0.44
Conductor & OPGW Stringing Setup Area - Puller (5)	4	300' x 150'	4.13	4.13	0.00
Conductor & OPGW Stringing Setup Area - Tensioner (5)	4	500' x 150'	6.89	6.89	0.00
New Access/Spur Roads (6)	2	linear miles x 14' wide	1.70	0.00	1.70
Red Bluff Sub - Material & Equipment Staging Area	1	approx. 1.5 acres	1.50	1.50	0.00
Guard Structures	8	100' x 100'	1.84	1.84	0.00
Total Estimated Disturbed Acres (7)			**32.83**	**27.73**	**5.10**

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 Disturbed During Construction	Acres Temporarily Disturbed	Acres Permanently Disturbed
Modify Existing 500-kV Lattice Steel Tower (1)	2	150' x 150'	1.03	1.03	0.000

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

Project Feature	Site Quantity	Disturbed Acreage Calculation (L x W)	Acres Disturbed During Construction	Acres Temporarily Disturbed	Acres Permanently Disturbed
Remove Existing 500-kV Lattice Steel Tower (1)	2	150' x 150'	1.03	1.03	0.000
Temporary Conductor Field Snub/Transfer Area (2)	8	200' x 150'	5.51	5.51	0.000
Construct New 500-kV Lattice Steel Tower (3)	2	200' x 200'	1.84	1.20	0.64
Construct New 220-kV Lattice Steel Tower (4)	2	200' x 200'	1.84	1.40	0.43
Conductor & OPGW Stringing Setup Area - Puller (5)	3	300' x 150'	3.10	3.10	0.000
Conductor & OPGW Stringing Setup Area - Tensioner (5)	3	500' x 150'	5.17	5.17	0.000
New Access/Spur Roads (6	0.5	linear miles x 18’ wide	0.85	0.000	0.85
Red Bluff Sub - Material & Equipment Staging Area	1	approx. 1.5 acres	1.500	1.500	0.000
Guard Structures	2	100’ x 100’	0.46	0.46	0.00
Total Estimated Disturbed Acres (7)			**22.33**	**18.57**	**1.92**

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 right-of-way, or the width of the proposed right-of-way 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 and 2.3-17 (Construction Equipment and Workforce Estimates by Activity to Construct New 500-kV Loop-in Lines), and Table 2.3-18 (Construction Equipment and Workforce Estimates by Activity for 500-kV and 220-kV Transmission Line Structure Modification/Replacement). 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: Primary Equipment Description	Work Activity: Estimated Horse-Power	Work Activity: Probable Fuel Type	Work Activity: Primary Equipment Quantity	Activity Production: Estimated Workforce	Activity Production: Estimated Schedule (Days)	Activity Production: Duration of Use (Hrs/Day)
Survey (1)				**4**	**6**	
3/4-Ton Pick-up Truck, 4x4	200	Gas	2		6	8
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		Duration of Project	2
Water Truck	350	Diesel	1		Duration of Project	
10,000 lb Rough Terrain Fork Lift	200	Diesel	1		Duration of Project	5
Truck, Semi, Tractor	350	Diesel	1		Duration of Project	1
Roads & Landing Work (3)				**5**	**7**	
1-Ton Crew Cab, 4x4	300	Diesel	2		7	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
Drum Type Compactor	250	Diesel	1		5	4
Track Type Dozer	350	Diesel	1		5	6
Lowboy Truck/Trailer	500	Diesel	2		3	2
Install LST Foundations (4)				**9**	**19**	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		19	2

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: Primary Equipment Description	Work Activity: Estimated Horse-Power	Work Activity: Probable Fuel Type	Work Activity: Primary Equipment Quantity	Activity Production: Estimated Workforce	Activity Production: Estimated Schedule (Days)	Activity Production: Duration of Use (Hrs/Day)
30-Ton Crane Truck	300	Diesel	1		19	5
Backhoe/Front Loader	200	Diesel	1		17	8
Auger Truck	500	Diesel	1		17	8
10-cu. yd. Dump Truck	350	Diesel	2		17	8
10-cu. yd. Concrete Mixer Truck	425	Diesel	4		19	5
LST Steel Haul (5)				**6**	**8**	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		8	2
10,000 lb Rough Terrain Fork Lift	200	Diesel	1		8	6
40' Flat Bed Truck/ Trailer	350	Diesel	1		8	8
LST Steel Assembly (6)				**7**	**75**	
3/4-Ton Pick-up Truck, 4x4	300	Diesel	3		75	4
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		75	4
10,000 lb Rough Terrain Fork Lift	200	Diesel	1		75	6
30-Ton Crane Truck	300	Diesel	2		74	8
Compressor Trailer	350	Diesel	2		75	6
LST Erection (7)				**8**	**54**	
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		54	5
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		54	5
Compressor Trailer	120	Diesel	1		54	6
80-Ton Rough Terrain Crane	350	Diesel	1		54	6
Guard Structure Installation (8)				**6**	**1**	
3/4-Ton Pick-up Truck, 4x4	300	Gas	1		1	6
1-Ton Crew Cab, 4x4	300	Diesel	1		1	6
Compressor Trailer	120	Diesel	1		1	6
Auger Truck	500	Diesel	1		1	6
Extendable Flat Bed Pole Truck	350	Diesel	1		1	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: Primary Equipment Description	Work Activity: Estimated Horse-Power	Work Activity: Probable Fuel Type	Work Activity: Primary Equipment Quantity	Activity Production: Estimated Workforce	Activity Production: Estimated Schedule (Days)	Activity Production: Duration of Use (Hrs/Day)
Install Conductor & OPGW (9)				**16**	**23**	
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		23	8
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		23	8
Wire Truck/Trailer	350	Diesel	2		19	2
Dump Truck (Trash)	350	Diesel	1		12	2
20,000 lb. Rough Terrain Fork Lift	350	Diesel	1		23	2
22-Ton Manitex	350	Diesel	1		23	8
30-Ton Manitex	350	Diesel	2		23	6
Splicing Rig	350	Diesel	1		10	2
Splicing Lab	300	Diesel	1		10	2
Spacing Cart	10	Diesel	1		10	8
Static Truck/ Tensioner	350	Diesel	1		23	2
3 Drum Straw line Puller	300	Diesel	1		15	4
60lk Puller	525	Diesel	1		23	3
Sag Cat w/ 2 winches	350	Diesel	1		23	2
580 Case Backhoe	120	Diesel	1		23	2
D8 Cat	300	Diesel	1		23	3
Lowboy Truck/Trailer	500	Diesel	1		23	2
Restoration (10)				**7**	**4**	
1-Ton Crew Cab, 4x4	300	Diesel	2		4	2
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 crews
#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

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: Primary Equipment Description	Work Activity: Estimated Horse-Power	Work Activity: Probable Fuel Type	Work Activity: Primary Equipment Quantity	Activity Production: Estimated Workforce	Activity Production : Estimated Schedule (Days)	Activity Production : Duration of Use (Hrs/Day)	Activity Production: Estimated Production Per Day
Survey (1)				**4**	**6**		**0.5 Miles**
3/4-Ton Pick-up Truck, 4x4	200	Gas	2		6	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		Duration of Project	2	
Water Truck	350	Diesel	1		Duration of Project		
10,000 lb Rough Terrain Fork Lift	200	Diesel	1		Duration of Project	5	
Truck, Semi, Tractor	350	Diesel	1		Duration of Project	1	
Roads & Landing Work (3)				**5**	**6**		**0.5 Miles & 4 Pads**
1-Ton Crew Cab, 4x4	300	Diesel	2		6	2	0.5 Miles/Day & 0.66 Structure Pads/Day
Road Grader	350	Diesel	1		4	4	0.5 Miles/Day & 0.66 Structure Pads/Day
Backhoe/Front Loader	350	Diesel	1		4	6	0.5 Miles/Day & 0.66 Structure Pads/Day

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

Work Activity: Primary Equipment Description	Work Activity: Estimated Horse-Power	Work Activity: Probable Fuel Type	Work Activity: Primary Equipment Quantity	Activity Production: Estimated Workforce	Activity Production : Estimated Schedule (Days)	Activity Production : Duration of Use (Hrs/Day)	Activity Production: Estimated Production Per Day
10-cu. yd. Dump Truck	350	Diesel	2		4	8	0.5 Miles/Day & 0.66 Structure Pads/Day
Drum Type Compactor	250	Diesel	1		4	4	0.5 Miles/Day & 0.66 Structure Pads/Day
Track Type Dozer	350	Diesel	1		4	6	0.5 Miles/Day & 0.66 Structure Pads/Day
Lowboy Truck/Trailer	500	Diesel	2		2	2	0.5 Miles/Day & 0.66 Structure Pads/Day
Install LST Foundations (4)				**9**	**9**		**4 LSTs**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		9	2	0.50 LST/Day
30-Ton Crane Truck	300	Diesel	1		9	5	0.50 LST/Day
Backhoe/Front Loader	200	Diesel	1		6	8	0.50 LST/Day
Auger Truck	500	Diesel	1		6	8	0.50 LST/Day
10-cu. yd. Dump Truck	350	Diesel	2		9	8	0.50 LST/Day
10-cu. yd. Concrete Mixer Truck	425	Diesel	4		6	5	0.50 LST/Day
LST Steel Haul (5)				**6**	**7**		**7 LSTs**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		7	2	1 LST/Day
10,000 lb Rough Terrain Fork Lift	200	Diesel	1		7	6	1 LST/Day
40' Flat Bed Truck/ Trailer	350	Diesel	1		7	8	1 LST/Day

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

Work Activity: Primary Equipment Description	Work Activity: Estimated Horse-Power	Work Activity: Probable Fuel Type	Work Activity: Primary Equipment Quantity	Activity Production: Estimated Workforce	Activity Production: Estimated Schedule (Days)	Activity Production : Duration of Use (Hrs/Day)	Activity Production: Estimated Production Per Day
LST Steel Assembly (6)				**14**	**20**		**4 LSTs**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	3		20	4	0.25 LST/Day
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		20	4	0.25 LST/Day
10,000 lb Rough Terrain Fork Lift	200	Diesel	1		20	6	0.25 LST/Day
30-Ton Crane Truck	300	Diesel	2		20	8	0.25 LST/Day
Compressor Trailer	350	Diesel	2		20	6	0.25 LST/Day
LST Erection (7)				**8**	**30**		**7 LSTs**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		30	5	0.33 LST/Day
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		30	5	0.33 LST/Day
Compressor Trailer	120	Diesel	1		30	6	0.33 LST/Day
80-Ton Rough Terrain Crane	350	Diesel	1		30	6	0.33 LST/Day
Guard Structure Installation (8)				**6**	**1**		**4 Structures**
3/4-Ton Pick-up Truck, 4x4	300	Gas	1		1	6	4 Structures
1-Ton Crew Cab, 4x4	300	Diesel	1		1	6	4 Structures
Compressor Trailer	120	Diesel	1		1	6	4 Structures
Auger Truck	500	Diesel	1		1	6	4 Structures
Extendable Flat Bed Pole Truck	350	Diesel	1		1	6	4 Structures
30-Ton Crane Truck	500	Diesel	1		1	8	4 Structures
80ft. Hydraulic Man-lift/Bucket Truck	350	Diesel	1		1	4	4 Structures

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

Work Activity: Primary Equipment Description	Work Activity: Estimated Horse-Power	Work Activity: Probable Fuel Type	Work Activity: Primary Equipment Quantity	Activity Production: Estimated Workforce	Activity Production: Estimated Schedule (Days)	Activity Production : Duration of Use (Hrs/Day)	Activity Production: Estimated Production Per Day
Install Conductor & OPGW (9)				**16**	**11**		**0.5 Circuit Miles**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		11	8	0.25 miles/day
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		9	8	0.25 miles/day
Wire Truck/Trailer	350	Diesel	2		10	2	0.25 miles/day
Dump Truck (Trash)	350	Diesel	1		5	2	0.25 miles/day
20,000 lb. Rough Terrain Fork Lift	350	Diesel	1		8	2	0.25 miles/day
22-Ton Manitex	350	Diesel	1		8	8	0.25 miles/day
30-Ton Manitex	350	Diesel	2		8	6	0.25 miles/day
Splicing Rig	350	Diesel	1		8	2	0.25 miles/day
Splicing Lab	300	Diesel	1		4	2	0.25 miles/day
Spacing Cart	10	Diesel	1		4	8	0.25 miles/day
Static Truck/ Tensioner	350	Diesel	1		10	2	0.25 miles/day
3 Drum Straw line Puller	300	Diesel	1		6	4	0.25 miles/day
60lk Puller	525	Diesel	1		6	3	0.25 miles/day
Sag Cat w/ 2 winches	350	Diesel	1		6	2	0.25 miles/day
580 Case Backhoe	120	Diesel	1		6	2	0.25 miles/day
D8 Cat	300	Diesel	1		6	3	0.25 miles/day
Lowboy Truck/Trailer	500	Diesel	1		9	2	0.25 miles/day
Restoration (10)				**7**	**3**		**0.5 Miles**
1-Ton Crew Cab, 4x4	300	Diesel	2		3	2	0.5 Mile/Day
Road Grader	350	Diesel	1		3	6	0.5 Mile/Day
Backhoe/Front Loader	350	Diesel	1		3	6	0.5 Mile/Day
Drum Type Compactor	250	Diesel	1		3	6	0.5 Mile/Day
Track Type Dozer	350	Diesel	1		3	6	0.5 Mile/Day

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

Work Activity: Primary Equipment Description	Work Activity: Estimated Horse-Power	Work Activity: Probable Fuel Type	Work Activity: Primary Equipment Quantity	Activity Production: Estimated Workforce	Activity Production: Estimated Schedule (Days)	Activity Production: Duration of Use (Hrs/Day)	Activity Production: Estimated Production Per Day
Lowboy Truck/Trailer	300	Diesel	1		3	3	0.5 Mile/Day

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: Primary Equipment Description	Work Activity: Estimated Horse-Power	Work Activity: Probable Fuel Type	Work Activity: Primary Equipment Quantity	Activity Production: Estimated Workforce	Activity Production: Estimated Schedule (Days)	Activity Production: Duration of Use (Hrs/Day)	Activity Production: 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		Duration of Project	2	
Water Truck	350	Diesel	1		Duration of Project	8	
10,000 lb Rough Terrain Fork Lift	200	Diesel	1		Duration of Project	5	
Truck, Semi, Tractor	350	Diesel	1		Duration of Project	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	0.5 Miles/Day & 2 Structure Pads/Day
Backhoe/Front Loader	350	Diesel	1		2	6	0.5 Miles/Day & 2 Structure Pads/Day
Drum Type Compactor	250	Diesel	1		2	4	0.5 Miles/Day & 2 Structure Pads/Day
Track Type Dozer	350	Diesel	1		2	6	0.5 Miles/Day & 2 Structure Pads/Day
Lowboy Truck/Trailer	500	Diesel	1		2	2	0.5 Miles/Day & 2 Structure Pads/Day
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	0.75 LST/Day
Compressor Trailer	120	Diesel	1		4	6	0.75 LST/Day

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: Primary Equipment Description	Work Activity: Estimated Horse-Power	Work Activity: Probable Fuel Type	Work Activity: Primary Equipment Quantity	Activity Production: Estimated Workforce	Activity Production: Estimated Schedule (Days)	Activity Production: Duration of Use (Hrs/Day)	Activity Production: Estimated Production Per Day
80-Ton Rough Terrain Crane	350	Diesel	1		4	6	0.75 LST/Day
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	0.50 LST/Day
Backhoe/Front Loader	200	Diesel	1		6	8	0.50 LST/Day
Auger Truck	500	Diesel	1		8	8	0.50 LST/Day
10-cu. yd. Dump Truck	350	Diesel	2		8	8	0.50 LST/Day
10-cu. yd. Concrete Mixer Truck	425	Diesel	3		8	5	0.50 LST/Day
LST Steel Haul (6)				**4**	**3**		**3 LSTs**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		3	2	1 LST/Day
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	1 LST/Day
LST Steel Assembly (7)				**7**	**14**		**3 LSTs**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		14	4	0.25 LST/Day
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		14	4	0.25 LST/Day
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	0.25 LST/Day
Compressor Trailer	350	Diesel	1		12	6	0.25 LST/Day
LST Erection (8)				**8**	**5**		**3 LSTs**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		5	5	1 LST/Day
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		5	5	1 LST/Day
Compressor Trailer	120	Diesel	1		3	6	1 LST/Day
80-Ton Rough Terrain Crane	350	Diesel	1		5	6	1 LST/Day
Conductor Transfer (9)				**16**	**5**		**.5 Circuit Miles**

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: Primary Equipment Description	Work Activity: Estimated Horse-Power	Work Activity: Probable Fuel Type	Work Activity: Primary Equipment Quantity	Activity Production: Estimated Workforce	Activity Production: Estimated Schedule (Days)	Activity Production: Duration of Use (Hrs/Day)	Activity Production: Estimated Production Per Day
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		5	8	1 tower/day
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		5	8	1 tower/day
Wire Truck/Trailer	350	Diesel	2		3	2	1 tower/day
Dump Truck (Trash)	350	Diesel	1		5	2	1 tower/day
20,000 lb. Rough Terrain Fork Lift	350	Diesel	1		5	2	1 tower/day
22-Ton Manitex	350	Diesel	1		5	8	1 tower/day
30-Ton Manitex	350	Diesel	2		5	6	1 tower/day
Splicing Rig	350	Diesel	1		5	2	1 tower/day
Splicing Lab	300	Diesel	1		3	2	1 tower/day
Spacing Cart	10	Diesel	1		3	8	1 tower/day
Static Truck/ Tensioner	350	Diesel	1		3	2	1 tower/day
3 Drum Straw line Puller	300	Diesel	1		3	4	1 tower/day
60lk Puller	525	Diesel	1		3	3	1 tower/day
Sag Cat w/ 2 winches	350	Diesel	1		3	2	1 tower/day
580 Case Backhoe	120	Diesel	1		5	2	1 tower/day
D8 Cat	300	Diesel	1		5	3	1 tower/day
Lowboy Truck/Trailer	500	Diesel	1		2	2	1 tower/day
Restoration (10)				**7**	**3**		**.5 Miles**
1-Ton Crew Cab, 4x4	300	Diesel	2		3	2	0.5 Mile/Day
Road Grader	350	Diesel	1		1	6	0.5 Mile/Day
Backhoe/Front Loader	350	Diesel	1		1	6	0.5 Mile/Day

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: Primary Equipment Description	Work Activity: Estimated Horse-Power	Work Activity: Probable Fuel Type	Work Activity: Primary Equipment Quantity	Activity Production: Estimated Workforce	Activity Production: Estimated Schedule (Days)	Activity Production: Duration of Use (Hrs/Day)	Activity Production: Estimated Production Per Day
Drum Type Compactor	250	Diesel	1		1	6	0.5 Mile/Day
Track Type Dozer	350	Diesel	1		3	6	0.5 Mile/Day
Lowboy Truck/Trailer	300	Diesel	1		2	3	0.5 Mile/Day

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 temporary and 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 Temporarily Disturbed	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	0.03	8.28

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

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: Primary Equipment Description	Work Activity: Estimated Horse-Power	Work Activity: Probable fuel type	Work Activity: Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Activity Production: Estimated Average Duration of Use (Hrs/Day)	Activity Production: Estimated Production Per Day
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 SCE-owned Red Bluff Substation Site may 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 temporary and 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 Temporarily Disturbed	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	-
Total Disturbance	0.03	0.12 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: Primary Equipment Description	Work Activity: Estimated Horse-Power	Work Activity: Probable fuel type	Work Activity: Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Activity Production: Estimated Average Duration of Use (Hrs/Day)	Activity Production: 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	

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

Work Activity: Primary Equipment Description	Work Activity: Estimated Horse-Power	Work Activity: Probable fuel type	Work Activity: Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Activity Production: Estimated Average Duration of Use (Hrs/Day)	Activity Production: Estimated Production Per Day
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-foot 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 Temporarily Disturbed	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	**0.03**	**0.22**

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 purposes is estimated at an average of 10 full time workers, up to 15 workers maximum. Typical work schedules are expected to be in two 12-hour shifts of 10 workers each. In addition, there will be 24-hour on-site security (two 12-hour shifts anticipated, with two guards each shift).

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 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.

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.

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 complete list of these 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.

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 resistively, 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

The Proponent's search for a suitable site began with an evaluation 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 suitable 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 project purpose and need, project objectives, were deemed to be technically disadvantageous, or had greater environmental impacts than the currently proposed project alternatives.

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. For various reasons, 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. 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. 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. 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 this species. Based on the environmental constraints considered, this alternative would have greater environmental impacts than the proposed action alternatives; therefore, 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 Big Horn 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. This alternative was determined to have greater environmental impact than the currently proposed project alternatives due to the effective elimination of the wildlife corridor; 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. The BLM has no jurisdiction over the siting of the project on private land, but the use of private lands was identified during scoping. The BLM, to inform the analysis, considered them but did not analyze them in detail because these sites would not be reasonable in that they would be no better than the proposed Project area and would result in greater environmental impacts.

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 increase the environmental impact and 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 increase the environmental impact and reduce project feasibility by duplicating transmission lines and interconnection facilities. Accordingly, this site was eliminated from further consideration.

Finally, as discussed above, private parcels within the Palen Dry Lake were not considered for development due to the unique nature of the environmental feature and environmental hazards.

Contaminated Sites near the Devers-Palo Verde Corridor

In response to EPA's scoping comments for the proposed Project, Applicant also considered sites 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 five to ten miles from the proposed Midpoint Substation. Both sites are part of the Resource Conservation and Recovery Act (RCRA) program. However, due to their size, they would not achieve the purpose and need of the project. Multiple additional projects would have 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.

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.

2.6.4 Alternate Non-Renewable Power Generating Technologies

Nonrenewable generation technologies that require use of natural gas, coal, or nuclear energy would not achieve the key project objective: to construct and operate 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. While these generation technologies would not achieve this key objective, they are presented here in brief for the benefit of the public and decision makers.

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. Concentrating solar generation technologies usually require much more water during the operating period than the Project.

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.

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.

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. 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 megawatts 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.