DOCKET
09-AFC-7
DATE JUL 20 2010
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July 20, 2010

Alan Solomon
Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

RE: **Palen Solar Power Project, Docket No. 09-AFC-7**
Data Responses to Alternatives 2 and 3
Technical Area: Air Quality, Hazardous Materials Management, Soil and Water, Worker Safety/Fire Protection, Transmission System Engineering

Dear Mr. Solomon:

Attached please find the following Data Reponses to Alternatives 2 and 3.

If you have any questions on this submittal, please feel free to contact me directly.

Sincerely,

Alice Harron
Senior Director, Development

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Palen Solar Power Project
Application for Certification

Responses to CEC Information Requests
Reconfigured Alternatives 2 and 3
09-AFC-7

Submitted by:
Palen Solar I, LLC

Submitted to:
California Energy Commission

Prepared by:
AECOM Environment

July 20, 2010

AIR QUALITY

DR-AIR-1

Information Required:

Please provide a discussion and comparison of the minimum distance to controlled fence line from the stationary sources and the other site property controls that would be used to demonstrate why the offsite pollutants impacts from project operation, which were determined for the original proposed project configuration, would not increase for the two project alternatives

Response:

The minimum distance from the center point of a PSPP power block to the controlled fenceline for the proposed Project configuration is approximately 3,914 feet; for Reconfigured Alternative 2, the distance is 2,388 feet; and for Reconfigured Alternative 3, the distance is 1,384 feet. While the stationary sources located at the power block (the boiler, cooling tower, emergency fire water pump and generator engines) are closer to the controlled fenceline with Reconfigured Alternatives 2 and 3 than for the proposed Project configuration, the resulting impacts to ambient air quality are not expected to change significantly because the emissions from power block sources only contribute about three percent to the overall modeled impacts. The overwhelming majority of the modeled impacts (approximately 97 percent) are caused by the vehicle exhaust and fugitive dust from maintenance vehicle activities. The distance from the solar field (where these maintenance activities would occur), to the controlled fenceline is unchanged from the Proposed Project to Reconfigured Alternatives 2 or 3.

DR-AIR-2

Information Required:

Please provide revised UTM coordinates for the revised locations for the controlled site boundary and stationary sources for each of the two alternatives.

Response:

The UTM coordinates (Zone 11N, NAD83) of the source locations for Reconfigured Alternative 2 are shown in Table 1; the UTM coordinates of the fenceline for Reconfigured Alternative 2 are provided in Table 2. The UTM coordinates of the source locations for Reconfigured Alternative 3 are shown in Table 3; the UTM coordinates of the fenceline for Reconfigured Alternative 3 are provided in Table 4. Note that the fenceline coordinates are the coordinates of the various corners that define the outer boundary of the site; between points; the boundary is a straight section of fence.

Table 1 UTM Coordinates for Stationary Sources, Reconfigured Alternative 2

Source Description	YNorth	XEast
Cooling Tower1	3728707.1	666794.9
Firewater 1	3728663.0	666715.7

Table 1 UTM Coordinates for Stationary Sources, Reconfigured Alternative 2

Source Description	YNorth	XEast
Ullage Vent 1	3728583.3	666734.5
Generator1	3728676.2	666800.9
Boiler 1	3728679.4	666719.5
Cooling tower 2	3729818.9	664477.9
Firewater 2	3729774.7	664399.3
Generator 2	3729787.9	664484.1
Boiler 2	3729791.2	664402.6
Ullage Vent 2	3729695.1	664417.5

Table 2 UTM Coordinates of Fenceline, Reconfigured Alternative 2

YNorth	XEast
3731949.4	663965.8
3731975.5	664831.6
3731217.0	664842.3
3731223.0	665733.9
3730339.5	666882.4
3730342.3	667138.2
3730113.2	667140.8
3729445.1	668060.5
3728797.0	668072.4
3728799.5	668228.9
3728520.8	668230.9
3728531.3	669169.9
3727337.0	669183.2
3727303.4	666160.3
3727505.8	665551.9
3727849.0	665548.1
3727841.3	664858.7
3728021.0	664859.1
3728017.5	664380.0
3728304.6	664377.9
3728300.8	663555.5
3728396.8	663118.5
3728499.3	663117.3

Table 2 UTM Coordinates of Fenceline, Reconfigured Alternative 2

YNorth	XEast
3728495.7	662819.2
3728539.8	662818.6
3728590.6	663159.0
3729728.8	663141.0
3729728.4	663213.1
3731132.3	663161.5
3731145.6	663982.5

Table 3 UTM Coordinates for Stationary Sources, Reconfigured Alternative 3

Source Description	YNorth	XEast
Cooling Tower1	3728691.2	666887.9
Firewater 1	3728646.7	666808.7
Ullage Vent 1	3728660.3	666894.0
Generator1	3728663.5	666813.0
Boiler 1	3728567.3	666827.3
Cooling tower 2	3729819.2	664500.1
Firewater 2	3729774.9	664421.6
Generator 2	3729788.2	664506.1
Boiler 2	3729791.5	664425.5
Ullage Vent 2	3729695.1	664439.6

Table 4 UTM Coordinates of Fenceline, Reconfigured Alternative 3

YNorth	XEast
3733219.9	661688.6
3731949.4	663965.8
3731975.5	664831.6
3731217.0	664842.3
3731238.1	666735.1
3730815.5	666739.8
3729436.8	667873.8
3729438.9	668060.6

Table 4 UTM Coordinates of Fenceline, Reconfigured Alternative 3

YNorth	XEast
3728797.0	668072.4
3728799.5	668228.9
3728506.8	668231.1
3728513.7	668843.3
3727761.5	668851.7
3727674.7	669008.5
3726968.3	669009.6
3726952.8	667618.0
3728188.9	667595.2
3728177.7	666782.4
3727310.5	666796.0
3727303.4	666160.3
3727505.8	665551.9
3727897.5	665547.5
3728027.2	665251.5
3728017.5	664380.0
3728304.6	664377.9
3728300.4	663525.4
3728375.7	663113.1
3728499.3	663117.3
3728495.7	662819.2
3728539.8	662818.6
3728590.6	663159.0
3729728.8	663141.0
3729729.5	663197.1
3731132.3	663161.5
3731145.6	663982.5

DR-AIR-3

Information Required:

Please identify whether SCAQMD is or is not requiring air quality impacts analysis, whether performed by the applicant or by SCAQMD, for the reconfigured project alternatives.

Response:

Pursuant to SCAQMD Rule 1303, Appendix A, modeling is not required for any pollutant for any of the stationary sources located at either power block. Therefore, SCAQMD has not requested and should not require Palen Solar I to perform ambient air quality modeling in order to demonstrate compliance with any ambient air quality standard, or require modeling in order to issue the FDOC.

As noted in the response to DR-AIR-1 above, the majority of modeled impacts from the proposed Project are due to the maintenance vehicle emissions, which are not regulated by SCAQMD and therefore not subject to modeling requirements. Impacts due to maintenance vehicle emissions would be expected to dominate the predicted impacts for Reconfigured Alternatives 2 and 3 also, if modeling were to be conducted.

DR-AIR-4

Information Required:

> Please provide a revised modeling analysis for short-term NO_2 (1-hour), and PM10 and PM2.5 (24-hour) impacts for each of the two alternatives: 1) where the site property controls will not maintain a controlled fence line distance from the project's stationary sources that is in all directions as great or greater than that of the modeled proposed project layout; and 2) if SCAQMD is requiring a revised air quality impacts analysis for these projects alternatives.

Response:

As noted in response to DR-AIR-1, while the stationary sources located at the power block are closer to the controlled fenceline with Reconfigured Alternatives 2 and 3 than for the proposed Project configuration, the resulting impacts to ambient air quality are not expected to change significantly because the emissions from power block sources contribute only a small percentage to the overall modeled impacts. The overwhelming majority of the modeled impacts are caused by the vehicle exhaust and fugitive dust from maintenance vehicle activities. The distance from the solar field (where the maintenance activities would occur), to the controlled fenceline is unchanged from the proposed Project to Reconfigured Alternatives 2 or 3.

As noted in response to DR-AIR-3, the stationary sources are exempt from modeling under SCAQMD rules. For these various reasons (e.g., minor power block emissions, no change in distance from solar fields to fenceline), Palen Solar I believes that CEC can conclude, without conducting additional modeling, that the Project would not have significant adverse impacts.

BIOLOGICAL RESOURCES
(To be provided under separate cover**)**

HAZARDOUS MATERIALS MANAGEMENT

DR-HAZ-1

Information Required:

Please provide a remodeling of blast impacts on off-site receptors, and in particular traffic on I-10, from the new location of the Unit 1 propane tank.

Response:

The location of the power block for Unit 1 in Reconfigured Alternatives 2 and 3 is shifted approximately 2,700 feet south compared to the Proposed Project. No change in the power block equipment layout would occur. The two reconfigured alternatives place the propane tank for the power block 2,700 feet closer to I-10 but maintain the same relative spatial relationship to the edge of the power block, the facility boundary, and the I-10 right of way (ROW).

This relocation of Field 1 in Reconfigured Alternatives 2 and 3 does not increase the potential hazard of blast impacts on the public traveling on I-10 during a fire involving the propane tank. The shortest distance from the propane tank to the property boundary under Reconfigured Alternatives 2 and 3 is approximately 4,900 feet (approximately 1,490 m). The blast overpressure at the I-10 ROW boundary for the reconfigured alternatives does not exceed the threshold levels established by the CEC, which is 1.0 pound per square inch (psi).

The results of the requested revised modeling for propane are shown in Table 1.

Table 1.
Results of Hazard Assessment for Propane and Therminol for Reconfigured Alternatives 2 and 3

Hazard	Material	Threshold	Distance to Threshold (m)	Distance to I-10 ROW Boundary (m)	Impact in I-10 ROW?
Vapor Cloud Explosion	Propane	1.0 psi	500	1,490	No
BLEVE	Propane	1,500 W/m2 for 40 Seconds	920	1,490	No
Pool Fire	Therminol	1,500 W/m2 for 40 Seconds	30	75	No

DR-HAZ-2

Information Required:

Please provide a modeling of thermal radiation effects on off-site receptors, and in particular traffic on I-10, from a fire at the new location of the Unit 1 propane tank.

Response:

This relocation of Unit 1 in Reconfigured Alternatives 2 and 3 does not increase the potential hazard of thermal radiation to the public traveling on I-10 during a fire involving spilled Therminol in one of the heat transfer fluid loops. The power block is located within the larger solar mirror field array. The shortest distance from the nearest mirror loop in the solar array to the I-10 ROW boundary is approximately 245 ft (approximately 75 m). The thermal flux at the property boundary does not exceed the threshold levels established by the CEC, which is 1,500 Watts per meter square for 40 seconds.

Regularly spaced isolation valves will limit the quantity of Therminol released from the solar array. One isolation valve per loop will be installed which will limit the potential spill amount to a maximum of approximately 1,250 gallons. A spill of this limited quantity of HTF would not extend offsite since the material tends to burn off quickly. Any HTF that does not burn off cools moves more slowly. On-site drainage control ditches around the site would intercept and trap any spilled HTF fluid. . As such, a fire involving spilled Therminol and its thermal impacts would be contained within the property boundary.

The results of the revised modeling as requested by CEC for Therminol is shown in Table 1 above.

DR-HAZ-3

Information Required:

Please provide a modeling of thermal radiation effects on off-site receptors, and in particular traffic on I-10, from a fire at the new location of the Unit 1 solar array closest to I-10.

Response:

The hazard analysis of radiation effects for the two alternatives (see results in Table 1 above), used the same methodology as was presented in the AFC for the original proposed Project, with the exception that the threshold for thermal effects was changed to 1,500 W/m2 for 40 seconds, as requested by CEC Staff. The methodology used for the hazard assessment is that contained in the USEPA guidance for offsite consequence analysis for a Risk Management Program (RMP). For a pool fire, the physical parameters required to estimate the thermal impact of a pool fire are capacity (Cp), heat of combustion, and heat of vaporization. Therminol is a solution of diphenyl ether and biphenyl. The physical parameters for Therminol are based on diethyl ether, the primary component of Therminol (approximately 74%). As biphenyl is a crystalline solid at room temperature (melting point 70°C), the physical parameters for biphenyl required in the EPA RMP equation for a pool fire are not available.

The impact distance to the thermal flux threshold for Therminal is approximately 100 ft (approximately 30 m), based on a spill of 1,250 gallons. The relatively short impact distance for a Therminol fire is due to two factors:

1. The heat of combustion of diethyl ether is approximately a factor of five less than that for propane, resulting in less energy available for thermal flux in a Theminol fire compared to a hotter burning flammable liquid.
2. The boiling point of Therminol is 257°C. As a result, a significant portion of the heat released during the combustion goes toward raising the Therminol to its boiling point, and this energy is therefore not available as thermal radiation.

The operating temperature of Therminol is 650°F. A spill of 1,250 gallons will form a liquid surface area of 472 m^2, when spread to a uniform depth of 1 cm. However, such a thin layer of liquid will cool very quickly due to rapid heat conduction into the underlying soil and convection to the air of the spilled liquid. A deeper pool will cool more quickly but would result in a smaller pool surface. The thermal flux resulting from a pool fire is proportional to the radius of the assumed pool and the square root of the pool surface temperature. As the pool size is the more significant parameter, the maximum pool size was assumed (472 m^2), but the pool temperature was assumed to have cooled to 200°F. Thus, the assumed surface temperature of 200°F is a compromise between maximizing the area of the pool fire and minimizing the temperature difference between the liquid surface and the liquid boiling point. In actuality, a large liquid pool of Therminol is unlikely to form near the edge of the mirror array as any spilled liquid from a loop at the edge will drain quickly into one of the on-site drainage control ditches surrounding the facility. However, for the purposes of this assessment, the Therminol is assumed to form a liquid pool 1cm in depth (approximately 470 m^2).

DR-HAZ-4

Information Required:

Please state the shortest distance from the Unit 1 propane tank to the I-10 ROW and the shortest distanced from a solar array to the I-10 ROW.

Response:

The shortest distance from the propane tank to the I-10 ROW boundary is approximately 4,900 feet (approximately 1,490 m). The shortest distance of the nearest mirror loop in the solar array to the I-10 ROW boundary is approximately 245 ft (approximately 75 m).

DR-HAZ-5

Information Required:

Please provide a rationale for the use of propane instead of natural gas.

Response:

PSPP will use a propane-fired auxiliary boiler to support rapid start-up of the facility each morning.

Propane is a safe and acceptable alternative. Propane storage tanks have been safely used for domestic, commercial and industrial applications for decades. Based on the Project's estimated annual propane consumption of ~103,900 million British thermal units, the annual anticipated costs for natural gas would be ~ $850,000; for propane the annual cost (including delivery) would be ~$900,000. The anticipated Project infrastructure cost of the propane system is estimated at about $6,000,000 and the cost of the natural gas system would be about $6,500,000. While it is possible that a natural gas pipeline could be constructed by Southern California Gas Company (SoCal Gas) to support the project, SoCal Gas has not agreed to extend service due to the relatively small demand of the PSPP and the extensive work that would be required to tap into the high pressure gas main just south of I-10. SoCal Gas provided a preliminary estimate (+/- 30%) of $2,500,000 as the cost of construction for the gas line for planning purposes but no commitment was provided. In summary, the costs of the natural gas option would be higher than propane and it is uncertain whether SoCal Gas would extend service to the site.

The high pressure gas pipeline is located south of I-10 and there is an existing 4-inch gas line that serves an agricultural property north of I-10. However, the existing 4-inch line would need to be upgraded to an 8-inch line to be able to serve the PSPP. The combination of the higher overall cost of the natural gas option, the uncertainty in pipeline construction costs (the estimate provided by SoCal Gas is described as preliminary), and the uncertainty of SoCal Gas' willingness to serve the Project due to the extensive upgrades required, led Palen Solar I to choose the propane alternative.

SOIL AND WATER

DR-S&W-1

Information Required:

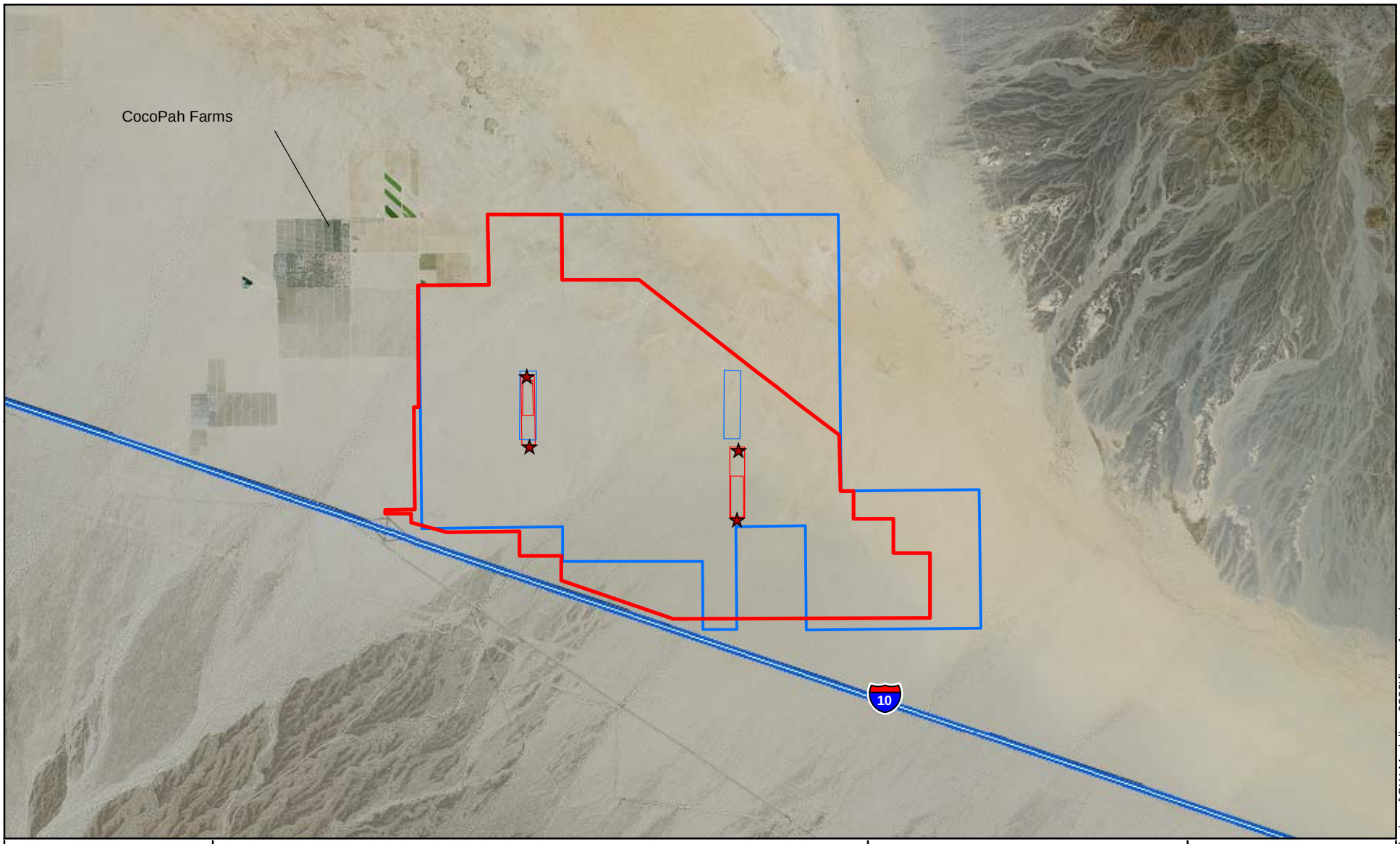
Staff is concerned that water demands and the well locations have been changed. Please verify the water demands and provide the locations of the proposed wells and their proposed capacity if they have changed.

Response:

The volume of groundwater proposed for the two new alternatives (Reconfigured Alternatives 2 and 3) has not changed from the previously proposed volumes for the proposed Project of 5,750 acre-feet for the construction period (39 months) and 300 acre-feet per year for the operational period of 30 years[i]. As the alternatives modify the location of the Unit 1 power block, the two water supply wells for that unit have changed, shifting the wells about 3,000 feet due south from their prior configuration (see Figure Soil and Water-1). The operational capacity of the proposed wells has not changed, under the same assumption as for the original proposed Project that each of the two wells in the power block would act as a primary and backup well, and would singularly provide the 150 acre-feet per year of groundwater required for each power block. .

However, as provided in Attachment 2[4], Environmental Evaluation of Project Updates, of the Palen Solar I LLC's Initial Comments on the Staff Assessment/Draft EIS, to supply the needed quantity of water proposed and based on the uncertainty in well yield due to the limited number of well tests performed to date, Palen Solar I proposes to install and operate up to 10 wells on site. This would be the case for the original proposed Project and for the two new alternatives. In each case, the wells would be located within the power block(s) and elsewhere within the solar field(s) to provide primary and secondary water supply to the Project.

[i4] Palen Solar 1, LLC's Initial Comments on the Staff Assessment/Draft Environmental Impact Statement (Docket No. 09-AFC-7), Attachment 2, Environmental Evaluation of Project Updates – Revision to Construction Water Requirements, number of groundwater wells and Construction Water Storage Approach, docketed May 4, 2010.



Map Location

Legend

- Alternative Project Right-of-Way
- Alternative Project Power Blocks
- AFC ROW
- AFC Power Blocks
- Location of Pumping Well Used in the Model

1 inch equals 1 miles

0 6,000 12,000 Feet

Data Sources:
Air Photo, NAIP, 2005
Basemap, (Roads, streams, cities), ESRI

Eastings
Northings
NAD 83 State Plane
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Palen Solar Power Project

Figure Soil and Water 1
Alternative Water Supply
Well Locations

Palen Solar I, LLC

AECOM

Project: 60139694-6200
Date: June 2010

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WORKER SAFETY/FIRE PROTECTION

Technical Area: Worker Safety/Fire Protection (AFC Section 5.18) Response Date: July 20, 2010

DR-WS-1

Information Required:

Please provide a new map for each of the two reconfigured site alternatives that clearly show the second emergency access road, the second access gate onto the site, the roads around the inside of the site from one field to the next, and the roads on the outside of the perimeter fence.

Response:

Worker Safety and Fire Protection for the Palen site will be facilitated by a series of internal roads that access the power blocks, warehouse areas, the administration facility and all the solar arrays and associated infrastructure. A paved road will be provided to all habitable structures on site, in compliance with the LORS of Riverside County. Gravel roads are to be provided throughout the balance of the site, adjacent to the main drainage channels, and along the perimeter of the site inside the security and wind fences. There are no roads planned on the exterior perimeter of the site.

A new gravel road is likely to be built along the west boundary of the site to provide continued access to adjacent parcels and the I-10 freeway located immediately south of the site. Emergency access to the site will be provided from a roadway in compliance with the LORS of Riverside County and other regulatory agencies.

CEC Staff have made various assertions about the need and cost of facilities. Palen Solar I (the Applicant) is still discussing these requests with the Riverside County Fire Department. To our knowledge, the Staff is assuming mitigation provisions that the RCFD has not yet decided upon that it needs. Palen Solar I requests the ability to continue to coordinate with the RCFD to establish the level of fire-related risk associated with the PSPP and determine the appropriate level of response capability commensurate with that risk and consistent with applicable safety regulations.

After careful consideration, Palen Solar I is willing to provide the secondary fire department access to the site if required by RCFD. Details of the design of secondary fire department access will be further discussed and detailed with appropriate parties. The design of the secondary fire department access will be submitted for approval as the design of the facility evolves further. As such, it is not possible to provide maps at present showing the locations of these potential facilities. We proposed that the following Condition of Certification be included in the Revised Staff Assessment.

> "The project owner shall
> a. Provide a second access gate for emergency personnel to enter the site. This secondary access gate shall be at least one-quarter mile from the main gate.
> b. ***If required by the Riverside County Fire Department***, provide a second access road that comes to the site. ***This road shall meet standards set forth in by the RCFD.***
> c. Maintain the main access road and, ***if required***, the second road and provide a plan for implementation.
>
> Plans for the secondary access gate, the method of gate operation, ***and, if necessary, secondary access road*** and to maintain the roads shall be submitted to the Riverside County Fire Department for review and comment and to the CPM for review and approval."

This condition is identical to the Condition recently proposed in Worker Safety-6 for the Blythe Solar Power Project.

TRANSMISSION SYSTEM ENGINEERING

Technical Area: Transmission System Engineering **Response Date: July 19, 2010**

DR-TSE-1

Information Required:

For each Alternative 2 and 3, please describe the redundant fiber optic line for facility and routing.

Response:

Please see the description of the redundant fiber optic line in Attachment TSE-1 (SCE Red Bluff Preliminary Separate Project Description, July 2, 2010). The SCE project description discusses both the western and the eastern substation options. The PSPP is expected to interconnect with the eastern option. The discussion of the eastern option begins with Section 1.7 on page 33. The location of the redundant fiber optic cable and specifications will be the same for both Reconfigured Alternatives 2 and 3 as well as for the proposed Project. The western unit of the reconfigured alternatives has not been altered from the proposed Project. All linears are proposed to exit from the same locations and as such there is no difference between all three proposed alignments.

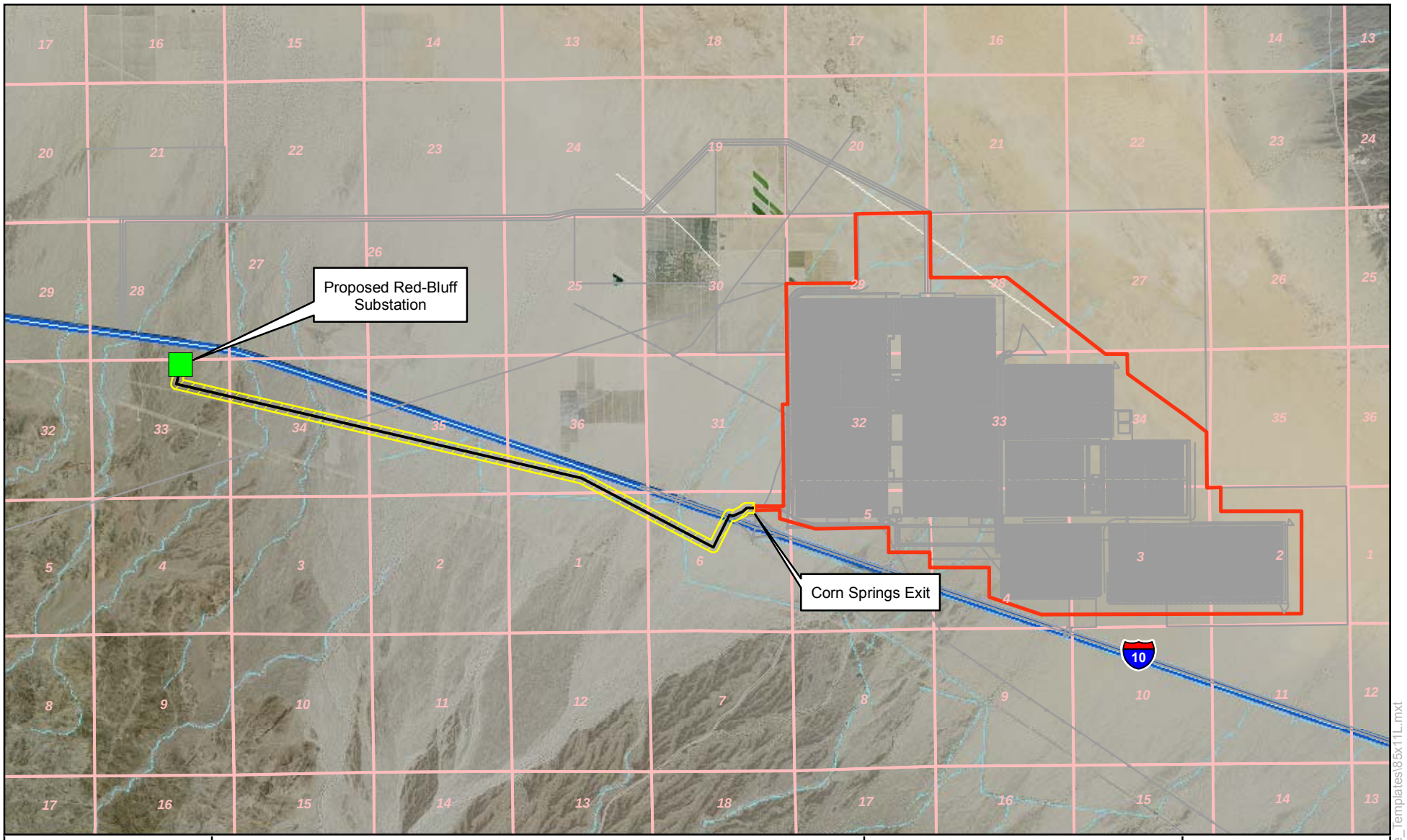
DR-TSE-2

Information Required:

For each Alternative 2 and 3, please provide maps for each alternative that show the routing for the transmission tap line, the redundant fiber optic line and the termination location in the reconfigured Red Bluff substation.

Response:

The western unit of the reconfigured alternatives has not been altered from the proposed Project. All linears are proposed to exit from the same locations and as such there is no difference between all three proposed alignments. Figures TSE 1 and TSE-2 identify the linear routes for the reconfigured Alternatives 2 and 3 and this alignment is the same as for the Proposed.



Map Location

Legend

- Redundant Telecom Route
- Existing SCE Utility Corridor
- Palen Solar Power Project Right-of-Way
- Section Lines

1 inch equals 1 miles

0 0.5 1 Miles

Data Sources:
Air Photo, NAIP, 2009
Basemap, (Roads, streams, cities), ESRI

Palen Solar Power Project

Figure TSE-1
Redundant Telecom Route
Alternative 2

Palen Solar I, LLC

AECOM

Project: 60139694-6500
Date: July 2010

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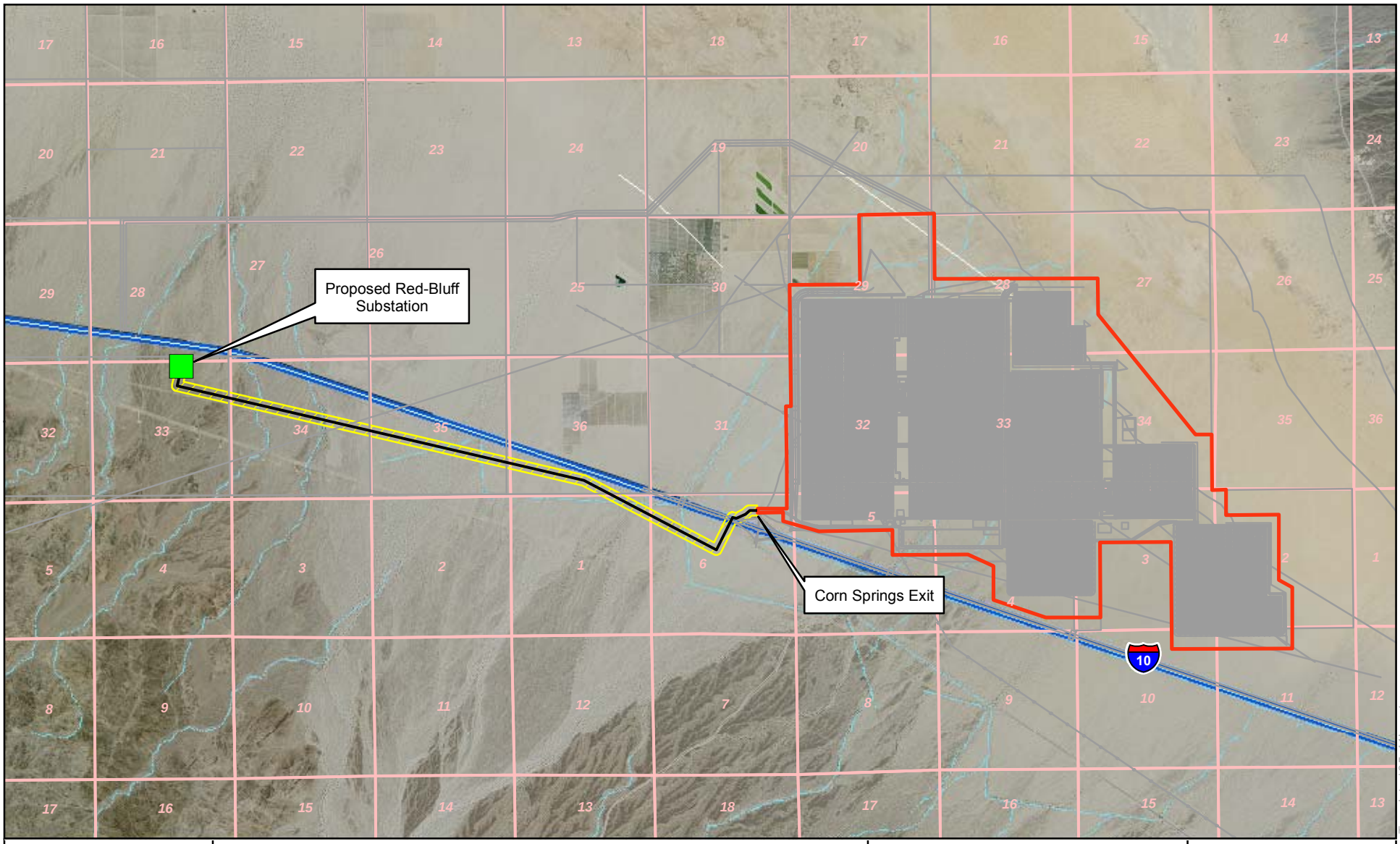

Map Location

Legend

- Redundant Telecom Route
- Existing SCE Utility Corridor
- Palen Solar Power Project Right-of-Way
- Section Lines

1 inch equals 1 miles

0 0.5 1 Miles

Data Sources:
Air Photo, NAIP, 2009
Basemap, (Roads, streams, cities), ESRI

Palen Solar Power Project

Figure TSE-2
Redundant Telecom Route
Alternative 3

Palen Solar I, LLC

AECOM

Project: 60139694-5230
Date: July 2010

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TRANSMISSION SYSTEM ENGINEERING
ATTACHMENT TSE-1

1.0 RED BLUFF SUBSTATION PROJECT DESCRIPTION

1.1 PROJECT OVERVIEW:

1.1.1 Description of Project Elements

Southern California Edison (SCE) proposes to construct the Red Bluff Substation Project (Project) near Desert Center in Riverside County, California to allow for interconnection of a solar development project in the Desert Center area of the Mohave Desert to SCE's existing Devers-Palo Verde (DPV) Transmission Line (T/L) and creating the Colorado River - Red Bluff and Devers - Red Bluff 500 kV T/Ls.[1] Two alternate sites ("Western Site" and "Eastern Site" shown in Figure 1) were identified for the Red Bluff Substation. The following is a summary of the Red Bluff Project components for the Western Site (Figure 2). A summary discussion of project components for the Red Bluff Substation at the Eastern Site is presented in Section 1.7:

- Red Bluff Substation: Construct a 500/220 kV substation enclosing approximately 75 acres of land.
- Transmission Lines: Loop the existing DPV 500 kV transmission line into the Red Bluff Substation by adding a total of approximately 2,000 feet of new transmission lines (two parallel lines approximately 1,000 feet long each within a corridor approximately 1,000 feet wide), creating the Colorado River-Red Bluff and Devers-Red Bluff 500 kV transmission lines.[2]
- Generation Tie Line Connection: Connect the customer-constructed and owned built 220kV generation tie line (gen-tie) into the Red Bluff Substation.
- Modification of existing 220 kV structures: The necessary crossing of the new FPL Buck-Julian Hinds 220 kV transmission lines by the proposed SCE 500 kV loop-in lines may require modifications. New tubular steel poles (details to be determined during detailed engineering phase) to modify the construction at the crossing location that may be needed to replace the existing poles.
- Distribution Line for Substation Light and Power: Construct approximately 300 feet of 12 kV overhead distribution line outside the substation enclosed area and approximately 1,000 feet of underground distribution line within the substation enclosed area to connect the existing distribution system along Eagle Mountain Road to Red Bluff Substation to provide substation light and power.
- Telecommunications Facilities: Install redundant optical ground wire (OPGW) on the proposed solar project's generation tie-line connection and to project's redundant

[1] Due to the impending Colorado River Switchyard/Substation that was approved at part of SCE's Devers-Palo Verde No. 2 Project (California segment), the naming convention for the proposed Red Bluff Substation and associated transmission tie loop in is proposed to reflect Colorado River Substation and therefore the line convention after the line is looped in to the proposed Colorado River Switchyard/Substation would be the Colorado River – Red Bluff and Devers-Red Bluff (subject to final confirmation once operating dates are agreed upon).

[2] See Note 1.

optical ground wire and connect to associated equipment installed inside both the proposed Red Bluff Substation and the proposed solar project's substation.[3] Install a new microwave repeater station, consisting of a new 12 foot by 36 foot communications room and associated equipment, along with a 185 foot tall lattice steel communications tower and two (2) 10 foot diameter microwave antennas.

Estimated Project land disturbance summary data for the two alternate sites is presented in Table 1. Factors used to estimate land disturbances for the two alternate sites are presented in Tables 3, 5, 8, and 10 for the Western Site and Tables 5, 10, 13 and 15 for the Eastern Site. This project description and the land disturbance estimates are based on planning level assumptions. Additional details would be determined following completion of preliminary and detailed engineering, identification of field conditions, labor availability, equipment, and compliance with applicable environmental and permitting requirements.

TABLE 1
RED BLUFF SUBSTATION PROJECT ESTIMATED LAND DISTURBANCE SUMMARY

PROJECT ELEMENT	WESTERN SITE (acres)		EASTERN SITE (acres)	
	Temporary	Permanent	Temporary	Permanent
SUBSTATION SYSTEM (1)	10.00	96.3	10.00	123.77
TRANSMISSION SYSTEM (2)	18.57	1.92	27.73	5.10
DISTRIBUTION SYSTEM (3)	0.03	0.12	0.03	8.28
TELECOMMUNIC-ATION SYSTEM (4)	0.30	0.22	0.30	0.22
TOTAL DISTURBANCE	28.90	98.56	38.06	137.37

(1) see Table 3 for the Western Site and Table 13 for the Eastern Site
(2) see Table 5 for the Western Site and Table 16 for the Eastern Site
(3) see Table 8 for the Western Site and Table 17 for the Eastern Site
(4) see Table 10 for both Western and Eastern Sites

The numbers presented in Table 1 are preliminary and subject to change as the result of detailed engineering.

1.1.2 Approval Process and Approving Public Agencies

A solar development project has been proposed in the vicinity of Desert Center, located on primarily government land under the jurisdiction of the Bureau of Land Management (BLM).

[3] Subject to confirmation whether the solar developer would incorporate the OPGW within its gen-tie (may be able to be removed as not within SCE's scope of work).

The solar developer will submit an Application to the BLM for an Amended Right-of-Way Grant.

If approved, the BLM will issue a Record of Decision and a Notice to Proceed allowing construction of the proposed solar development project under the administration of the BLM. Prior to approval of a Project, the BLM will have an Environmental Impact Statement (EIS) prepared by a third-party consultant which analyzes the environmental impacts associated with the proposed project pursuant to the National Environmental Policy Act (NEPA).

The solar development project would interconnect with SCE's regional transmission system via a 220 kV gen-tie line from each solar project to the new Red Bluff Substation where they would connect to SCE's bulk transmission system via SCE's existing DPV 500 kV transmission line. SCE will construct and own the Red Bluff Substation. Although discussions are still underway with the California Public Utilities Commission (CPUC), it is expected that the Red Bluff Substation Project will be reviewed in accordance with a Permit to Construct standard pursuant to CPUC General Order 131-D.

Based on discussions with CPUC and BLM staff, SCE anticipates that the CPUC and BLM will work cooperatively and will conduct a joint California Environmental Quality Act (CEQA)/NEPA review of the substation and transmission connection system. This cooperation will include use of a single environmental consultant who will prepare the EIS and work closely with the CPUC to ensure compliance with CEQA for the substation and transmission connection system.

Additional approvals and permits that may need to be obtained for the Project to proceed include a Biological Opinion from the U.S Fish & Wildlife Service, a Consistency Determination by the California Department of Fish and Game (CDFG), California State Historic Preservation Office (SHPO) approval of the cultural resources Programmatic Agreement (PA), and 401/404 federal water permits from the Army Corps of Engineers and 1601/1602 clean water permits from the CDFG. In addition to these permits additional permits may be required from other federal agencies (e.g. Federal Communication Commission, Federal Aviation Administration, etc.), state agencies (e.g. California Department of Transportation, Department of Toxic Substances Control, South Coast Air Quality Management District, etc.) and local agencies (e.g. Riverside County, cities and local fire departments, etc.).

1.1.3 Length of Construction Activities and Projected Operation Date

Construction of the Red Bluff Substation is expected to start in the second quarter of 2011 and would proceed for two years. The projected substation operating date is in the third quarter of 2013.

1.2 PROJECT LOCATION:

1.2.1 Regional and Local Location

The Red Bluff Western Site would be located south of Interstate 10 at Eagle Mountain Road, in the County of Riverside, California (Figure 1 – Western Site). The Red Bluff Substation is expected to enclose approximately 75 acres, and would be generally located in the center of the parcel.

1.2.2 Substation Site Land Use

The Red Bluff Substation Western Site is located primarily on a 160 acre 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. In addition approximately 20 acres of a 70 acre BLM parcel directly to the north may also need to be utilized as part of the substation extents.

1.3 SUBSTATION

1.3.1 Introduction

SCE proposes to construct the Red Bluff Substation Project to interconnect the proposed solar development project to SCE's existing DPV 500 kV transmission line. The DPV 500 kV transmission line will connect to the Red Bluff Substation by looping the line into the Substation. In addition, 220 kV gen-tie lines would be extended from the solar developments to inside the Red Bluff Substation Site.

1.3.2 Substation Design and Equipment

The Red Bluff Substation would be an 1120MVA, 500/220kV substation with an enclosed area measuring approximately 1,500 feet by 2,200 feet to loop the DPV 500 kV transmission line and provide for the solar developers' 220 kV gen-tie line position(s). The substation will be surrounded by a wall with two gates.

1.3.2.1 Substation Equipment

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 DPV 500 kV transmission line to create the Colorado River-Red Bluff and Devers–Red Bluff 500 kV lines[4], two positions would be reserved to loop the future Colorado River – Red Bluff No. 2 and Colorado River-Devers No. 2 500 kV T/Ls[5] and one position would be for a AA-bank position for generation interconnection. The remaining two positions will be available for future expansion.

[4] See footnote 2 for line convention naming assuming the proposed Colorado River Substation is in service. For ease of the reader, the introductory reference is made to the existing Devers-Palo Verde 500 kV line.

[5] The future Colorado River-RedBluff No.2 and Devers-Red Bluff No. 2 T/Ls are licensed in accordance with the "DPV2" CPCN which the CPUC issued a PTM to construct the California portion of the DPV2 Project in November 2008. Please note that the PUC's approval of this project is conditioned upon CAISO approval which is expected during third or fourth quarter of 2010.

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

The 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
- A Mechanical Electrical Equipment Room (MEER)
- Station light and power transformers
- Station lighting
- 750 kVA emergency generator

1.3.2.2 Development Plan

The Substation Western Site development plan is presented in Figure 2.

1.3.2.3 Site Access

Access to the Red Bluff Substation Western Site would be from the Eagle Mountain exit from Highway I-10. A new access road would be constructed from the highway off ramp angling approximately 800 feet towards the northeast substation corner then continuing south approximately 1,000 feet to the main entry gate.

This new access road is anticipated to be 24 feet in width with a three foot wide overburden on each side for total of 30 feet. Construction would include compaction of the sub-soil and the placing a 4 inch thick layer of asphalt concrete over 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 to include allowances for side slopes and surface runoff control resulting in a total land disturbance of approximately 1.3 acres.

1.3.2.4 Lighting and Perimeter Features

Lighting at the proposed 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 feet-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.

1.3.2.5 Operation and Maintenance

Once constructed, the Red Bluff Substation would be unstaffed, 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.

1.3.2.6 Electric and Magnetic Fields (EMF)

A NEPA analysis does not commonly include a discussion of potential environmental impacts from electric and magnetic fields (EMF) due to the lack of a consensus among scientists that EMF exposure poses a risk to human health. Nor are there any CEQA standards regarding the analysis of potential human health risks caused by EMF exposure. However, the EIS prepared for this project is expected to contain a discussion of EMF to accommodate the public's interest and concern regarding potential human health effects related to EMF exposure from transmission lines.

Although there are no NEPA or CEQA standards regarding the analysis of potential human risks associated with EMF exposure, the CPUC reviewed and updated its EMF policy in 2006 (CPUC Decision 06-01-042) for California's regulated electric utilities. This policy decision update reaffirmed the finding that state and federal public health regulatory agencies have not established a direct link between exposure to EMF and human health effects, and that the existing "no-cost and low-cost" precautionary-based EMF policy should be continued for electrical facilities. As the electrical infrastructure is upgraded in California, measures to reduce magnetic fields will be incorporated into the project design in accordance with the California EMF Design Guidelines for Electrical Facilities, CPUC Decision 93-11-013 and CPUC Decision 06-01-042. Furthermore, the design of the proposed substation and transmission lines will incorporate "no-cost and low-cost" measures such as placing major substation electrical equipment away from the substation property lines to reduce magnetic fields. These measures would be documented in a project specific Field Management Plan.

1.3.3 Substation Construction

1.3.3.1 Grading and Drainage

Red Bluff Substation Western Site 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.

The Red Bluff Substation Western Site is located north of the Chuckwalla Mountains which contributes to surface storm water runoff through the proposed site. A designated Blue-line stream is located running 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 the installation of a berm designed to direct the flow around both sides of the substation pad. These drainage improvements would potentially disturb an area approximately 80 feet wide around three sides of the fenced in substation resulting in a total permanent disturbance area of approximately 20 acres.

Internal surface runoff would be directed towards a detention basin located at the north end of the substation. The basin 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.

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

Table 2 provides the approximate volume and type of earth materials to be used or disposed of at the Western Site (within the substation wall and the required drainage structures outside/around the substation).

TABLE 2
RED BLUFF SUBSTATION WESTERN SITE AND ACCESS ROAD - GROUND SURFACE IMPROVEMENT MATERIALS AND ESTIMATED VOLUMES

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

(1) The design concept would be intended to balance the earthwork quantities, utilizing any site cut material as site fill, where feasible.
(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.

The numbers presented in Table 2 are preliminary and subject to change as the result of detailed engineering.

1.3.3.2 Staging Areas

Additional temporary land disturbance (up to approximately 10 acres) adjacent to the Western Site property may be necessary for temporary equipment storage and material staging areas associated with construction efforts.

1.3.3.3 Geotechnical Studies

Prior to the start of construction, SCE expects to conduct a geotechnical study of the 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 resistively, slope stability, and the presence of hazardous materials.

1.3.3.4 Below Grade Construction

After the substation site is graded, below grade facilities would be installed. Below grade facilities include a ground grid, underground conduit, trenches, and all required foundations. The design of the ground grid would be based on soil resistively measurements collected during a geotechnical investigation that would be conducted prior to construction.

1.3.3.5 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.

1.3.3.6 Hazards and Hazardous Materials

Construction of the Project 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. Material Safety Data Sheets would be made available at the construction site for all crew workers.

The Storm Water Pollution Prevention Plan prepared for the 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.

1.3.3.7 Waste Management

Construction of the 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.

Soil excavated for the Red Bluff Substation would either be used as fill or disposed of off-site at an approved licensed facility.

1.3.3.8 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 Project to as close to preconstruction conditions as possible, or, where applicable, to the conditions agreed upon between the landowner 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.

1.3.3.9 Land Disturbance

Table 3 provides a preliminary estimate of temporary and permanent land disturbance related to construction of the substation at the Western Site (outside the substation fence and the required drainage structures outside/around the substation). The numbers presented in Table 3 are preliminary and subject to change as the result of detailed engineering.

TABLE 3
RED BLUFF SUBSTATION WESTERN SITE CONSTRUCTION – ESTIMATED LAND DISTURBANCE SUMMARY (PRELIMINARY)

CONSTRUCTION ACTIVITY	ACRES TEMPORARILY DISTURBED	ACRES PERMANENTLY DISTURBED
Substation Grading	**-**	**75.0**
Drainage/Side Slopes	**-**	**20.0**
Substation Access Road (1)	**-**	**1.3**
Staging Area	**10.0**	**-**
Total Acres Disturbed	**10.0**	**96.3**

(1) Based on road dimensions of 1,800 feet long by 30 feet wide.

1.3.10 Construction Equipment and Labor

The estimated elements, materials, number of personnel and equipment required for construction of the Red Bluff Substation Western Site are summarized below in Table 4 below. The numbers presented in Table 4 are preliminary and subject to change as the result of additional detailed engineering.

In addition to the information provided in Table 4, a temporary office trailer and equipment trailer may be placed within the proposed substation construction area during the construction phase of the project.

Construction would be performed by either SCE construction crews or contractors managed by SCE construction management personnel. SCE anticipates a minimum 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 local government 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 need to occur on different days or hours, SCE would obtain variances as necessary from appropriate jurisdiction where the work would take place.

TABLE 4
RED BLUFF SUBSTATION WESTERN SITE CONSTRUCTION EQUIPMENT AND LABOR ESTIMATE (PRELIMINARY)

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)** **2-Loader (Diesel)** **1-Scraper (Diesel)** **1-Grader (Diesel)** **2-Water Truck (Diesel)** **2-4x4 Backhoe (Diesel)** **1-4x4 Tamper (Diesel)** **1-Tool Truck (Gasoline)** **1-Pickup 4x4 (Gasoline)**	**4** **4** **3** **3** **2** **2** **2** **2** **2**
Fencing (4 people)	**25**	**1-Bobcat (Diesel)** **1-Flatbed Truck (Gasoline)** **1-Crewcab Truck (Gasoline)**	**8** **2** **4**

Activity and number of Personnel	Number of Work Days	Equipment and Quantity	Duration of Use (Hours/Day)
Civil **(8 people)**	**90**	**1-Excavator** **(Diesel)** **1-Foundation auger** **(Diesel)** **2-Backhoes (Diesel)** **1-Dump truck** **(Diesel)** **1-Skip Loader** **(Diesel)** **1-Water Truck** **(Diesel)** **2-Bobcat Skid Steer** **(Diesel)** **1-Forklift** **(Propane)** **1-17 TonCrane** **(Diesel)** **1-Tool Truck** **(Gasoline)**	**4** **5** **3** **2** **3** **3** **3** **4** **2 hours/day for 45 days** **3**
MEER **(6 people)**	**60**	**1-Carry-all Truck** **(Gasoline)** **1-Tool truck (Gasoline)** **1-Stake Truck** **(Gasoline)**	**3** **2** **2**
Electrical **(10) people)**	**120**	**2-Scissor Lifts** **(Propane)** **2-Manlifts** **(Propane)** **1-Reach Manlift** **(Propane)** **1-15 ton Crane (Diesel)** **1-Tool Trailer** **3-Crew Trucks** **(Gasoline)**	**3** **3** **4** **3** **3** **2**
Wiring **(2 people)**	**90**	**1-Manlift (Propane)** **1-Tool Trailer**	**4** **3**
Maintenance Crew Equipment Check **(2 people)**	**30**	**2-MaintenanceTrucks** **(Gasoline)**	**4**
Testing **(2 people)**	**90**	**1-Crew Truck (Gasoline)**	**3**

Activity and number of Personnel	Number of Work Days	Equipment and Quantity	Duration of Use (Hours/Day)
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**

1.4 TRANSMISSION LINES AND RELATED STRUCTURES – RED BLUFF SUBSTATION WESTERN SITE

1.4.1 Design and Equipment

SCE's transmission line requirements for the solar project(s) interconnection to the DPV 500 kV transmission line are broken into the following components: 1) 500 kV Loop-in lines; 2) gen-tie 220 kV line connection; and 3) existing structure modifications. Each of these components is described below.

1.4.1.1 500 kV Transmission Line Loop-In Design

The proposed Red Bluff Substation would be connected to the existing DPV 500 kV transmission source line via a loop-in line. The loop-in line would dissect the existing line and change it into two line segments: The Colorado River-Red Bluff and the Devers-Red Bluff 500 kV transmission lines.[6] The new piece of each line segment into the Red Bluff Substation would be approximately 1,000 feet long.

The new 500 kV line segments would be constructed using approximately four transmission structures - two of which are expected to be single-circuit lattice steel tower (LST) (Figure 3) or tubular steel pole (TSP) (Figure 4) and two of which are expected to be modified double-circuit LSTs (Figure 5).

The 500 kV double circuit structures would be utilized just outside of the substation wall (but within the SCE-controlled Red Bluff Substation Site). The purpose of the double circuit

[6] See Footnote 2 for discussion of line representation.

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 proper phasing at the substation racks. To achieve this, these towers would be approximately 40 feet taller than the single circuit towers. The conductor utilized would be 2B-2156 kcmil "Bluebird" Aluminum Conductor Steel Reinforced (ACSR) conductor.

Some of the new transmission structures may require a new right of way along that portion of the loop-in lines between SCE's existing ROW and the new Red Bluff Substation Site. Other transmission structures would be within SCE's existing ROW. Three dead-end structures would be required for each line segment (a total of six structures for both lines) to reach the edge of the Red Bluff Substation Site.

1.4.1.2 220 kV Generation Tie-Line Extension Design

The proposed gen-tie connection design into the Red Bluff Substation is described for each proposed solar project separately in a project-specific appendix.

1.4.1.3 220 kV Transmission Line Structure Modifications/Replacement Design

The proposed routes for the 500 kV transmission loop-in line require crossing over the recently constructed Florida Power and Light's (FPL) Buck-Julian Hinds 220 kV transmission line. In order to allow this 220 kV line to safely cross under the 500 kV loop-in lines, it may be necessary to modify the FPL structures to comply with the 'Grade A crossing' requirements found in CPUC General Order No. 95 (GO 95). The GO 95 'Grade A Crossing' requires that the towers be able to withstand a '1/3 broken wire' condition. In the SCE system, there are currently two types of suspension towers (EHT and EGA) that satisfy these criteria and have been previously utilized in other projects. In order to minimize cost, SCE would attempt to utilize these lower-cost suspension towers rather than a dead-end structure; however, that cannot be known with certainty at this time.

At the point of the undercrossing, the FPL Buck-Julian Hinds 220 kV line may possibly need to be lowered or otherwise reconfigured. The preferred approach at this time would be to determine the appropriate loop-in structures and position them within the proper span. Additional towers may be required to bring the modified spans to current standards and specifications.

The detailed modifications to the FPL 220 kV transmission line required to accommodate the 500 kV loop-in lines cannot be known until further engineering work and studies are completed. The type and size of towers and footings would depend on survey information, weather studies, soil analysis, and final transmission engineering.

1.4.2 Transmission Line and Related Structures Construction

1.4.2.1 Marshalling Yards/Staging Areas

A temporary equipment and material staging area would be established for short-term utilization within the Red Bluff Substation Western Site 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 and would take into account, where practical, suggestions by the SCE Crew Foreman or the SCE Contractor selected to do the work. An area of approximately 0.5 to 1.5 acres may be required. Additional temporary areas may be required for crew "show up" yards and would be used for temporary parking. Land disturbed at the temporary equipment and material staging area would be restored to preconstruction conditions following the completion of construction.

1.4.2.2 Access and Spur Roads

This portion of the project involves construction within existing and new ROW. 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. This project 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. These roads would be cleared of vegetation, blade-graded to remove potholes, ruts, and other surface irregularities, and re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. 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, fill material would be deposited where necessary, and roads would be re-compacted to provide a smooth and dense riding surface capable of supporting heavy 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. Access road associated drainage hardware that had been damaged or in need of adjustment would be restored to working condition. 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.

1.4.2.3 Modifications of Existing Transmission Structures

The structure modifications 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 modification to leg extensions, body panels, boxed sections, bridges, and peaks, 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. For each structure, a crane truck or rough terrain, the structure would be stabilized by a minimum 120-ton all-terrain or rough terrain crane, then the various steel components used to reinforce the towers would be lifted into place with a minimum 80-ton all-terrain or rough terrain crane and the tower modification work would be performed by a combined erection and torquing crew.

1.4.2.4 Removal of Existing 500 kV Transmission Structures

Transmission line facilities to be removed include existing 500 kV transmission structures and associated hardware (i.e., insulators, vibration dampeners, suspension clamps, ground wire clamps, shackles, links, nuts, bolts, washers, cotters pins, insulator weights, and bond wires). 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 feet by 50 feet (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.

1.4.2.5 Construction of New 500 kV and 220kV Transmission Structures

The new 500kV and 220kV structure locations and 220kV gen-tie 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 to provide a reasonably level and vegetation-free surface for temporary area needed for the laydown, assembly, and erection of the structures. This area is approximately 200 feet by 200 feet (0.92 acre). Erection of the structure would require an erection crane to be set up adjacent to and 60 feet from the centerline of the structure. 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 feet by 50 feet (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.

The foundation process starts with the excavation of the hole for the structure. The hole would be excavated using truck or track-mounted augers with various diameter augers to match the diameter requirements of the structure. The excavated material would be distributed at the structure site, used as fill for the new roads or substation site, or used in the rehabilitation of existing access roads. Alternatively, the excavated soil may be disposed of at an off-site disposal facility in accordance with all applicable laws.

Following excavation of the foundation footing for each structure, steel reinforced rebar cage(s) would be set in the excavated footing holes, anchor bolts and/or stub angles would be set in place, precision would be verified by a surveyor, and concrete would then be placed. The steel reinforced rebar cage(s) would be assembled off site and delivered to the structure location by flatbed truck. 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 1-4 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. Equipment would include a central mixer unit (drum type); three silos for injecting concrete additives, fly ash, and cement; a water tank; portable pumps; a pneumatic injector; and a loader for handling concrete additives not in the silos. Dust emissions would be controlled by watering the area and by sealing the silos and transferring the fine particulates pneumatically between the silos and the mixers.

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.

1.4.2.6 Guard Structures

Guard structures would be installed at the FPL Buck-Julian Hinds 220 kV transmission crossing and at any other facilities in the area requiring protection. Guard structures are temporary facilities designed to stop the movement of a conductor should it momentarily drop below a conventional stringing height. Typical guard structures are standard wood poles, taller in height than the line being crossed. Depending on the width of the new line being constructed, the number of guard poles installed on either side of a crossing would be between two and four. The guard structures are removed after the conductor is secured into place. In some cases, the wood poles could be substituted with the use of specifically equipped boom-type trucks with heavy outriggers staged to prevent the conductor from dropping.

1.4.2.7 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.

Wire-stringing activities would be conducted in accordance with SCE specifications, which is similar to process methods detailed in Institute of Electrical and Electronics Engineers Standard (IEEE) 524-2003, Guide to the Installation of Overhead Transmission Line Conductors.

Wire pulls are the length of any given continuous wire installation process between two selected points along the line. Wire pulls are selected, where possible, based on availability of dead-end structures at the ends of each pull, geometry of the line as affected by points of inflection, terrain, and suitability of stringing and splicing equipment setups. In some cases, it may be preferable to select an equipment setup position between two suspension structures. Anchor rods would then be installed to provide dead-ending capability for wire sagging purposes, and also to provide a convenient splicing area.

To ensure the safety of workers and the public, safety devices such as traveling grounds, temporary grounding grid/mats around stringing equipment, guard structures, and radio-equipped public safety roving vehicles and linemen would be in place prior to the initiation of wire-stringing activities.

The following four steps describe the wire installation activities utilized by SCE:

- Step 1: Sock Line, Threading: Typically, a lightweight sock line is passed from structure to structure, which would be threaded through the wire rollers in order to engage a camlock device that would secure the pulling sock in the roller. This threading process would continue between all structures through the rollers of a particular set of spans selected for a conductor pull.

- Step 2: Pulling: The sock line would be used to pull in the conductor pulling cable. The conductor pulling cable would be attached to the conductor using a special swivel joint to prevent damage to the wire and to allow the wire to rotate freely to prevent complications from twisting as the conductor unwinds off the reel. A piece of hardware known as a running board would be installed to properly feed the conductor into the roller; this device keeps the bundle conductor from wrapping during installation.

- Step 3: Splicing, Sagging, and Dead-ending: After the conductor is pulled in, the conductor would be sagged to proper tension and dead-ended to structures.

- Step 4: Clipping-in, Spacers: After the conductor is dead-ended, the conductors would be secured to all tangent structures; a process called clipping in. Once this is complete, spacers would be attached between the bundled conductors of each phase to keep uniform separation between each conductor.

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.

For stringing equipment that cannot be positioned at either side of a dead-end transmission structure, field snubs (i.e., anchoring and dead-end hardware) would be temporarily installed to sag conductor wire to the correct tension.

The puller and tensioner set-up locations require level areas to allow for maneuvering of the equipment. When possible, these locations would be located on existing level areas and existing roads to minimize the need for grading and cleanup. The final number and locations of the puller and tensioner sites would be determined during detailed engineering for the Proposed Project and the construction methods chosen by SCE or its Contractor.

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; it is typically installed in conjunction with the conductor, depending upon various factors, including line direction, inclination, and accessibility.

1.4.2.8 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 pre-construction conditions following the completion of construction. 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.

1.4.2.9 Land Disturbance

Table 5 below provides estimates of temporary and permanent land disturbance areas related to construction of the transmission lines at the Western Site. The numbers presented in Table 5 are preliminary and subject to change as the result of detailed engineering.

TABLE 5
RED BLUFF SUBSTATION WESTERN SITE
TRANSMISSION LINE 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	0.00
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
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	0.00
Conductor & OPGW Stringing Setup Area - Tensioner (5)	3	500' x 150'	5.17	5.17	0.00
New Access/Spur Roads (6)	0.5	linear miles x 14’ wide	0.85	0.00	0.85
Red Bluff Sub - Material & Equipment Staging Area	1	approx. 1.5 acres	1.50	1.50	0.00

Guard Structures	2	100’ x 100’	0.46	0.46	0.00
TOTAL ESTIMATED DISTURBED ACRES (7)			**22.33**	**18.57**	**1.92**
Notes to Table 5:					
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 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.					
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 0.22 acres.					
5. Based on 9,000 foot conductor reel lengths, number of circuits, and route design.					
6. Based on length of road in miles x road width of 18 feet.					
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; they are subject to revision based upon final engineering and review of the project by SCE's Construction Manager and/or Contractor awarded project.					
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 material, and equipment, and any environmental and/or permitting requirements.					

1.4.2.10 Operation and Maintenance

Following the completion of project construction, operation and maintenance of the new lines would commence. Operation, inspection, and maintenance activities would occur at least once per year, and they would be consistent with CPUC General Order No. 165. 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.

1.4.2.11 Construction Equipment and Labor

Construction of the Proposed 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 at the Western Site is shown in Table 6 - Construction Equipment and Workforce Estimates by Activity To Construct New 500 kV Loop-in Lines, and Table 7- Construction Equipment and Workforce Estimates by Activity for 500 kV and 220 kV Transmission Line Structure Modification/Replacement. The numbers presented are preliminary and subject to change as the result of detailed engineering.

TABLE 6

RED BLUFF SUBSTATION WESTERN SITE

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY TO CONSTRUCT NEW 500 KV LOOP-IN LINES

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

TABLE 6

RED BLUFF SUBSTATION WESTERN SITE

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY TO CONSTRUCT NEW 500 KV LOOP-IN LINES

Work Activity				Activity Production			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
LST Steel Haul (5)				**6**	**7**		**7 LSTs**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		7	2	
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	
LST Steel Assembly (6)				**7**	**18**		**4 LSTs**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	3		18	4	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		18	4	
10,000 lb Rough Terrain Fork Lift	200	Diesel	1		18	6	0.25 LST/Day
30-Ton Crane Truck	300	Diesel	2		18	8	
Compressor Trailer	350	Diesel	2		18	6	
LST Erection (7)				**8**	**25**		**7 LSTs**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		25	5	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		25	5	0.33 LST/Day
Compressor Trailer	120	Diesel	1		25	6	
80-Ton Rough Terrain Crane	350	Diesel	1		25	6	
Guard Structure Installation (8)				**6**	**1**		**4 Structures**
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	4 Structures/Day
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 6

RED BLUFF SUBSTATION WESTERN SITE

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY TO CONSTRUCT NEW 500 KV LOOP-IN LINES

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

Notes to Table 6: 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
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 7

RED BLUFF SUBSTATION WESTERN SITE

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY FOR 500 KV AND 220 KV TRANSMISSION LINE STRUCTURE MODIFICATION/REPLACEMENT

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

TABLE 7

RED BLUFF SUBSTATION WESTERN SITE

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY FOR 500 KV AND 220 KV TRANSMISSION LINE STRUCTURE MODIFICATION/REPLACEMENT

Work Activity				Activity Production			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
LST Removal (4)				**8**	**4**		**3 LSTs**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		4	6	0.75 LST/Day
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		4	6	
Compressor Trailer	120	Diesel	1		4	6	
80-Ton Rough Terrain Crane	350	Diesel	1		4	6	
Install LST Foundations (5)				**9**	**8**		**3 LSTs**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		8	2	0.50 LST/Day
30-Ton Crane Truck	300	Diesel	1		8	5	
Backhoe/Front Loader	200	Diesel	1		6	8	
Auger Truck	500	Diesel	1		8	8	
10-cu. yd. Dump Truck	350	Diesel	2		8	8	
10-cu. yd. Concrete Mixer Truck	425	Diesel	3		8	5	
LST Steel Haul (6)				**4**	**3**		**3 LSTs**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		3	2	1 LST/Day
10,000 lb Rough Terrain Fork Lift	200	Diesel	1		3	6	
40' Flat Bed Truck/ Trailer	350	Diesel	1		3	8	
LST Steel Assembly (7)				**7**	**14**		**3 LSTs**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		14	4	0.25 LST/Day
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		14	4	
10,000 lb Rough Terrain Fork Lift	200	Diesel	1		12	6	
30-Ton Crane Truck	300	Diesel	1		14	8	
Compressor Trailer	350	Diesel	1		12	6	
LST Erection (8)				**8**	**5**		**3 LSTs**

TABLE 7

RED BLUFF SUBSTATION WESTERN SITE

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY FOR 500 KV AND 220 KV TRANSMISSION LINE STRUCTURE MODIFICATION/REPLACEMENT

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

TABLE 7

RED BLUFF SUBSTATION WESTERN SITE

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY FOR 500 KV AND 220 KV TRANSMISSION LINE STRUCTURE MODIFICATION/REPLACEMENT

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

Notes to Table 7: 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.

1.5 DISTRIBUTION SYSTEM FOR STATION LIGHT AND POWER – WESTERN SUBSTATION SITE

1.5.1 Distribution System Description

In order to provide the necessary station light and power for the Red Bluff Substation at the Western Site, the existing Desert Center 12 kV circuit would be extended overhead south on Eagle Mountain road from 33.700 North and 115.454 West for approximately 300 feet by installing approximately 2-3 poles (see Figure 6) outside of the substation perimeter wall. The line extension would then be continued south underground in new conduits along the Red Bluff Substation driveway for approximately 1,000 feet to the Red Bluff Substation at the Western Site. - see Figure 2. Within the substation boundaries, a new pad mounted 750 kVA station light and power transformer would be installed.

The overhead conductor size would be 1/0 ACSR and the underground cable size would be a 1/0 CLP. Circuit modifications may also be required to provide support for voltage regulating requirements.

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 overhead distribution lines along Eagle Mountain Road from the existing Desert Center 12 kV circuit to the Red Bluff Substation Western Site. The access road would be approximately 300 feet long and approximately 18 feet wide.

1.5.1.2 Operations and Maintenance

Operation, inspection, and maintenance activities would occur at least once per year, and they would be consistent with CPUC General Order No. 165. 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.

1.5.2 Distribution System Construction

1.5.2.1 Land Disturbance

Table 8 provides an estimate of the temporary and permanent land disturbance related to construction of the distribution system for station light and power. The numbers presented in Table 8 are preliminary and subject to change as the result of detailed engineering.

TABLE 8
DISTRIBUTION SYSTEM FOR STATION POWER AND LIGHT CONSTRUCTION RED BLUFF SUBSTATION WESTERN SITE – ESTIMATED LAND DISTURBANCE

CONSTRUCTION ACTIVITY	ACRES TEMPORARILY DISTURBED	ACRES PERMANENTLY DISTURBED
Access road (1)	**-**	**0.12**
12kV overhead circuit on 3 poles (2)	**-**	**0.00**
Underground 12kV line (3)	**0.03**	**-**
Total Disturbance	**0.03**	**0.12**

(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 1,000 feet long by 1.5 feet wide trench.

1.5.2.2 Construction Equipment and Labor

The estimated number of workers and equipment required to construct the distribution system for station light and power is presented in Table 9. The numbers presented in Table 9 are preliminary and subject to change as the result of detailed engineering.

TABLE 9
CONSTRUCTION EQUIPMENT AND WORKFORCE AND ESTIMATES BY ACTIVITY TO CONSTRUCT THE DISTRIBUTION SYSTEM FOR STATION LIGHT AND POWER – RED BLUFF SUBSTATION WESTERN SITE

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

(1) Trenching and conduit installation = one 4-man crew
(2) Overhead Line Work = one 6-man crew
(3) Underground Cable Pulling – one 4-man crew

1.6 TELECOMMUNICATION SYSTEM – RED BLUFF SUBSTATION WESTERN SITE

1.6.1 Telecommunication System Description

A telecommunication system (Figure 7) 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. To provide this system, SCE would build the following:

- line protection, SCADA and telecommunications circuits from the solar developers' substation to the Red Bluff Substation and Devers Substation utilizing optical ground wires on the customer's 220 kV gen-tie line.
- 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 redundant optical system between the solar developers' substation and the Red Bluff Substation. One line will be routed by the project on its 220 kV generation tie line. The second line will be routed on the SCE 12 kV line that provides station light and power approximately 12.5 miles east to the project site. From there, the line will be buried, crossing under I10 and along the site access road into the project site (see Figure X).
- a microwave system between Red Bluff Substation and a new Desert Center Communications Site
- a microwave system between a new Desert Center Communications Site and the existing Chuckwalla Mountain Communications Site

1.6.1.1 Equipment and Installation

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.
- a new 185 foot 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 foot in diameter.
- a new Desert Center Communications Site which would have a tower identical to the one at Red Bluff Substation. It would have microwave equipment and dishes for paths to Red Bluff Substation and Chuckwalla Communications Site. The microwave repeater station would be located along Airport Access Road approximately 600 feet east of Rice Road. It would consist of an area approximately 100 feet by 50 feet and include a 12 feet by 30 feet communication room and a 185 foot tall lattice steel microwave tower and two 8-foot diameter microwave antennas.
- microwave equipment and a dish at Chuckwalla Communications Site.

1.6.1.2 Laydown Areas and Access Roads

Laydown areas would include SCE's proposed Red Bluff Substation and the area adjacent to the proposed microwave repeater station. A new access road would be required to the new Desert Center Communications Site.

1.6.1.3 Operation and Maintenance

The telecommunications system would require periodic routine maintenance as well as emergency procedures for service continuity. Routine maintenance would include equipment testing, equipment monitoring, and repair. No additional SCE personnel, beyond normal

staffing levels, would be required to operate or maintain the telecommunication system for the substation.

Typical maintenance of the telecommunications equipment requires an annual visit by one person, using one van, staying 3 hours at the substation or communications site. The engine would not be kept running.

1.6.2 Telecommunications Systems Construction

SCE or contractor crews would use standard construction methods to construct the required facilities.

1.6.2.1 Grading and Land Disturbance

Telecommunication construction activities would include the following:

1) SCE would construct the Desert Center Communications Site (Figure 8) to house microwave transmission equipment. The site would be fenced and cover an area 100 foot long and 50 foot wide. 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 12 foot by 8 foot concrete pad. The interior of the building would have include a separate generator room containing a 20 kW propane powered generator to ensure safe operation of the solar developer's gen-tie line protection in the event of an outage on the Desert Center 12 kV distribution line.

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 foot deep.

A new dirt access entry, 20 feet wide and 30 feet long, would be created from Airport Access Road to the site. Since the site is located in a flood plain area, an 8 foot high berm would be constructed on the north, west, and south sides. Soil from excavation of the site will be used to construct the berm.

The primary source of electrical service will be from a tap into the nearest 12 kV line, which would require the installation of approximately 3-5 wooden poles for approximately 730 feet to the northeast.

Table 10 provides estimates of temporary and permanent land disturbances related to construction of the telecommunication system. The numbers presented in Table 10 are preliminary and subject to change as the result of detailed engineering.

TABLE 10
TELECOMMUNICATION SYSYTEM CONSTRUCTION –
RED BLUFF SUBSTATION WESTERN AND EASTERN SITES ESTIMATED LAND DISTURBANCE

CONSTRUCTION ACTIVITY	ACRES TEMPORARILY DISTURBED	ACRES PERMANENTLY DISTURBED

Duct from Red Bluff MEER to first 220kV tower outside station (1)	0.03	-
Duct from Red Bluff MEER to first pole of 12 kV line providing Station Light and Power (2)	0.03	
Desert Center Microwave Repeater Site (3)	-	0.19
Access Road (4)	-	0.01
12 kV Distribution Line (5)	-	0.02
Total Acres Disturbed	0.06	0.22

(1) 1,000 feet long by 1.5 feet wide trench.
(2) Redundant fiber optic line will be routed on existing SCE 12 kV line
(3) Based on a graded site area of 120 feet by 70 feet.
(4) Based on road dimensions of 30 feet long by 20 feet wide.
(5) Based on 730 foot long line with one pole per 100 feet and 1.5 square feet disturbance per pole

1.6.2.2 Construction Equipment and Labor

See Table 11 for the construction workforce and type of equipment expected to be used in constructing the proposed telecommunications facilities. The numbers presented in Table 11 are preliminary and subject to change as the result of detailed engineering.

TABLE 11
CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY TO CONSTRUCT THE RED BLUFF SUBSTATION WESTERN AND EASTERN SITES TELECOMMUNICATION SYSTEM

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	15	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	20	1-2 ton truck (gas/diesel) 1 – crew truck (gas)

1.6.2.3 Hazards and Hazardous Waste

The telecom building would contain a 48VDC lead-calcium flooded cell battery, in order to operate the optical equipment. The total volume of electrolyte will be 200 gallons. The total weight of the lead will be 5,000 pounds. There would also be a 499 gallon propane tank in the telecom building.

1.6.2.4 Post construction Cleanup

Surplus soil, if any, would be disposed of off-site at an approved licensed facility.

1.7 RED BLUFF SUBSTATION EASTERN SITE

1.7.1 Introduction

A second substation site alternative (Figure 1) was also reviewed. The Red Bluff Substation Eastern Site and associated transmission, distribution, and telecommunications facilities are located in the general vicinity of the Red Bluff Substation Western Site and its associated facilities.

1.7.2 Eastern Site Location

The Red Bluff Substation Eastern Site is located approximately 5 miles east of California State Highway 177 along the south side of Interstate 10 in the County of Riverside. The substation would be located on federal land.

The substation site would be reached (see Figure 1) from Interstate 10 via the Corn Springs Road exit approximately nine miles east of the State Highway 177 (Desert Center) exit. This access would include heading east along an existing 3,800-foot long paved portion of Chuckwalla Valley Road. At this point the access would turn south over a 1,100 foot portion of Corn Springs Road. At the intersection of the existing unimproved pipeline patrol road the substation the access turns west over a distance of approximately 25,000 feet. The final leg of the access would be a new road segment approximately 1,400 feet long that would connect to the substation's southern boundary.

1.7.2.1 Red Bluff Substation Eastern Site Design and Land Disturbance

The substation site would require substantial grading to incorporate the proposed approximately 1,450-foot by 2,200-foot enclosed facility (containing approximately 75 acres) and to provide diversion means to channel the existing surface drainage around the facility. Grading of the substation site would require the relocation of site soil from the higher elevations to fill in lower elevations creating a level substation pad with an even slope of between one and two percent. The engineering design would attempt to utilize the existing cut soil as fill to reduce the need for the importing or exporting of soil to or from the site. Creating the pad would result in side slopes that transition between the natural desert floor and the newly graded pad. These slope areas would extend beyond the enclosed substation

and be integrated with the diversion channels. The surface area occupied by the slopes and channels would be anticipated at approximately 30 acres.

Extensive improvements along the 25,000 foot pipeline road would be required in order to provide 24-hour access to the Red Bluff Substation. Included in these improvements would be widening to a minimum width of 24 feet, leveling or installation of culverts over the numerous eroded gully crossings, diversion berms along portions of the south (upslope) edge to prevent erosion of the road, and the placement of a compacted layer of base gravel to form a firm drivable surface.

Table 12 provides the approximate volume and type of earth materials to be used or disposed of from the Red Bluff Substation Eastern Site (within the substation fence and the required drainage structures outside/around the substation).

TABLE 12
RED BLUFF SUBSTATION EASTERN SITE AND ACCESS ROAD GROUND SURFACE IMPROVEMENT MATERIALS AND ESTIMATED VOLUMES

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

(1) The design concept would be intended to balance the earthwork quantities, utilizing the site cute material 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.

Because the Red Bluff Substation Eastern Site is located down-slope from the Chuckwalla Mountains, surface runoff in the form of several eroded channels (designated as Blue-line streams) traverse the site. It is anticipated that alteration of three of these channels would be required in order to protect the substation's southern exposure from flooding. Preliminary engineering suggests that a trapezoidal channel would be required to convey the storm water runoff around both sides of the substation, discharging the flow through two existing culverts under Highway 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 approximately 20 acres.

Internal surface runoff would be directed towards detention basins located within or directly adjacent to the enclosed substation. The 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 13 presents estimates of temporary and permanent land disturbance related to construction of the Red Bluff Substation at the Eastern Site (outside the substation fence and the required drainage structures outside/around the substation). The numbers presented in Tables 12 and 13 are preliminary and subject to change as the result of detailed engineering.

TABLE 13
RED BLUFF SUBSTATION EASTERN SITE CONSTRUCTION – ESTIMATED LAND DISTURBANCE

CONSTRUCTION ACTIVITY	ACRES TEMPORARILY DISTURBED	ACRES PERMANENTLY DISTURBED
Substation grading	-	75.00
Drainage/side slopes	-	20.00
Substation Access road (1)	-	13.77
Staging area	10.00	
Total Disturbance	10.00	123.77

(1) Based on road dimensions of 20,000 feet long by 30 feet wide

1.7.2.3 Substation Construction Equipment and Labor

The estimated number or personnel and equipment required for construction of the Red Bluff substation at the Eastern Site are summarized in Table 14.

TABLE 14
RED BLUFF SUBSTATION EASTERN SITE CONSTRUCTION EQUIPMENT AND LABOR ESTIMATES

Activity and number of Personnel	Number of Work Days	Equipment and Quantity	Duration of Use (Hours/Day)

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) 2-Loader (Diesel) 1-Scraper (Diesel) 1-Grader (Diesel) 2-Water Truck (Diesel) 2-4x4 Backhoe (Diesel) 1-4x4 Tamper (Diesel) 1-Tool Truck (Gasoline) 1-Pickup 4x4 (Gasoline)	4 4 3 3 2 2 2 2 2
Fencing (4 people)	25	1-Bobcat (Diesel) 1-Flatbed Truck (Gasoline) 1-Crewcab Truck (Gasoline)	8 2 4
Civil (8 people)	90	1-Excavator (Diesel) 1-Foundation auger (Diesel) 2-Backhoes (Diesel) 1-Dump truck (Diesel) 1-Skip Loader (Diesel) 1-Water Truck (Diesel) 2-Bobcat Skid Steer (Diesel) 1-Forklift (Propane) 1-17 Ton Crane (Diesel) 1-Tool Truck (Gasoline)	4 5 3 2 3 3 3 4 2 hours/day for 45 days 3
MEER (6 people)	60	1-Carry-all Truck (Gasoline) 1-Tool truck (Gasoline) 1-Stake Truck (Gasoline)	3 2 2
Electrical (10) people)	120	2-Scissor Lifts (Propane) 2-Manlifts (Propane) 1-Reach Manlift (Propane) 1-15 ton Crane (Diesel) 1-Tool Trailer 3-Crew Trucks (Gasoline)	3 3 4 3 3 2
Wiring (6 people)	90	1-Manlift (Propane) 1-Tool Trailer	4 3
Maintenance Crew Equipment Check (2 people)	30	2-MaintenanceTrucks (Gasoline)	4
Testing (2 people)	90	1-Crew Truck (Gasoline)	3

Activity and number of Personnel	Number of Work Days	Equipment and Quantity	Duration of Use (Hours/Day)
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

1.7.3 Transmission Lines and Related Structures – Red Bluff Substation Eastern Site

1.7.3.1 500 kV Transmission Line Loop-in

1.7.3.1.1 Transmission Line Loop-In Description

As the substation orientation of the Eastern and Western substation site layout differ, the 500 kV transmission line loop-in design connecting to the Eastern Site would be substantially different in scope from was described for the Western Site (see Section 1.4.1.1).

As described in Section 1.4.1.1 the proposed Red Bluff Substation at the Eastern Site location would also be connected to the existing DPV 500 kV transmission source line via a loop-in line, which would dissect the existing line and change it into two line segments: the Colorado River-Red Bluff and the Devers-Red Bluff 500 kV transmission lines.[7] The new piece of each line segment into the Red Bluff Substation at the Eastern Site would be approximately 5500 feet long.

The new 500 kV line segments would be constructed using approximately eight transmission structures - six of which are expected to be single-circuit lattice steel tower (LST) (Figure 3) or tubular steel pole (TSP) (Figure 4) and two of which are expected to be modified double-circuit LSTs (Figure 5).

The 500 kV double circuit structures would be utilized just outside of the substation wall (but within the SCE-controlled 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 proper phasing at the substation racks. To achieve this, these towers would be approximately 40 feet taller than the single

[7] See Footnote 2 for discussion of line representation.

circuit towers. The conductor utilized would be 2B-2156 kcmil "Bluebird" Aluminum Conductor Steel Reinforced (ACSR) conductor.

The new transmission line segments would require an approximately 600 foot wide right of way along that portion of the loop-in lines between SCE's existing ROW and the new Red Bluff Substation Site. Other transmission structures would be within SCE's existing ROW. Three dead-end structures and 1 suspension structures 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 - see Figure 9.

1.7.3.1.2 Transmission Line Loop-In Construction Equipment and Labor

Construction of the Proposed 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 at the Eastern Site is shown in Table 15 - Construction Equipment and Workforce Estimates by Activity To Construct New 500 kV Loop-in Lines, and Table 7- Construction Equipment and Workforce Estimates by Activity for 500 kV and 220 kV Transmission Line Structure Modification/Replacement. The numbers presented are preliminary and subject to change as the result of detailed engineering.

TABLE 15

RED BLUFF SUBSTATION EASTERN SITE

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY TO CONSTRUCT NEW 500 KV LOOP-IN LINES

Work Activity				Activity Production		
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)
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			2
30-Ton Crane Truck	300	Diesel	1			2
Water Truck	350	Diesel	1		Duration of Project	
10,000 lb Rough Terrain Fork Lift	200	Diesel	1			5
Truck, Semi, Tractor	350	Diesel	1			1
Roads & Landing Work (3)				**5**	**7**	
1-Ton Crew Cab, 4x4	300	Diesel	2		7	2
Road Grader	350	Diesel	1		5	4

TABLE 15

RED BLUFF SUBSTATION EASTERN SITE

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY TO CONSTRUCT NEW 500 KV LOOP-IN LINES

Work Activity				Activity Production		
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)
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
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

TABLE 15

RED BLUFF SUBSTATION EASTERN SITE

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY TO CONSTRUCT NEW 500 KV LOOP-IN LINES

Work Activity				Activity Production		
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)
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
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

TABLE 15

RED BLUFF SUBSTATION EASTERN SITE

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY TO CONSTRUCT NEW 500 KV LOOP-IN LINES

Work Activity				Activity Production		
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)
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 to Table 15: 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
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.

1.7.3.2 500 kV/220 kV Transmission Line Structure Modifications/Replacement Design

1.7.3.2.1 System Description

The design for any 500 kV/220 kV transmission line structure modifications/replacements connecting to the Red Bluff Substation Eastern Site would be essentially similar in scope as was described for the Western Site (see Section 1.4.1.3).

1.7.3.2.2 Construction Equipment and Labor

Labor and equipment requirements for any 500 kV/220 kV structure modifications/replacements on the Red Bluff Substation Eastern Site would be essentially similar in scope as was described for the Western Site (see Section 1.4.2.11 and Table 7).

1.7.3.3 Land Disturbance

Table 16 below provides estimates of temporary and permanent land disturbance areas related to construction of the 500kV transmission loop-in lines at the Red Bluff Substation Eastern Site. The numbers presented in Table 16 are preliminary and subject to change as the result of detailed engineering.

TABLE 16
RED BLUFF SUBSTATION EASTERN SITE
TRANSMISSION LINE 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
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 to Table 16:

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 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.

1.7.4 Distribution System for Station Light and Power

1.7.4.1 System Description

Placement of the substation at the Red Bluff Substation Eastern Site 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 the replacement of approximately 100 poles (see Figure 6), assuming an average span of 200 feet.

1.7.4.2 Construction Equipment, Labor and Land Disturbance

The description for conductor sizes and types, circuit modifications for voltage regulation, SL&P transformer size, laydown location at the Western Site (see Section 1.5.1) and workforce times and requirements (see Section 1.5.2) are similar at the Eastern Site. This distribution line work could follow the new/upgraded access road that will likely be required to support the rebuilt overhead distribution lines from existing circuitry to the Red Bluff Substation Eastern Site.

Table 17 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 Eastern Site. The numbers presented in Tables 15 and 16 are preliminary for planning purposes and subject to change as the result of detailed engineering.

TABLE 17
DISTRIBUTION SYSTEM FOR STATION POWER AND LIGHT CONSTRUCTION EASTERN SITE – ESTIMATED LAND DISTURBANCE

CONSTRUCTION ACTIVITY	ACRES TEMPORILY DISTURBED	ACRES PERMANENTLY DISTURBED
Access Road (1)	**_**	**8.26**
12 kV Overhead Circuit on	**_**	**0.02**

100 poles (2)		
Underground 12 kV line (3)	**0.03**	**-**
Total disturbance	**0.03**	**8.28**

(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.

The estimated number of workers and equipment required to construct the distribution system for station light and power is presented in Table 16.

TABLE 18
CONSTRUCTION EQUIPMENT AND WORKFORCE AND ESTIMATES BY ACTIVITY TO CONSTRUCT THE DISTRIBUTION SYSTEM FOR STATION LIGHT AND POWER – RED BLUFF SUBSTATION EASTERN SITE

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

4x4							
55-foot double-bucket truck	350	Diesel	1			4	

(4) Trenching and conduit installation = one 4-man crew
(5) Overhead Line Work = two 4-man crew
(6) Underground Cable Pulling – one 4-man crew

1.7.5 Telecommunication System

1.7.5.1 System Description

There would be no substantial difference in the required telecommunication system design if the substation were constructed on either the Eastern Site or the Western Site with the exception that the length of the redundant fiber optic line routed on the 12 kV pole line would only be approximately 4.75 miles.

1.7.5.2 Construction

There would be no substantial difference in the telecommunication system construction scope of work if the substation were constructed on either the Eastern Site or the Western Site.

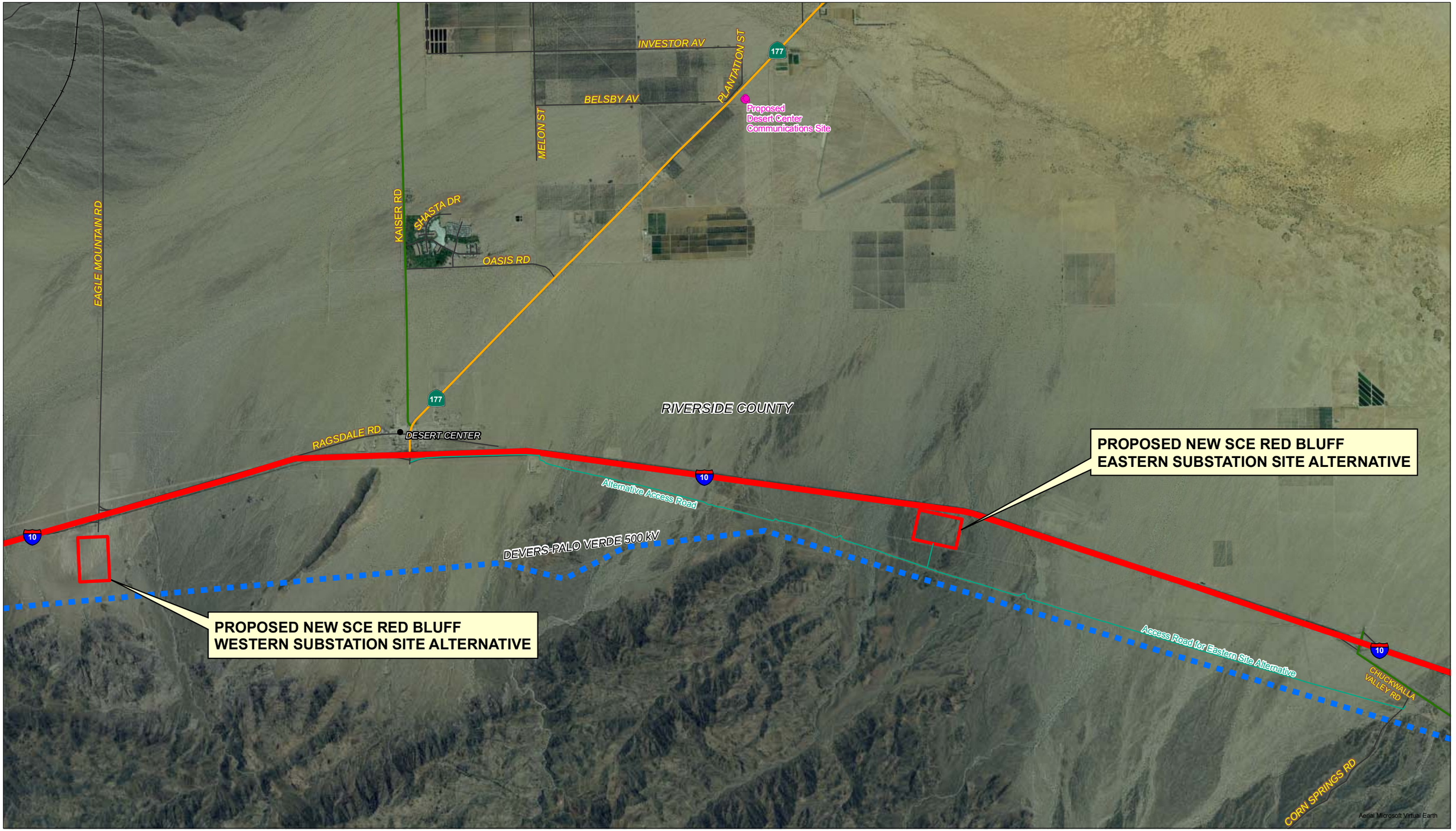

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FIGURE 1
PROPOSED NEW SCE RED BLUFF SUBSTATION SITES

Features depicted herein are planning level accuracy, and intended for informational purposes only. Distances and locations may be distorted at this scale. Always consult with the proper legal documents or agencies regarding such features.

Legend

- Proposed Red Bluff Substation Sites
- Existing 500kV Transmission Lines (SCE, 2009)
- Proposed Desert Center Communications Site
- Freeways (TBM, 2008)
- Highways (TBM, 2008)
- Major Road (TBM, 2008)
- Minor Road (TBM, 2008)
- Railroad (TBM, 2008)
- Proposed SCE Access Road

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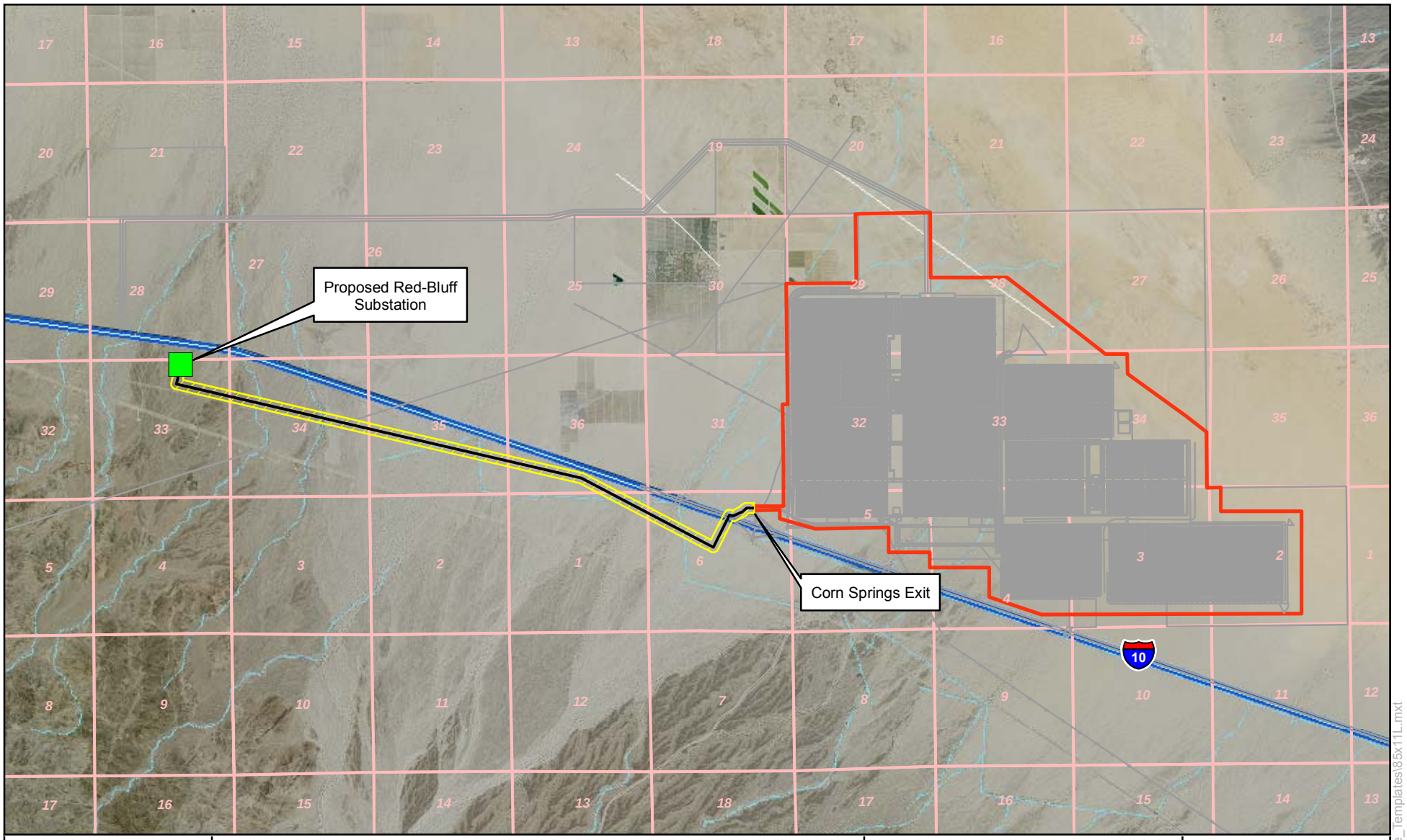
0 0.4 0.8 1.6 Miles



Map Location

Legend

- Redundant Telecom Route
- Existing SCE Utility Corridor
- Palen Solar Power Project Right-of-Way
- Section Lines

1 inch equals 1 miles

0 0.5 1 Miles

Data Sources:
Air Photo, NAIP, 2009
Basemap, (Roads, streams, cities), ESRI

Palen Solar Power Project

Figure TSE-1
Redundant Telecom Route
Alternative 2

Palen Solar I, LLC

AECOM

Project: 60139694-6500
Date: July 2010

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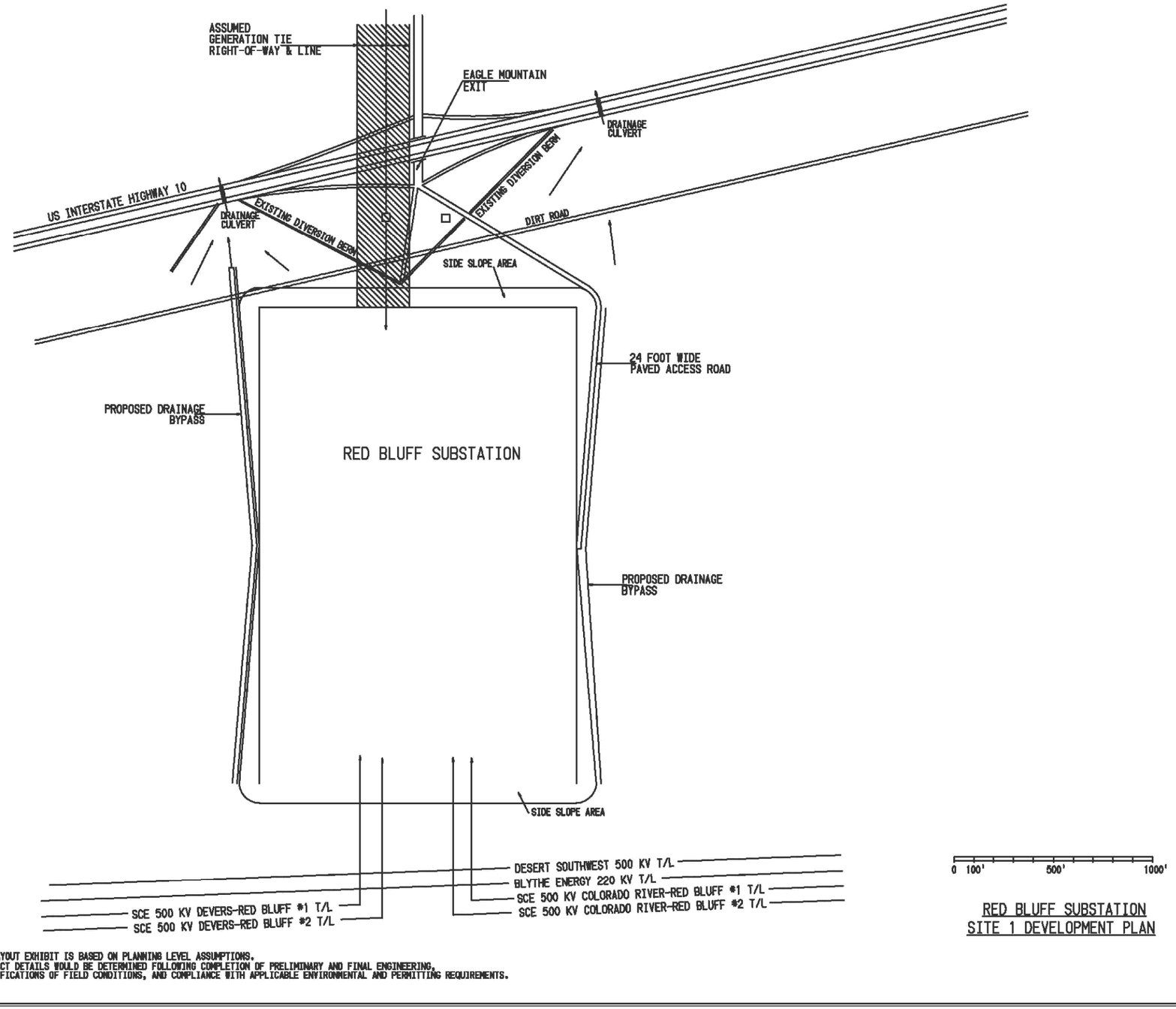

THIS LAYOUT EXHIBIT IS BASED ON PLANNING LEVEL ASSUMPTIONS.
THE EXACT DETAILS WOULD BE DETERMINED FOLLOWING COMPLETION OF PRELIMINARY AND FINAL ENGINEERING,
INDENTIFICATIONS OF FIELD CONDITIONS, AND COMPLIANCE WITH APPLICABLE ENVIRONMENTAL AND PERMITTING REQUIREMENTS.

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FIGURE 2
PROPOSED NEW SCE RED BLUFF SUBSTATION SITE 1 DEVELOPMENT PLAN

Features depicted herein are planning level accuracy, and intended for informational purposes only. Distances and locations may be distorted at this scale. Always consult with the proper legal documents or agencies regarding such features.

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TYPICAL SINGLE CIRCUIT 500KV

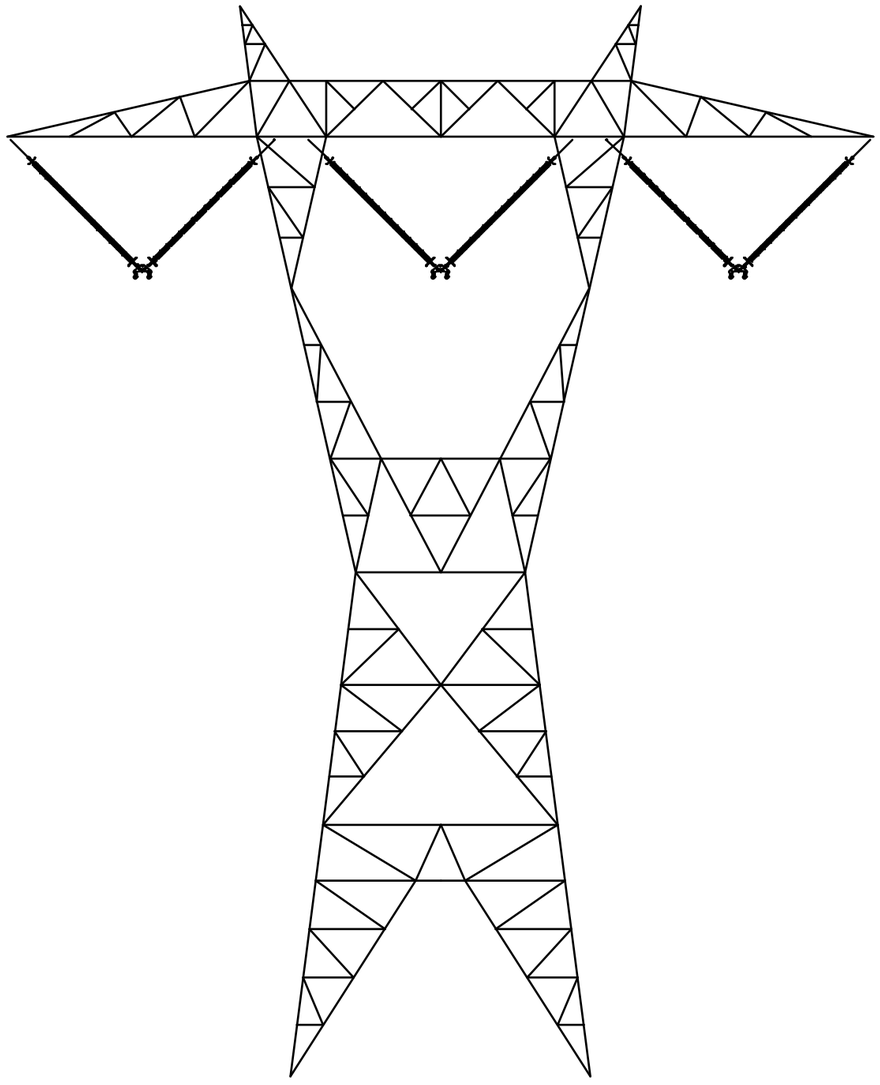

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FIGURE 3
TYPICAL SINGLE CIRCUIT 500 KV
LATTICE STEEL TOWER CONFIGURATION

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TYPICAL SINGLE CIRCUIT TSP 500KV

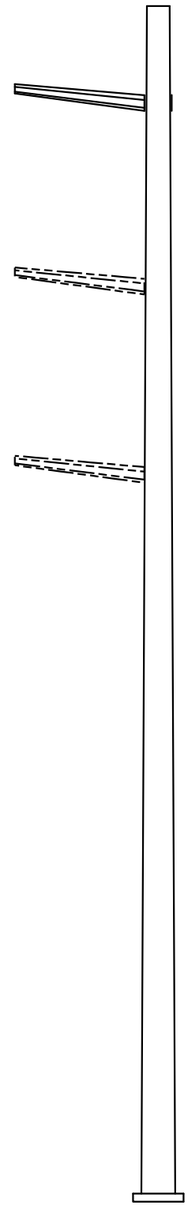

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FIGURE 4
TYPICAL SINGLE CIRCUIT 500 KV
TUBULAR STEEL POLE CONFIGURATION

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TYPICAL DOUBLE CIRCUIT 500KV

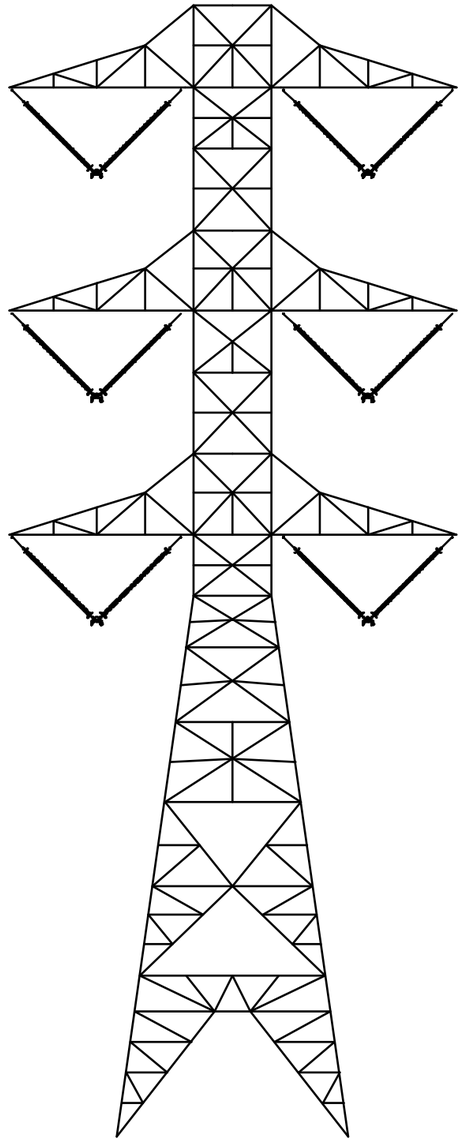

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FIGURE 5
TYPICAL DOUBLE CIRCUIT 500 KV
LATTICE STEEL TOWER CONFIGURATION

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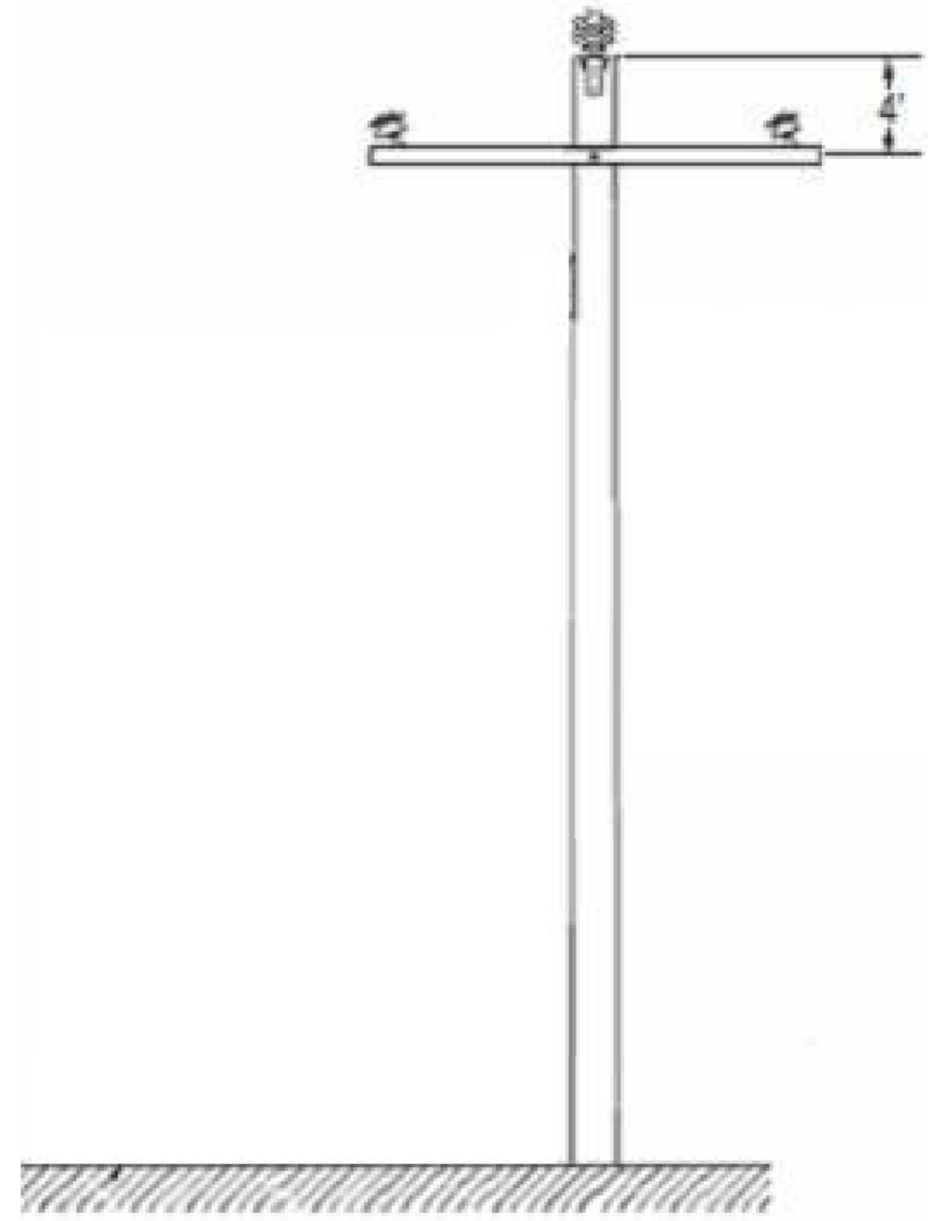

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FIGURE 6
TYPICAL 12 KV
DISTRIBUTION POLE -
WESTERN AND EASTERN SITE

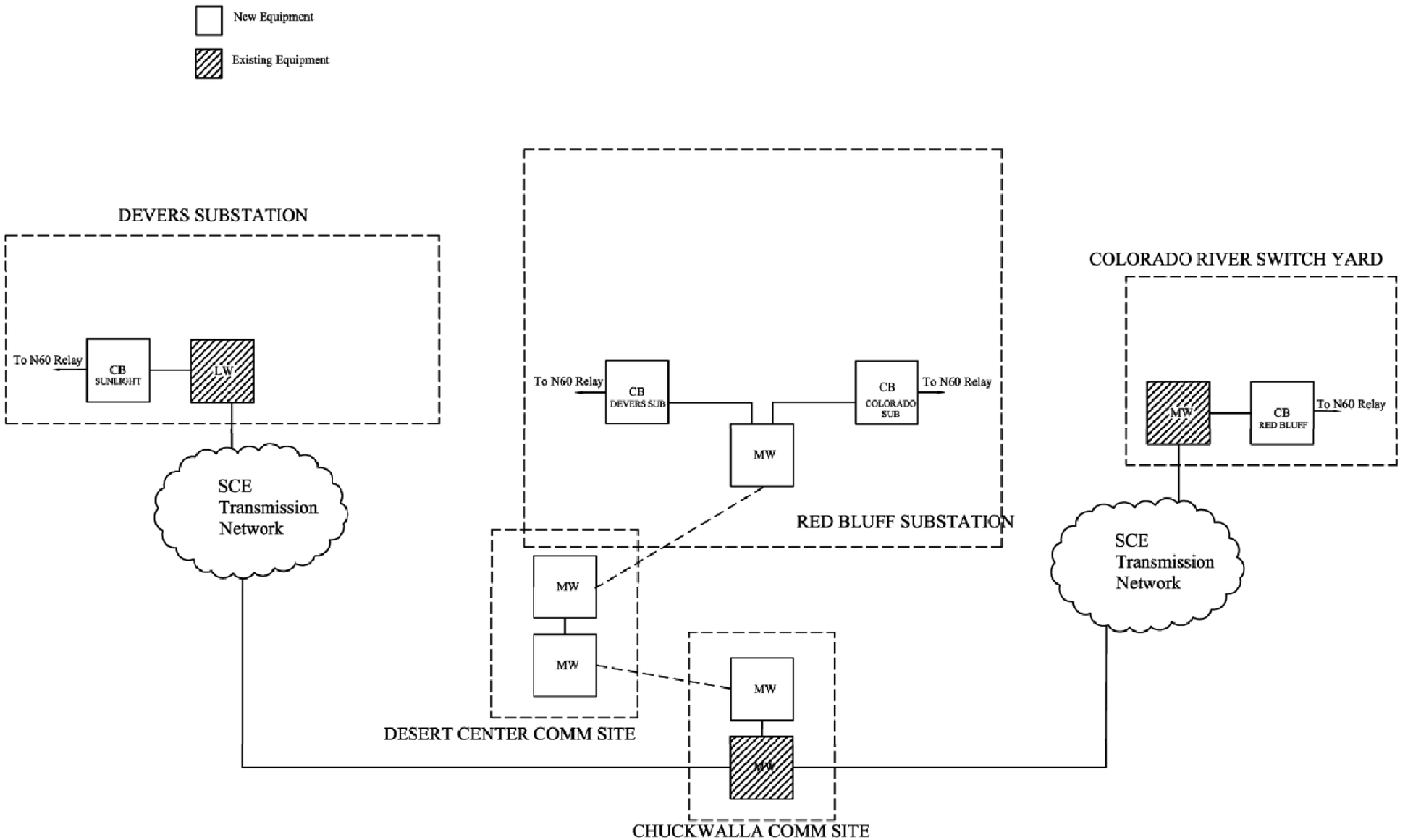

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FIGURE 7
RED BLUFF SUBSTATION
TELECOMMUNICATION PLAN

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Proposed Desert Center Communcations 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

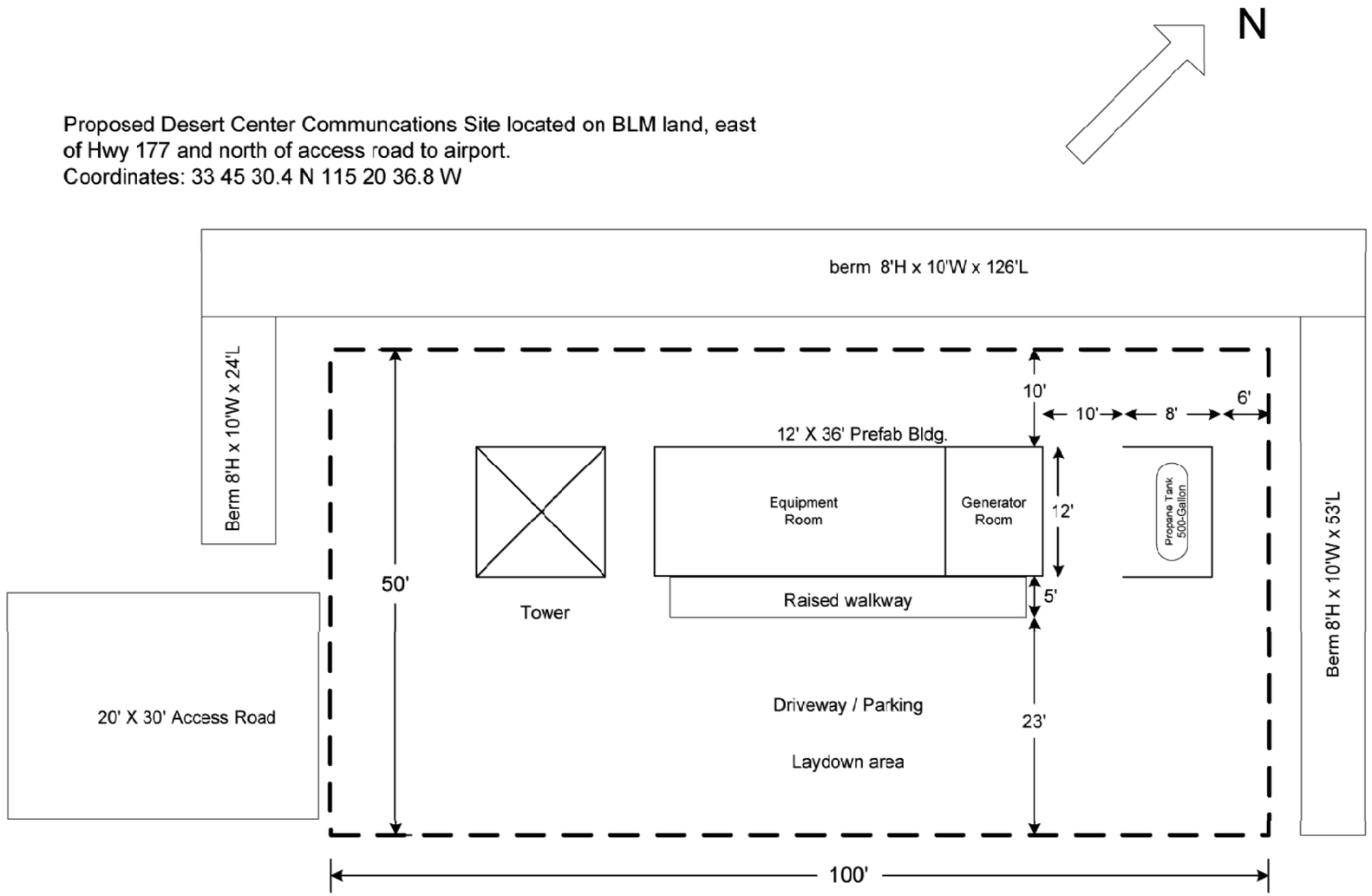

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FIGURE 8
RED BLUFF
DESERT CENTER COMMUNICATION SITE

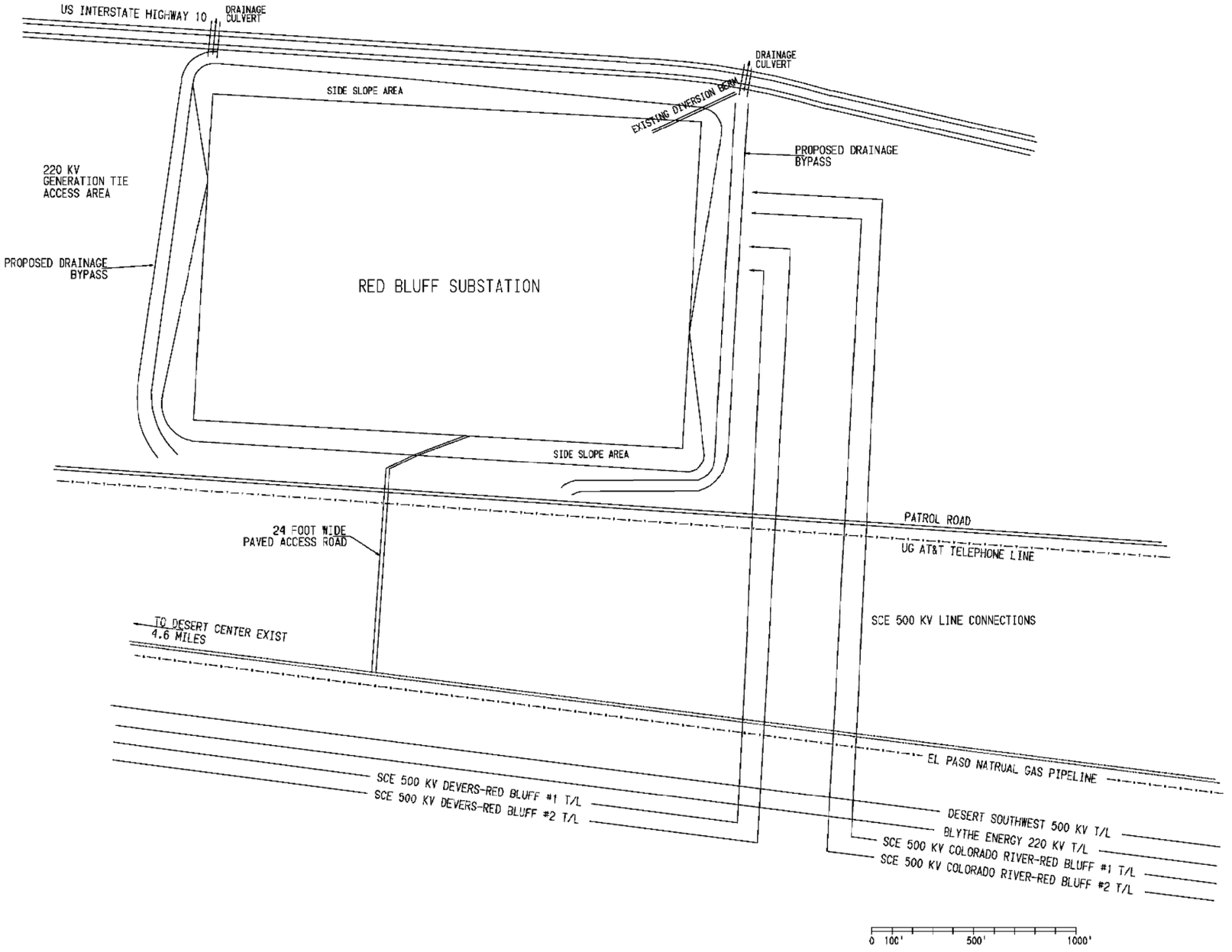

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FIGURE 9
RED BLUFF
EASTERN SUBSTATION SITE
DEVELOPMENT PLAN

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BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA

In the Matter of:
APPLICATION FOR CERTIFICATION for the *PALEN SOLAR POWER PROJECT*

Docket No. 09-AFC-7
PROOF OF SERVICE
(Revised 7/2/10)

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DECLARATION OF SERVICE

I, Carl Lindner, declare that on, July 20, 2010, I served and filed copies of the Data Responses to Alternatives 2 and 3. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: **[http://www.energy.ca.gov/sitingcases/solar_millennium_palen]**.

The document has been sent to the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(*Check all that Apply*)

FOR SERVICE TO ALL OTHER PARTIES:

___**X**__sent electronically to all email addresses on the Proof of Service list;

_____ by personal delivery

___**X**__ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on the date to those addresses **NOT** marked "email preferred."

AND

For filing with the Energy Commission:

___**X**__sending an original paper copy and one electronic copy, mailed respectively, to the address below (**preferred method**);

OR

_____ depositing in the mail an original and 12 paper copies, along with 13 CDs, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 09-AFC-7
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the country where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.