

CHAPTER 2

Project Description

2.1 Introduction

This EIR examines the environmental impacts associated with construction and operation of the Southern California Edison (SCE) Devers-Mirage 115 kV Subtransmission System Split Project (the Proposed Project). As described in more detail in the following sections, the primary components of the Proposed Project include two new 115 kV subtransmission¹ line segments and a loop-in of the existing Devers-Coachella Valley 220 kV transmission line into Mirage Substation. Other components include rearrangement and modification of subtransmission line connections, replacement of 220 kV and 115 kV circuit breakers, installation of one 280 MVA 220/115 kV transformer at Mirage Substation, and the construction of other substation modifications in the cities of Palm Springs, Rancho Mirage, Indian Wells, Cathedral City, Palm Desert, and unincorporated areas of Riverside County, including the Thousand Palms community.

2.2 Project Location

The Proposed Project is located in eastern Riverside County, as shown in Figure 1-1. The Proposed Project Electrical Needs Area includes the Cities of Palm Springs, Cathedral City, Rancho Mirage, Palm Desert, Indian Wells, and unincorporated areas of Riverside County, including the Thousand Palms community.

2.3 Summary of Project Components

The Proposed Project consists of a number of distinct project components that together make up the entire Proposed Project, including two new 115 kV subtransmission lines, three 115 kV subtransmission line reconfigurations, a new 220 kV transmission line, substation modifications, and an upgraded telecommunications infrastructure. This section presents a brief overview of each of these components. Sections 2.4 through 2.7 present detailed discussions of each of these components including details on proposed operations, construction practices, and the schedules for construction and start of operations.

¹ The term subtransmission is used here to describe transmission lines used to supply a local distribution network off the primary higher voltage long distance transmission lines.

2.3.1 115 kV Subtransmission Lines

The Devers Subtransmission System consists of multiple 115 kV subtransmission lines in the Electrical Needs Area. The existing 115 kV subtransmission lines that would be affected by the Proposed Project as part of the newly created Devers 115 kV Subtransmission System are the Garnet-Santa Rosa, Tamarisk-Thornhill, and Devers-Eisenhower 115 kV lines. The Garnet-Santa Rosa 115 kV subtransmission line is also proposed to be reconfigured as part of the Mirage 115 kV Subtransmission System work described in Section 2.4.

At the time SCE filed its Application with the CPUC, two 115 kV subtransmission lines were connected to the Mirage Substation transformers: the Devers-Capwind-Mirage-Concho and the Mirage-Tamarisk 115 kV subtransmission lines. However, in 2008, the Mirage-Capwind-Concho-Devers 115 kV subtransmission line was looped into the Mirage Substation 115 kV switchrack, creating the Devers-Capwind-Mirage and the Mirage-Concho 115 kV subtransmission lines. Thus, there are currently three 115 kV lines connected to the Mirage Substation. The Proposed Project would include the construction of the new Mirage-Santa Rosa 115 kV subtransmission line and reconfiguration of the existing Devers-Capwind-Mirage, Garnet-Santa Rosa, Mirage-Concho, Mirage-Tamarisk, and the Santa Rosa-Tamarisk 115 kV subtransmission lines. As a result, the following 115 kV subtransmission lines would be served from Mirage Substation: Mirage-Concho, Mirage-Capwind-Devers-Tamarisk, Mirage-Santa Rosa-Tamarisk, and the newly constructed Mirage-Santa Rosa subtransmission line.

2.3.2 220 kV Transmission Lines

The Proposed Project would include looping in the existing Devers-Coachella Valley 220 kV transmission line, creating the Devers-Mirage No. 2 and the Mirage-Coachella Valley 220 kV transmission lines within the existing ROW located north of Mirage Substation. Additionally, the Proposed Project would require the relocation of the existing Devers-Mirage, Julian Hinds-Mirage, and Mirage-Ramon 220 kV transmission line components within the existing ROW and at Mirage Substation. A total of eight new lattice steel towers (LSTs), one tubular steel pole (TSP), and the removal of four LSTs, plus the addition of new conductor, insulators, and equipment would be required for this component, See Section 2.5 for a more detailed description.

2.3.3 Substations

The Proposed Project would add minor improvements and/or upgrades to 10 existing substations within the project area. All electrical component improvements and/or upgrades would be installed within the existing fenced perimeter surrounding each substation. All construction would take place within the existing substation fences or walls, with the exception of Farrell Substation, where a new driveway would be constructed for permanent access. See Section 2.6 for detailed discussion of all substation components. In addition, a description of substation construction process, personnel, equipment, waste materials, and schedules is provided in Sections 2.6.11 through 2.6.13.

2.3.4 Telecommunications

As part of the Proposed Project's changes and upgrades, existing fiber optic cables would be transferred from existing poles to the new poles to be installed for both the proposed Mirage-Santa Rosa and Farrell-Garnet 115 kV subtransmission lines. Additionally telecommunications equipment, including channel bank and fiber optic equipment, would be installed at Concho, Devers, Eisenhower, Farrell, Garnet, Indian Wells, Mirage, Santa Rosa, Tamarisk, and Thornhill substations, and at the Edom Hill Communications Site and Palm Springs Service Center. See Section 2.7 for a more detailed description of this component.

2.4 115 kV Subtransmission Lines

2.4.1 Overview of the Proposed Devers 115 kV System

Existing Configuration

Devers-Farrell-Windland 115 kV Line

The Devers-Farrell-Windland 115 kV subtransmission line is constructed on single-circuit structures and parallels Diablo Road southerly to Garnet Road south of the Interstate 10 (I-10) Freeway. At Garnet Road, the line proceeds easterly past Indian Avenue around Garnet Substation. The line proceeds easterly by southeasterly, paralleling the I-10 Freeway until immediately west of Gene Autry Trail, where it crosses the Union Pacific Railroad (UPRR) in a southeasterly direction to the east side of Gene Autry Trail. The line proceeds south on the east side of Gene Autry Trail until it reaches Farrell Substation.

Tamarisk-Thornhill 115 kV Line

The Tamarisk-Thornhill 115 kV subtransmission line is constructed on single-circuit structures. The line proceeds west out of Tamarisk Substation until Date Palm Drive, where it proceeds north to Dinah Shore Drive. At Dinah Shore Drive, the line proceeds west to Gene Autry Trail, where it turns north and proceeds through Eisenhower Substation. At East Sunny Dunes Road, the line proceeds west to Thornhill Substation.

Devers-Eisenhower 115 kV Line

The Devers-Eisenhower 115 kV subtransmission line proceeds east out of Devers Substation parallel to the Devers-Mirage 220 kV transmission line corridor until Date Palm Drive, where it proceeds south to 33rd Avenue. At 33rd Avenue, the line proceeds west to Eisenhower Substation, located at East Mesquite Avenue and Gene Autry Trail.

Proposed Configuration

Proposed Farrell-Garnet 115 kV Line Configuration

Implementation of the Proposed Project would result in the new Farrell-Garnet 115 kV subtransmission line by replacing approximately 5.3 miles of the Devers-Farrell-Windland 115 kV subtransmission line on single-circuit wood poles between Garnet Substation and Farrell Substation. The existing line would be replaced with new double-circuit light-weight steel (LWS) and TSPs using primarily existing rights-of-way (ROW) and public road franchise locations. The existing Devers-Farrell-Windland 115 kV line would be transferred to the new double-circuit poles and the existing poles would be removed.

One exception to using existing ROW would be the portion of the proposed alignment immediately north of the UPRR, where the proposed alignment would deviate from the existing SCE ROW for approximately 0.8 mile at the request of the private property owner (SCE, 2009). Just north of the UPRR, the proposed subtransmission line would turn in a northwesterly direction, establishing a new 30-foot wide ROW along the north side of the UPRR for approximately 1,680 feet, where the line would turn north and continue for approximately 1,070 feet to a point where it would turn east and proceed for approximately 1,200 feet. The line would then turn northeast and continue for approximately 330 feet to Salvia Road, where the new proposed 115 kV ROW would rejoin the existing SCE ROW on the south side of Salvia Road. (See Figure 2-1, *Existing Conditions and Proposed Farrell-Garnet 115 kV Lines* and Figure 2-2, *Proposed Farrell-Garnet 115 kV Line*.)

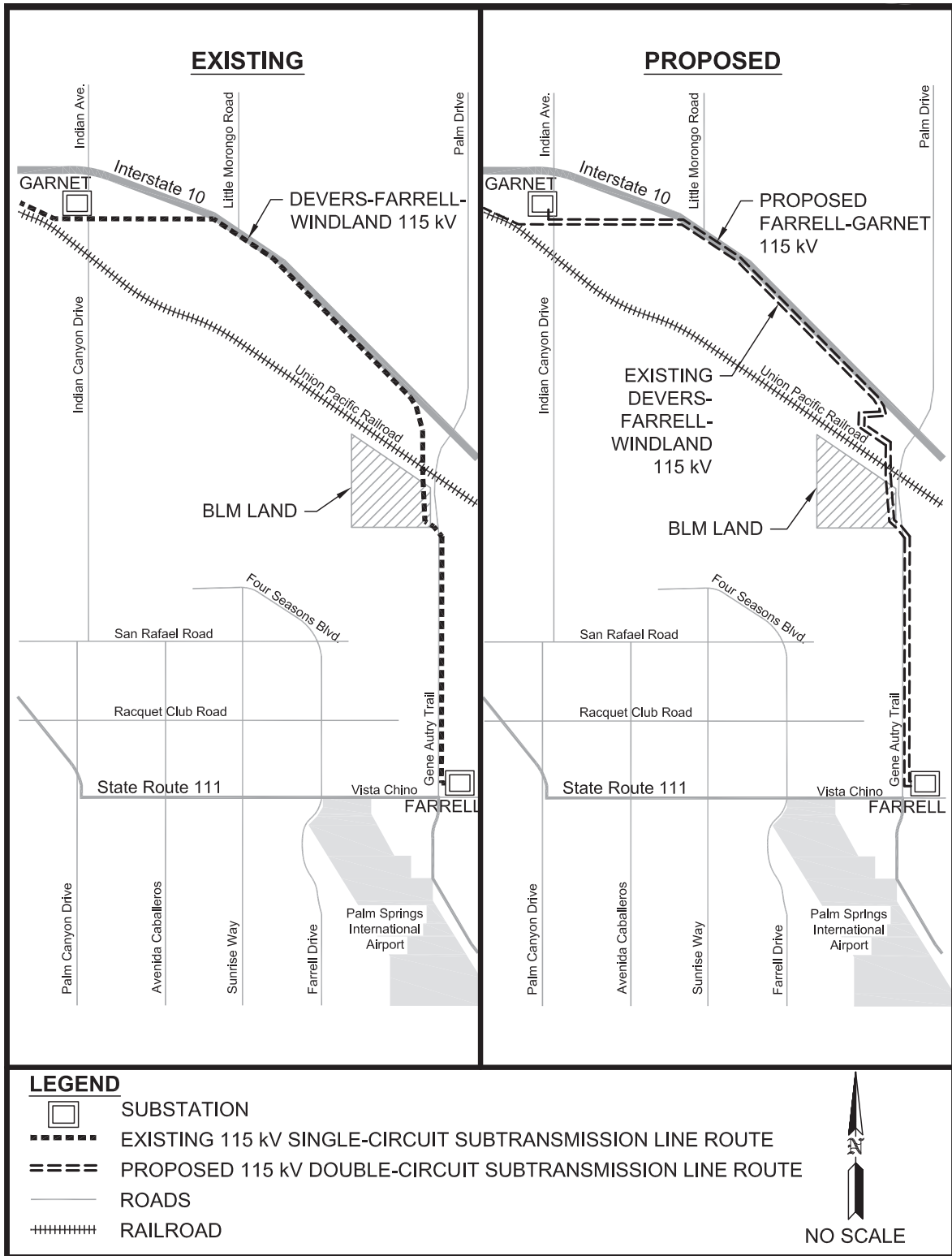
Reconfigured Eisenhower-Tamarisk 115 kV Line

The Proposed Project would result in the Eisenhower-Tamarisk 115 kV subtransmission line through the reconfiguration of the existing Tamarisk-Thornhill 115 kV subtransmission line inside Eisenhower Substation. This new line would remain open at Tamarisk Substation and be available as a 115 kV system parallel point between the Devers and Mirage subtransmission systems. All work would be done inside the Eisenhower Substation.

Reconfigured Devers-Eisenhower-Thornhill 115 kV Line

The Proposed Project would create the Devers-Eisenhower-Thornhill 115 kV subtransmission line through the reconfiguration of the existing Tamarisk-Thornhill 115 kV subtransmission line and connecting it to the existing Devers-Eisenhower 115 kV subtransmission line inside Eisenhower Substation.

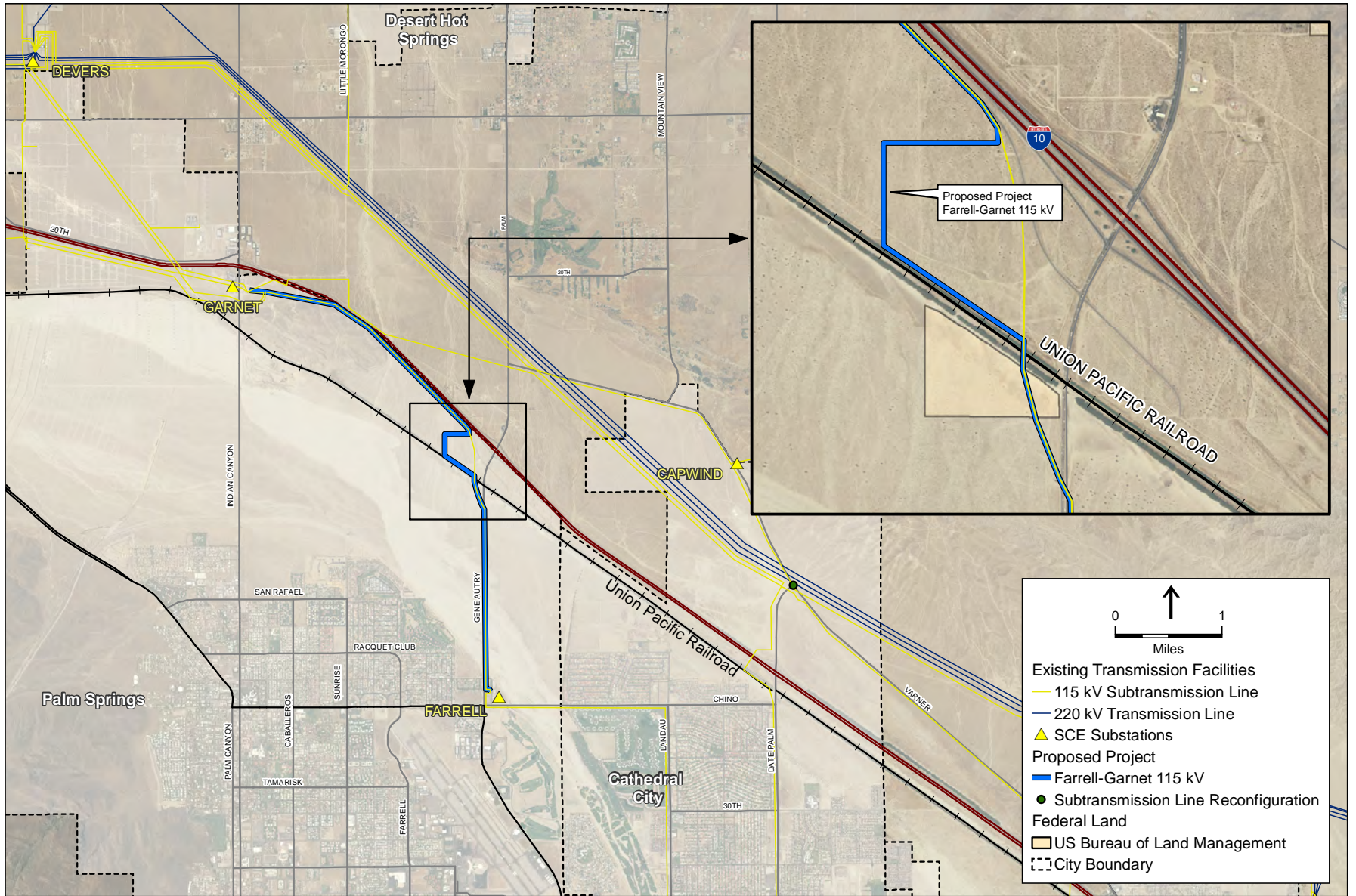
The remaining Tamarisk-Thornhill 115 kV subtransmission line segment between Thornhill and Eisenhower substations would be connected at the 115 kV switchrack using two new TSPs inside the substation, to the existing Devers-Eisenhower 115 kV subtransmission line position. All work would be done inside the Eisenhower Substation.



SOURCE: SCE, 2008a.

Devers-Mirage 115 kV Subtransmission System Split Project . 207059

Figure 2-1
Existing Conditions and
Proposed Farrell-Garnet 115 kV Line



SOURCE: SCE, 2008

Devers-Mirage 115 kV Subtransmission System Split Project . 207059

Figure 2-2

Proposed Project - Farrell Garnet 115 kV

Engineering Plan to Support the Proposed Devers 115 kV System

As discussed above, to accomplish the subtransmission line construction for the proposed Devers 115 kV Subtransmission System, approximately 157 new poles would be installed.

Approximately 142 poles would be direct-buried, double-circuit LWS poles. The LWS poles would be approximately 65 to 80 feet in length, of which approximately 10 feet would be buried (see Figure 2-3, *Typical 115 kV Line Pole Configurations*). The base diameters of the LWS poles would vary between 24 inches and 36 inches and the top diameters would vary between 12 inches and 16 inches depending on the pole class. The remaining 15 poles would be bolted based TSPs between 70 and 100 feet tall above ground, depending on their specific location. The TSPs would be bolted to steel-reinforced (rebar) concrete footings approximately six feet in diameter and at least 22 feet below the ground surface. The above-ground portion of the footing would be approximately two feet. Existing distribution lines attached to the existing wood poles would be transferred to the new LWS and TSP poles.

The Proposed Project would utilize 954 stranded aluminum conductor (SAC) conductor for the proposed Farrell-Garnet 115 kV subtransmission line and for the reconfigured 115 kV line segments discussed above.

Construction Plan to Support Proposed Devers 115 kV System

Proposed Farrell-Garnet 115 kV Line

To construct the proposed Farrell-Garnet 115 kV subtransmission line, the following would be required:

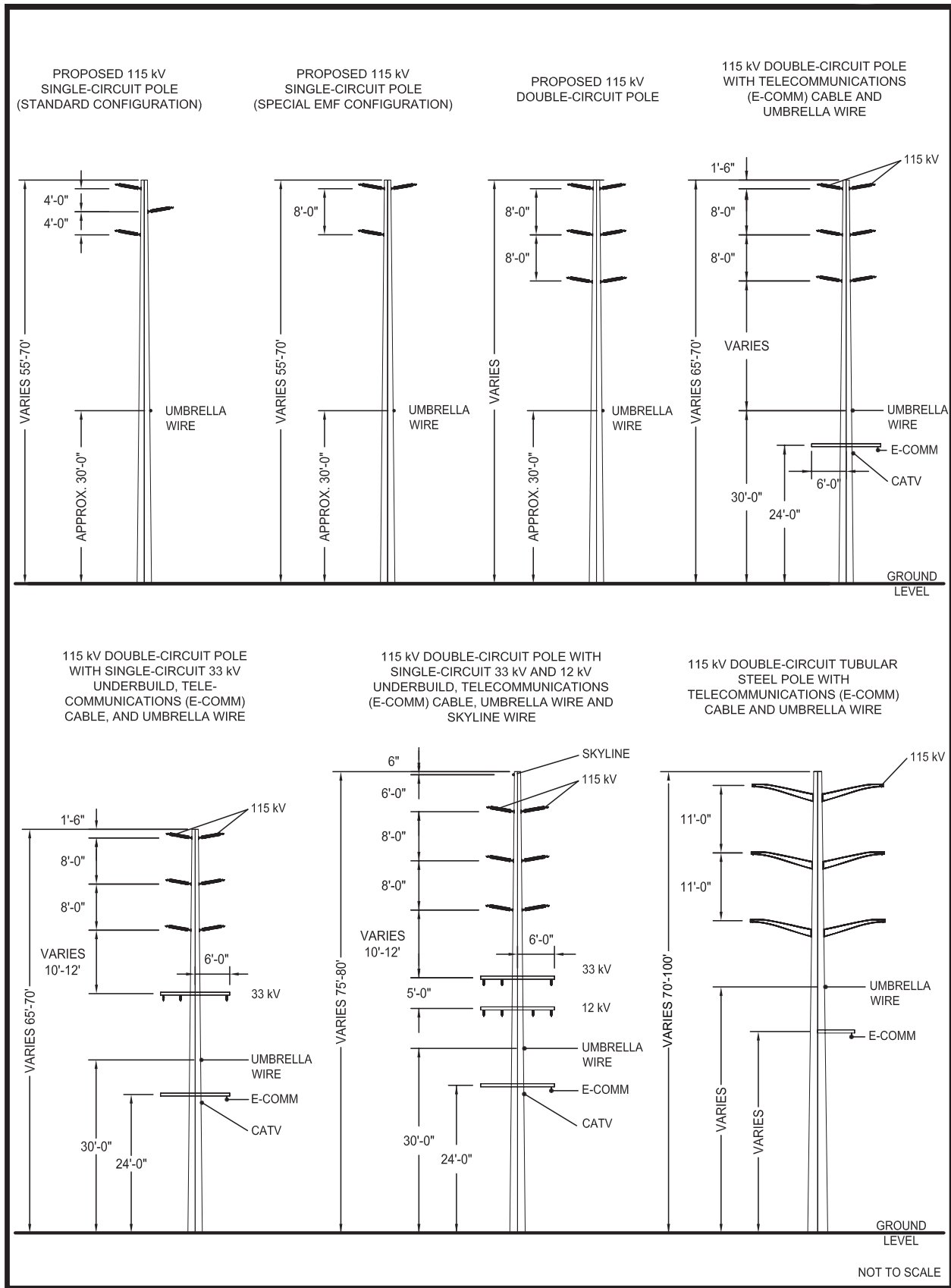
- Install approximately 15 TSPs and approximately 142 double-circuit LWS poles between Farrell and Garnet substations;
- Remove 138 single-circuit wood poles;
- For the existing circuit, transfer 5.3 miles of existing 653 kcmil ACSR and 0.5 mile of new 653 kcmil ACSR conductor to the new double-circuit poles; and
- Install 5.8 miles of new 954 SAC conductor to the new double-circuit poles.

Reconfigured Eisenhower-Tamarisk 115 kV Line

To construct the reconfigured Eisenhower-Tamarisk 115 kV subtransmission line, the following would be required:

- Install two TSPs inside Eisenhower Substation;
- Remove one TSP inside Eisenhower Substation; and

Inside Eisenhower Substation, open the underground tap between the Tamarisk and Thornhill substations, connect the Tamarisk 115 kV subtransmission line leg to one of the TSPs, and connect the TSP to the existing substation rack.



SOURCE: SCE, 2008a.

Devers-Mirage 115 kV Subtransmission System Split Project . 207059

Figure 2-3
Typical 115 kV Subtransmission Line Pole Configurations

Reconfigured Devers-Eisenhower-Thornhill 115 kV Line

To construct the reconfigured Devers-Eisenhower-Thornhill 115 kV subtransmission line, the remaining Thornhill 115 kV subtransmission line leg would be connected to the Devers-Eisenhower 115 kV subtransmission line inside Eisenhower Substation, using the poles previously installed at Eisenhower Substation for the reconfigured Eisenhower-Tamarisk 115 kV subtransmission line.

Staging and Access

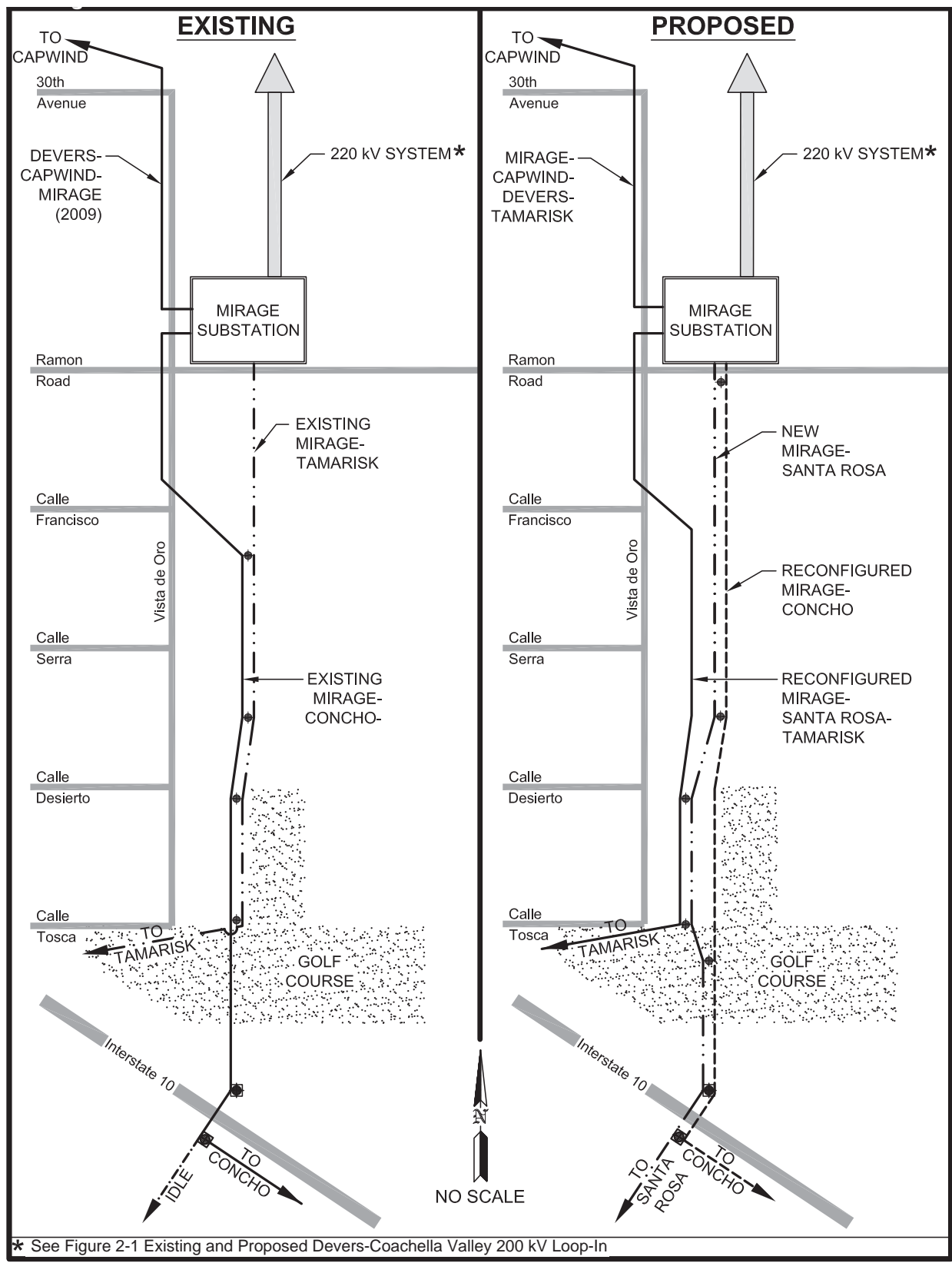
The primary material staging areas would be at Devers and Eisenhower substations, due to their proximity to the work sites. Material and equipment would be staged at these substations and would include poles, wire reels, insulators, hardware, heavy equipment, light trucks, construction trailers, and portable sanitation facilities. All material for the 115 kV subtransmission line work would be delivered by truck. Construction traffic would primarily use Diablo Road for access to Devers Substation and Palm Drive to Mesquite Avenue for access to Eisenhower Substation. Construction traffic would be scheduled for off-peak traffic hours to the extent possible. Poles would be loaded out of Devers Substation and delivered to the specific locations for installation. For access to project construction sites, construction traffic would primarily use common highways (e.g., Garnet Avenue and Gene Autry Trail or Palm Drive and Mesquite Avenue).

2.4.2 Overview of the Proposed Mirage 115 kV System

Existing Configuration

The Devers-Capwind-Mirage-Concho 115 kV subtransmission line was looped into the Mirage Substation 115 kV switchrack forming the Devers-Capwind-Mirage and Mirage-Concho 115 kV subtransmission lines in 2008. The Mirage-Concho and Mirage-Tamarisk 115 kV subtransmission lines currently proceed south out of Mirage Substation toward I-10 within an existing SCE ROW and the Devers-Capwind-Mirage 115 kV subtransmission line proceeds north out of Mirage Substation, within an existing SCE ROW (see Figure 2-4, *Existing and Proposed Mirage-Santa Rosa 115 kV Line Configurations*).

The work performed in 2008 was solely for the purpose of increasing the reliability of the two existing 115 kV subtransmission lines by utilizing a 115 kV switchrack to connect the 115 kV subtransmission lines to either of the two existing 220/115 kV transformers inside Mirage Substation in the event one of the 220/115 kV transformers were to fail. Without performing this work in 2008, the 115 kV subtransmission lines could have experienced sustained outages or substandard voltage related problems should either transformer fail, thus losing the power flow on the affected 115 kV subtransmission line from Mirage Substation. This work was necessary to mitigate power outages to customers or substandard voltage-drops on the 115 kV subtransmission lines served by the Mirage Substation prior to the completion of the Proposed Project.



SOURCE: SCE, 2008a.

Devers-Mirage 115 kV Subtransmission System Split Project . 207059

Figure 2-4
Existing and Proposed Mirage-Santa Rosa
115 kV Subtransmission Line Configuration

Mirage-Concho and Mirage-Tamarisk 115 kV Lines

The 2008 Mirage-Concho and Mirage-Tamarisk 115 kV subtransmission lines share an existing ROW south of Mirage Substation that consists of local franchise locations and easements. Between Ramon Road and Calle Desierto, the ROW is approximately 140 feet wide. From Calle Desierto to the southern edge of Tri-Palm Estates, at approximately Calle Tosca Drive, the ROW curves slightly to the east. In this area the ROW is approximately 150 feet wide. From Calle Tosca to I-10, the ROW straightens and is approximately 50 feet wide (see Figure 2-4).

The 2008 Mirage-Concho line is on single-circuit wood poles in an easement on the east side of Vista de Oro, from Mirage Substation to a point just south of Calle Francisco, where it crosses Vista de Oro in a southeasterly direction to join the Mirage-Tamarisk line. The Mirage-Tamarisk line is on single-circuit wood poles within an existing SCE easement on the east side of Vista de Oro until it joins the Mirage-Concho line just south of Calle Francisco.

From the juncture of the Mirage-Concho and Mirage-Tamarisk lines at Calle Francisco to a point just south of Tri-Palm Estates at Calle Tosca, the two lines are on double-circuit wood poles and one double-circuit TSP. The Mirage-Concho line is strung on the west side of these double-circuit structures and the Mirage-Tamarisk line is strung on the east side of the structures.

At the intersection of Vista de Oro and Calle Tosca, where the existing double-circuit TSP is located, the Mirage-Tamarisk line proceeds in a westerly direction to Tamarisk Substation on existing support structures. The Mirage-Concho line proceeds south on single-circuit wood poles until it reaches an existing TSP on the north side of I-10. This TSP is engineered for a double-circuit line but currently has only the Mirage-Concho line strung on the structure.

South of I-10, the Mirage-Concho line is strung on the east side of a double-circuit TSP before continuing to Concho Substation on existing single-circuit structures. The west side of this TSP is strung with an idle 115 kV subtransmission line segment that exists on single-circuit structures between I-10 and the corner of Gerald Ford Drive and Portola Avenue.

Devers-Capwind-Mirage 115 kV Line

The Devers-Capwind-Mirage 115 kV subtransmission line is on single-circuit wood poles in an SCE easement, franchise locations, and on fee-owned ROW north of Mirage Substation. This ROW extends approximately 0.8 mile north of Mirage Substation, adjacent to Vista de Oro, from Mirage Substation to 30th Avenue, which is the approximate intersection of the existing Devers-Coachella Valley 220 kV ROW. This 115 kV subtransmission line continues northwest in the existing Devers-Coachella Valley 220 kV ROW until the intersection of Date Palm Drive and Varner Road where it continues along Varner Road until it rejoins the Devers-Coachella Valley 220 kV ROW and then continues to Devers Substation.

Proposed Configuration

The Proposed Project would result in three 115 kV subtransmission lines that would proceed south out of Mirage Substation within the existing SCE ROW. These three lines would be the reconfigured Mirage-Santa Rosa-Tamarisk line, the proposed Mirage-Santa Rosa line, and the reconfigured Mirage-Concho line. The reconfigured Mirage-Capwind-Devers-Tamarisk 115 kV subtransmission line would proceed north out of Mirage Substation on existing structures.

There are no changes or additions to or expansion of the ROWs discussed above for this part of the Proposed Project. Construction of this portion of the Proposed Project is expected to occur completely within existing SCE easements or franchise locations. Figure 2-4 shows the proposed 115 kV line and reconfigured 115 kV line segments that are created as part of the Proposed Project.

Reconfigured Mirage-Santa Rosa-Tamarisk 115 kV Line

The Mirage-Santa Rosa-Tamarisk line would exit on the west side of the Mirage Substation and would utilize existing conductor on one TSP. From this TSP, the 115 kV subtransmission line would utilize existing conductor on single-circuit wood poles in the same easement location previously occupied by the Mirage-Concho line. The Mirage-Santa Rosa-Tamarisk line would be on the east side of Vista de Oro, from Mirage Substation to a point just south of Calle Francisco, where it would cross Vista de Oro in a southeasterly direction. At Calle Francisco, two new TSPs would be installed, and the line would not proceed as far east as the Mirage-Concho line previously did, where it had merged with the Mirage-Tamarisk line.

From the second TSP, south of Calle Francisco, the Mirage-Santa Rosa-Tamarisk line would be on new single-circuit LWS poles along the west side of the ROW to Calle Desierto, where it would join with the proposed Mirage-Santa Rosa line on existing double-circuit wood poles.

The Mirage-Santa Rosa-Tamarisk line would be located on the west side of the existing double-circuit wood poles to a location adjacent to the intersection of Vista de Oro and Calle Tosca, where it would proceed west along Calle Tosca to Tamarisk and Santa Rosa substations on existing structures.

In order to complete the reconfiguration of the Mirage-Santa Rosa-Tamarisk 115 kV subtransmission line and connect this 115 kV subtransmission line to Santa Rosa Substation, four poles would be replaced with seven new poles at the intersection of Bob Hope Drive and Dinah Shore Drive. One wood pole located at the southwest corner would be replaced with one LWS pole (with a new pole switch) and one TSP. One LWS pole located at the northeast corner would be replaced with one TSP. One TSP at the northwest corner would be replaced with one LWS pole (with a new pole switch) and one TSP. One TSP at the southeast corner would be replaced with one LWS pole (with a new pole switch) and one TSP.

The existing Garnet-Santa Rosa 115 kV subtransmission line would be eliminated and the existing wires associated with this 115 kV line and the existing or new wires on these new structures would be used to form the Mirage-Santa Rosa-Tamarisk line and the Mirage-Capwind-

Devers-Tamarisk line. The following work would be required for the proposed reconfiguration of these two lines:

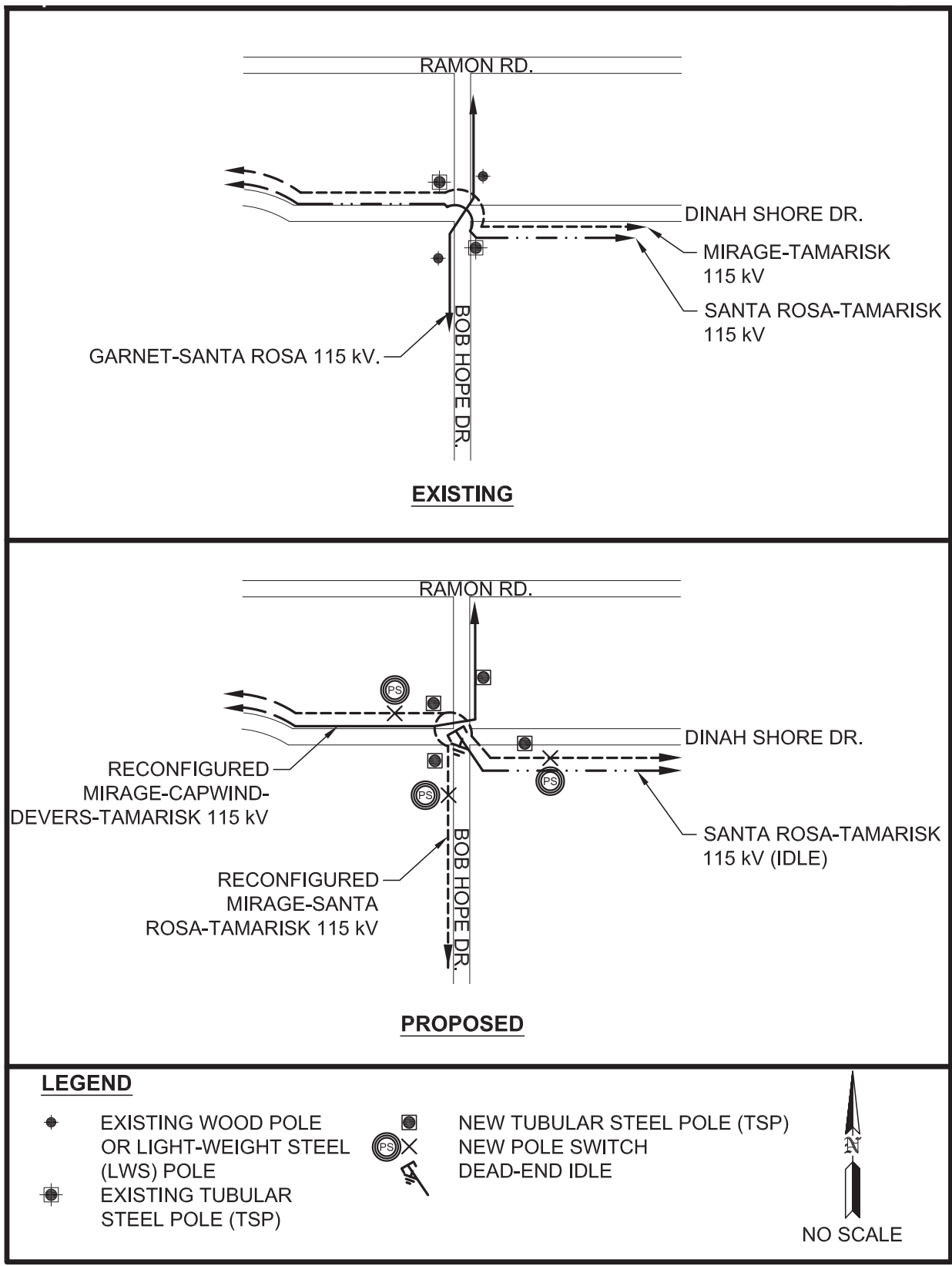
- Split the existing Garnet-Santa Rosa 115 kV subtransmission line at the intersection of Bob Hope Drive and Dinah Shore Drive by removing the span of wire that connects the southwest and northeast corner poles (see Figure 2-5, *Existing and Proposed 115 kV Line Configurations at Bob Hope and Dinah Shore Drives*).
- Split the Santa Rosa-Tamarisk at the same intersection by dead-ending and grounding the Santa Rosa leg at the northwest corner pole. The portion of the Santa Rosa-Tamarisk line between Bob Hope Drive east to Portola Avenue would become idle.
- Connect the open Tamarisk leg of the existing Santa Rosa-Tamarisk 115 kV subtransmission line to the open Garnet leg of the existing Garnet-Santa Rosa 115 kV subtransmission line at the northeast corner pole of Bob Hope Drive and Dinah Shore Drive.
- Create the Mirage-Santa Rosa-Tamarisk 115 kV subtransmission line by tapping the existing southern segment of the Garnet-Santa Rosa 115 kV subtransmission line to the existing Mirage-Tamarisk 115 kV subtransmission line at the northwest corner pole.

Proposed Mirage-Santa Rosa 115 kV Line

The Mirage-Santa Rosa 115 kV subtransmission line would exit south out of Mirage Substation on the new double-circuit LWS poles located in approximately the same alignment as the existing Mirage-Tamarisk line. The Mirage-Santa Rosa line would be strung on the west side of these new double-circuit structures south to Calle Francisco. From Calle Francisco the line would be on existing double-circuit wood poles to Calle Desierto, where it would proceed southwesterly to join the reconfigured Mirage-Santa Rosa-Tamarisk 115 kV subtransmission line (discussed above). Next, the Mirage-Santa Rosa 115 kV subtransmission line would be strung on the east side of existing double-circuit wood poles between Calle Desierto and Calle Tosca, on the existing double-circuit wood poles described above.

At Calle Tosca, the Mirage-Santa Rosa line would join the Mirage-Concho 115 kV subtransmission line and proceed south on the west side of new double-circuit LWS poles. At I-10, the existing double-circuit TSP on the north side of I-10 would be installed with three additional insulators to provide for the crossing of I-10 to the existing double-circuit TSP on the south side of I-10.

The proposed Mirage-Santa Rosa 115 kV subtransmission line would be constructed by removing approximately 1,783 feet of existing single-circuit 115 kV subtransmission line between Mirage Substation and a point south of Calle Francisco. The existing single-circuit support structures used for existing Mirage-Tamarisk 115 kV subtransmission line would be replaced with new double-circuit LWS poles. An additional 2,130 feet of single-circuit 115 kV subtransmission line would be replaced from Calle Tosca to I-10. The existing single-circuit wood poles would be replaced with new double-circuit LWS poles.



SOURCE: SCE, 2008a.

Devers-Mirage 115 kV Subtransmission System Split Project . 207059

Figure 2-5
 Existing and Proposed 115 kV Subtransmission Line Configuration at Bob Hope and Dinah Shore Drives

South of I-10, an existing idle, single-circuit 115 kV subtransmission line between I-10 and the intersection of Gerald Ford Drive and Portola Avenue would be connected to the new 115 kV subtransmission line and energized. A wood pole on the northwest corner of Portola Avenue and Gerald Ford Drive would be replaced with a new double-circuit TSP, approximately 50 feet north of the existing wood pole (see Figure 2-6, *Existing and Proposed 115 kV Line Configurations at Portola Avenue and Gerald Ford Drive*).

From that point, the Mirage-Santa Rosa line would continue southwest to the Santa Rosa Substation on existing single-circuit structures that were part of the existing Santa Rosa-Tamarisk line. The portion of the existing Santa Rosa-Tamarisk line on Gerald Ford Avenue west to Monterey Avenue then north to Dinah Shore Drive and then west to Bob Hope Drive would become idle.

Reconfigured Mirage-Concho 115 kV Line

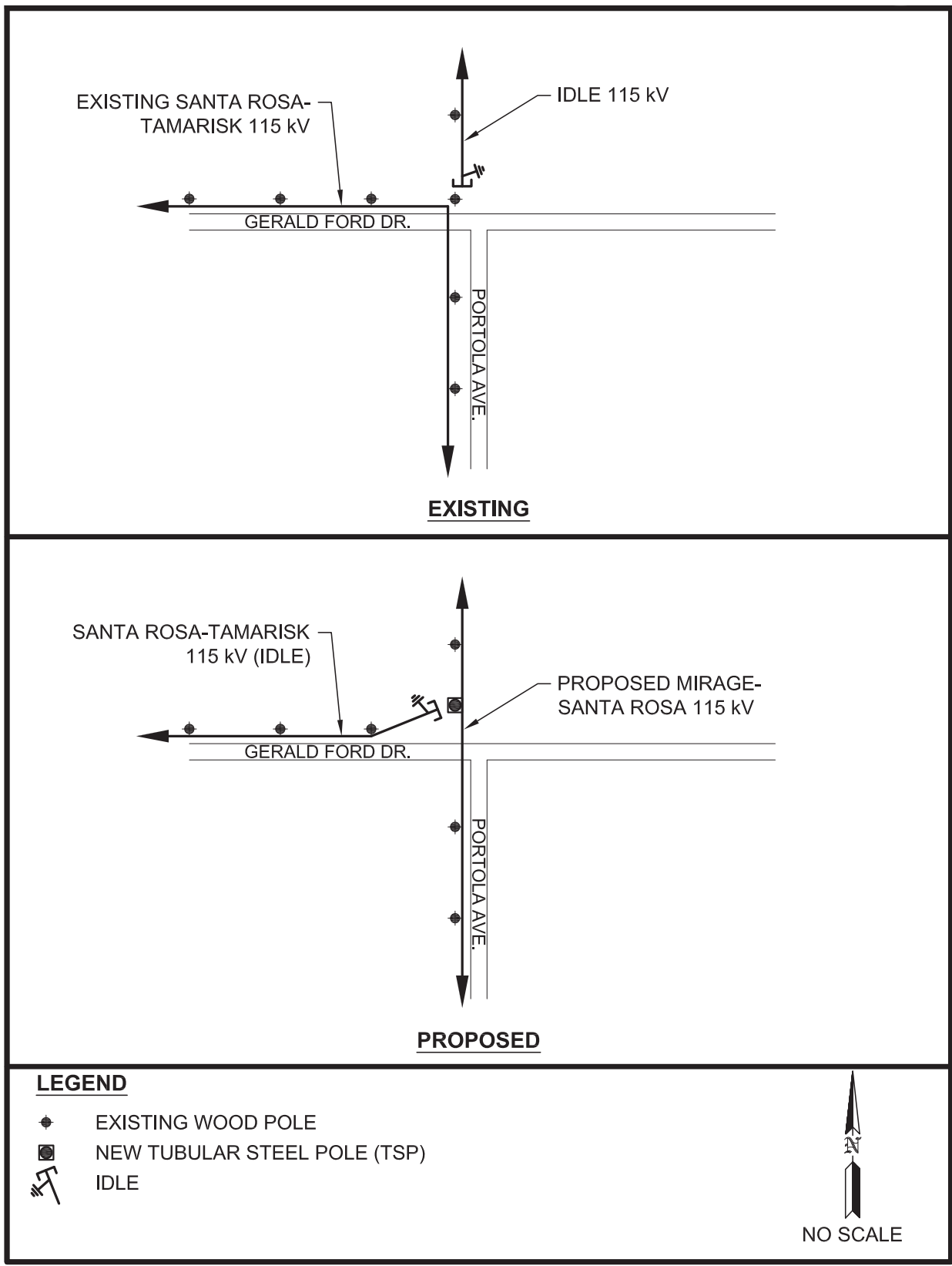
The reconfigured Mirage-Concho line would exit Mirage Substation on the new double-circuit LWS poles described above in the discussion of the proposed Mirage-Santa Rosa line. The reconfigured Mirage-Concho line would be strung on the east side of these double-circuit structures to Calle Francisco. From Calle Francisco, the line would continue south on existing double-circuit wood poles until Calle Desierto. From Calle Desierto, the reconfigured Mirage-Concho line would proceed south on new single-circuit wood poles to Calle Tosca, where it would angle to the west joining the Mirage-Santa Rosa line on the new double-circuit LWS poles described above.

From Calle Tosca, the reconfigured Mirage-Concho line would be strung on the east side of the new double-circuit LWS poles until it would reach the reconfigured TSP on the north side of I-10 described above. At this location the Mirage-Concho line would cross I-10 to an existing double-circuit TSP on the south side of I-10 and then continue to Concho Substation on existing single-circuit structures.

Reconfigured Mirage-Capwind-Devers-Tamarisk 115 kV Line

The reconfigured Mirage-Capwind-Devers-Tamarisk 115 kV subtransmission line would be created by connecting the Devers-Capwind-Mirage 115 kV subtransmission line described above, a portion of the existing Garnet-Santa Rosa 115 kV subtransmission line, a portion of the existing Mirage-Tamarisk 115 kV subtransmission line, and rearranging the connections of these existing 115 kV subtransmission lines at the intersection of Bob Hope Drive and Dinah Shore Drive (Figure 2-5) and the intersection of Date Palm Drive and Varner Road (Figure 2-7, *Existing and Proposed 115 kV Line Configurations at Varner Road and Date Palm Drive*).

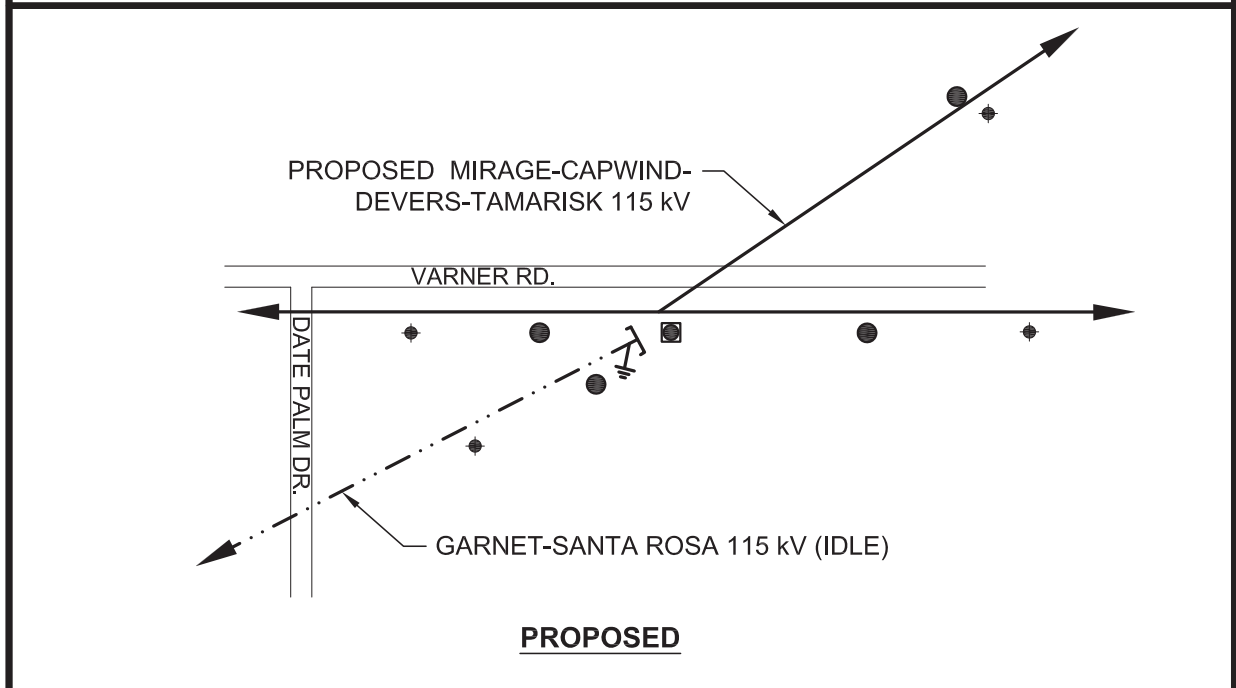
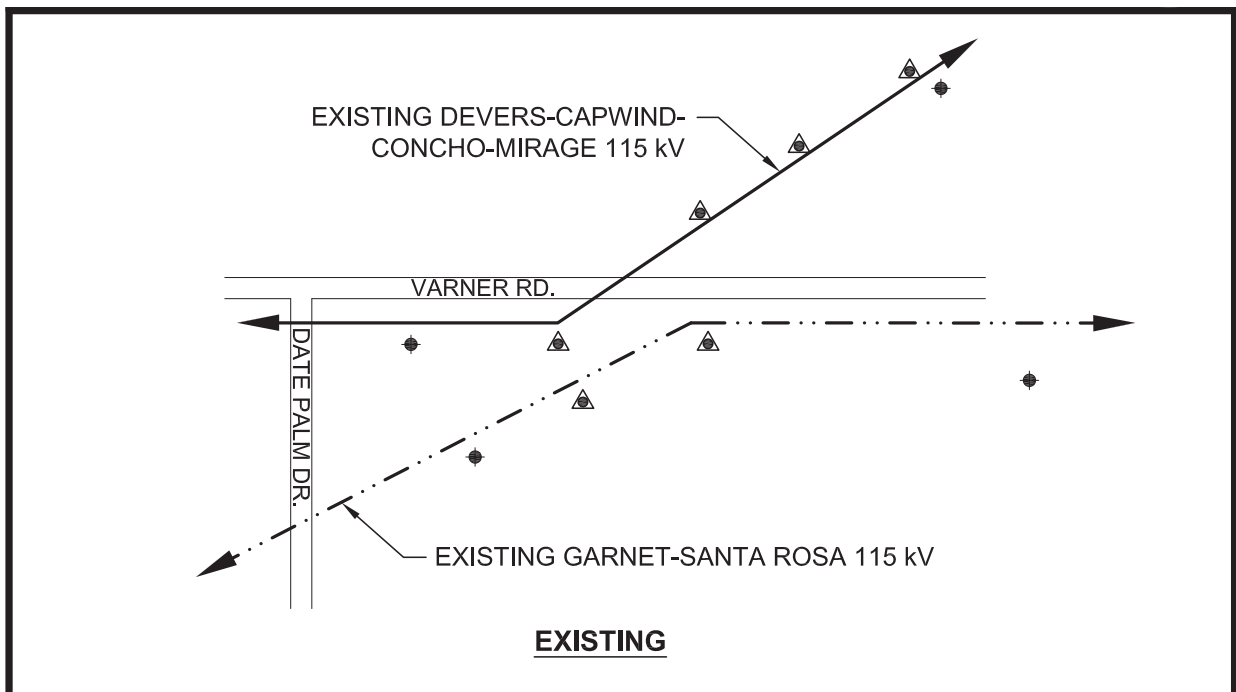
The work at Bob Hope Drive and Dinah Shore Drive was described above as part of the Mirage-Santa Rosa-Tamarisk 115 kV subtransmission line work. The work at Date Palm Drive and Varner Road would consist of removing six wood poles and installing one new TSP and four wood poles. The following work would be required for the proposed reconfiguration of the Mirage-Capwind-Devers-Tamarisk 115 kV subtransmission line:



SOURCE: SCE, 2008a.

Devers-Mirage 115 kV Subtransmission System Split Project . 207059

Figure 2-6
Existing and Proposed 115 kV Subtransmission Line Configuration at Portola Avenue and Gerald Ford Drive



LEGEND

- ◆ EXISTING WOOD POLE
- ▲ EXISTING WOOD POLE TO BE REMOVED
- NEW WOOD POLE
- NEW TUBULAR STEEL POLE (TSP)
- ⚡ DEAD-END IDLE



NO SCALE

Figure 2-7
Existing and Proposed 115 kV Subtransmission Line
Configuration at Varner Road and Date Palm Drive

- Install a span of conductor between the existing north segment of the Garnet-Santa Rosa 115 kV subtransmission line and the existing west segment of the Santa Rosa-Tamarisk 115 kV subtransmission line at the northwest corner of Bob Hope Drive and Dinah Shore Drive.
- Split the existing Garnet-Santa Rosa 115 kV subtransmission line by dead-ending and grounding the Garnet leg to the new TSP installed east of Date Palm Drive and south of Varner Road. This portion of the Garnet-Santa Rosa line, between the intersection of Date Palm Drive and Varner Road and Garnet Substation, would become idle.
- Connect the existing Devers-Capwind-Mirage 115 kV subtransmission line to the existing Santa Rosa leg of the existing Garnet-Santa Rosa 115 kV subtransmission line at the new TSP installed east of Date Palm Drive and south of Varner Road to form the reconfigured Mirage-Capwind-Devers-Tamarisk 115 kV subtransmission line.

Summary of Proposed and Reconfigured 115 kV Lines for the Proposed Mirage 115 kV System

Once the work described above is completed, the existing Garnet-Santa Rosa 115 kV subtransmission line would no longer exist. The existing Mirage-Tamarisk 115 kV subtransmission line would become the Mirage-Santa Rosa-Tamarisk 115 kV subtransmission line. The Devers-Capwind-Mirage 115 kV subtransmission line, created in 2008, would become the reconfigured Mirage-Capwind-Devers-Tamarisk 115 kV subtransmission line. The Mirage-Concho 115 kV subtransmission line, created in 2008, would continue to exist. Finally, the new Mirage-Santa Rosa 115 kV subtransmission line would be created.

Engineering Plan to Support Proposed Mirage 115 kV System

To accomplish the subtransmission line construction south of Mirage Substation, approximately 55 new poles would be installed. Approximately 37 poles would be direct-buried LWS poles, and approximately 11 would be wood poles. The LWS poles and the wood poles would be approximately 65 to 80 feet in length, of which approximately 10 feet would be buried. Illustrations of typical LWS poles are shown in Figure 2-3. The remaining seven poles would be bolted-based TSPs between 70 and 100 feet above ground, depending on their specific location. The TSPs would be bolted to steel-reinforced (rebar) concrete footings approximately six feet in diameter and at least 22 feet below the ground surface. The above-ground portion of the footing could be approximately two feet tall. Existing distribution lines attached to the existing wood poles would be transferred to the new LWS and TSP poles.

The Proposed Project would utilize 954 SAC conductor and one 221 kcmil ACSR ground conductor for the new Mirage-Santa Rosa 115 kV subtransmission line and for the reconfigured 115 kV line segments discussed above.

Construction Plan to Support Proposed Mirage 115 kV System

To create the new Mirage 115 kV Subtransmission System the following construction would be required:

- install approximately seven TSPs, approximately 37 double-circuit LWS poles, and approximately 11 wood poles;
- remove 29 wood poles;
- transfer approximately 1.5 miles of existing 653 kcmil ACSR to the new LWS and wood double-circuit poles; and
- install 1.5 miles of new 954 SAC and 221 kcmil ACSR to the new double-circuit poles.

Staging and Access

Primary material staging areas would be at Mirage and Santa Rosa substations due to their proximity to the work sites. Material and equipment to be staged in these substation yards would include poles, wire reels, insulators, hardware, heavy equipment, light trucks, construction trailers, and portable sanitation facilities. All material for the 115 kV subtransmission line work would be delivered by truck. Construction traffic would primarily use Ramon Road for Mirage Substation and Monterey Avenue for Santa Rosa Substation. Deliveries would be scheduled for off-peak traffic hours to the extent possible. Poles would be loaded out of either of the two substations and delivered to the specific locations for installation.

2.4.3 Design Features and Common Construction Methods for 115 kV Lines

The following information is common to all 115 kV subtransmission line work previously discussed in Sections 2.4.1 and 2.4.2.

Structures

New wood and LWS poles and TSPs would support the proposed subtransmission lines. Any existing underbuilt subtransmission lines, distribution lines, and communication lines would be transferred (where applicable) to the new poles installed for the Proposed Project. The existing poles would be removed.

Specific pole height and spacing would be determined upon final engineering and would be constructed in compliance with CPUC General Order (GO) 95 and other factors including, but not limited to:

- length of span between poles (average span of 200 feet; 100-foot minimum span and 500-foot maximum span);
- ground clearances pursuant to GO 95 and SCE construction standards;
- overhead clearances pursuant to GO 95 and SCE transmission construction standards;
- wind loading;
- distance between angle points; and
- number and voltage of electrical lines installed on the poles.

Typical pole (support structures) configurations used for the new Farrell-Garnett and Mirage-Santa Rosa 115 kV subtransmission lines are shown in Figure 2-3. Figure 2-8, *Tubular Steel Pole Configurations at the Intersection of Bob Hope Drive and Dinah Shore Drive*, illustrates the TSP configurations that would be used at Bob Hope Drive and Dinah Shore Drive.

Access Roads and Spur Roads

Construction and maintenance of the proposed subtransmission lines would require access to each of the planned pole locations. Public roads and ROWs or privately owned and maintained roads adjacent to the proposed subtransmission line alignments would be utilized whenever possible to provide construction and maintenance access.

Approximately 0.6 mile of new access roads and 0.1 mile of new spur roads, which provide direct access to pole sites from the access roads, would be constructed associated with the portion of the proposed Farrell-Garnett line that would require new ROW, north of the UPRR. In addition, approximately 3.75 miles of existing access and spur roads would be used and cleared of vegetation and blade-graded to remove potholes, ruts, and other surface irregularities. The existing access and spur roads would be re-compacted to provide a smooth and dense surface capable of supporting heavy equipment. Graded dirt roads would have a minimum drivable width of 14 feet. Trees and other vegetation would be removed or trimmed to obtain the minimum 14 feet of clear, drivable width. Construction would be performed by SCE construction crews and/or contractors under the supervision of SCE personnel.

General Construction Plan

To accomplish the entire proposed subtransmission line construction, approximately 214 new poles would be installed. Approximately 182 of the new poles would be direct-buried LWS poles, 75 to 80 feet in length, approximately 10 feet of which would be buried. The remaining 32 would be wood poles, and bolted-based TSPs between 70 and 100 feet tall (above the concrete footing), depending on their specific location. The TSPs would be bolted to steel-reinforced (rebar) concrete footings approximately six feet in diameter and at least 22 feet below the ground surface. The above ground portion of the footing could add up to two additional feet to the total height of installed TSPs. These structures would be placed within existing 115 kV ROWs or existing franchise locations. Existing subtransmission and distribution lines and telecommunications cables attached to the existing wood poles would be transferred to the new TSPs.

Steel Pole Installation

Construction activities would begin with the survey of the 115 kV subtransmission line alignments. Survey crews would stake the steel pole locations, including reference points and centerline hubs. Survey crews would also survey limits of grading for steel pole excavations.

Any steel poles that would replace existing wood pole structures in existing ROW areas would be installed as close as possible to the existing poles and would require new excavations to set the poles. As a result, minimal new surface disturbance would be required at these locations. Depending on their location, the assembly and erection of some of the new TSPs may require that

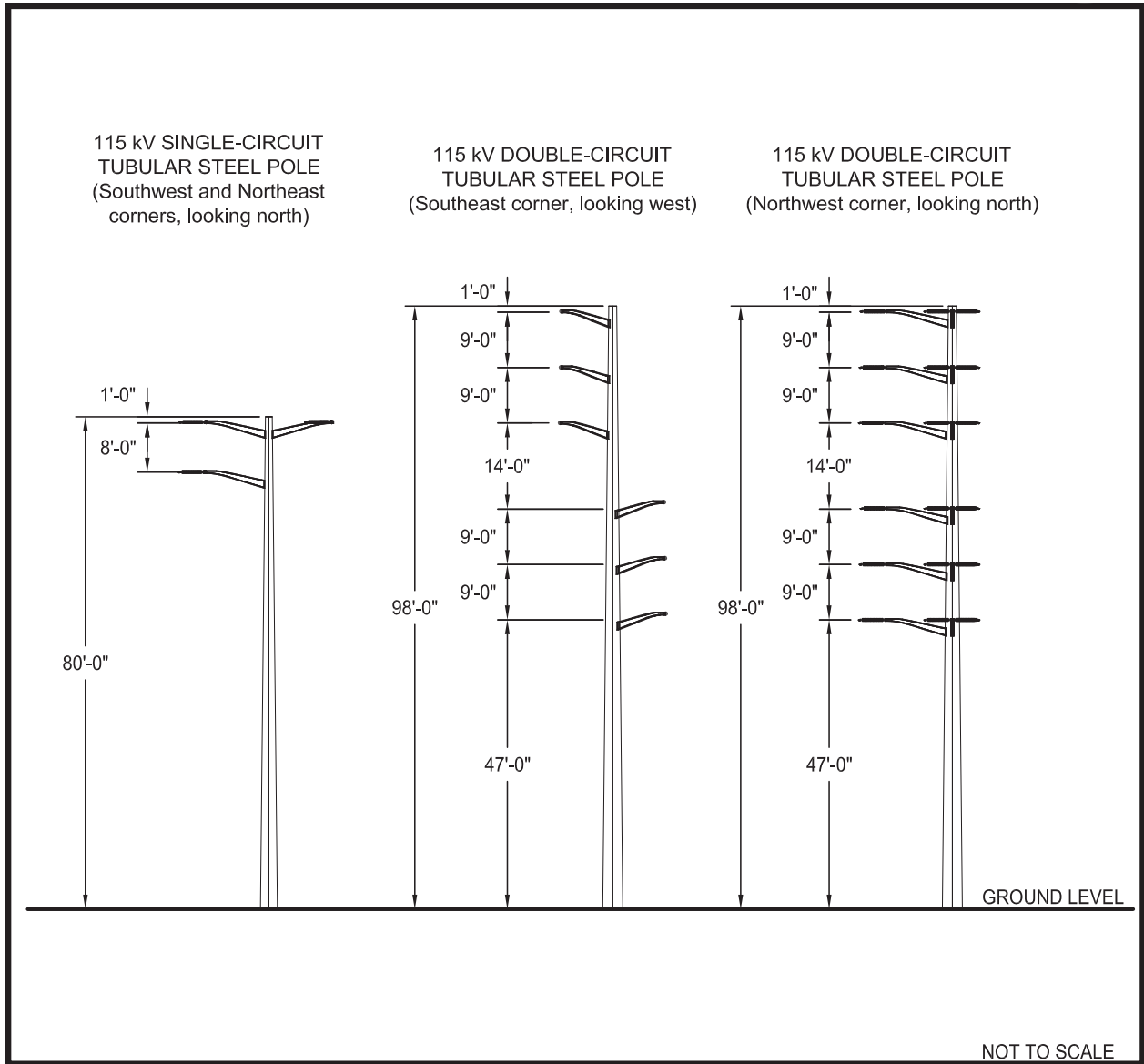


Figure 2-8
Tubular Steel Pole Configurations at the Intersection
of Bob Hope Drive and Dinah Shore Drive

a new crane pad, approximately 50 feet by 50 feet (approximately 0.06 acre each), be prepared to allow an erection crane to set up 60 feet from the centerline of each TSP. The crane pad would be located transversely from each applicable TSP location.

Most pole sites would need minimal site preparation prior to pole installation. With the exception of the short segment of the Farrell-Garnet alignment, north of the UPRR, all of the proposed pole locations would be within existing SCE ROWs or franchise locations. Sites may require minor grading, leveling, or clearing to accommodate the new poles. No new access roads would be necessary. Pole sites would be cleared and graded at approximately the same time that the existing access roads would be graded and cleared of vegetation.

LWS poles would be installed in native soil in holes bored approximately 24 to 36 inches in diameter and 10 to 12 feet deep. LWS poles are normally installed using a line truck. Once the LWS poles have been set in place, bore spoils (material from holes drilled in the soil) would be used to backfill the hole. If the bore spoils are not suitable for backfill, imported clean fill material, such as clean fill dirt and/or pea gravel, would be used. Excess bore spoils would be distributed at each pole site, used as backfill for the holes left after removal of the wood poles, or removed from the pole sites.

The TSPs would be installed on top of cylindrical concrete footings approximately six to eight feet in diameter and approximately 20 to 25 feet deep. After holes for the footings have been bored, a steel rebar cage would be inserted into the hole, and then concrete would be poured into the hole to a level up to two feet above the ground surface. After the concrete has cured, the TSP would be bolted onto the footing. Excess bore spoils would be distributed at each pole site, used as backfill to fill holes left after removal of nearby wood poles, or removed from the pole sites.

Both LWS poles and TSPs consist of separate base and top sections for ease of construction. Steel pole installation would begin by transporting the poles from the staging area and laying the individual sections on the ground at each new pole location. While on the ground, the top section would be pre-configured with the necessary insulators and wire-stringing hardware. A line truck with a boom on it for LWS poles, or a crane for TSPs would be used to position each pole base section into previously augured holes for the LWS poles or on top of previously prepared foundations for the TSPs. When the base section is secured, the top section would be placed above the base section. The two sections may be spot-welded together for additional stability.

Removal of Existing Conductor and Wood Poles

Conductor

After the existing subtransmission and distribution lines have been transferred to the proposed subtransmission line poles, all remaining subtransmission and distribution line conductor that could not be reused by SCE would be removed and delivered to a facility for recycling.

Wood Poles

Following installation of the new steel poles, the existing wood poles would be completely removed (including the below-ground portion). The standard work practice to remove a wood pole is to attach a sling at the upper end of the pole, using boom or crane equipment, while using a hydraulic jack at the base of the pole to vertically lift the pole out of the ground until the pole can be physically lifted completely out of the ground without creating an over limit strain on the boom or crane. Excavation around the base of the wood pole would only be required in the event that the base of the pole becomes encased in hardened soil or man-made materials (e.g., asphalt or concrete), or where the pole has deteriorated to the point that it would splinter or break apart by the jacking and pulling operation described above.

Once the wood pole has been removed, the hole would be backfilled using imported fill in combination with fill that may be available as a result of excavation for the installation of the new steel poles. The backfill material would be thoroughly tamped and the filled-hole would be leveled to grade with no depression or mound allowable. Holes located in areas subject to pedestrian traffic would be filled level to the walking surface. The last two inches of fill would consist of a firmly packed temporary blacktop patch or equivalent material until permanent walkway (e.g., concrete sidewalks) repairs can be made.

Depending on their condition and original chemical treatment, the removed wood poles would be reused by SCE, returned to the manufacturer, or disposed of in a Class I hazardous waste landfill.

Conductor Pulling

Conductors would be installed on 115 kV polymer insulator assemblies attached to each crossarm in a horizontal configuration or suspension assemblies consisting of single polymer insulators attached to each crossarm in a vertical configuration. Overhead ground wires would be installed on the top of the steel poles. Distribution lines transferred to the new steel poles would typically be installed on standard wood crossarms with polymer insulators.

Conductor pulling includes all activities associated with the installation of conductors onto the LWS and wood poles and TSPs. These activities include installing three 115 kV 954 SAC conductors, one 221 kcmil ACSR ground conductor, ground wire, vibration dampeners, weights, and suspension and dead-end hardware assemblies for the entire length of the proposed subtransmission lines.

The standard wire-stringing plan includes a sequenced program of events starting with a determination of the most effective wire pull equipment set-up positions. The conductor-stringing plan may require altered hours of operation, implementation of special dust control measures, or use of guard structures in particular areas to prevent inadvertent stoppages of traveled roadways.

Conductor pulls are the length of any given continuous wire installation process between two selected points along the line. Conductor pulls are selected, where possible, based on availability of dead end structures at the ends of each pull (preferably a TSP), geometry of the line as affected by points of inflection, terrain, and suitability of stringing and splicing equipment setups. Pulling

locations are areas of surface disturbance where equipment would be set up for installing the conductors. The dimensions of the area needed for stringing setups varies depending upon the terrain. A typical stringing setup would be 100 feet by 200 feet, depending on placement of a tensioner with a reel stand truck or a puller but, due to space limitations, crews can work within a smaller area. Typically, the maximum conductor pulls and splices would occur every 6,000 feet.

Generally, pulling locations and equipment setup would be in direct line in the direction of the overhead conductors at a distance approximately three times the height of the pole. The exact locations of the pulling sites would be determined during construction.

Special equipment would be positioned at each end of the conductor pull. At one end, a puller would be positioned, and on the other end a tensioner and wire reel stand truck would be positioned. Once positioned, a lightweight sock line would be installed through stringing sheaves on each pole for the particular distance selected for the conductor pull. The sock line would then be used to pull in the conductor-pulling cable. The conductor-pulling cable would then be attached to the three conductors using a special swivel joint to prevent the wire from “blanketing” and allowing it to rotate freely, thus preventing complications from twisting as the conductors unwind off the reels. At the completion of each pull, the conductors would be secured to dead ends at each end, sagged to provide proper ground clearance, and secured to the insulators at each pole location. Stringing equipment from one end of the pull would then be rotated 180 degrees to face the new pull direction. The equipment from the other end of the pull would then be “leapfrogged” to its new pulling position, and the process would be repeated. A similar process would be employed for the ground wire. Conductor pulling would be in accordance with SCE specifications and similar to process methods detailed in Institute of Electrical and Electronics Engineers (IEEE) Standard 524-1992 (Guide to the Installation of Overhead Transmission Line Conductors).

Conductor Splicing

Two conductors to be spliced must first be grounded in accordance with SCE and IEEE standards. Then the two conductors would be pulled to have a slack in their tension via socks and anchoring. The two conductor ends would then be inserted into an aluminum sleeve that would be compressed by a hydraulic compressing tool. The tension would be put back onto the conductors and the splicing process would be completed.

Labor and Equipment

Construction would be performed by SCE construction crews or contractors under the supervision of SCE personnel. Anticipated construction personnel and equipment are summarized below in Table 2-1, *Construction Equipment and Workforce Estimates*. Construction equipment powered by an internal combustion engine would be equipped with exhaust and intake silencers in accordance with manufacturers’ specifications, and would be maintained in good working order. Stationary construction equipment (e.g., portable power generators, compressors, etc.) would be located at the furthest distance possible from nearby residential units while meeting construction requirements and safe work practices.

**TABLE 2-1
CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES
(115 kV SUBTRANSMISSION LINES)**

Number of Personnel	Primary Equipment Description	Estimated Horsepower	Probable Fuel Type	Primary Equipment Quantity	Estimated Activity Schedule (days)	Duration of Use (hours/day)
30	Survey					
	½-Ton Pick-up Truck 4X4	200	Gasoline	1	3	10
	Workers			3	3	10
	Roads					
	1-Ton Crew Cab 4X4	300	Gasoline	2	12	2
	Road Grader	350	Diesel	1	12	10
	Track Type Dozer	350	Diesel	2	12	2.6
	Water Trucks	350	Diesel	1	12	10
	Workers			4	12	10
	Pole Framing and Setting					
	¾-Ton Suburban	300	Gasoline	2	147	10
	5-Ton Framing Truck 4X4	350	Diesel	2	83	10
	30-Ton Line Truck	350	Diesel	2	83	10
	Digger Truck	500	Diesel	1	24	10
	Water Trucks	350	Diesel	1	83	10
	Backhoe	350	Diesel	2	147	10
	Bucket Truck	350	Diesel	2	147	10
	Truck Mounted Crane	350	Diesel	2	147	10
	30-Ton Crane	350	Diesel	1	14	10
	Cement Truck	500	Diesel	1	3	10
	Workers	350	Diesel	16	147	10
	Material Delivery					
	60-foot Flat Bed Pole Truck	350	Diesel	2	5	8
	Forklift	200	Diesel	1	5	8
	Workers			3	5	8
	Conductor Installation					
	Flat Bed Truck & Trailer (Wire Puller)	300	Gasoline	1	24	6
	Flat Bed Truck & Trailer (Wire Dolly)	300	Gasoline	1	24	6
	30-Ton Line Truck	300	Diesel	2	24	5
	¾-Ton Suburban	300	Gasoline	2	24	10
	Water Trucks	350	Diesel	1	24	10
	Bucket Truck	350	Diesel	2	24	6
	Truck Mounted Crane	350	Diesel	2	24	6
	Workers			16	16	10
	Restoration					
	1-Ton Crew Cab 4X4	300	Gasoline	2	40	8
	Water Trucks	350	Diesel	1	40	8
	Workers			8	40	8

Hazardous Materials and Waste Management

Construction of the 115 kV subtransmission lines would require limited use of hazardous materials, including fuel, lubricants, and cleaning solutions. All hazardous materials would be stored, handled, and used in accordance with applicable regulations, including the construction Storm Water Pollution Prevention Plan (SWPPP) for the proposed subtransmission line segments.

Construction of the 115 kV subtransmission lines would result in the generation of various waste materials, including wood, soil, vegetation, and sanitation waste (portable toilets), that would be disposed of per the below discussion.

Post-Construction Clean-Up and Restoration

All construction debris associated with construction of the 115 kV subtransmission lines would be placed in appropriate onsite containers and periodically disposed of in accordance with all applicable regulations. Temporary spur roads that might be needed for the proposed 115 kV subtransmission line split would be reseeded or scarified and allowed to return to natural conditions after the completion of work.

Construction Schedule

Construction of the proposed subtransmission lines would include surveying the subtransmission line alignments, engineering design based on these surveys, preconstruction biological protocol surveys, construction of the proposed subtransmission lines, and the transfer of existing lines to the new poles. Some of these activities may overlap. SCE anticipates that surveying activities would take three to six months to complete. Engineering design and physical construction activities, including grading, erecting new poles, installing conductors, transferring existing conductors, and removing unnecessary poles and conductors, would take approximately 12 months to complete.

It is anticipated that construction activities would start by the second quarter of 2010, following the CPUC's approval of SCE's application for a Permit to Construct (PTC), and would continue through mid-2011.

After the completion of final engineering and biological protocol environmental surveys, construction teams would grade all areas for construction. The proposed subtransmission lines would be energized once the Proposed Project has been constructed, including improvements at Devers, Mirage, Concho, Indian Wells, Santa Rosa, Eisenhower, Farrell, Garnet, Thornhill, and Tamarisk substations and the installation of the telecommunication facilities.

The proposed subtransmission line construction activities would occur between the hours of 8:00 a.m. and 6:30 p.m., Monday through Saturday. Construction activities would be prohibited on federal and State-recognized holidays.

Drainage Structures

Drainage structures would be installed to allow for construction traffic usage, as well as to prevent road damage and erosion due to uncontrolled water flow. Drainage structures may include wet crossings, water bars, overside drains, pipe culverts, and energy dissipaters. The specific need for and location of drainage systems or similar improvements would be identified during final engineering with a detailed topographic survey of the proposed subtransmission line corridors.

Ground Disturbance

Table 2-2, *Summary of Proposed 115 kV Line Ground Disturbing Activities*, provides a summary of the estimated amounts of temporary and permanent ground disturbance that would occur as a result of construction of the proposed 115 kV subtransmission lines.

**TABLE 2-2
SUMMARY OF PROPOSED 115 KV LINE GROUND DISTURBING ACTIVITIES**

	Farrell-Garnet 115 kV Subtransmission Line ^a	Mirage-Santa Rosa 115 kV Subtransmission Line ^b	Total
Length of proposed subtransmission line	5.8 miles	1.5 miles	7.3 miles
Number of existing structures removed	138	29	167
Area affected by structure removal	8.3 acres	1.8 acres	10.1 acres
Number of new structures installed	159	55	214
Area affected by new structure installation ^c	9.5 acres	3.3 acres	12.8 acres
Number of pulling/splicing sites	13	8	21
Area affected by pulling/splicing sites ^c	13 acres (temporary)	8 acres (temporary)	21 acres (temporary)
Number of laydown sites	1	1	2
Area affected by laydown sites ^c	1 acre (temporary)	1 acre (temporary)	2 acres (temporary)

NOTES:

^a Includes all structures to be installed at Eisenhower Substation associated with the reconfigured Eisenhower-Tamarisk 115 kV line.

^b Includes all pole replacements for line reconfigurations at Dinah Shore/Bob Hope, Date Palm/Varner, and Portola/Gerald Ford intersections.

^c Estimates based on 0.06 acre for each structure (inclusive of temporary and permanent disturbance) and 1 acre of temporary disturbance for each pulling/splicing and laydown area.

All quantities are preliminary estimates and subject to modification based on final engineering

2.4.4 Operation, Inspection, and Maintenance

Normal operation of the proposed subtransmission lines would be controlled remotely through SCE control systems. SCE would inspect the subtransmission lines at least once per year by driving and/or flying the line alignments. Maintenance would occur as needed. Maintenance would include activities such as repairing conductors, replacing insulators, replacing poles, and access road and spur road maintenance.

2.5 Devers-Coachella Valley 220 kV Loop-In

2.5.1 Existing Configuration

Currently, four 220 kV transmission lines are located within the ROW that runs north/south from Mirage Substation to the Devers-Coachella Valley 220 kV transmission line corridor. The Mirage Substation is served by two of the existing lines; the Devers-Mirage and Mirage-Ramon 220 kV transmission lines. The third line, the Julian Hinds-Mirage 220 kV transmission line, is connected to Mirage Substation, but serves as an outgoing 220 kV source line to Metropolitan Water District (MWD)'s Julian Hinds Substation. The fourth line, the Coachella Valley-Ramon 220 kV line, connects directly to the Imperial Irrigation District (IID)'s Ramon Substation that is located on the east side of Mirage Substation. The Devers-Mirage, Julian Hinds-Mirage, and Coachella Valley-Ramon 220 kV transmission lines are located on LSTs within an approximately 0.8-mile long and 300-foot wide existing ROW, paralleling Vista de Oro on the east side, and starting at Mirage Substation, heading north to 30th Avenue, which is the approximate intersection of the existing northwest/southeast Devers-Coachella Valley 220 kV ROW. The Mirage-Ramon 220 kV line is located on three TSPs on the north side of the Mirage and Ramon substations, outside of the substation fence.

In addition to these four 220 kV transmission lines, the Devers-Coachella Valley 220 kV transmission line is located approximately 0.8 mile north of Mirage Substation. Figure 2-9, *Existing and Proposed Devers-Coachella Valley 220 kV Loop-In*, shows the existing alignment of the above-described 220 kV transmission lines and the associated LSTs and TSPs.

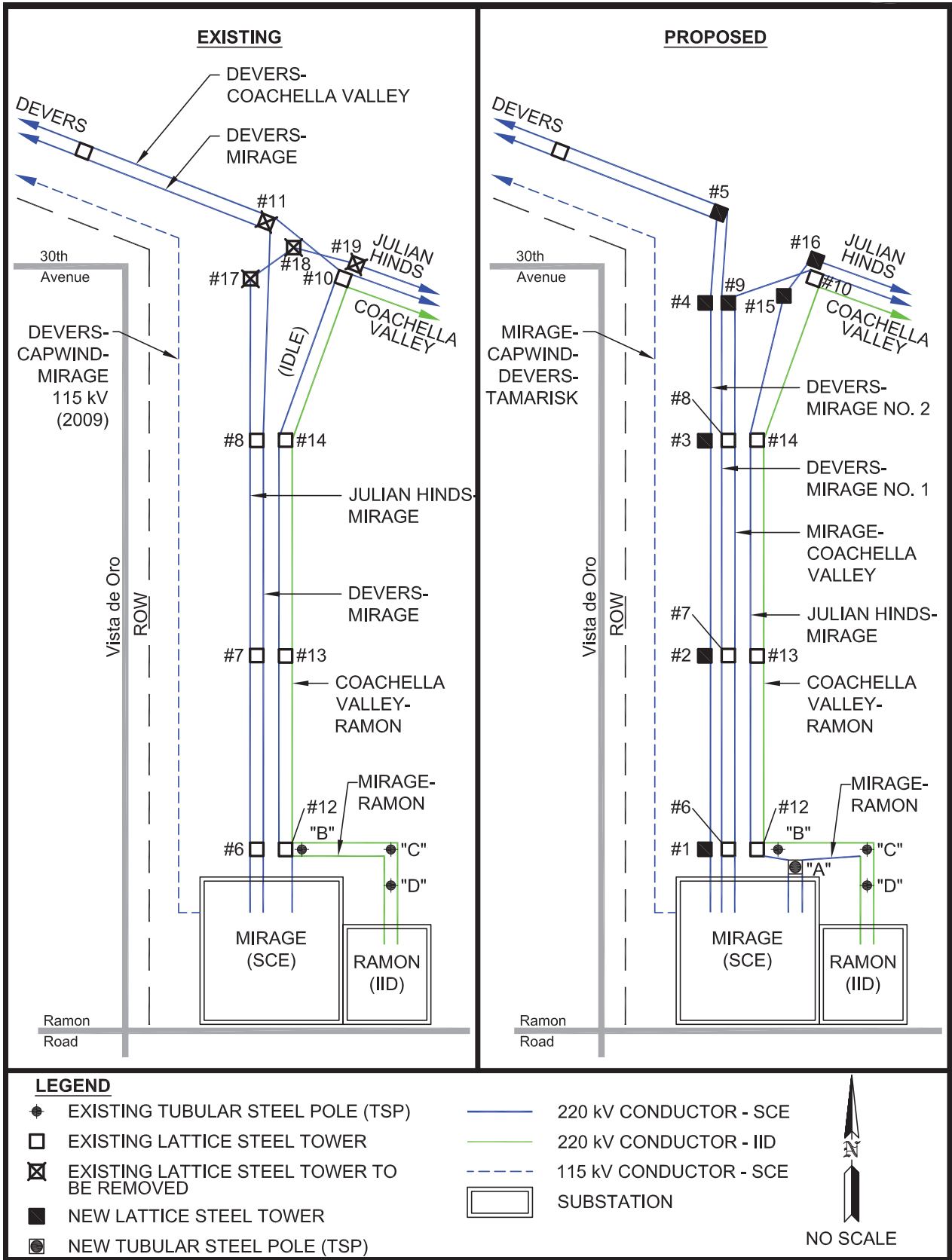
2.5.2 Proposed Configuration

To create the proposed Devers-Mirage No. 2 and the Mirage-Coachella Valley 220 kV transmission lines, the existing Devers-Coachella Valley 220 kV transmission line would be looped into Mirage Substation through the installation of new 220 kV LSTs and conductors, and line cutovers. The existing and proposed 220 kV transmission lines would require the use of existing double-circuit LSTs and the installation of new single-circuit and double-circuit LSTs and one double-circuit TSP (see Figure 2-10, *Typical Pole Configurations for the Devers-Coachella Valley 220 kV Loop-In* and Figure 2-11, *Existing and Proposed 220 kV Tower Configurations*).

Proposed TSP base diameters would be approximately 30 to 42 inches in diameter and would be approximately 12 to 18 inches at the top. These lines would require the use of new and existing 1033 kcmil aluminum conductors steel reinforced (ACSR) conductors, spanning approximately 0.8 mile from the Mirage Substation north to the Devers-Coachella Valley 220 kV transmission line ROW. These five 220 kV transmission lines are discussed in more detail below.

Reconfigured Devers-Mirage (No. 1) 220 kV Line

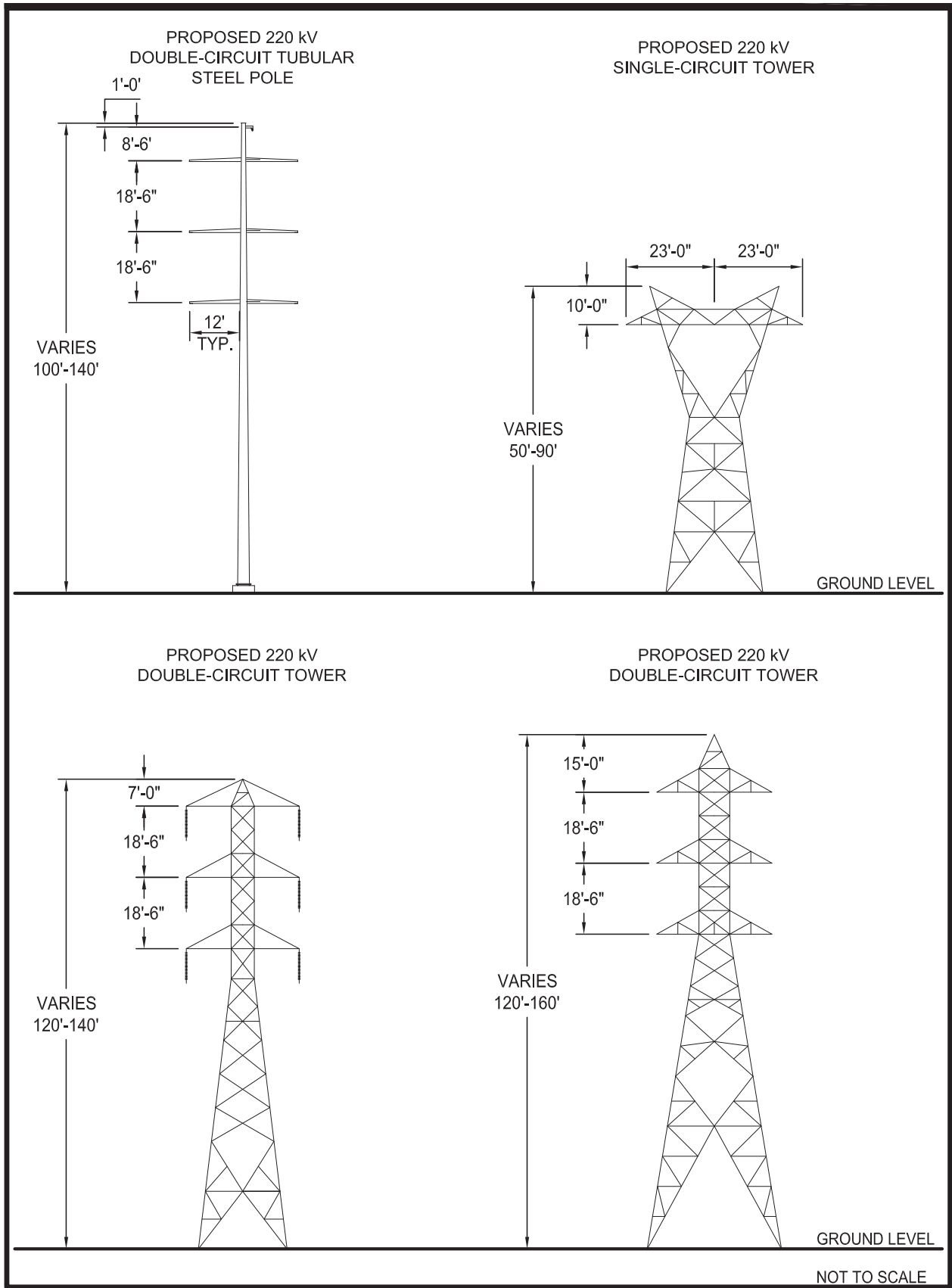
As shown in Figure 2-9, the existing Devers-Mirage 220 kV transmission line is located on the east side of the four existing LSTs (#6, #7, #8, and #11) that are located 190 feet east of the western property line of the north/south ROW into Mirage Substation. After new LST #9 is



SOURCE: SCE, 2008a.

Devers-Mirage 115 kV Subtransmission System Split Project . 207059

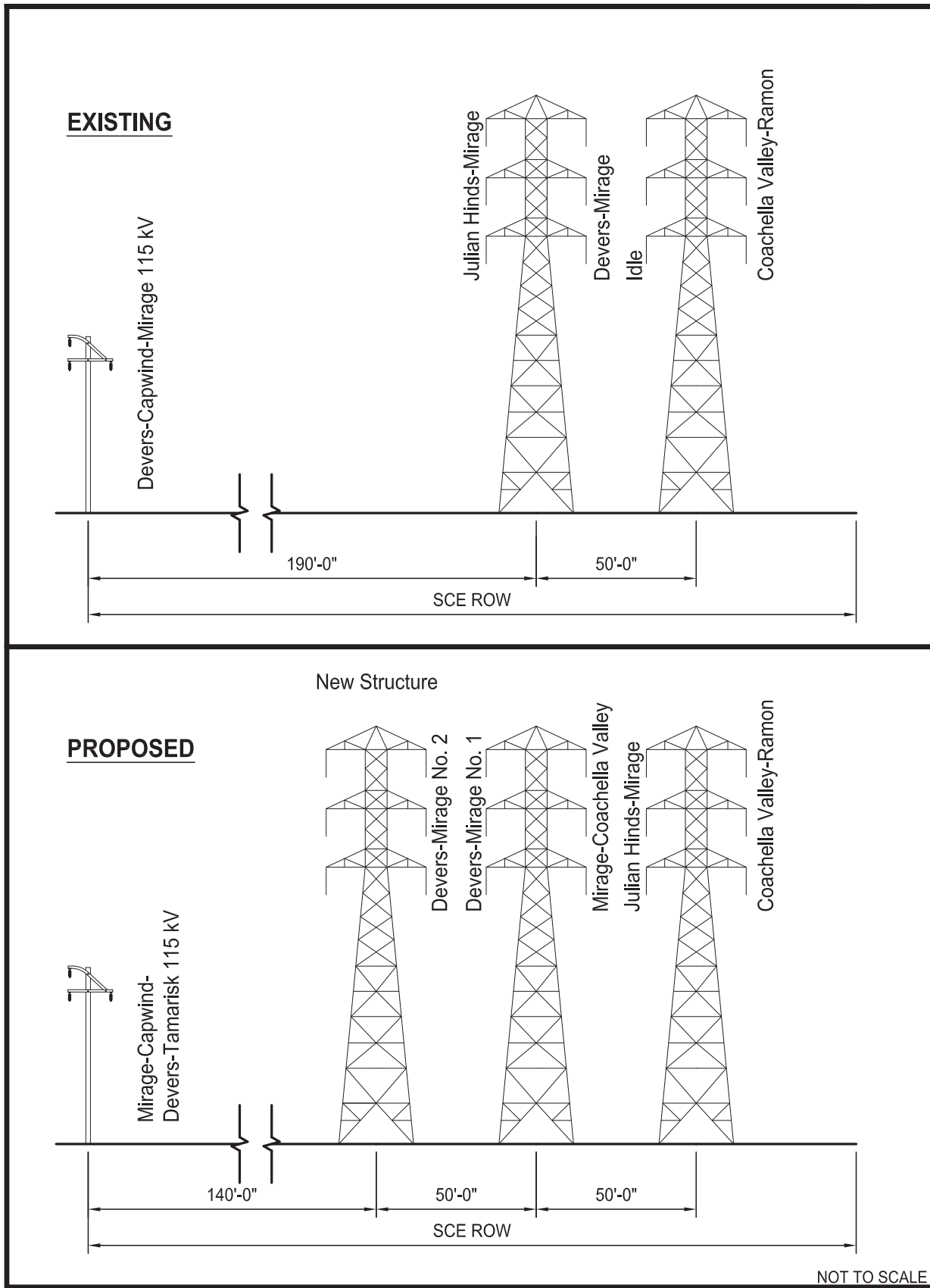
Figure 2-9
Existing and Proposed Devers-Coachella Valley 220 kV Loop-In



SOURCE: SCE, 2008a.

Devers-Mirage 115 kV Subtransmission System Split Project . 207059

Figure 2-10
Pole and Tower Configurations for the
Devers-Coachella Valley 220 kV Loop-In



SOURCE: SCE, 2008a.

Devers-Mirage 115 kV Subtransmission System Split Project . 207059

Figure 2-11
Existing and Proposed 220 kV
Transmission Line Tower Configuration

constructed, the existing Julian Hinds-Mirage 220 kV transmission line would be reconfigured as the Devers-Mirage No. 1 line and reside on the west side of three existing LSTs (#6, #7, and #8) and two new LSTs (#5 and #9). Three new spans of conductor would be added north from Mirage Substation, including one from the 220 kV switchrack to existing LST #6, one from LST #8 to LST #9, and one span from LST #9 to LST #5. The Devers-Mirage No.1 would connect at LST #5 to the existing Devers-Coachella Valley 220 kV transmission line segment that travels west to Devers Substation. Existing LST #11 would be replaced with LST #5, and two existing conductor spans would be removed, including one span from LST #8 to LST #11 and one span from LST #8 to LST #17.

New Devers-Mirage No. 2 220 kV Line

As shown in Figure 2-9, the new Devers-Mirage No. 2 220 kV transmission line segment would be created by installing new double-circuit LSTs with new conductors for 0.8 mile, from Mirage Substation to the loop-in point. The new line segment would be comprised of five new double-circuit LSTs (#1, #2, #3, #4, and #5) placed approximately 140 feet east of the western ROW property line. The new conductor would be placed on the east side of the new LSTs, and would connect to the south side of the existing Devers-Mirage 220 kV transmission line at new LST #5. There would not be a transmission line on the western side of pole #s 1, 2, 3, and 4.

New Mirage-Coachella Valley 220 kV Line

The new Mirage-Coachella Valley 220 kV transmission line segment would be created by looping in the existing Devers-Coachella Valley 220 kV transmission line into Mirage Substation (see Figure 2-9). This new line would use four existing LSTs (#6, #7, #8, and #10) and one new LST (#9) located within the existing ROW, approximately 190 feet east of the western ROW property line. This new line would be located on the eastern side of the LSTs. The new line would connect to the Coachella Valley segment of the former Devers-Coachella Valley 220 kV line at existing LST #10. This line would use two existing spans of conductor (previously used by the Devers-Mirage 220 kV transmission line) between LST #6 and #8 and three new spans of conductor from the Mirage Substation 220 kV switchrack to existing LST #6.

Reconfigured Julian Hinds-Mirage 220 kV Line

As illustrated in Figure 2-9, the existing Julian Hinds-Mirage 220 kV transmission line resides on the west side of three existing LSTs (#6, #7, and #8) that are located approximately 190 feet east of the western ROW property line along with the existing Devers-Mirage 220 kV transmission line, which is located on the east side of these existing LSTs. Additionally, the existing Julian Hinds-Mirage 220 kV transmission line is strung from LST #8 to single-circuit LSTs #17, #18, and #19 before proceeding southeasterly within the existing Devers-Coachella Valley 220 kV transmission line ROW.

After the two new single-circuit LSTs (#15 and #16) are constructed, the idle 220 kV transmission line residing on four existing LSTs (#10, #12, #13, and #14), located approximately 240 feet east of the western ROW property line, would be reconfigured using new TSP "A," three

existing double-circuit LSTs (#12, #13, and #14), and two new single-circuit LSTs (#15 and #16). Up to six new spans of conductor would be added from the Mirage Substation 220 kV switchrack traveling north to TSP “A” and then north on the LSTs, finally connecting at new LST #16, where it would connect to the existing Julian Hinds 220 kV line that travels east to Julian Hinds Substation. Existing single-circuit LSTs #17, #18, and #19 would be removed. Also, two existing conductor spans would be removed: one span from LST #17 to LST #18 and one span from LST #18 to LST #19.

Reconfigured Mirage-Ramon 220 kV Line

The existing Mirage-Ramon 220 kV line connects the SCE Mirage Substation to the IID Ramon Substation. In order to perform the realignment of the Julian Hinds 220 kV line to the western side of existing LSTs #12, #13, and #14 described above, the Mirage-Ramon 220 kV line would be reconfigured on new TSP “A” and existing TSPs “C” and “D.” First, the existing Ramon-Mirage line would be reconfigured by removing two spans of conductor, including one span between LST #12 and existing TSP “B” and one span between TSP “B” and TSP “C” (see Figure 2-9). Next, the existing conductor between LST #12 and the Mirage Substation 220 kV switchrack would be replaced with new conductor that would connect the Mirage Substation 220 kV switchrack to new TSP “A.” Finally, a new span of conductor would be installed between new TSP “A” and existing TSP “C.”

2.5.3 Construction Plan

The Proposed Project at Mirage Substation would loop the existing Devers-Coachella Valley 220 kV transmission line into the Mirage Substation along existing ROW for approximately 0.8 mile on double-circuit LSTs forming the new Devers-Mirage No. 2 and Mirage-Coachella Valley 220 kV transmission lines in accordance with the following scope of work:

- Install approximately 7,240 feet of single-circuit 220 kV transmission line on six new double-circuit LSTs and two new single-circuit LSTs. The new LSTs would be strung with single 1033 kcmil ACSR conductors on new polymer insulators.
- Remove four LSTs and 3,770 feet of existing single-circuit 220 kV transmission line in or near the existing Devers-Coachella Valley 220 kV transmission line ROW north of the Mirage Substation.
- Install one new TSP and 1,000 feet of single-circuit 220 kV transmission line at Mirage Substation and rearrange the Julian Hinds 220 kV transmission line from the existing LSTs on the west side of the approximately 0.8-mile ROW to existing LSTs on the east side of the ROW.
- Install 1,540 feet of single-circuit 220 kV transmission line and remove 820 feet of single-circuit 220 kV transmission line between the 220 kV switchrack located inside Mirage Substation and the three LSTs and one TSP adjacent to the north fence of Mirage Substation.

Tower Site Preparation

Each tower site would be graded or cleared to provide a relatively level pad, free of any vegetation that could hinder tower construction. Tower site work areas approximately 200 feet by 200 feet would be graded so that no ponding or erosive water flow could occur that would cause damage to the tower footings. The graded pad would be compacted to at least 90 percent relative density and would be capable of supporting heavy vehicles.

Staging and Access

Material would be staged within the Mirage Substation during construction. All material for the proposed 220 kV transmission line loop-in work, including concrete, steel, and wire, would be delivered by truck. Construction traffic would use Ramon Road and would be scheduled for off-peak traffic hours to the extent possible. Concrete truck deliveries may need to be made during peak hours when footing work would be performed.

Existing Access and Spur Roads

Approximately 0.95 mile of existing access and spur 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 equipment. These roads would be maintained throughout the life of the Proposed Project. The graded roads would have a minimum drivable width of 14 feet, with a preferable shoulder width of two feet on each side. Drainage structures (e.g., wet crossings, water bars, over side drains, pipe culvers, and energy dissipaters) would be installed along spur and access roads to allow for construction equipment usage, as well as to prevent erosion from uncontrolled water flow. Slides, washouts, and other slope failures would be repaired and stabilized along the roads by installing retaining walls or other means necessary to prevent future failures. The type of mechanically stabilized earth-retaining structure to be used would be based on site-specific conditions.

New Access and Spur Roads

Where the three new LSTs are to be constructed within the existing access road, the access road would need to be realigned around each set of structures. Approximately 400 feet of new access road would be required for each of the three sets of LSTs. Also, approximately 120 feet of new spur road to new tower #15 would be required. New roads would be a minimum of 14 feet wide, with grades varying from flat to approximately 12 percent, and would include the drainage structures and erosion controls described above. Approximately 1,320 linear feet of total new access or spur road would be created within the existing Mirage 220 kV ROW.

Foundations

After a geotechnical investigation and final engineering of the LSTs have been completed, pier-type foundations would be installed using augured excavation techniques. The depth of the underground portion of the footing would depend on the findings of the geotechnical report. The above-ground portion of the footings would be approximately three feet high.

Tower Assembly

LSTs would be assembled at each individual LST location. Crews would erect the steel onto the footings and would bolt together the panel sections until the entire LST would be erected.

Assembly and erection of the LSTs would require an erection crane to be set up approximately 60 feet from the centerline of each LST. The crane pad would be located transversely from each LST location.

Removal and Disposal of Wire, Structures, and Footings

SCE would remove four existing LSTs and associated hardware (e.g., insulators, vibration dampeners, suspension clamps, ground wire clamps, shackles, links, nuts, bolts, washers, cotters pins, insulator weights, and bond wires). Approximately one day would be required for the removal of each existing LST. The LSTs would be transported off-site with a 40-foot flatbed truck and a companion $\frac{3}{4}$ -ton pick-up truck.

Removal of Existing Transmission Facilities

SCE proposes to remove the existing LSTs through the following activities:

- ***Grading:*** Grading activities near the existing LSTs may be required to ensure safe removal.
- ***Removal Crane:*** For each LST, a crane pad of approximately 50 feet by 50 feet would be constructed to allow a removal crane to be set up at a distance of 60 feet from the LSTs center line. The crane pad would be located transversely from the LST locations.
- ***Earth Disturbance:*** The existing LST footing would be removed by cutting the tower steel at the top of the footing. The concrete footing will be jack-hammered, as well as all the exposed steel cut away, and removed to a depth of two feet below existing grade. Holes would be filled and compressed to 90 percent compaction with native soil and the ground area smoothed to match surrounding topography. The removed concrete and steel material would be transported by dump truck used to remove other material (e.g., conductor removal) to an off-site location of a salvage contractor.
- ***Steel Removal:*** Crews would cut the steel into manageable lengths that can be loaded and transported away on a 40-foot flatbed truck for further dismantling at the off-site location of a salvage contractor.

SCE proposes to remove the existing conductor through the following activities:

- ***Wire-Pulling Locations:*** Wire-pulling locations that would be an estimated 200 feet by 200 feet (approximately 0.9 acre) in area would be sited at each of the three dead-end LSTs and points of inflection. Wire-pulling equipment would be placed intermittently along the utility corridor.
- ***Breakaway Reels:*** The old conductor wire would be wound onto “breakaway” reels during removal.
- ***Pulling Cable:*** A $\frac{3}{8}$ -inch pulling cable would replace the old conductor as it is pulled out, thereby allowing complete control of the conductor during its removal. The $\frac{3}{8}$ -inch line

would then be removed under controlled conditions to minimize ground disturbance, and all wire-pulling equipment would be removed.

- ***Conductor Disposal:*** The conductor would be transported to a material and equipment yard where it would be prepared for recycling.

Disposal of Existing Transmission Facilities

Recyclable items would be handled by construction crews that would process those materials into roll-off boxes. Recyclable items (e.g., conductor, steel, hardware) would be received, sorted, and baled at a commercial metal-recycling facility in Los Angeles, and then sold on the open market. Items to be recycled include 100 percent of the steel from LSTs (e.g., towers, nuts, bolts, and washers), 100 percent of the conductor wire (e.g., 1033 kcmil ACSR, 605 kcmil ACSR), and 100 percent of the hardware (e.g., shackles, clevises, yoke plates, links, and/or other connectors used to support conductor). Sanitation waste (i.e., human generated waste) would be disposed of according to sanitation waste management practices.

All waste materials that would not be recycled would be categorized by SCE in order to guarantee proper final disposal. Examples of disposable wastes include wood from cribbing and packing materials, soil and vegetative matter from excavations and land-clearing activity, and miscellaneous refuse generated during construction.

Conductor Pulling

Conductor pulling includes all activities associated with the installation of conductors onto the LSTs. This activity includes the installation of overhead ground wire (OHGW) and primary conductor, vibration dampeners, weights, spacers, and dead-end hardware assemblies. Two cable pulls would be performed, one for each circuit, between the switchrack and the LSTs intercepting the 220 kV line. A 200-foot by 200-foot temporary staging area would be required at each pulling location.

Conductor pulling would be conducted in accordance with SCE specifications and similar to process methods detailed in the IEEE Standard 524-1992 (Guide to the Installation of Overhead Transmission Line Conductors). Conductors would be pulled using individual reels, with ropes strung along the LSTs. Conductors would be pulled from each pull location using take-up reels. A standard wire-stringing plan would include a sequenced program of events, beginning with determination of wire pulls and wire-pulling equipment setup positions. Advanced planning would determine circuit outages, pulling times, and safety protocols required to ensure that safe and quick installation of wire is accomplished.

Labor and Equipment

Construction would be performed by SCE construction crews and/or by contractors under the supervision of SCE personnel. Anticipated required construction personnel and equipment are summarized in Table 2-3, *Construction Equipment and Workforce Estimates by Activity (Devers-Coachella Valley 220 kV Loop-In)*.

**TABLE 2-3
CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY
(DEVERS-COACHELLA VALLEY 220 KV LOOP-IN)**

Primary Equipment Description	Estimated Horsepower	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Activity Schedule (Days)	Duration of Use (Hours/Day)	Estimated Production
Survey				3			1.2 Miles
1/2-Ton Pick-Up Truck, 4X4	200	Gas	2		3	8	0.5 Mile per Day
Marshalling Yards				4			
1-Ton Crew Cab 4X4	300	Diesel	1		85 Days	2	Duration of Project
30-Ton Crane Truck	300	Diesel	1			2	
10,000-Pound Rough-Terrain Fork Lift	200	Diesel	2			5	
40-Foot Flat Bed Trailers	N/A	N/A	3			2	
Truck, Semi, Tractor	350	Diesel	1			1	
Office Trailer	N/A	N/A	1			N/A	
Storage Containers	N/A	N/A	3			N/A	
Roads and Landing Work				3			1.2 Miles
1-Ton Crew Cab 4X4	300	Diesel	1		3	5	0.5 Mile per Day
Road Grader	350	Diesel	1		3	6	
Track Type Dozer	350	Diesel	1		3	6	
Drum Type Compactor	250	Diesel	1		3	6	
Water Trucks	350	Diesel	3		3	10	
Lowboy Truck/Trailer	500	Diesel	1		3	4	
Excavator	300	Diesel	1		3	6	
Front End Loader	350	Diesel	1		3	6	
Install Foundations				5			8 Towers 1 TSP
1-Ton Crew Cab Flat Bed, 4X4	300	Diesel	4		17	6	1 Structure per 2 Days
30-Ton Crane Truck	300	Diesel	2		17	5	
Front End Loader	200	Diesel	1		17	5	
Diggers	500	Diesel	2		17	8	
4,000-Gallon Water Trucks	350	Diesel	2		17	5	
10-Yard ³ Concrete Mixer Trucks	425	Diesel	6		17	5	

TABLE 2-3 (Continued)
CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY
(DEVERS-COACHELLA VALLEY 220 KV LOOP-IN)

Primary Equipment Description	Estimated Horsepower	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Activity Schedule (Days)	Duration of Use (Hours/Day)	Estimated Production
Tower Legs, Haul & Erect				6			8 Towers 1 TSP
1-Ton Crew Cab Flat Bed, 4X4	300	Diesel	1		4	6	2 Structures per Day
30-Ton Crane Truck	300	Diesel	1		4	8	
10,000-pound Rough-Terrain Fork Lift	200	Diesel	1		4	6	
40-Foot Flat Bed Truck & Trailer	350	Diesel	1		4	5	
10,000-Pound Rough-Terrain Fork Lift	200	Diesel	1		5	8	
40-Foot Flat Bed Truck & Trailer	350	Diesel	2		5	10	
Tower Assembly				10			8 Towers
80-Ton Rough Terrain Cranes	400	Diesel	2		8	8	1 Tower per Day
30-Ton Crane Truck	300	Diesel	2		8	8	
10,000-Pound Rough Terrain Fork Lift	200	Diesel	2		8	5	
3/4-Ton Pick-Up Truck, 4X4	300	Diesel	3		8	10	
1-Ton Crew Cab Flat Bed, 4X4	300	Diesel	4		8	5	
Compressor Truck	350	Diesel	2		8	5	
Tower & TSP Erection				10			8 Towers, 1 TSP
3/4-Ton Pick-Up Truck, 4X4	300	Diesel	1		8	5	1 Tower and 1 TSP per Day
1-Ton Crew Cab Flat Bed, 4X4	300	Diesel	2		8	5	
Compressor Truck	350	Diesel	1		8	5	
180-Ton Rough-Terrain Crane	500	Diesel	1		8	6	
Tower Removal				3			4 Towers
3/4-Ton Pick-Up Truck, 4X4	300	Diesel	1		4	8	1 Tower per Day
40-Foot Flat Bed Truck	350	Diesel	1		4	8	

TABLE 2-3 (Continued)
CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY
(DEVERS-COACHELLA VALLEY 220 KV LOOP-IN)

Primary Equipment Description	Estimated Horsepower	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Activity Schedule (Days)	Duration of Use (Hours/Day)	Estimated Production
Conductor Installation				12			1.2 Miles
1-Ton Crew Cab Flat Bed, 4X4	300	Diesel	3		10	8	0.12 Mile per Day
Wire Trucks & Trailers	350	Diesel	2		6	2	
Dump Truck (Trash)	350	Diesel	1		10	2	
¾-Ton Pick-Up Truck, 4X4	300	Diesel	1		10	10	
30-Ton Manitex	350	Diesel	2		10	6	
22-Ton Manitex	350	Diesel	1		10	8	
Sleeving Rigs	350	Diesel	2		10	2	
Log Truck & Trailer	500	Diesel	1		10	2	
20,000-Pound Rough-Terrain Fork Lift	350	Diesel	1		10	2	
580 Case Backhoe	120	Diesel	1		6	2	
Spacing Carts	10	Diesel	4		6	4	
Static Truck	350	Diesel	1		6	2	
Static Tensioner	0	Diesel	1		6	2	
3-Drum Strawline Pullers	300	Diesel	2		6	4	
60lk Puller	525	Diesel	1		6	3	
Sag Cat with 2 Winches	350	Diesel	1		6	2	
D8 Cats	300	Diesel	4		6	1	
Hughes 500 E Helicopter	650	Jet A	1		3	4	
Fuel, Helicopter Support Truck	300	Diesel	1		3	2	
Low Boy Truck & Trailer	500	Diesel	1		10	2	
Restoration				5			1/2 Mile
1-Ton Crew Cab 4X4	300	Diesel	1		4	5	1/2 Mile per Day
Road Grader	350	Diesel	1		4	6	
Track Type Dozer	350	Diesel	1		4	6	
Drum Type Compactor	250	Diesel	1		4	6	
Water Trucks	350	Diesel	3		4	10	
Lowboy Truck/ Trailer	500	Diesel	1		4	4	
Front End Loader	350	Diesel	1		4	6	
Excavator	300	Diesel	1		4	6	

SOURCE: SCE, 2008a.

Ground Disturbance

Table 2-4, *Summary of Proposed Devers-Coachella Valley 220 kV Loop-In Ground Disturbing Activities*, provides a summary of the amounts of temporary and permanent ground disturbance that would occur as a result of construction of the proposed Devers-Coachella Valley 220 kV Loop-In.

**TABLE 2-4
SUMMARY OF PROPOSED DEVERS-COACHELLA VALLEY 220 KV LOOP-IN
GROUND-DISTURBING ACTIVITIES**

Length of proposed transmission line	0.8 mile (approximately)
Number of existing structures removed	4
Area affected by structure removal	3.7 acres (temporary)
Number of new structures installed	9
Area affected by new structure installation	8.2 acres (permanent)
Number of pulling/splicing sites	5
Area affected by pulling/splicing sites	4.5 acres (temporary)
Number of laydown sites	4
Area affected by laydown sites	0.9 acre (temporary)
Area affected by widening access road and spur roads	0.6 acre (1,320 linear feet) (permanent)

NOTES: All quantities are preliminary estimates and subject to modification based on final engineering. Disturbance for the pulling sites would coincide with the disturbance of the installation of the new structures.

Hazardous Material Usage and Waste Generation

Construction of the proposed 220 kV transmission line loop-in would require limited use of hazardous materials, including fuel, lubricants, and cleaning solutions. All hazardous materials would be stored, handled, and used in accordance with applicable regulations, and the Hazardous Materials and Waste Handling Management plan (see Applicant Proposed Measure (APM) HAZ-1 in Section 4.7.3). Construction of the proposed 220 kV transmission line loop-in would generate waste in the form of wood, soil, vegetation, and sanitation waste.

Post-Construction Clean-Up and Restoration

All debris associated with construction of the proposed 220 kV transmission line loop-in would be placed in appropriate onsite containers and periodically disposed of in accordance with all applicable regulations. After construction activities are completed, the area of the proposed 220 kV transmission line loop-in would be scarified and allowed to return to natural conditions.

Construction Schedule

It is anticipated that construction of the proposed 220 kV transmission line loop-in would begin during approximately the second quarter of 2010 and would conclude by mid-2011.

2.6 Substations

2.6.1 Devers Substation

Engineering Plan

Devers Substation is a staffed, 500/220/115 kV substation located in the unincorporated area of Riverside County, north of the City of Palm Springs. The proposed improvements at Devers Substation include the replacement of two 115 kV circuit breakers in existing Position No. 7 for the new Devers-Eisenhower-Thornhill 115 kV subtransmission line and replacement of two 115 kV circuit breakers in existing Position No. 4 for the new Mirage-Capwind-Devers-Tamarisk 115 kV subtransmission line. Improvements at the substation would also include installation of new line-protection relays.

Equipment

The proposed improvements to the Devers Substation would include installation of the components listed below:

- Four 115 kV, 1,200 Amp, 40 kiloannum (kA) duty, circuit breakers
- Fifteen 115 kV lightning arresters

Concrete foundations and steel supports would also be required. Construction would result in approximately 978 square feet of ground disturbance within the fenced substation area. Relays would be upgraded for the reconfigured Devers-Eisenhower-Thornhill and Mirage-Capwind-Devers-Tamarisk 115 kV subtransmission lines. Additional site lighting would not be required as part of the proposed substation improvement.

Drainage

Site drainage installations would be consistent with the existing NPDES permit requirements and best engineering practices. There would be no change to the existing drainage patterns at Devers Substation as a result of this work.

Staging and Access

Material would be staged within the substation wall/fence during construction. All material, including circuit breakers, would be delivered by truck. Construction traffic would use Indian Wells, to Dillon Road, to Diablo Road and would be scheduled for off-peak traffic hours, to the extent possible. Concrete truck deliveries may need to be made during peak hours when footing work would be conducted.

Construction Schedule

Construction within the Devers Substation would take a total of approximately 60 days to complete, commencing approximately in the second quarter of 2010 and concluding in mid-2011, including testing and energizing of the substation. The planned operating date is mid-2011.

2.6.2 Mirage Substation

Engineering Plan

Mirage Substation is an unstaffed, 220/115 kV substation located in unincorporated Riverside County in the general vicinity of the community of Thousand Palms. The proposed improvements at Mirage Substation include the installation of one 280 MVA, 220/115 kV transformer bank, one new 220 kV bank position, one new 115 kV bank position, and one new 220 kV breaker-and-a-half configuration for two new 220 kV line positions, and the relocation of the existing Mirage-Ramon 220 kV transmission line, the existing Julian Hinds-Mirage 220 kV transmission line, and the existing Devers-Mirage 220 kV transmission line. Other work at the substation would include looping of the Devers-Coachella Valley 220 kV transmission line into the Mirage 220 kV switchrack, installation of the new Mirage-Santa Rosa 115 kV subtransmission line, relocation of existing Mirage-Concho 115 kV subtransmission line, and installation of new line protection relays.

Equipment

The proposed improvements to the Mirage Substation would include installation of the components listed below.

Major Equipment

- One 280 MVA 220/115 kV transformer bank;
- Five 220 kV, 3,000 amp, 50 kA duty, circuit breakers;
- Ten 220 kV, 3,000 amp, center-side-break disconnect switches;
- Fifteen 220 kV station post insulators;
- Six 220 kV metering potential transformers;
- Two 115 kV, 3,000 amp, 40 kA duty circuit breakers;
- Three 115 kV, 2,000 amp, 40 kA duty circuit breakers;
- Four 115 kV, 3,000 amp, center-side-break disconnect switches;
- Six 115 kV, 2,000 amp, center-side-break disconnect switches;
- Nine 115 kV potential transformers; and
- Twenty-seven 115 kV post insulators.

Switchrack Configurations

- One new 220 kV transformer bank position No. 6S designed with a double-breaker configuration;
- One new 220 kV line position No. 5 designed with a breaker-and-a-half configuration for relocation of the existing Julian Hinds-Mirage 220 kV transmission line (Pos. No. 5N) and relocation of the existing Mirage-Ramon 220 kV transmission line (Pos. No. 5S);

- Existing 220 kV transmission line Position No. 3 would be upgraded and remain a breaker-and-a-half configuration for the installation of the new Devers-Mirage No. 2 220 kV transmission line (Pos. No. 3N) and the installation of the new Mirage-Coachella Valley 220 kV transmission line (Pos. No. 3S);
- One new 115 kV transformer bank position (No. 6N) designed with a double-breaker configuration;
- One new 115 kV line position (No. 7N) designed with a double-breaker configuration; and
- Convert existing 115 kV line position (No. 4) from a double-breaker configuration to a breaker-and-a-half configuration.

Concrete foundations and steel transformer racks, switch supports, and dead-end racks would also be required. Transformer and dead-end racks would be various sizes, up to approximately 60 feet high. Construction would result in approximately 43,226 square feet of ground disturbance within the fenced substation area. Additional site lighting would not be required as part of the proposed substation improvement.

Construction Plan

All construction would take place inside the fenced perimeter of Mirage Substation. New relays would be provided for the installation of the new 280 MVA 220/115 kV transformer bank. Relays would be upgraded as needed for the new 115 kV subtransmission line rearrangements.

Drainage

Site drainage installations would be consistent with the existing NPDES permit requirements and best engineering practices. There would be no change to the existing drainage patterns at Mirage Substation as a result of this work.

Staging and Access

Material would be staged within the substation wall/fence during construction in an existing staging area (230 feet x 230 feet) in the southeast corner of Mirage Substation. All material would be delivered by truck. Construction traffic would use Ramon Road and would be scheduled for off-peak traffic hours to the extent possible. Concrete truck deliveries may need to be made during peak hours when footing work is being prepared. The transformer would be delivered by heavy transport vehicles and off-loaded on site by large cranes with support trucks. A traffic control service would be used for transformer delivery.

Construction Schedule

Construction within Mirage Substation would take approximately eight months, commencing in the second quarter of 2010 and concluding by mid-2011, including testing and energizing the substation.

2.6.3 Concho Substation

Engineering Plan

Concho Substation is an unstaffed, 115/12 kV low-profile substation located in Palm Desert. The proposed improvements at Concho Substation include protection relay replacements for the existing Concho-Indian Wells-Santa Rosa 115 kV subtransmission line and the existing Concho-Indian Wells 115 kV subtransmission line.

Equipment

The proposed substation improvements include only the installation of new line-protection relays. No ground disturbance would occur and additional site lighting would not be required as part of the proposed substation improvement.

Construction Plan

Relays would be upgraded on the existing Concho-Indian Wells-Santa Rosa 115 kV subtransmission line and the existing Concho-Indian Wells 115 kV subtransmission line.

Drainage

Site drainage installations would be consistent with the existing NPDES permit requirements and best engineering practices. There would be no change to the existing drainage patterns at Concho Substation as a result of this work.

Staging and Access

Materials would be staged within the substation wall/fence during construction. All material would be delivered by truck. Construction traffic would use Cook Avenue and Country Club Drive and would be scheduled for off-peak traffic hours, to the extent possible. Concrete truck deliveries may need to be made during peak hours when footing work is being prepared. A traffic-control service would be used if needed.

Construction Schedule

Construction within Concho Substation would take a total of approximately 35 days, commencing approximately in the second quarter of 2010 and concluding in the second quarter of 2011, including testing and energizing the substation. The planned operating date is the mid-2011.

2.6.4 Indian Wells Substation

Engineering Plan

Indian Wells Substation is an unstaffed, 115/12 kV low-profile substation located in the City of Indian Wells. The proposed improvements at Indian Wells Substation include the protection line

relay replacements for existing Concho-Indian Wells-Santa Rosa 115kV subtransmission line and the existing Concho-Indian Wells 115kV subtransmission line.

Equipment

The proposed substation improvements include only the installation of new line protection relays. No ground disturbance would occur and additional site lighting would not be required as part of the proposed substation improvement.

Construction Plan

Relays would be upgraded on the existing Concho-Indian Wells-Santa Rosa 115 kV subtransmission line, the existing Concho-Indian Wells 115 kV subtransmission line, and the existing 115 kV bus tie position.

Drainage

Site drainage installations would be consistent with the existing NPDES permit requirements and best engineering practices. There would be no change to the existing drainage patterns at Indian Wells Substation as a result of this work.

Staging Access

Materials would be staged within the substation wall/fence during construction. All material would be delivered by truck. Construction traffic would use Monterey Avenue and Fred Waring Drive and would be scheduled for off-peak traffic hours, to the extent possible. Concrete truck deliveries may need to be made during peak hours when footing work is being prepared. A traffic-control service would be used if needed.

Construction Schedule

Construction within Indian Wells Substation would take a total of approximately 50 days, commencing approximately in the second quarter of 2010 and concluding by mid-2011, including testing and energizing the substation.

2.6.5 Santa Rosa Substation

Engineering Plan

Santa Rosa Substation is an unstaffed, 115/33/12 kV low-profile substation located in the City of Rancho Mirage. The proposed improvements at Santa Rosa Substation include the conversion of the existing Santa Rosa-Garnet 115 kV subtransmission line to the new Mirage-Santa Rosa-Tamarisk 115 kV subtransmission line; conversion of the existing Santa Rosa-Tamarisk 115 kV subtransmission line to the new Mirage-Santa Rosa 115 kV subtransmission line; installation of new line-protection relays for new lines; and line protection relay replacement of the existing Concho-Indian Wells-Santa Rosa 115 kV subtransmission line.

Equipment

The proposed improvements include connecting the Mirage-Santa Rosa-Tamarisk 115 kV subtransmission line and the new Mirage-Santa Rosa 115 kV subtransmission line and installation of new line protection relays. No ground disturbance would occur and additional site lighting would not be required as part of the proposed substation improvement.

Construction Plan

New relays would be provided for installation of the new Mirage-Santa Rosa-Tamarisk 115 kV subtransmission line, and the new Mirage-Santa Rosa 115 kV subtransmission line and relays would be upgraded for the new 115 kV subtransmission line rearrangements.

Drainage

Site drainage installations would be consistent with the existing NPDES permit requirements and best engineering practices. There would be no change to the existing drainage patterns at Santa Rosa Substation as a result of this work.

Staging Access

Materials would be staged within the substation wall/fence during construction. All material would be delivered by truck. Construction traffic would use Monterey Avenue and would be scheduled for off-peak traffic hours, to the extent possible. Concrete truck deliveries may need to be made during peak hours when footing work is being prepared. A traffic-control service would be used if needed.

Construction Schedule

Construction within Santa Rosa Substation would take a total of approximately 40 days, commencing approximately in the second quarter of 2010 and concluding by mid-2011, including testing and energizing the substation.

2.6.6 Eisenhower Substation

Engineering Plan

Eisenhower Substation is an unstaffed, 115/33/12 kV low-profile substation located in Palm Springs. The proposed improvements at Eisenhower Substation include the relocation of the existing Eisenhower-Farrell 115 kV subtransmission line from Position No. 3 to existing Position No. 2, conversion of the existing Eisenhower-Devers 115 kV subtransmission line to the reconfigured Eisenhower-Devers-Thornhill 115 kV subtransmission line into existing Position No. 2, installation of the reconfigured Eisenhower-Tamarisk 115 kV subtransmission line into existing Position No. 6, replacement of three existing 115 kV circuit breakers in existing Position Nos. 2, 3, and 6, and installation of new line protection relays.

Equipment

The proposed improvements to the Eisenhower Substation would include the installation of the following equipment components:

- Three 115 kV, 1,200 Amp, 40 kA duty circuit breakers;
- One 115 kV, 1,200 Amp, center-side-break disconnect switch;
- One 115 kV potential transformer; and
- Fifteen 115 kV lightning arresters.

In addition, one existing 115 kV bus tie position would be converted to a 115 kV line position. Concrete foundations and steel transformer, lightning arrester, and switch supports would also be required. The support structures would be various sizes, up to approximately eight feet high. Construction would result in approximately 1,100 square feet of ground disturbance within the fenced substation area. Additional site lighting would not be required as part of the proposed substation improvement.

Construction Plan

New relays would be provided for installation of the new Eisenhower-Tamarisk 115 kV subtransmission line and the new Devers-Eisenhower-Thornhill 115 kV subtransmission line. Relays would be upgraded for the new 115 kV subtransmission line rearrangements.

Drainage

Site drainage installations would be consistent with the existing NPDES permit requirements and best engineering practices. There would be no change to the existing drainage patterns at Eisenhower Substation as a result of this work.

Staging and Access

Material would be staged within the substation wall/fence during construction. All material would be delivered by truck. Construction traffic would use Date Palm Drive, to East Ramon Road, to South Gene Autry Trail, to East Mesquite Avenue and would be scheduled for off-peak traffic hours, to the extent possible. Concrete truck deliveries may need to be made during peak hours when footing work is being prepared. A traffic-control service would be used if needed.

Construction Schedule

Construction within Eisenhower Substation would take a total of approximately 65 days, commencing approximately in the second quarter of 2010 and concluding by mid-2011, including testing and energizing the substation.

2.6.7 Farrell Substation

Engineering Plan

Farrell Substation is an unstaffed, 115/12 kV low-profile substation located in Palm Springs. The proposed improvements at Farrell Substation include the addition of one 115 kV Position No. 3, relocation of the existing Farrell-Eisenhower 115 kV subtransmission line from Position No. 6 to new Position No. 3, relocation of the existing Farrell-Devers-Windland 115 kV subtransmission line from Position No. 7 to Position No. 6, installation of the new Farrell-Garnet 115 kV subtransmission line in existing Position No. 7, and installation of new line protection relays.

Equipment

The proposed improvements to the Farrell Substation would include the components listed below:

- One 115 kV, 1,200 amp, 40 kA duty circuit breaker;
- Three 115 kV, 1,200 amp, center-side-break disconnect switches;
- One 115 kV potential transformer;
- Three 115 kV lightning arresters; and
- One 115 kV line position designed with a single-breaker configuration.

Concrete foundations, steel lightning arrester and switch supports, and a dead-end rack would also be required. The support structures would be approximately eight feet high, and the dead-end rack would be 27 feet high. Construction would result in approximately 2,250 square feet of ground disturbance within the fenced substation area. Additional site lighting would not be required as part of the proposed substation improvement.

Construction Plan

All construction would take place inside the fenced perimeter of Farrell Substation, except for the installation of the driveway at the northeast corner of the substation adjacent to Executive Drive. New relays would be provided for installation of the new Farrell-Garnet 115 kV subtransmission line. Relays would be upgraded for the 115 kV subtransmission line rearrangements.

Drainage

Site drainage installations would be consistent with the existing NPDES permit requirements and best engineering practices. There would be no change to the existing drainage patterns at Farrell Substation as a result of this work.

Staging and Access

A new 16-foot-wide by 30-foot-long paved substation access driveway with a 16-foot-wide double-drive access gate would be located along the Executive Drive frontage and centered approximately 50 feet from the northeastern SCE property corner. This new gate would provide access to the northern portion of the substation during construction of the new 115 kV line and

during future construction activities at the substation. It would be a secondary access and would not be used for normal substation operation and maintenance activities.

Construction of the new access would include removal of approximately 20 feet of the existing substation perimeter fence; minor grading to match the existing Executive Drive curb and gutter with the substation interior finished grade; construction of a new concrete driveway approach per the City of Palm Springs standards; paving of approximately 30 feet of an asphalt concrete driveway; and the installation of a new 16-foot-wide by 8-foot-high double-drive chain-link gate with barbed wire, including new gateposts with concrete footings to match the existing fence.

Approximately 10 cubic yards of soil would be excavated, redistributed, and compacted to form the new two percent slope driveway. Paving the new driveway would require approximately four cubic yards of asphalt concrete and four cubic yards of Class II aggregate road base. The new concrete driveway approach would require approximately 1.5 cubic yards of cement concrete. Each gatepost footing would require approximately 0.3 cubic yard of concrete. A total of 640 square feet of new ground disturbance would result from construction of the driveway. Construction of the new driveway would require a permit from the City of Palms Springs.

Materials would be staged within the substation wall/fence during construction. All material would be delivered by truck. Construction traffic would use North Gene Autry Trail, to East Via Escuela, to Executive Drive and would be scheduled for off-peak traffic hours, to the extent possible. Concrete truck deliveries may need to be made during peak hours when footing work would be conducted. A traffic control service would be used if needed.

Construction Schedule

Construction within Farrell Substation would take a total of approximately 65 days, commencing approximately in the second quarter of 2010 and concluding by mid-2011, including testing and energizing the substation.

2.6.8 Garnet Substation

Engineering Plan

Garnet Substation is an unstaffed, 115/33/12 kV substation located in north Palm Springs. The proposed improvements at Garnet Substation include the conversion of the existing Garnet-Santa Rosa 115 kV subtransmission line to the new Farrell-Garnet 115 kV subtransmission line, installation of new line protection relays, and replacement of the existing bus tie protection relays.

Equipment

The proposed improvements at Garnet Substation include the installation of the new Garnet-Farrell 115 kV subtransmission line and new line protection relays. No ground disturbance or additional lighting would be required as part of the proposed substation improvement.

Construction Plan

New relays would be provided for installation of the new Farrell-Garnet 115 kV subtransmission line, and relays would be upgraded for the 115 kV bus tie position.

Drainage

Site drainage installations would be consistent with the existing NPDES permit requirements and best engineering practices. There would be no change to the existing drainage patterns at Garnet Substation as a result of this work.

Staging Access

Materials would be staged within the substation wall/fence during construction. All material would be delivered by truck. Construction traffic would use Indian Canyon Drive and would be scheduled for off-peak traffic hours, to the extent possible. Concrete truck deliveries may need to be made during peak hours when footing work is being prepared. A traffic-control service would be used if needed.

Construction Schedule

Construction within Garnet Substation would take a total of approximately 16 days, commencing approximately in the second quarter of 2010 and concluding by mid-2011, including testing and energizing the substation.

2.6.9 Thornhill Substation

Engineering Plan

Thornhill Substation is an unstaffed, 115/12 kV low-profile substation located in Palm Springs. The proposed improvements at Thornhill Substation include the conversion of the existing Thornhill-Tamarisk 115 kV subtransmission line to the new Devers-Eisenhower-Thornhill 115 kV subtransmission line and the installation of new line protection relays.

Equipment

The proposed improvements at Thornhill Substation include the installation of the new Devers-Eisenhower-Thornhill 115 kV subtransmission line and new line protection relays. No ground disturbance or additional lighting would be required as part of the proposed substation improvement.

Construction Plan

New relays would be provided for installation of the new Devers-Eisenhower-Thornhill 115 kV subtransmission line in support of the of the new 115 kV subtransmission line rearrangement.

Drainage

Site drainage installations would be consistent with the existing NPDES permit requirements and best engineering practices. There would be no change to the existing drainage patterns at Thornhill Substation as a result of this work.

Staging Access

Materials would be staged within the substation wall/fence during construction. All material would be delivered by truck. Construction traffic would use Indian Canyon Drive to South Calle Amigos and would be scheduled for off-peak traffic hours, to the extent possible. Concrete truck deliveries may need to be made during peak hours when footing work is being prepared. A traffic control service would be used if needed.

Construction Schedule

Construction within Thornhill Substation would take a total of approximately 40 days, commencing approximately in the second quarter of 2010 and concluding by mid-2011, including testing and energizing the substation.

2.6.10 Tamarisk Substation

Engineering Plan

Tamarisk Substation is an unstaffed, 115/12 kV low-profile substation located in Rancho Mirage. The proposed substation scope of work at Tamarisk Substation includes the conversion of the existing Mirage-Tamarisk 115 kV subtransmission line to the new Mirage-Santa Rosa-Tamarisk 115 kV subtransmission line, conversion of the existing Santa Rosa-Tamarisk 115 kV subtransmission line to the new Devers-Capwind-Mirage-Tamarisk 115 kV subtransmission line, conversion of the existing Tamarisk-Thornhill 115 kV subtransmission line to the reconfigured Eisenhower-Tamarisk 115 kV subtransmission line, replacement of one 115 kV circuit breaker in existing Position No. 4, and installation of new line protection relays.

Equipment

The proposed improvements to the Tamarisk Substation would include one 115 kV, 1,200 amp, 40 kA duty circuit breaker. Approximately 171 square feet of ground disturbance would occur within the fenced substation area. Additional site lighting would not be required as part of the proposed substation improvement.

Construction Plan

New relays would be installed in support of the new 115 kV subtransmission line rearrangement to accommodate the new Devers-Capwind-Mirage-Tamarisk 115 kV subtransmission line.

Drainage

Site drainage installations would be consistent with the existing NPDES permit requirements and best engineering practices. There would be no change to the existing drainage patterns at Tamarisk Substation as a result of this work.

Staging and Access

Materials would be staged within the substation wall/fence during construction. All material would be delivered by truck. Construction traffic would use Dinah Shore Drive south to Plumley Road and would be scheduled for off-peak traffic hours to the extent possible. Concrete truck deliveries may need to be made during peak hours when footing work is being prepared. A traffic control service would be used if needed.

Construction Schedule

Construction within Tamarisk Substation would take a total of approximately 40 days, commencing approximately in the second quarter of 2010 and concluding by mid-2011, including testing and energizing the substation.

2.6.11 Common Construction Methods for All Substations

Construction for all substations mentioned above would be performed by SCE construction crews and/or contractors under the supervision of SCE personnel. Construction activities would begin by mobilizing the civil or below-grade construction crews on site. Where ground disturbance would occur, the area would be cleared of existing crushed rock, and the rock would be temporarily stockpiled on site. Excavation and auguring would begin for the new equipment foundations, where required. Excavation would be performed with a skip loader. Foundations would be placed with corresponding anchor bolts or steel imbed plates. Trench excavation would follow for the installation of conduit duct runs and equipment grounding systems. The previously cleared crushed rock would be placed back in the affected areas after the completion of the below-grade construction.

Electrical construction crews would move on site following the completion of all below-grade structures. Electrical crews would begin by erecting structural steel, installing disconnect switches, voltage devices, surge arresters, circuit breakers, and primary conductors. Wiring crews would begin wiring the internal components of the circuit breaker and voltage devices. Wiring crews would connect secondary cables at the switch-rack equipment and in the control room. The control room would house the protective relaying equipment. The new equipment would be tested to verify electrical integrity and proper operation of the equipment throughout the construction process. Construction areas would be monitored by SCE-provided security services outside of normal working hours on Monday through Friday and 24 hours a day on Saturdays and Sundays.

All debris generated during construction activities would be placed in appropriate onsite containers and periodically disposed of in accordance with all applicable regulations.

2.6.12 Hazardous Materials and Waste Management

Construction for all substation work mentioned above would result in the generation of various waste materials, including materials associated with removal activities and construction within the substation. A summary of the waste generation estimates is presented below in Table 2-5, *Substation Construction Waste Generation Estimates*.

**TABLE 2-5
SUBSTATION CONSTRUCTION WASTE GENERATION ESTIMATES**

Element	Waste Item	Cubic Yards Total	Cubic Yards Reusable on Site	Cubic Yards Recyclable or Disposed
Mirage Substation				
Civil	Soil	1,200	1,200	0
	Wood	100	0	100
	Concrete	1,200	1,195	5
	Sanitation Waste	60	0	60
	Miscellaneous	20	0	20
Electrical	Wood	80	0	80
	Aluminum	240	160	80
	Copper	200	160	40
	Steel	30,000	30,000	0
	Sanitation Waste	60	0	60
	Miscellaneous	20	0	20
Concho Substation				
Electrical	Copper	3	2	1
	Sanitation Waste	1	0	1
	Miscellaneous	1	0	1
Indian Wells Substation				
Electrical	Copper	3	2	1
	Sanitation Waste	1	0	1
	Miscellaneous	1	0	1
Santa Rosa Substation				
Electrical	Copper	3	2	1
	Sanitation Waste	1	0	1
	Miscellaneous	1	0	1
Devers Substation				
Civil	Soil	21	21	0
	Concrete	21	21	0
Electrical	Aluminum	3	2	1
	Copper	1	1	0
	Steel	2	2	0
	Sanitation Waste	2	0	2

TABLE 2-5 (Continued)
SUBSTATION CONSTRUCTION WASTE GENERATION ESTIMATES

Element	Waste Item	Cubic Yards Total	Cubic Yards Reusable on Site	Cubic Yards Recyclable or Disposed
Eisenhower Substation				
Civil	Soil	90	90	0
	Wood	1	0	1
	Concrete	90	89	1
	Sanitation Waste	2	0	2
	Rock	25	25	0
Electrical	Aluminum	40	35	5
	Copper	20	15	5
	Steel	5	5	0
	Sanitation Waste	2	0	2
Farrell Substation				
Civil	Soil	115	115	0
	Wood	1	0	1
	Concrete	118	115	3
	Sanitation Waste	2	0	2
	Rock	25	25	0
Electrical	Aluminum	40	35	5
	Copper	20	15	5
	Steel	5	5	0
	Sanitation Waste	2	0	2
Garnet Substation				
Electrical	Copper	3	2	1
	Sanitation Waste	1	0	1
	Miscellaneous	1	0	1
Thornhill Substation				
Electrical	Copper	3	2	1
	Sanitation Waste	1	0	1
Tamarisk Substation				
Civil	Soil	12	12	0
	Concrete	12	12	0
	Sanitation Waste	1	0	1
	Rock	1	1	0
Electrical	Aluminum	3	2	1
	Copper	1	1	0
	Steel	2	2	0
	Sanitation Waste	2	0	2

Construction within substation sites would require limited use of hazardous materials, including fuel, lubricants, and cleaning solutions. All hazardous materials that would be used for the substation components would be stored, handled, and used in accordance with applicable regulations, and the Hazardous Materials and Waste Handling Management plan (see Applicant Proposed Measure (APM) HAZ-1 in Section 4.7.3).

For the installation of the additional transformer at Mirage Substation, SCE would incorporate Best Management Practices (BMPs) and design measures through a SPCC Plan to minimize the possibility of any spills or releases from the transformer.

2.6.13 Construction Schedule

Proposed substation construction activities would be completed in the time frames as described for each substation in the previous sections, overlapping with the proposed subtransmission line construction. The scheduled operating date for the project is mid-2011. Substation construction would be scheduled to occur Monday through Friday. Table 2-6, *Substation Construction Personnel and Equipment Summary*, identifies the number of personnel and equipment needed for construction of the substation improvements.

2.7 Telecommunications

2.7.1 Engineering Plan

Telecommunication systems provide circuits that interface with the protection relays to protect transmission and subtransmission lines. The telecommunication circuits allow sensor relays to operate during abnormal conditions by providing remote-control operation and monitoring of substation equipment such as circuit breakers, transformers, and capacitors. With the use of existing fiber optic cables and microwave radios, a telecommunications transport interconnect can be established between the SCE substations that require protection circuits.

Telecommunication circuits required to interface with protection relays at IID Coachella Valley Substation require a hand-over of such protection circuit to IID telecommunications department for transport over IID telecommunication systems. Telecommunication system interconnect points between SCE and IID are located at the Edom Hill Communications Site and Mirage Substation, and protection circuits demarcation points shall occur at one or both of the interconnect locations.

Equipment

Telecommunications equipment, including channel bank and fiber optic equipment, would be installed at Concho, Devers, Eisenhower, Farrell, Garnet, Indian Wells, Mirage, Santa Rosa, Tamarisk, and Thornhill substations. Additional telecommunication equipment, for telecommunication system interconnects, would be required at Edom Hill Communications Site and Palm Springs Service Center. All telecommunication equipment would be installed within existing buildings.

**TABLE 2-6
SUBSTATION CONSTRUCTION PERSONNEL AND EQUIPMENT SUMMARY**

Construction Element	Number of Personnel	Equipment Type	Equipment Duration (days)	Equipment Use (hours/day)
Mirage Substation				
Civil	14	1-Office Trailer (Electric)	80	8
		1-Driller (Diesel)	50	8
		2-Crew Trucks (Gas/Diesel)	80	2
		1-14-Ton Crane (Diesel)	25	4
		1-Dump Truck (Gas/Diesel)	75	6
		1-Tractor (Diesel)	75	6
		1-5-Ton Truck (Gas/Diesel)	15	4
		1-Forklift (Diesel)	75	4
		1-Ditch Digger (Diesel)	55	6
Electrical	23	1-Office Trailer (electric)	110	8
		2-Manlifts (Diesel)	100	6
		1-Pick-Up Truck (Gas/ Diesel)	110	2
		1 14-Ton Crane Truck (Gas/Diesel)	90	6
		2-Crew Trucks (Gas/ Diesel)	110	2
		1-150-Ton Crane (Diesel)	60	6
		1-5-Ton Truck (Gas/Diesel)	50	2
		1-Forklift (Diesel)	100	6
		2-Carryall Vehicles (Gas/ Diesel)	110	2
		1-Support Truck (Gas/ Diesel)	25	2
Transformer Installation	12	2-Carryall (Gas/Diesel)	22	6
		1-Manlifts (Diesel)	20	6
		1-Forklift (Diesel)	22	6
		1-50-Ton Crane (Diesel)	15	6
		2-Crew Trucks (Gas/Diesel)	22	2
		1-Processing Trailer (Electric)	15	8
Maintenance	5	1-Foreman Truck (Gas/Diesel)	40	2
		1-Manlifts (Gas/Diesel)	40	6
		2-Crew Trucks (Gas/Diesel)	110	2
		1-Gas/Processing Trailer (Electric)	20	8
Test	2	1-Pick-Up Truck (Gas/Diesel)	110	2
Concho Substation				
Electrical	2	1-Carryall Vehicle (Gas/ Diesel)	34	2
Test	2	1-Pick-Up Truck (Gas/Diesel)	34	2
Indian Wells Substation				
Electrical	2	1-Carryall Vehicle (Gas/Diesel)	50	2
Test	2	1-Pick-Up Truck (Gas/Diesel)	50	2
Santa Rosa Substation				
Electrical	2	1-Carryall Vehicle (Gas/Diesel)	40	2
Test	2	1-Pick-Up Truck (Gas/Diesel)	40	2

TABLE 2-6 (Continued)
SUBSTATION CONSTRUCTION PERSONNEL AND EQUIPMENT SUMMARY

Construction Element	Number of Personnel	Equipment Type	Equipment Duration (days)	Equipment Use (hours/day)
Devers Substation				
Civil	4	1-Driller (Diesel)	2	8
		1-Crew Truck (Gas/ Diesel)	5	2
		1-Dump Truck (Gas/ Diesel)	5	6
		1-Tractor (Diesel)	5	6
Electrical	6	1-Office Trailer (Electric)	60	8
		1-Manlift (Diesel)	45	6
		1-Pick-Up Truck	60	2
		1-Crew Truck (Gas/ Diesel)	60	2
		1-150-Ton Crane (Diesel)	10	6
		1-Forklift (Diesel)	40	6
		1-Carryall Vehicle (Gas/Diesel)	60	2
Maintenance	2	1-Foreman Truck (Gas/ Diesel)	5	2
		1-Crew Truck (Gas/ Diesel)	10	2
		1-Gas/Processing Trailer (Electric)	5	8
Test	2	1-Pick-Up Truck (Gas/Diesel)	20	2
Eisenhower Substation				
Civil	4	1-Driller (Diesel)	5	8
		1-Crew Truck (Gas/Diesel)	15	2
		1-Dump Truck (Gas/Diesel)	15	6
		1-Tractor (Diesel)	15	6
		1-Ditch Digger (Diesel)	5	6
Electrical	6	1-Office Trailer (Electric)	45	8
		1-Manlift (Diesel)	35	6
		1-Crew Truck (Gas/Diesel)	45	2
		1-150-Ton Crane (Diesel)	20	6
		1-Forklift (Diesel)	45	6
		1-Carryall Vehicle (Gas/Diesel)	45	2
Maintenance	2	1-Foreman Truck (Gas/Diesel)	5	2
		1-Crew Truck (Gas/Diesel)	10	2
		1-Gas/Processing Trailer (Electric)	10	8
Test	2	1-Pick-Up Truck (Gas/Diesel)	45	2
Farrell Substation				
Civil	6	1-Driller (Diesel)	10	8
		1-Crew Truck (Gas/Diesel)	20	2
		1-Dump Truck (Gas/Diesel)	20	6
		1-Tractor (Diesel)	20	6
		1-Ditch Digger (Diesel)	10	6
Electrical	6	1-Office Trailer (Electric)	55	8
		1-Manlift (Diesel)	40	6
		1-Crew Truck (Gas/Diesel)	55	2
		1-150-Ton Crane (Diesel)	25	6

TABLE 2-6 (Continued)
SUBSTATION CONSTRUCTION PERSONNEL AND EQUIPMENT SUMMARY

Construction Element	Number of Personnel	Equipment Type	Equipment Duration (days)	Equipment Use (hours/day)
Farrell Substation (cont.)				
Electrical (cont.)		1-Forklift (Diesel)	55	6
		1-Carryall Vehicle (Gas/Diesel)	55	2
Maintenance	2	1-Foreman Truck (Gas/Diesel)	5	2
		1-Crew Truck (Gas/Diesel)	10	2
		1-Gas/Processing Trailer (Electric)	10	8
Test	2	1-Pick-Up Truck (Gas/Diesel)	55	2
Garnet Substation				
Electrical	2	1-Carryall Vehicle (Gas/Diesel)	16	2
Test	2	1-Pick-Up Truck (Gas/Diesel)	16	2
Thornhill Substation				
Electrical	2	1-Carryall Vehicle (Gas/Diesel)	40	2
Test	2	1-Pick-Up Truck (Gas/Diesel)	40	2
Tamarisk Substation				
Civil	3	1-Crew Truck (Gas/Diesel)	5	2
		1-Dump Truck (Gas/Diesel)	5	6
		1-Tractor (Diesel)	5	6
Electrical	4	1-Office Trailer (Electric)	40	8
		1-Manlift (Diesel)	5	6
		1-Pick-Up Truck (Gas/Diesel)	40	2
		1-Crew Truck (Gas/Diesel)	40	2
		1-150-Ton Crane (Diesel)	2	6
		1-Forklift (Diesel)	5	6
		1-Carryall Vehicle (Gas/Diesel)	40	2
Maintenance	2	1-Foreman Truck (Gas/Diesel)	1	2
		1-Crew Truck (Gas/Diesel)	2	2
		1-Gas/Processing Trailer (Electric)	1	8
Test	2	1-Pick-Up Truck (Gas/Diesel)	30	2

Routing

As part of the Proposed Project, existing fiber optic cables would be transferred from existing poles to the new poles to be installed for both the proposed Mirage-Santa Rosa and Farrell-Garnet 115 kV subtransmission lines. The telecommunication line conduit diameter is approximately five inches.

2.7.2 Construction Plan

The existing fiber optic cables would be transferred from existing poles to the new 115 kV subtransmission poles that would be installed within existing ROWs or franchise locations. The All-Dielectric Self-Supporting (ADSS) fiber optic cables would be attached to a support block

beneath the end of each 10-foot wood cross-arm on each new pole as shown in Figure 2-3. Telecommunications equipment installation would occur within existing SCE substation buildings and at the Edom Hill Communications Site. IID equipment and circuit installation would occur at the IID's mechanical-electrical equipment room (MEER).

Staging and Access

Since no new fiber optic cable would be installed, no additional staging areas for cable reel equipment would be necessary to perform the telecommunications construction. Existing access roads would be used and therefore no new ground disturbance would occur as a result of the fiber optic cable removal and installation process.

Construction Schedule

The telecommunications construction would occur after the installation of the new 115 kV poles, which would require vehicles to access each individual pole, separate from the proposed subtransmission line construction activities. Telecommunication equipment and circuit installation would occur throughout the project timeline. With the possible exception of Edom Hill Communications Site, it is not anticipated that access to the work location would influence the construction schedule.

Labor and Equipment

The personnel, equipment, and construction schedule for the telecommunication system are listed in Table 2-7, *Telecommunication Construction Summary*.

Hazardous Materials and Waste Management

Electronics components associated with telecommunication construction activities would be removed from the site and returned to the technician's home base for disposal in accordance with SCE policies and all applicable regulations.

Post-Construction and Clean-Up

All debris associated with construction would be placed in appropriate onsite containers, or removed, and periodically disposed of in accordance with all applicable regulations.

2.7.3 Operation and Maintenance

The telecommunication 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.

**TABLE 2-7
TELECOMMUNICATION CONSTRUCTION SUMMARY**

Construction Element	Number of Personnel	Number of Days	Equipment Requirements
Mirage-Santa Rosa 115 kV Subtransmission Route			
Cable Construction	4	5	2 – Bucket Trucks (Diesel) 1 – Pick-Up (Gasoline) 1 – 2-Axle Trailer
Receive and Load Out Materials	4	1	1 – 5-Ton Forklift (Diesel) 1 – Pick-Up (Gasoline)
Clean-Up	4	1	2 – Bucket Trucks (Diesel) 1 – Pick-Up (Gasoline)
Farrell-Garnet 115 kV Subtransmission Alignment			
Cable Construction	4	18	2 – Bucket Trucks (Diesel) 1 – Pick-Up (Gasoline) 1 – 2-Axle Trailer
Receive and Load Out Materials	4	1	1 – 5-Ton Forklift (Diesel) 1 – Pick-Up (Gasoline)
Clean-Up	4	1	2 – Bucket Trucks (Diesel) 1 – Pick-Up (Gasoline)
Devers, Equipment/Circuit Installation			
Equipment Installation	3	5	2 – Pick-Up (Gasoline)
Circuit Installation	2	5	2 – Pick-Up (Gasoline)
Clean-Up	1	1	1 – Pick-Up (Gasoline)
Mirage, Equipment/Circuit Installation			
Equipment Installation	3	10	2 – Pick-Up (Gasoline)
Circuit Installation	2	10	2 – Pick-Up (Gasoline)
Clean-Up	1	1	1 – Pick-Up (Gasoline)
Tamarisk, Equipment/Circuit Installation			
Equipment Installation	3	6	2 – Pick-Up (Gasoline)
Circuit Installation	2	6	2 – Pick-Up (Gasoline)
Clean-Up	1	1	1 – Pick-Up (Gasoline)
Eisenhower, Equipment/Circuit Installation			
Equipment Installation	3	5	2 – Pick-Up (Gasoline)
Circuit Installation	2	5	2 – Pick-Up (Gasoline)
Clean-Up	1	1	1 – Pick-Up (Gasoline)
Concho, Equipment/Circuit Installation			
Equipment Installation	3	5	2 – Pick-Up (Gasoline)
Circuit Installation	2	5	2 – Pick-Up (Gasoline)
Clean-Up	1	1	1 – Pick-Up (Gasoline)
Indian Wells, Equipment/Circuit Installation			
Equipment Installation	3	35	2 – Pick-Up (Gasoline)
Circuit Installation	2	3	2 – Pick-Up (Gasoline)
Clean-Up	1	1	1 – Pick-Up (Gasoline)
Santa Rosa, Equipment/Circuit Installation			
Equipment Installation	3	7	2 – Pick-Up (Gasoline)
Circuit Installation	2	7	2 – Pick-Up (Gasoline)
Clean-Up	1	1	1 – Pick-Up (Gasoline)

TABLE 2-7 (Continued)
TELECOMMUNICATION CONSTRUCTION SUMMARY

Construction Element	Number of Personnel	Number of Days	Equipment Requirements
Thornhill, Equipment/Circuit Installation			
Equipment Installation	2	5	1 – Pick-Up (Gasoline)
Circuit Installation	2	5	1 – Pick-Up (Gasoline)
Clean-Up	1	1	1 – Pick-Up (Gasoline)
Garnet, Equipment/Circuit Installation			
Equipment Installation	2	5	1 – Pick-Up (Gasoline)
Circuit Installation	2	5	1 – Pick-Up (Gasoline)
Clean-Up	1	1	1 – Pick-Up (Gasoline)
Farrell, Equipment/Circuit Installation			
Equipment Installation	2	5	1 – Pick-Up (Gasoline)
Circuit Installation	2	5	1 – Pick-Up (Gasoline)
Clean-Up	1	1	1 – Pick-Up (Gasoline)
Edom Hill C.S., Equipment/Circuit Installation			
Equipment Installation	2	5	1 – Pick-Up (Gasoline)
Circuit Installation	2	5	1 – Pick-Up (Gasoline)
Clean-Up	1	1	1 – Pick-Up (Gasoline)
Palm Springs S.C., Equipment/Circuit Installation			
Equipment Installation	2	3	1 – Pick-Up (Gasoline)
Circuit Installation	2	3	1 – Pick-Up (Gasoline)
Clean-Up	1	1	1 – Pick-Up (Gasoline)

2.8 Electric and Magnetic Fields Summary

2.8.1 Electric and Magnetic Fields

This EIR does not consider electric and magnetic fields (EMF) in the context of the CEQA analysis of potential environmental impacts because [1] there is no agreement among scientists that EMF creates a potential health risk, and [2] there are no defined or adopted CEQA standards for defining health risk from EMF. However, recognizing that there is a great deal of public interest and concern regarding potential health effects from human exposure to EMF from transmission lines, this document does provide information regarding EMF associated with electric utility facilities and human health and safety. Thus, the EMF information in this EIR is presented for the benefit of the public and decision makers.

Potential health effects from exposure to *electric fields* from transmission lines (i.e., the force field produced by the existence of an electric charge, such as an electron, ion, or proton, in the volume of space or medium that surrounds it) have not been established. Electric fields are generally not thought of as a concern since electric fields are effectively shielded by materials such as trees, walls, etc. Therefore, the majority of the following information related to EMF focuses primarily on exposure to *magnetic fields* (i.e., the invisible fields created by moving

charges) from transmission lines. Additional information on electric and magnetic fields generated by transmission lines is presented in Appendix D.

After several decades of study regarding potential public health risks from exposure to power line EMF, research results remains inconclusive. Several national and international panels have conducted reviews of data from multiple studies and state that there is not sufficient evidence to conclude that EMF causes cancer. Most recently the International Agency for Research on Cancer (IARC) and the California Department of Health Services (DHS) both classified EMF as a *possible* carcinogen.

Presently, there are no applicable federal, State, or local regulations related to EMF levels from power lines or related facilities, such as substations. However, the CPUC has implemented a decision (D.06-01-042) requiring utilities to incorporate “low-cost” or “no-cost” measures for managing EMF from power lines up to approximately four percent of total project cost. Using the four percent benchmark, SCE has incorporated low-cost and no-cost measures to reduce magnetic field levels along the subtransmission and transmission corridors.

2.8.2 EMF and the Proposed Project

SCE has conducted a design comparison of calculated magnetic field levels for the transmission line (i.e., 0.8-mile 220 kV Loop-In) portion of the Proposed Project. Table 2-8, *Comparison of Calculated Magnetic Fields at Edges of Right of Way*, shows a comparison of magnetic field levels for the existing design and the Proposed Project within the existing 0.8-mile ROW associated with the 220 kV Loop-In portion of the Proposed Project.

**TABLE 2-8
COMPARISON OF CALCULATED MAGNETIC FIELDS AT EDGES OF RIGHT OF WAY**

Design Options	Left ROW (mG)	% Reduction	Right ROW (mG)	% Reduction
220 kV Loop-In				
Existing 220 kV Design	13.8	Base	22.8	Base
Proposed 220 kV Design	12.1	12.3	12.9	43.4
Proposed 220 kV Design + 10 Feet	12.3	Less than 15% increase	12.7	1.6

NOTE: This table lists calculated magnetic field levels for design comparison only and is not meant to predict actual magnetic field levels.

SOURCE: SCE, 2008b.

In accordance with the EMF Design Guidelines, filed with the CPUC in compliance with CPUC Decisions 93-11-013 and 06-01-042, SCE would implement the following “no-cost and low-cost” magnetic field reduction measures. The field reduction measures would include:

For the Devers 115 kV System

- Using taller poles (typically 65 to 70 feet above the ground, except in areas near the Farrell Substation, where poles would be about 75 feet above ground).
- Using a double-circuit pole-head configuration (or similar); and
- Phasing the proposed subtransmission line with respect to the existing 115 kV subtransmission line as follows:
 - Devers-Farrell-Windland 115 kV: A-B-C (top to bottom)
 - Garnet-Farrell 115 kV: C-B-A (top to bottom)

For the Mirage 115 kV System – From Calle Francisco to near Calle Tosca

- Using taller poles (typically 65 to 70 feet above the ground).
- Using a double-circuit pole-head configuration; and
- Phasing the proposed subtransmission line with respect to the existing 115 kV subtransmission line as follows:
 - Mirage-Santa Rosa-Tamarisk 115 kV: A-B (top to bottom) on the west side and C on the right side
 - Mirage-Santa Rosa 115 kV: C-B-A (top to bottom)
 - Mirage-Concho 115 kV: A-B-C (top to bottom)

For the Mirage 115 kV System – From Calle Tosca to South of I-10 Freeway

- Using taller poles (typically 65 to 70 feet above the ground).
- Using a double-circuit pole-head configuration; and
- Phasing the proposed subtransmission line with respect to the existing 115 kV subtransmission line as follows:
 - Mirage-Santa Rosa 115 kV: C-B-A (top to bottom)
 - Mirage-Concho 115 kV: A-B-C (top to bottom)

For the 115 kV System Reconfigurations (Area D)

- Phasing the proposed subtransmission line with respect to the existing 115 kV subtransmission line as follows:
 - Eisenhower-Farrell 115 kV: C-B-A (top to bottom)
 - Devers-Eisenhower-Thornhill 115 kV: A-B-C (top to bottom)

For the 115 kV System Reconfigurations (Area E)

- Phasing the proposed subtransmission line with respect to the existing 115 kV subtransmission line as follows:
 - Mirage-Capwind-Devers-Tamarisk 115 kV: C-B-A (top to bottom)
 - Mirage-Santa Rosa-Tamarisk 115 kV: A-B-C (top to bottom)

For the 220 kV Loop-In

- Phasing the newly created transmission line with respect to the existing 220 kV transmission lines as follows:
 - Devers-Mirage No. 2 220 kV: A-B-C (top to bottom)
 - Devers-Mirage No. 1 220 kV: B-C-A (top to bottom)

- Mirage-Coachella Valley 220 kV: A-B-C (top to bottom)
 - Julian Hinds-Mirage 220 kV: C-B-A (top to bottom)
 - Coachella Valley-Ramon 220 kV: A-B-C (top to bottom)
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2.9 References

SCE, 2009. Southern California Edison (SCE), 2009. Electronic communication from Milissa Marona, SCE Project Manager, to Eric Chiang, CPUC Project Manager, July 8, 2009.

SCE, 2008a. Proponent's Environmental Assessment, Devers-Mirage 115 kV Subtransmission System Split Project. January 31, 2008.

SCE, 2008b. Application of Southern California Edison Company for a Permit to Construct Electrical Facilities with Voltages between 50 kV and 200 kV: Devers-Mirage 115 Kilovolt Subtransmission System Split Project. January 31, 2008.