B. Project Description – Contents

B. Project Description

B.1 Introduction

Section B describes the Sunrise Powerlink Transmission Project ("SRPL" or "Proposed Project") as proposed by San Diego Gas and Electric Company (SDG&E). The potential environmental effects of the project as described here are analyzed in Section D. Section B.2 presents an overview of the Proposed Project including possible future transmission system expansions. Section B.3 details the Proposed Project components and design specifications. Section B.4 describes the construction activities and procedures associated with the Proposed Project, Section B.5 explains the operation and maintenance procedures, Section B.6 contains a description of SRPL "Connected Actions" under the National Environmental Policy Act (NEPA) and "Indirect Effects" of the Proposed Project. Section B.7 presents a comprehensive listing of SDG&E's Applicant Proposed Measures (APMs) to reduce potential impacts resulting from the Proposed Project.

This section includes maps of the Proposed Project area that illustrate land-ownership and general routing. Appendix 11 of the Environmental Impact Report/Environmental Impact Statement (EIR/EIS) includes detailed maps that illustrate the approximate proposed locations of each transmission structure and associated facilities based upon the status of SDG&E's preliminary engineering studies to date.

The Project Objectives as defined by both SDG&E and the CPUC/BLM, along with the NEPA discussion of Purpose and Need for the Proposed Project, are set forth in Section A.2 of this EIR/EIS.

B.2 Overview of the Proposed Project

SDG&E proposes to construct new electric transmission lines between the existing Imperial Valley and Peñasquitos Substations, a proposed new Central East Substation, and other system modifications in order to reliably operate the new lines. Collectively, the proposed transmission line, substation and system modifications are known as the Sunrise Powerlink Transmission Project (SRPL). The entire project would traverse approximately 150 miles between the El Centro area of Imperial County and northwestern San Diego County, in southern California. The location of the Proposed Project is illustrated in Figure B-1. The project, as proposed by SDG&E, includes the following components:

Transmission Lines

- Construction of an overhead single-circuit 500 kV transmission line from the existing Imperial Valley Substation to a new 500/230 kV substation referred to as the Central East Substation.
- Construction of a double-circuit 230 kV transmission line from the Central East Substation to the existing Sycamore Canyon Substation. This project component consists of both overhead and underground segments.
- Construction of a single-circuit 230 kV transmission line from the existing Sycamore Canyon Substation to the existing Peñasquitos Substation. This project component consists of both overhead and underground segments.
- Relocation of an existing 69 kV transmission line to parallel the proposed 230 kV overhead transmission lines between the junction of State Route (SR) 76 and SR79 and a point near the existing Santa Ysabel Substation. To accommodate the proposed relocation, this segment would also include

removal of the existing 69 kV structures, and placement of new towers along a nine miles segment to accommodate the relocated 69 kV line.

- Relocation of the existing 69 kV and 92 kV transmission lines to the Proposed Project ROW between the eastern boundary of Anza-Borrego Desert State Park (ABDSP) and the proposed Central East Substation. This segment would include placing portions of the existing 69 or 92 kV lines underground within the adjacent SR78 roadway and placing other portions of the existing 69 or 92 kV lines onto the 500 kV towers.

Substations

- Modification of the existing Imperial Valley Substation to accommodate termination of one new 500 kV transmission line
- Construction of the new Central East Substation capable of accommodating termination of one 500 kV transmission line from the Imperial Valley Substation and two 230 kV transmission lines that would extend to the Sycamore Canyon Substation
- Modification of the existing Sycamore Canyon Substation to accommodate termination of two 230 kV transmission lines from the Central East Substation and one new 230 kV transmission line that would extend to the Peñasquitos Substation
- Modification of the existing Peñasquitos Substation to accommodate termination of one new 230 kV transmission line from the Sycamore Canyon Substation

Other System Modifications

- Reconductoring of the existing 69 kV transmission line between the existing Sycamore Canyon and Elliot Substations
- Addition of a 230 kV, 69 megavolt-amperes reactive (MVAR) shunt capacitor[1] and a third 230/69 kV transformer to the existing San Luis Rey Substation
- Addition of a 69 kV, 50 MVAR shunt capacitor to the existing South Bay Substation.[2]

For clarity, the Proposed Project is described in five separate segments or "links" according to geographical location: Imperial Valley Link, Anza-Borrego Link, Central Link, Inland Valley Link, and Coastal Link (Figure B-2). In order to provide a consistent frame of reference, the proposed SRPL ROW has been assigned mileposts (MP), which range from the Imperial Valley Substation (MP 0) to the Peñasquitos Substation (MP 149.9). The sections that follow provide additional detail about each of the Proposed Project components.

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[1] A shunt capacitor provides voltage stability so that when system load changes, the actual level of power delivered changes predictably.

[2] An Application for Certification for the South Bay Replacement Project (06-AFC-3) was filed on June 30, 2006 at the California Energy Commission. If approved, the existing South Bay Power Plant and substation would be demolished and rebuilt at a nearby site.

Figure B-1. Proposed Project Overview
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Figure B-2. Proposed Project Links
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Future Phases of the Proposed Project

SDG&E states that an objective of the Proposed Project is to allow for future expansion of the transmission system, including both 230 kV and 500 kV systems. However, approval of the SRPL would not result in automatic approval of the potential future expansions to the SRPL and all future 230 or 500 kV lines would require new applications by SDG&E, followed by preparation of project-level environment documents and separate approvals from the CPUC prior to permitting and construction. These potential future phases of the Sunrise Powerlink Project are described in Section B.2.7. The project is considered to include the following future phases:

- **230 kV Future Phases.** At least four additional 230 kV future circuits may be required after the two 230 kV circuits proposed as part of the SRPL. Although this expansion may not be needed for decades, it is expected that two additional 230 kV circuits are possible within the first decade following completion of the Sunrise Powerlink. The most likely substation end points for the additional 230 kV circuits are Sycamore Canyon, Peñasquitos, Escondido, Mission and Los Coches Substations.
- **500 kV Future Phases.** A 500 kV circuit may be constructed from the proposed Central East Substation to connect with the Southern California Edison transmission system. This would involve construction of a new 500 kV transmission line, likely following an existing 69 kV transmission corridor and also possibly the route of the Lake Elsinore Advanced Pumped Storage (LEAPS) Project's 500 kV line.

Connected Actions and Indirect Effects

The CPUC and BLM have determined that four projects are so closely related to the Proposed Project as to be considered "connected actions" under NEPA. These four projects are the Stirling Energy Systems solar facility, two components of the IID 230 kV transmission system upgrades, the Esmeralda–San Felipe Geothermal Project, and the Jacumba 230/500 kV Substation. One additional project, a wind project in northern Mexico's La Rumorosa area, under contract to meet Southern California Edison's renewable requirements, is considered as an "indirect effect" of the Proposed Project. These five projects are described in Section B.6, and the environmental impacts of these projects are presented in Section D of this EIR/EIS, following the discussion of the SDG&E transmission line and associated facilities.

B.2.1 Imperial Valley Link

The Imperial Valley Link extends from Milepost (MP) 0 at the existing Imperial Valley Substation to MP 60.9 at the eastern boundary of ABDSP. The Imperial Valley Link includes modifications to the existing Imperial Valley Substation and construction of a new 500 kV transmission line that would extend from the Imperial Valley Substation to ABDSP. Within this link, 60.9 miles of 500 kV overhead transmission lines would be supported by a combination of lattice towers and steel poles within a new 200-foot ROW (see Section B.3). Refer to Figure B-3 for details on the 500 kV route through Imperial Valley.

Transmission Line

The 500 kV overhead transmission line would originate at the existing Imperial Valley Substation (MP 0) and parallel the existing 500 kV Southwest Powerlink (SWPL) for approximately four miles. The pro-

posed SRPL would be constructed approximately 450 feet north of the existing SWPL towers. The new SRPL structures would be constructed parallel to each existing SWPL tower.

At MP 4, the transmission line would turn north and travel through open desert land managed by the U.S. Bureau of Land Management (BLM), before crossing Interstate Highway 8 (I-8) and continuing through private agricultural land west of the outskirts of the unincorporated town of Seeley. The line would continue north-northeast toward the existing Imperial Irrigation District (IID) 161 kV transmission line at MP 20.4.

Between MP 20.4 to MP 37.7, the line would parallel the existing IID 161 kV transmission line to the east as it travels north-northwest toward the intersection of SR78 and SR86. At MP 37.7, the SRPL line would diverge from the IID ROW to follow SR78 for 2.5 miles to MP 40.2. The segment of 500 kV overhead transmission line between MP 40.2 and MP 47.3 would continue due west along the south side of SR78, turning due south and bypassing the existing IID Anza Substation (MP 47.2) to follow an existing IID 92 kV transmission line to MP 50. At MP 50, the SRPL line would turn southwest for one mile, then due west to parallel the southern extent of an existing BLM property line. At this point (MP 54.2), the line would be parallel to the southern edge of the existing IID 92 kV transmission line. From MP 54.2, the SRPL line would parallel the south side of the existing IID 92 kV transmission line to ABDSP at MP 60.9, passing the existing IID San Felipe Substation (MP 58.8).

Imperial Valley Substation

The existing Imperial Valley Substation (MP 0) is located west of El Centro in southern Imperial County (Figure B-3). SDG&E proposes to modify the existing substation to accommodate the termination of an additional 500 kV circuit. Currently, the 500 kV SWPL passes through the Imperial Valley Substation as it brings power from Arizona to San Diego and the Imperial Valley. The Imperial Valley Substation also interconnects with the IID transmission system and transmission lines importing power from Mexican generators at Mexicali and Rosita to the south. All proposed modifications and all activities associated with staging and access would be located within the previously disturbed area of SDG&E substation property. See Section B.4.2.1 for additional details on construction specifications for the existing Imperial Valley Substation.

B.2.2 Anza-Borrego Link

The Anza-Borrego Link extends 22.6 miles through the Park, from MP 60.9 to MP 83.5. The SRPL line would travel approximately 22.6 miles through ABDSP. The 500 kV transmission line would be constructed entirely overhead through the State Park on lattice towers or H-frame structures. Currently, an overhead 92 kV transmission line owned by IID enters the State Park approximately two miles south of SR78 near the Ocotillo Wells Airport and terminates at the Narrows Substation, within ABDSP. Additionally, SDG&E owns a 69 kV line that enters the western boundary of ABDSP from Grapevine Canyon, passes through the Narrows Substation and continues north to Borrego Springs. The Proposed Project within the entire Anza-Borrego Link would require relocation of the existing IID 92 kV and SDG&E 69 kV transmission lines, as described below. The SRPL line would follow the existing IID 92 kV or SDG&E 69 kV transmission line ROWs within ABDSP. However, an additional 50-foot ROW width would need to be acquired, as detailed in Section B.3.1. Refer to Figure B-4 for the route of the SRPL Project within the Anza-Borrego Link.

Figure B-3. Imperial Valley Link
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Figure B-4. Anza-Borrego Link
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Existing Transmission ROW

In general, the SRPL Project would follow SDG&E and IID's existing easements or an existing transmission line through ABDSP, except that it would require additional ROW width. The statutory or recorded easement through the majority of ABDSP is 100 feet, but may be narrower or even non-existent in several areas. The project would require a total ROW width of 150 feet continuously through the Park, an increase of at least 50 feet along most of the route. The existing easement follows the IID 92 kV line along Old Kane Springs Road past the IID San Felipe Substation (located just east of the Park Boundary), then along SR78 to the Narrows Substation. At this point the ROW ownership transfers from IID to SDG&E. The route continues along SR78 to County Route 3 (S-3). Just east of S-3, the existing easement turns northwest along SDG&E's existing 69 kV line but for about a mile, the project would follow more closely Grapevine Canyon Road. See Appendix 11B for detailed maps of the Proposed Project through Anza-Borrego Desert State Park that show deviations from the existing corridor.

The Grapevine Canyon area, except for SDG&E's current easement, has been classified as State Wilderness by the California Park and Recreation Commission. The Proposed Project 150-foot ROW would be generally located southwest of Pinyon Ridge Wilderness Area and northeast of Grapevine Mountain Wilderness Area. Additional ROW, however, would be located within these Wilderness Areas for a total of 50.2 acres over 7.3 miles of the project (between MPs 75.8 and 83.1).

The width and continuity of the existing easement through the Park is contested and under discussion between SDG&E, BLM, and State Parks. It is outside the scope of the CEQA and NEPA processes to verify the status of the easement, but a summary of available information follows.

The following are documents considered in the ongoing discussion of the existing easement:

- Federal granting Act of March 3, 1853 granting Section 16 lands to the state for public schools and excepting them from preemption laws
- California Statutes of 1921 preserving rights-of-way across state school lands for purposes relating to irrigation and reclamation
- A 1924 federal power site withdrawal for the transmission line
- Federal land patents during the 1920s, 1930s and 1940s to private individuals, reserving a 100-foot right-of-way for the existing transmission line
- 1933 federal legislation authorizing disposal of federal land to the state for public park purposes, expressly preserving "valid existing rights", such as the licensed right-of-way for the transmission line
- 1937, 1938 and 1964 land patents issued by the federal government to the State of California, expressly reserving a right-of-way for the transmission line
- California Statutes of 1943 repealing the 1921 statute above
- A 1955 easement within the Park issued by the BLM to SDG&E for the transmission line
- 1975 California wilderness legislation expressly preserving "existing rights" through the Park
- Recorded and prescriptive easements over private lands.

IID Easement in ABDSP – History and Current Status

The existing transmission line in ABDSP was originally built in the mid-1920s by the Southern Sierras Power Company (SSPC) as part of its 99.3 miles, 88 kV transmission line from its El Centro Substation to SDG&E's Rincon Substation. The Federal Power Commission (FPC) issued the power site with-

drawal for this project in 1924, granting SSPC permission to construct. In 1943, Imperial Irrigation District succeeded SSPC's entire interest in the line and in 1945 SDG&E purchased the portion of the transmission line west of the Narrows Substation from IID.

SDG&E Easement in ABDSP – History and Current Status

In 1945, SDG&E purchased the portion of IID's line that it currently owns and operates west of what is now Narrows Substation. During this time, the FPC determined that the line was not within its licensing authority because it was not a primary line as defined in Section 3(11) of the Federal Water Power Act of 1920 (P.L. 66-280). SDG&E was advised by the FPC to obtain its own permits from BLM for the continued occupancy of lands. Therefore, SDG&E submitted its application, and in 1955, BLM issued a right-of-way grant for what is now the existing corridor in which SDG&E's existing 69 kV transmission line crosses lands located within the Park (see partial illustration in Figure B-4a).

History and Discussion of BLM's 100-Foot ROW Grant

The U.S. Congress passed legislation authorizing the federal government to grant land patents of federal property to California for public park purposes in 1933 which subjects any disposal of federal property to the State to then "valid existing rights" such as the licensed transmission line. The 1933 legislation contained language expressly reserving from transfer a 100-foot-wide corridor for the transmission line. Further affirming the federal government's intent to protect the property rights of the transmission line were private land patents that reserve from the transfer a 100-foot-wide corridor for the transmission line (#1017160, June 22, 1928 and #1019379, September 18, 1928). These privately held lands were later conveyed to the State of California and incorporated into the Park. Therefore, according to SDG&E, the federal authorizing legislation and the reservations in the land patents, both to the State of California and to private parties, created a legal right-of-way independent of the ROW created by the Section 24 federal power site withdrawal (SDG&E's Response to CPUC Data Request No. 1). The existing transmission line may, however, cross land that was not transferred by the federal authorizing legislation and reservations in the land patents.

An exception to the BLM ROW through the Park, Section 16 lands were granted to the State through a federal granting act that predates all other ownership records for the area (Act of March 3, 1853, 10 Stat. 244).[3] State Parks contends that ROW for transmission infrastructure is excluded from these lands. As of July 5, 2007, BLM is reviewing the status of federal interest in Section 16 lands. The existing lines cross Section 16 lands in two places, in Range 6 and 7 East. As shown in Figure B-4a, before 1954, the recorded length of the 69 kV transmission line inside Section 16 Range 6 East was approximately 0.3 miles. The three most recent surveys place the line squarely across the section, or just under 1 mile. The Proposed Project would follow closely the existing transmission line route.

[3] The relevant language is in Section 6 of the Act, "…all public lands in the State of California, whether surveyed or unsurveyed, with the exception of sections sixteen and thirty-six, which shall be and hereby are granted to the State for the purpose of public schools in each township…shall be subject to the preemption laws.…" Because Section 16 lands are held in trust for the purpose of public schools, it is exempt from the grant of rights of way from State to federal lands for power lines (Public Resources Code section 8351 Stats. 1921, Ch. 173, pp. 180-81 and Stats. 1943, Ch. 1124, sec. 3, p. 3067; also Wyman v. Banvard (1863) 22 Cal. 524, 530-31; 41 Ops.Cal.Atty.Gen 202) (California Department of Park and Recreation, 2007)

Figure B-4a. Anza-Borrego ROW History of Surveys
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SDG&E has previously referenced ROW segments that are 24 feet wide (SDG&E, 2006b). There is no documentation for an existing easement of 24 feet and the Applicant has since withdrawn that description (SDG&E, 2007a). There are, however, several segments of the existing lines that cross lands with either uncertain jurisdiction or private ROW grants. There is no documented ROW width for these segments, allowing for interpretation of a minimal width equal to what the existing transmission line occupies (California State Park and Recreation Commission, 2007).

The actual location of towers and associated right-of-way have not been recorded accurately on maps within the ABDSP desert due to a lack of field monuments and the distortion of section lines on hand-drawn maps that were not to scale. Additionally, the desert landscape surrounding the existing transmission towers and ROW has changed significantly over time. The inaccuracy in recording ownership and ROW within ABDSP has made it difficult to determine the site-specific location of State and privately held land patents, making title records throughout the 1920s and 1930s unclear and inaccurate.

Due to inadequate land surveys in the past, unclear title records have hampered SDG&E's search for ROW grants dated over 80 years ago. However, SDG&E has surveyed the existing facilities as part of its 2005 application to the BLM to renew its 100-foot-wide ROW. Figure B-4a presents an illustration of one segment of the transmission line route, showing the location of the transmission line route identified in the SDG&E 2005 survey in comparison with the location from the State Parks Records, the 1924 Southern Sierras Co. survey, and the 2006 GPS. If correct, the 2006 GPS survey data may place the existing transmission line in some areas for which State Parks Department has jurisdiction and no statutory or recorded easement exists. SDG&E asserts that maps of the facilities to date, including results of the 2006 GPS survey, are inaccurate. For the purposes of impact assessment in this EIR/EIS, the ROW is considered to be 100 feet wide, 50 feet on either side of the centerline of the existing 69 kV line.

Transmission Line

MP 60.9 marks the eastern end of the proposed 500 kV line within ABDSP. The 500 kV overhead line would follow the existing IID 92 kV line between MP 60.9 and the existing Narrows Substation (MP 69.7). As part of the Proposed Project, SDG&E would remove the 92 kV conductors from the existing wood poles between MP 60.9 and MP 68.2 and attach (or "underbuild") them to the new 500 kV lattice steel towers. At MP 68.2, the 92 kV circuit would transition from overhead to underground, and continue within SR78 road ROW, while the 500 kV line would continue as an overhead line on the north side of SR78. The relocated 92 kV underground transmission line would terminate at the existing Narrows Substation. The 500 kV line would not connect with the Narrows Substation.

SDG&E's existing 69 kV line to Borrego Springs would intersect the SRPL ROW just west of the Narrows Substation (MP 69.7). Between MP 69.7 and MP 74.8, the existing 69 kV line would be placed underground within the SR78 road ROW, whereas the 500 kV line would continue west as an overhead line within the SDG&E's existing easement on the north side of SR78.

At the intersection of S-3 and SR78 (MP 74.8), the 69 kV line would transition back to an overhead configuration and would be attached onto the new 500 kV lattice steel towers. This segment would traverse through Grapevine Canyon along the north side of Grapevine Canyon Road to the western boundary of ABDSP (MP 83.5). The wood poles that currently support the 69 or 92 kV segments that would be underbuilt on the SRPL structures or placed underground would be removed (MP 61.7 to MP 83.5).

B.2.3 Central Link

The Central Link of the Proposed Project includes the area between the western boundary of ABSDP (MP 83.5) and MP 110.8, which is southwest of the SR78 and SR79 junction, near Santa Ysabel. The new Central East Substation is included in this portion of the Proposed Project. The eastern half of the Central Link includes the 500 kV transmission line from the Anza-Borrego Link to the proposed Central East Substation. A new double-circuit 230 kV transmission line would begin at the new Central East Substation and extend to the southwestern edge of the Central Link boundary, near the community of Santa Ysabel. Throughout the Central Link, the overhead line would be supported by lattice towers or steel poles within a new ROW ranging from 200 to 300 feet wide (see Section B.3). Refer to Figure B-5 for the route of the SRPL within the Central Link and Table B-1 "Proposed Structure Configuration" for details on where the structures would be.

Transmission Line

From the western boundary of ABDSP (MP 83.5), the 500 kV line would continue northwest through Grapevine Canyon to MP 87.6, following SDG&E's existing 69 kV transmission line ROW. The existing 69 kV circuit would be removed from the wood poles and attached to the 500 kV structures through this segment. The wooden poles that currently support the 69 kV circuit would remain to support existing distribution circuits. Near the proposed Central East Substation (MP 91.0), the 69 kV line would separate from the 500 kV towers and continue northwest to the existing Warners Substation on existing wood poles.

The 500 kV line would end at the proposed Central East Substation and the double-circuit 230 kV lines would begin. From the Central East Substation, the proposed SRPL Project would follow the west side of S-2 as it travels north to MP 92.6, then west through Vista Irrigation District (VID) property. At MP 97.6, the line would turn southwest to parallel the existing SDG&E 69 kV transmission line. This segment follows the east side of SR79 before crossing to the west side of the road near the junction of SR79 and SR76 (MP 100.2).

At MP 100.2, the double-circuit 230 kV transmission line would jog first west, then south, along the eastern boundary of the Santa Ysabel reservation and then following other parcel boundaries to MP 103.5. The segment between MP 103.5 and MP 106.1 would traverse southeast along Mesa Grande Road. At this point (MP 106.1), the route would turn due south and travel west of SR79 and cross SR78 before turning roughly southwest to MP 110.8.

The existing 69 kV transmission line that is currently located along SR79 between MP 100.2 and Santa Ysabel Substation would be relocated and placed on new tubular steel poles within the SRPL ROW, paralleling the proposed double-circuit 230 kV line until MP 109.4, which is approximately 1.5 miles southwest of the Santa Ysabel Substation. At this point, the 69 kV line would deviate from the consolidated SRPL Project ROW to enter the Santa Ysabel Substation from the south. The existing 69 kV poles would be removed between MP 100.2 and MP 109.4.

Central East Substation

The proposed Central East Substation would provide voltage step down from the 500 kV transmission line from the Imperial Valley Substation to the double-circuit 230 kV line exiting toward the existing Sycamore Canyon Substation. The Central East Substation would be constructed on a parcel owned by

Figure B-5. Central Link
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SDG&E near the community of San Felipe, west of S-2 and approximately 1.5 miles south of the intersection of S-2 and County Route 22 (S-22). See Section B.4.2.2 for additional details on equipment and construction specifications for the proposed Central East Substation.

B.2.4 Inland Valley Link

The Inland Valley Link encompasses the double-circuit 230 kV transmission lines between the western boundary of the Central Link (MP 110.8) and the existing Sycamore Canyon Substation (MP 136.3). This portion of the Proposed Project would consist of both overhead and underground segments. Throughout this link the transmission line would be located in new and existing ROWs ranging between 60 and 200 feet wide. The overhead line would be supported by lattice towers and steel poles (see Section B.3). Refer to Figure B-6 and B-7 for detail of the route of the SRPL within the Inland Valley Link.

Transmission Line

From the western boundary of the Central Link (MP 110.8) to the underground transition (MP 117.2), the proposed overhead double-circuit 230 kV transmission lines would generally parallel the existing SDG&E 69 kV overhead transmission line that connects the Santa Ysabel and Creelman Substations. However, near MP 111.3, the proposed 230 kV and existing 69 kV lines would be routed to the west of the existing 69 kV ROW for approximately one mile to avoid Cleveland National Forest. The Proposed Project would parallel the existing 69 kV line to MP 117.2.

Between MP 117.2 and MP 121.9, the double-circuit 230 kV transmission line would be underground (Figure B-7). This portion would follow an unpaved access road within the Mount Gower Open Space Preserve and then follow the Gunn Stage Road and San Vicente Road ROW in a southeasterly direction. At MP 121.9, the line would transition to overhead and continue west along the north side of San Vicente Road to MP 123.3. Between MP 123.3 and the existing Sycamore Canyon Substation (MP 136.3), the overhead double-circuit 230 kV transmission lines would be built within the existing SDG&E ROW, parallel to an existing 69 kV transmission line, crossing Mussey Grade Road at MP 128 and SR67 at MP 131.9.

B.2.5 Coastal Link

The Coastal Link of the Proposed Project encompasses modifications to the existing Sycamore Canyon Substation and construction of a single-circuit 230 kV transmission line between Sycamore Canyon Substation (MP 136.3) and the existing Peñasquitos Substation (MP 149.9). Additionally, the Coastal Link includes proposed modifications to the existing Peñasquitos Substation. The Coastal Link of the Proposed Project would consist of both overhead and underground segments. Throughout this link, the transmission line would be located in new and existing ROWs ranging between 60 and 300 feet wide. The overhead line would be supported by steel poles (see Section B.3). Refer to Figures B-8 and B-9 for the route of the SRPL in the Coastal Link.

Transmission Line

From the existing Sycamore Canyon Substation (MP 136.3), the single-circuit 230 kV overhead transmission line would be located within an existing utility ROW to Chicarita Substation (MP 142.3). The existing utility ROW between the Sycamore Canyon and Chicarita Substations presently contains 230 kV and 69 kV circuits supported by double-circuit steel poles or lattice towers and a 138 kV circuit supported by wood H-frame structures. Under the Proposed Project, the new 230 kV transmission line

would be constructed on double-circuit steel poles and the existing 138 kV circuit would be relocated to the new 230 kV poles. The existing 138 kV H-frame structures would be removed. The SRPL would not enter the existing Chicarita Substation and no new construction or modifications are proposed there.

Just outside of the existing Chicarita Substation (MP 142.3), the existing 69 kV, 138 kV, and 230 kV lines would deviate from the consolidated ROW and the new single-circuit 230 kV overhead line would transition from overhead to underground. This portion of the SRPL line would be underground within an existing, vacant SDG&E ROW between MP 142.3 and MP 143.9. At MP 143.9, the underground line would deviate from the existing SDG&E ROW to follow Park Village Drive and an existing trail within Los Peñasquitos Canyon Open Space Preserve to MP 146.6. At this point (MP 146.6), the 230 kV single-circuit line would transition from underground to overhead. Figure B-9 illustrates the underground segment of the SRPL within the Coastal Link.

Between MP 146.6 and the existing Peñasquitos Substation (MP 149.9), the single-circuit overhead 230 kV transmission line would follow existing 69 kV and 138 kV transmission lines that are supported on shared double-circuit lattice towers. The SRPL line would parallel these circuits on newly constructed support structures. Additionally, there is a second 69 kV circuit within this stretch of ROW that is supported by wood H-frame structures. This second 69 kV circuit would be removed and relocated to the new 230 kV structures and the H-frame structures that originally supported the 69 kV circuit would be removed. Peñasquitos Substation would be the western terminus of the SRPL transmission line.

Sycamore Canyon Substation

The existing Sycamore Canyon Substation (MP 136.3) is located on the northeastern side of Miramar Marine Corps Air Station. SDG&E proposes to modify Sycamore Canyon Substation to accommodate the termination of three new 230 kV transmission circuits (two 230 kV circuits entering the substation from the new Central East Substation and one single-circuit exiting the substation toward the existing Peñasquitos Substation). All proposed modifications and associated staging and access requirements would be located within the previously disturbed area of SDG&E substation property. See Section B.4.2.3 for additional details on construction specifications for the existing Sycamore Canyon Substation.

Peñasquitos Substation

The existing Peñasquitos Substation (MP 149.9) is located northeast of the junction of Interstate Highways 5 and 805 (I-5 and I-805). Under the Proposed Project, Peñasquitos Substation would be modified to accommodate the termination of one 230 kV transmission circuit from the Sycamore Canyon Substation. All work and associated staging areas and equipment would be located on previously disturbed areas within the boundaries of the existing SDG&E substation property. See Section B.4.2.4 for additional details on construction specifications for the existing Peñasquitos Substation.

B.2.6 Other System Upgrades

Additional system upgrades are proposed under the SRPL Project and would be required to accommodate the operation of the transmission line in accordance with State and federal electric system criteria. The existing 69 kV overhead transmission line between the existing Sycamore Canyon and Elliot Substations would be reconductored (see Section B.2.6.1 and B.4.3.3). In addition, system upgrades would be performed at the existing San Luis Rey and South Bay Substations, as described below and in Section B.4.3. The locations of the proposed system upgrades are shown in Figure B-10.

Figure B-6. Inland Valley Link
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Figure B-7. Inland Valley Link Detail
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Figure B-8. Coastal Link
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Figure B-9. Coastal Link Detail
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B.2.6.1 Sycamore Canyon to Elliot 69 kV Reconductor

Reconductoring of the existing 69 kV transmission line between Sycamore Canyon Substation and Elliot Substation is required to increase the capacity and reliability of this circuit. The increased capacity would support the additional electric load delivered to the Sycamore Canyon Substation from the SRPL Project. Currently, this line traverses 8.2 miles on 84 wood poles. The reconductoring would require improving existing access roads to facilitate entry into individual structure sites, replacement of 11 existing poles, replacement of porcelain insulators with polymer insulators, and replacement of the existing aluminum-clad steel reinforced/aluminum (ACSR/AW) conductors with aluminum-clad steel supported/aluminum (ACSS/AW) conductors. Refer to Figure B-11 for a map of the proposed reconductoring.

B.2.6.2 Substation Modifications

San Luis Rey Substation

Proposed system upgrades at the existing San Luis Rey Substation would include installation of a third 230/69 kV transformer within substation property. Installation of the additional transformer would be required to mitigate a single element contingency (N-1) overload that would occur after energizing the SRPL transmission lines. The critical N-1 contingency, as specified by the California Independent System Operator (CAISO), is the loss of either one of the two existing 230/69 kV transformers. If either of the existing transformers went out of service, the other would be immediately overloaded above its emergency rating. See Section B.4.3.1 for additional description of the proposed modifications to the San Luis Rey Substation.

South Bay Substation

In order to provide system voltage support, modifications would be performed at the existing South Bay Substation, including installation of a 69 kV, 50 MVAR shunt capacitor. See Section B.4.3.2 for additional description of the proposed modifications to the South Bay Substation.

B.2.7 Future Transmission System Expansion

SDG&E has stated that a system goal for the Sunrise Powerlink Project is to bring a single 500 kV line as close to the SDG&E load center as is reasonably practicable, then use 230 kV lines to distribute the power to major 230 kV load-serving substations within the San Diego load center. The potential future 230 kV circuits are described in Section B.2.7.1. In addition, SDG&E has designed the proposed Central East Substation to accommodate a 500 kV line exiting the substation to the north. The 500 kV future transmission line is described in Section B.2.7.2.

B.2.7.1 Potential Future 230 kV Circuits

Based on SDG&E's current construction standards, it would take four 230 kV lines to match the capacity of one 500 kV line. Therefore, under an ultimate design for an "all-lines-in-service" condition there could be at least four 230 kV circuits coming out of the proposed Central East Substation. In order to maintain transfer capability on the 230 kV circuits equivalent to the transfer capability of the 500 kV portion of the project for an N-1 or a credible N-2 outage of the 230 kV circuits, as many as five or six 230 kV circuits exiting Central East Substation would be necessary. As a result, the design and layout of the proposed Central East Substation would accommodate up to six 230 kV circuits (i.e., four 230 kV future circuits in addition to the two 230 kV circuits proposed).[4]

[4] One tower can support two circuits, also known as a double-circuit transmission line (DCTL).

SDG&E has stated in a response to a data request to the CPUC (dated December 13, 2006) that this ultimate build out may not be needed for decades, but at least one or two additional 230 kV circuits are possible within the first decade following completion of the Sunrise Powerlink in 2010. At present, the need for such lines is not anticipated within the 10-year planning horizon (2007-2016). As time passes and additional information becomes available concerning load growth, transmission expansion, generation retirements, generation additions, Automated Metering Infrastructure (AMI) impacts, rooftop solar photovoltaic applications, energy efficiency programs, demand response initiatives, and other related matters, the timing of the need for additional 230 kV circuits out of Central East Substation will be clearer.

The factors that affect the location and timeframe for each of the additional circuits out of Central East Substation include: reliability requirements dictated by NERC/WECC reliability criteria; CAISO planning criteria; the need to maintain or expand import capability; operational issues; and economic considerations. The most likely trigger for additional 230 kV circuits out of Central East Substation is reliability needs and operational constraints or mitigation required by NERC/WECC reliability criteria for the outage of one or both of the two Central East–Sycamore Canyon 230 kV circuits (which would be constructed on common structures for the overhead portions of the two circuits under the proposed SRPL).

These factors will be analyzed every year as part of SDG&E's annual Grid Assessment and Transmission Expansion Plan ("Grid Assessment") process. As part of its annual Grid Assessment, SDG&E evaluates its transmission system and makes recommendations to the CAISO as to its modification and expansion. This Grid Assessment looks in depth at each year of the upcoming five year period as well as the tenth year from the current year. Detailed looks beyond ten years are more difficult as there is far less certainty about assumptions during this period. Therefore, this future expansion of SDG&E's 230 kV transmission system is analyzed in this EIR/EIS at a programmatic level.

The future 230 kV lines are discussed in this EIR/EIS in order to fully disclose the potential for these transmission lines to be constructed as a result of the presence of the SRPL, if it is approved and constructed, and incorporate all available information at this time. Approval of the SRPL would not result in automatic approval of the potential future expansion discussed here, and all future 230 kV lines would require new applications by SDG&E, compliance with CEQA and NEPA followed by approvals from the CPUC prior to construction.

Routes of 230 kV Circuits

The most likely connection points for the additional circuits would include Sycamore Canyon, Peñasquitos (with or without tying into Sycamore Canyon), Escondido, Mission and Los Coches Substation (assuming a 230 kV bus is added to this substation).

From a planning perspective, SDG&E would, to the extent possible, site additional lines in already-disturbed corridors using existing ROWs. As a result, at least one or two additional circuits could follow segments of the proposed Sunrise Powerlink 230 kV transmission corridor, as described in Section B.2. Figure B-12a illustrates the likely locations of each route described below.

Figure B-10. Other System Upgrades
CLICK HERE TO VIEW

Figure B-11. Sycamore Canyon – Elliot Substation Reconductor
CLICK HERE TO VIEW

- **Central East Substation to Sycamore Canyon or Peñasquitos Substation.** To terminate at Sycamore Canyon or Peñasquitos Substations, the future routes would most likely follow the Proposed Project ROW west from the proposed Central East Substation. From the proposed Central East Substation, the route would parallel the Proposed Project 230 kV lines for 2.7 miles. It would continue north-northwest to meet and parallel an existing 69 kV transmission line along Highway S-2 to the existing Warners Substation at the intersection with SR79. From Warner Substation, the route would turn south following the existing 69 kV line toward the Santa Ysabel Substation, closely following the road. The route would parallel the Proposed Project from MP 97.7 to MP 100. After crossing SR79 and SR76, it would diverge from the project to continue south along the existing 69 kV line for approximately 10 miles.

  In the first 4.7 miles after the SR79 and SR76 intersection, the southern route would be generally parallel to and west of SR79. Where the southern border of the Santa Ysabel Reservation no longer parallels the east side of SR78 and the valley begins to level out, the southern route would cross to the east side of SR79 with the existing 69 kV line. The route would continue south for 3.2 miles (19 towers) on the east side of SR79, behind the Santa Ysabel Mission, pass east of the Santa Ysabel Substation, cross SR78, and pass through the town of Santa Ysabel. The route would continue south for 0.5 miles before turning southwest for 1.0 mile and meeting the Proposed Project at approximately MP 109.5, still along an existing 69 kV line. The future 230 kV route from Central East Substation (MP 91.0) would be 45.3 miles long to Sycamore Canyon Substation (MP 136.3) and 58.9 miles long to Peñasquitos Substation (MP 149.9). Another possible 230 kV route segment leading to the Sycamore Canyon or Peñasquitos Substations would follow the existing overhead 69 kV line north of San Diego Country Estates, past the Creelman Substation and south to San Vicente Road at approximately MP 123 of the proposed route.

- **Central East Substation to Mission Substation.** To terminate at Mission Substation, the future 230 kV route would most likely follow the proposed SRPL ROW for 45.3 miles from the proposed Central East Substation to Sycamore Canyon Substation. From Sycamore Canyon Substation, the route would turn south and would follow the existing 69 kV Sycamore Canyon–Elliot Substation corridor that is proposed for reconductoring under the Sunrise Powerlink Project (see Section B.2.7.1). This route would travel south-southwest from Sycamore Canyon Substation through Marine Corps Air Station Miramar and the City of San Diego for 8.2 miles to Elliot Substation. From Elliot Substation, the route would continue southwest for an additional 4.0 miles within the existing 69 kV corridor and crossing I-15 to terminate at the existing Mission Substation, located at 9060 Friars Road, which is 0.9 miles north of I-8 and 0.25 miles west of I-805. Another possible 230 kV route through MCAS Miramar would follow another existing transmission line, diverging from the proposed route at MP 135 and turning due south, eventually joining the Sycamore-Elliott segment at about MP 5.

- **Central East Substation to Los Coches Substation.** To Los Coches Substation, the route would follow the proposed SRPL corridor for 31.2 miles from Central East Substation (MP 91) to approximately MP 122.2, which would be approximately 1.0 mile south of Creelman Substation in the Town of Ramona. At MP 122.2, the future 230 kV route could turn south following the existing Creelman-Lakeside 69 kV corridor through unincorporated San Diego County and then 1.6 miles through largely hilly open space on the Barona Reservation east of the San Vicente Reservoir and west of the Barona Creek Golf Club and Barona Valley Resort and Casino. The 10.5 miles route would then cross the San Diego River and El Monte Road and would terminate at the existing Los Coches Substation, which is 0.3 miles northwest of Lake Jennings near Lake Jennings County Park and the community of Lakeside. Currently only 138 kV/69 kV circuits pass through this substation

and so a 230 kV bus would need to be added to this substation to accommodate a 230 kV circuit. Another possible 230 kV route segment leading to the Los Coches Substation would follow the existing overhead 69 kV line north of San Diego Country Estates, past the Creelman Substation and south across San Vicente Road.

Central East Substation to Escondido Substation. The fourth likely destination for one or two additional circuits could be Escondido Substation via the Rincon or Pala Substations and the "Full Loop" route defined by SDG&E in responses to Data Requests (dated September 27, 2006). Two routes are identified for this potential future line; both are described below and illustrated on Figures B-12a and B-12b.

- **Northern Route.** From the proposed Central East Substation, the route would travel west through Vista Irrigation District land paralleling the proposed SRPL route for approximately 6.6 miles to its intersection with SR79. At SR79 the line would diverge from the proposed SRPL route and would head north parallel to SR79 for approximately 1.2 miles to the intersection of Highway S2 with SR79 at the existing Warner Substation. From there the route would parallel the existing 69 kV corridor west across open space owned by Vista Irrigation District north of Lake Henshaw and then it would turn southwest, following the northwest edge of the lake to SR76.

  At SR76 the route would turn west-northwest paralleling SR76 for 13.3 miles following the existing Warners-Rincon 69 kV transmission corridor across and/or bordering parcels of the Cleveland National Forest for approximately 4 miles and across La Jolla Reservation for 6 miles to Rincon Substation, which is just north of the Rincon Reservation at the Highway S6 intersection with SR76. The hilly route along SR76 is primarily agricultural/open space with scattered rural residences.

  At Rincon Substation the route would diverge from SR76 and would follow the existing Rincon-Escondido 69 kV corridor, generally parallel to Highway S6 south through the Rincon Reservation for 3 miles passing through some medium density single family residential and commercial land uses. South of the Rincon Reservation, the route would turn west in the Valley Center Substation area generally paralleling Highway S6 and then would turn south on the east side of Highway S6 for 1.6 miles before turning southwest, crossing Highway S6, and entering the City of Escondido after approximately 0.75 miles. In the City of Escondido, the route would turn south and then southwest for approximately 8 miles following the existing 69 kV corridor into Escondido Substation.

- **Southern Route.** This route would follow the "Central East Substation to Peñasquitos Substation" route described above, diverging from the proposed route at the Chicarita Substation. From the existing Chicarita Substation, the route would turn north along existing 230 kV and 69 kV transmission lines for approximately 6.2 miles. Upon entering San Dieguito River Planning Area, it would jog west-northwest for 1 mile along the existing lines. The route would follow the existing 69 kV line east and north along the west bank of Lake Hodges and crossing in and out of the City of Escondido for another 7.2 miles to terminate at Escondido Substation.

Figure B-12a. 230 kV Transmission System Expansion
CLICK HERE TO VIEW

Figure B-12b. Future Transmission System Expansion: 500 kV Central East to Riverside
CLICK HERE TO VIEW

B.2.7.2 Potential Future 500 kV Circuit

Like the potential future 230 kV circuits described above, a potential future 500 kV circuit may connect the proposed Central East Substation to the Southern California Edison (SCE) transmission system, as shown on Figure B-12b. A potential 500 kV line would exit the proposed substation, running west to Valley Center, north to Rainbow, again west to Camp Pendleton, and finally north through the Cleveland National Forest to connect with SCE's existing Serrano-Valley 500 kV line in Riverside County (SDG&E, 2007b).

A portion of the potential future 500 kV line is currently proposed by the Nevada Hydro Company, Inc. and Elsinore Valley Municipal Water District as the Lake Elsinore Advanced Pumped Storage (LEAPS) Project with a Final EIS published by Federal Energy Regulatory Commission in January 2007. The LEAPS Project is analyzed as an alternative to the Sunrise Powerlink Project (see Section E.7).

The potential future 500 kV circuit would exit the proposed Central East Substation, running northwest to parallel the existing 69 kV line past the Warners Substation. It would then follow the existing Warners-Rincon 69 kV transmission line past Lake Henshaw, hugging the lake's northern banks until it would meet SR76. The route would continue to follow the existing 69 kV line and generally following SR76 for approximately 12 miles to Rincon Substation. From Rincon, the route would continue west along the existing Rincon-Lilac 69 kV transmission line for approximately 9.5 miles across Valley Center and meet the existing Talega-Escondido 230 kV transmission line west of Lilac Substation. The route would parallel the existing 230 kV line north for approximately 13 miles, turning west with the existing corridor near the community of Rainbow. After another 16 miles, the potential future route would be between the northern boundary of Camp Pendleton Marine Corps Base and Cleveland National Forest, still following the Talega-Escondido corridor.

From Camp Pendleton, the route would follow the LEAPS Project 500 kV transmission line route to connect to SCE's existing Serrano-Valley 500 kV transmission line. The LEAPS Project route for the 500 kV line is as defined by the 33-mile "staff alternative" in the January 2007 Final EIS. The northern end of the 500 kV line would interconnect with SCE's 500 kV transmission system at a new substation north of Interstate 15 (I-15), about 20 miles west of SCE's Valley Substation.

The southern portion of the LEAPS route would be about 18.9 miles long with almost its entire length within the Trabuco Ranger District of the Cleveland National Forest, Camp Pendleton, and BLM lands. It would pass the Tenaja Ranger Station, swerving northwest, around the San Mateo Canyon Wilderness. It would continue north within the Forest, generally in a northwesterly direction. It would be underground for about 2.1 miles through a popular hang-gliding area, transitioning to overhead at a point about 1.7 miles south of SR74 along South Main Divide Road. The overhead line would continue north along South Main Divide Road, crossing SR74 (Ortega Highway), and crossing into Orange County. It would leave the Forest in a northeasterly segment that crosses I-15 to an interconnection point with the existing SCE Valley-Serrano 500 kV line.

B.3 Proposed Project Components

Each of the proposed 500 kV and 230 kV transmission lines would consist of three bundles of wires (conductors) to form three electrical phases. The overhead conductors would be supported by various structure types and separated from these structures by insulators. This section describes the structures, hardware, access road, and ROW components of the Proposed Project.

B.3.1 Structures

The proposed 500 kV circuit would be supported by three types of structures: lattice steel towers (Figure B-13), tubular steel poles (Figure B-14), and steel H-frame structures (Figure B-15). The SRPL 230 kV structures would be lattice steel towers (Figure B-16), tubular steel poles (Figure B-17), and single-circuit transition structures (Figure B-18). The proposed lattice towers and steel poles for the 230 kV segment of the SRPL would be able to support two circuits. Both circuit locations would be occupied by new 230 kV SRPL circuits between the Central East and Sycamore Canyon Substations. Between the Sycamore Canyon and Peñasquitos Substations one circuit location would be occupied by the new SRPL 230 kV circuit whereas the second circuit would be a relocated, existing 138 kV or 69 kV circuit. The dimensions of the structures would vary depending on the voltage (i.e., 500 kV structures would be larger than 230 kV structures). Additionally, some 500 kV structures within ABDSP would have a third circuit underbuilt, as described in Section B.2 and illustrated in Figure B-19.

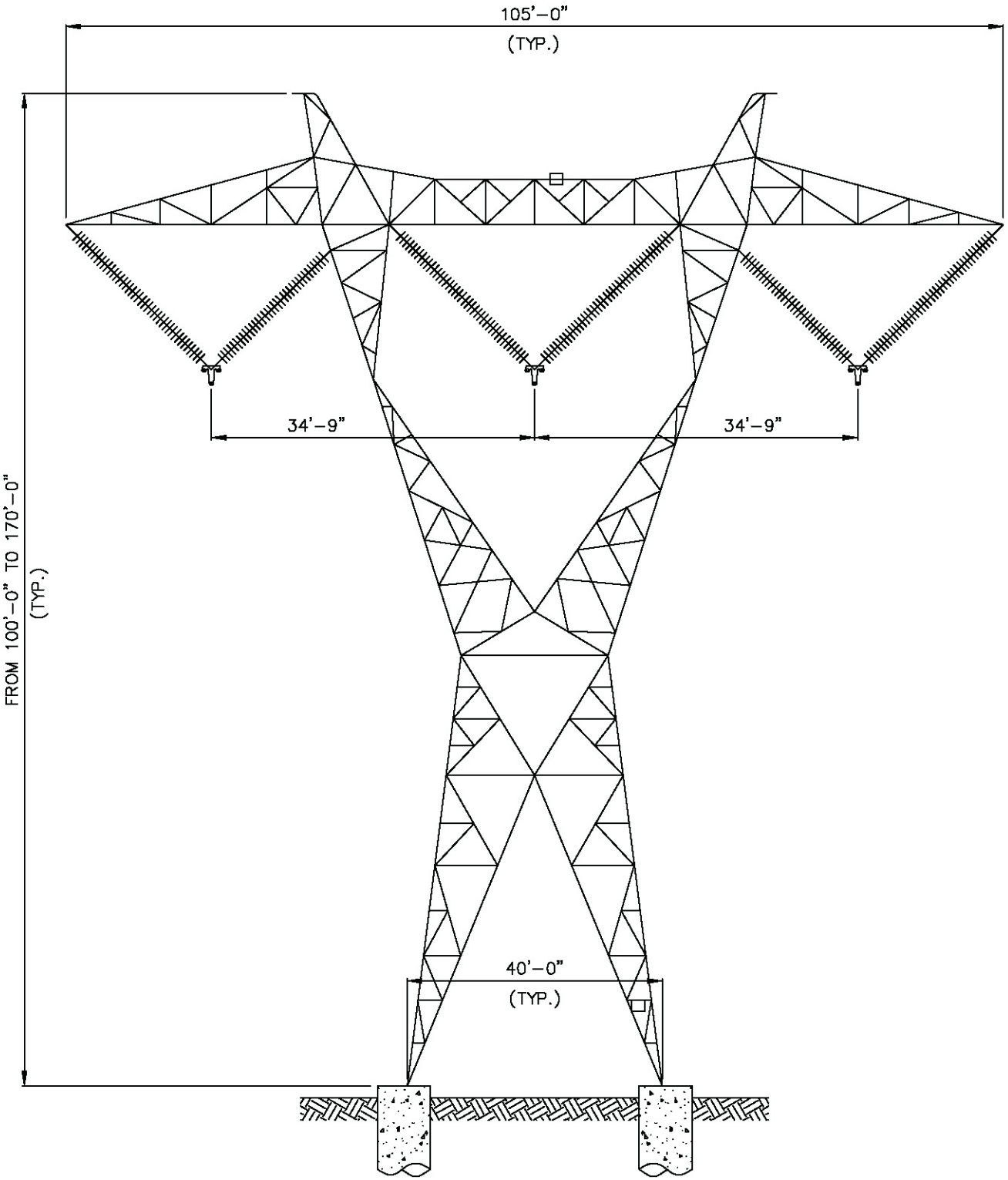
New wooden poles and new wooden replacement poles would also be used in some locations, specifically to reconductor the 69 kV circuit between Sycamore Canyon and Elliot Substations. The replacement wooden poles for this segment of the Proposed Project would have the same dimensions as the existing wooden poles. Other proposed structure types include 69 kV tubular steel poles within the Central Link between MP 100.2 and MP 109.4 (Figure B-20), and transition structures for the 69 kV and 92 kV circuits within the Anza-Borrego Link (Figures B-21 through B-23).

As illustrated in Table B-1, the SRPL would have the following configuration:

Imperial Valley Link. Within the Imperial Valley Link, the SRPL would require construction of 206 new 500 kV structures. Each new tower structure would be approximately 160 feet tall. Between MP 0 and MP 4, lattice towers would parallel the existing SWPL towers with new towers aligned parallel to each existing tower. From MP 4 to MP 20, where the route follows the western edge of agricultural lands, 47 steel poles and 14 lattice structures are proposed. The next 41 miles of the SRPL would be supported by lattice towers.

Anza-Borrego Link. Transmission structures supporting the SRPL within ABDSP would be approximately 130 feet tall. From the eastern Park boundary (MP 61.0) to SR78, the SRPL transmission line would be supported by 46 new steel lattice towers. Within this segment, SDG&E proposes to remove IID's existing 92 kV line and attach it to the new lattice tower structures. At MP 68.2, the 92 kV line would transition underground via a transition structure and would be installed underground within SR78 to the existing Narrows Substation. Along this segment, the new 500 kV line would be supported by H-frame structures north of the highway. At the Narrows Substation (MP 69.7), the 500 kV line would pass north of SR78, and the 92 kV lines would connect to the substation.

SDG&E currently operates an existing 69 kV line that extends from Warners Substation to Narrows Substation to Borrego Substation. West of Narrows Substation, the 69 kV line (currently on wood poles) would be relocated underground into SR78 for 5.1 miles, and the new 500 kV line would continue north of the highway on 25 new H-frame structures. At each end of the underground segment, a new tubular steel transition structure would be installed to transition the line. At the intersection of S-3 and SR78 (MP 74.8), the 69 kV line would transition overhead and be underbuilt on 56 new 500 kV lattice towers through Grapevine Canyon. Within the Park, a total of 144 new structures would be constructed.



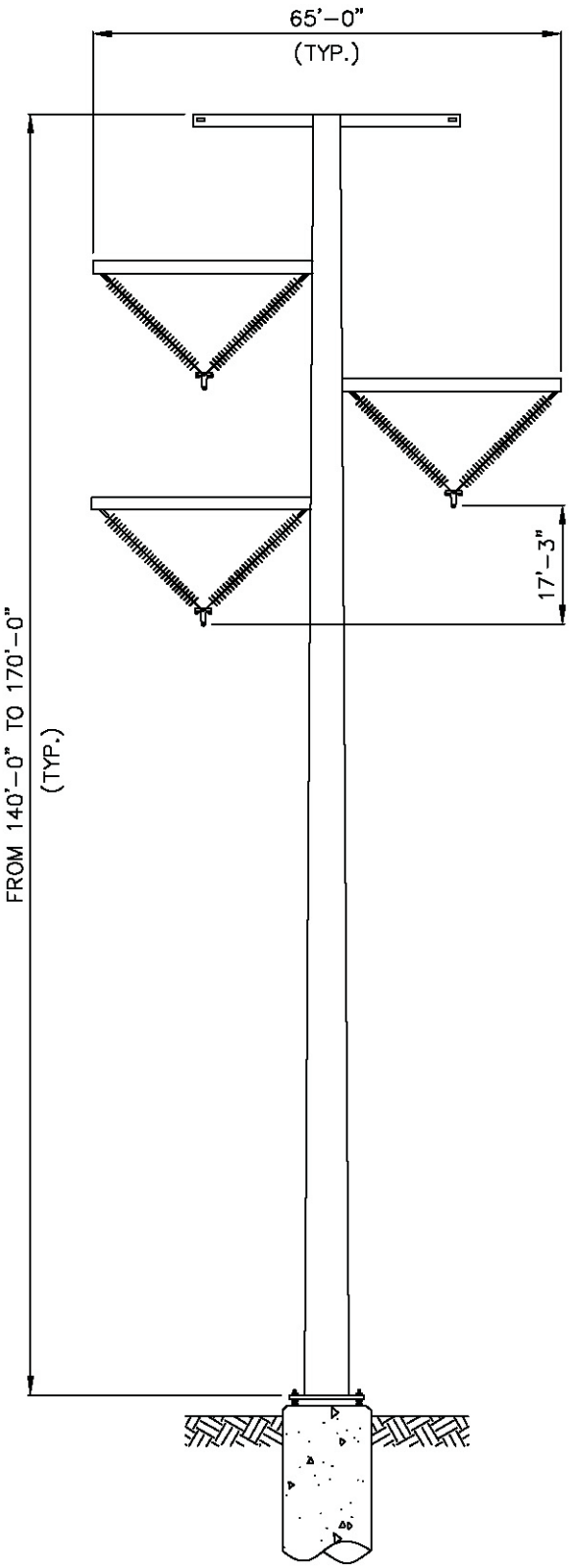
Aspen Environmental Group

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

Source: PEA, 2006

Sunrise Powerlink Project

Figure B-13
Typical 500 kV Single Circuit Lattice Tower: Imperial Valley and Central Links



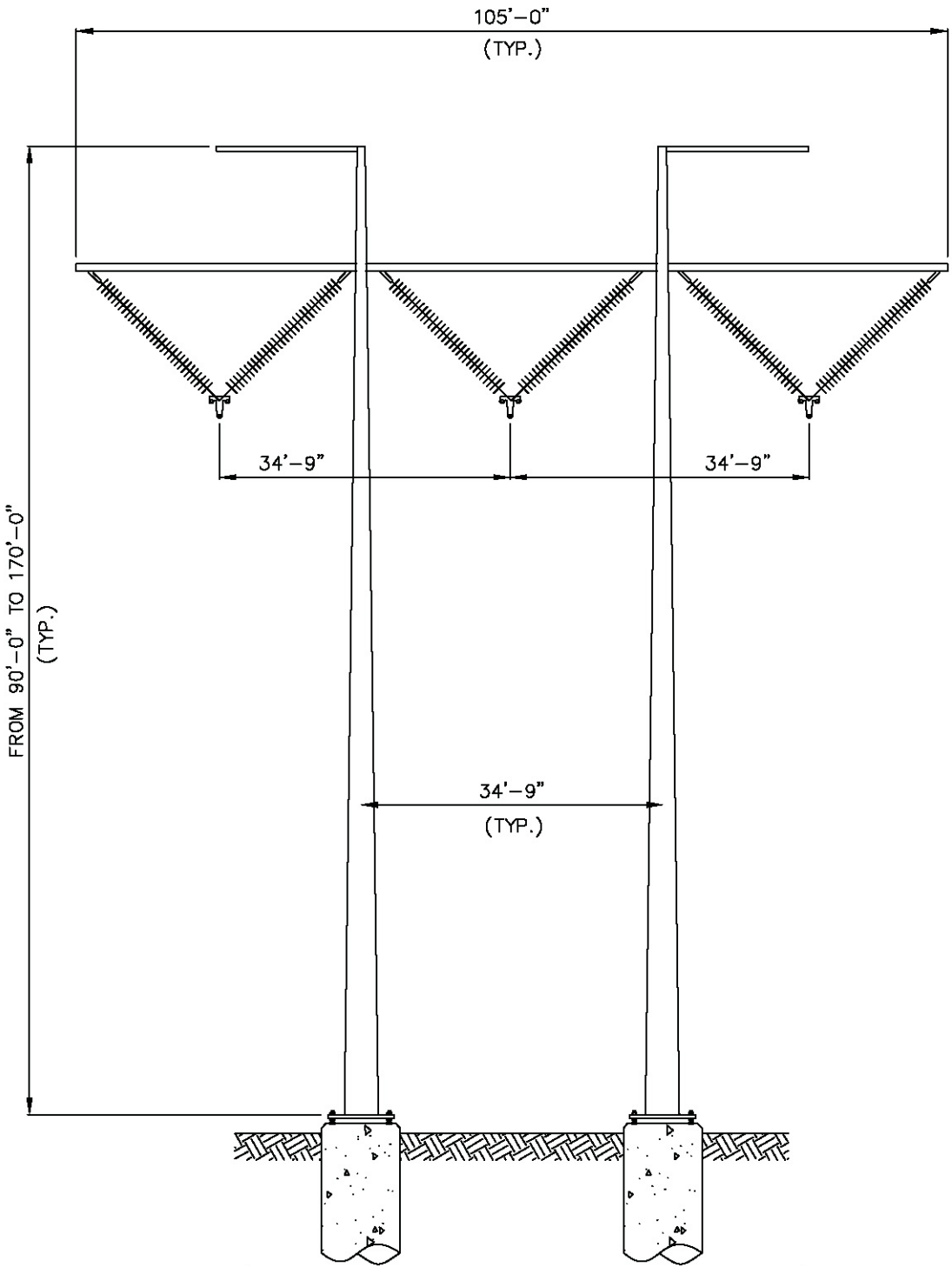
Aspen Environmental Group

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

Source: PEA, 2006

Sunrise Powerlink Project

Figure B-14
Typical 500 kV Single Circuit Tubular Steel Pole: Imperial Valley Link

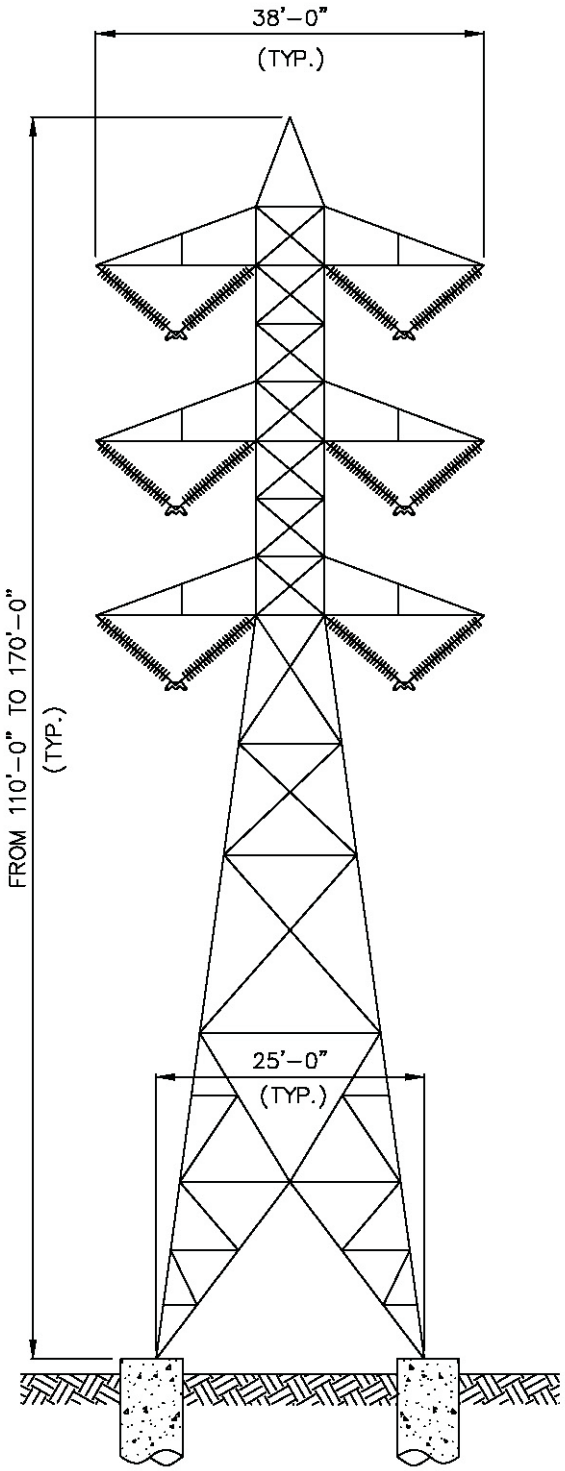


Note: Dimensions are approximate and may vary with site conditions.

Source: PEA, 2006

Sunrise Powerlink Project

Figure B-15
Typical 500 kV Single Circuit Steel H-Frame Tower: Anza-Borrego Links



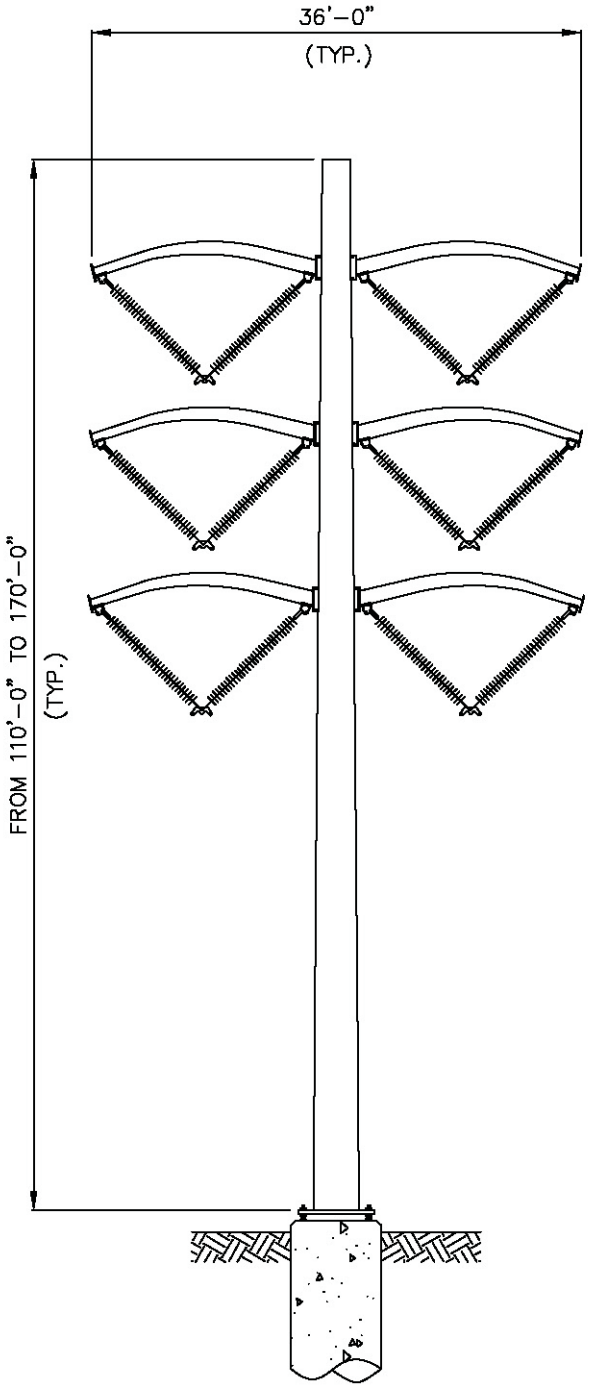
Aspen Environmental Group

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

Source: PEA, 2006

Sunrise Powerlink Project

Figure B-16
Typical 230 kV Double Circuit Lattice Tower: Central, Inland Valley, and Coastal Links



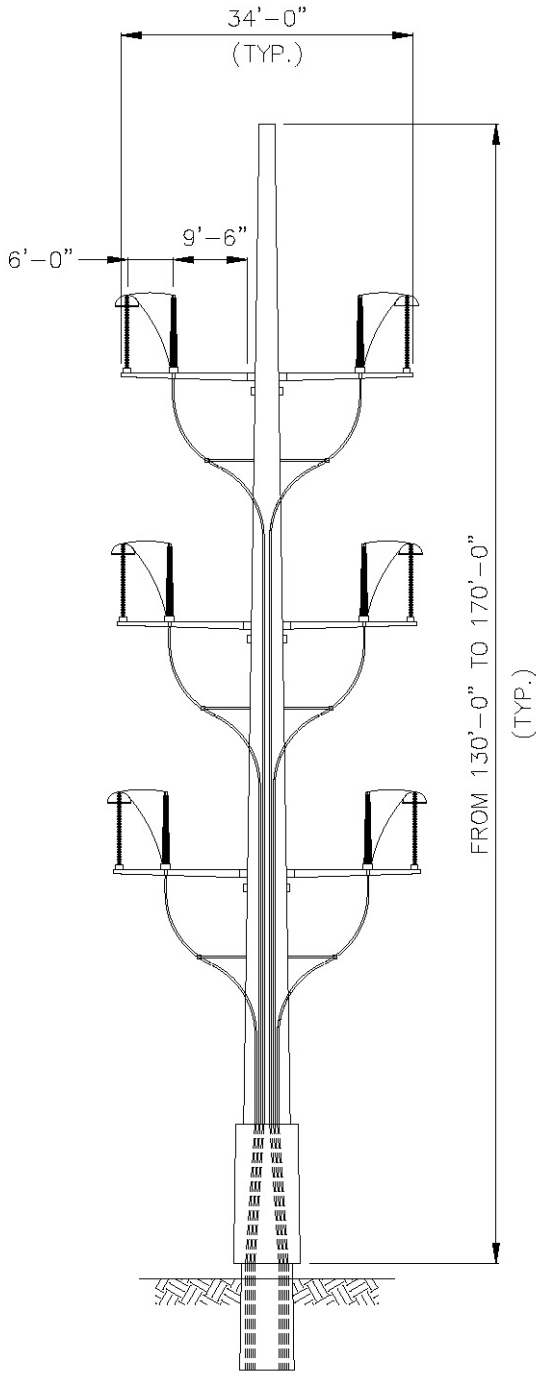
Aspen Environmental Group

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

Source: PEA, 2006

Sunrise Powerlink Project

Figure B-17
Typical 230 kV Double Circuit Tubular Steel Pole: Central, Inland Valley, and Coastal Links



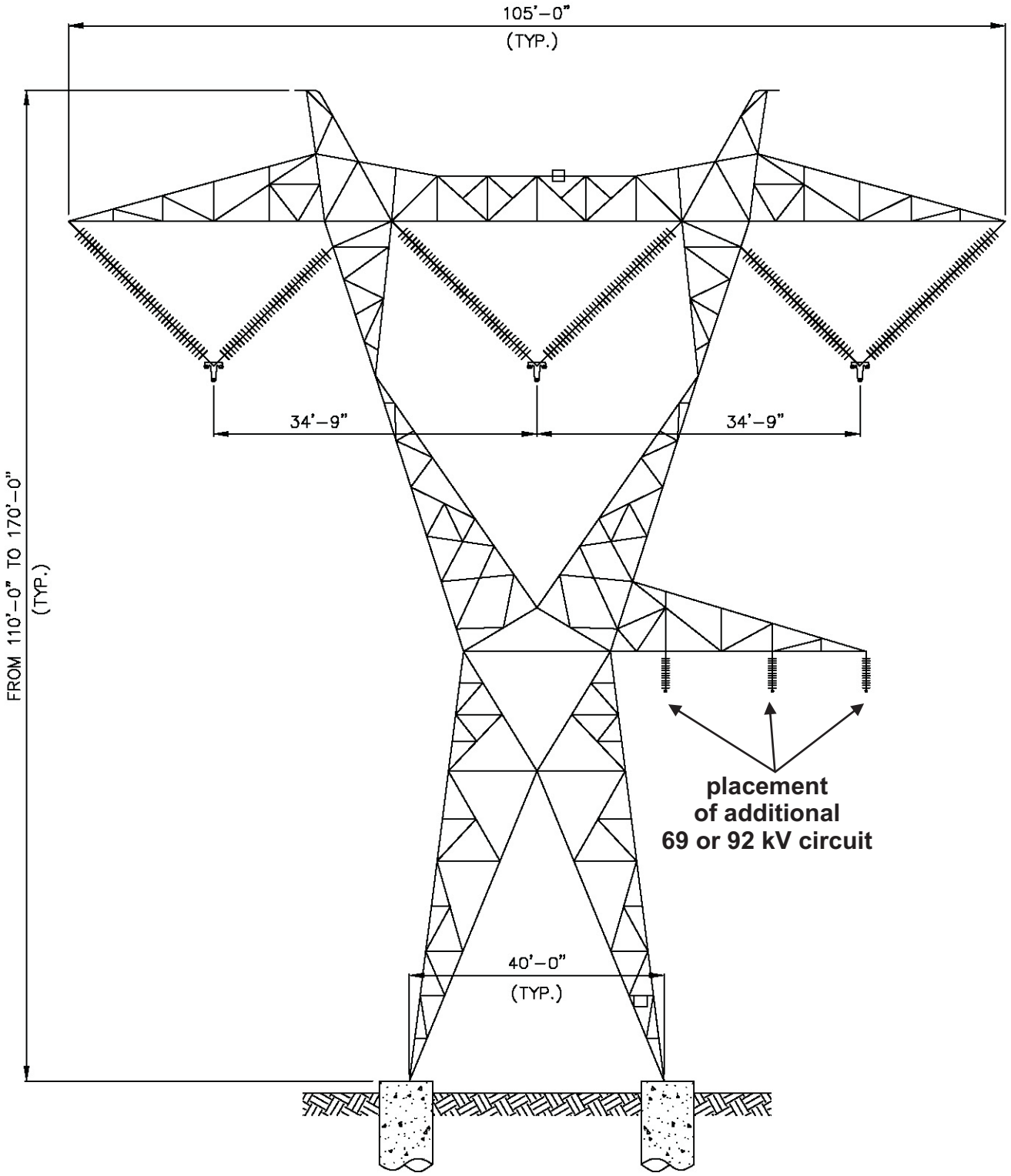
Aspen Environmental Group

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

Source: PEA, 2006

Sunrise Powerlink Project

Figure B-18
Typical 230 kV Single Circuit Steel Transition Tower: Inland Valley and Coastal Links



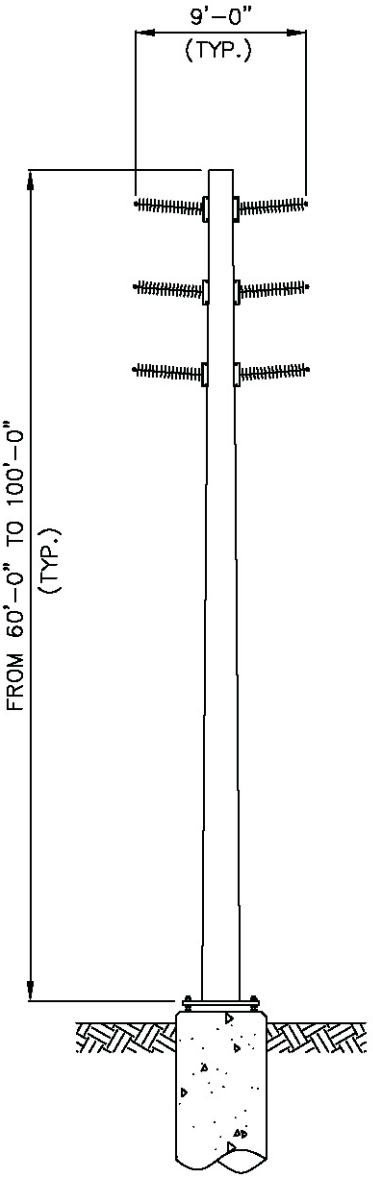
Aspen Environmental Group

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

Source: PEA, 2006

Sunrise Powerlink Project

Figure B-19
Typical 500 kV Single Circuit Lattice Tower with 69 kV or 92 kV Underbuild: Anza-Borrego and Central Links

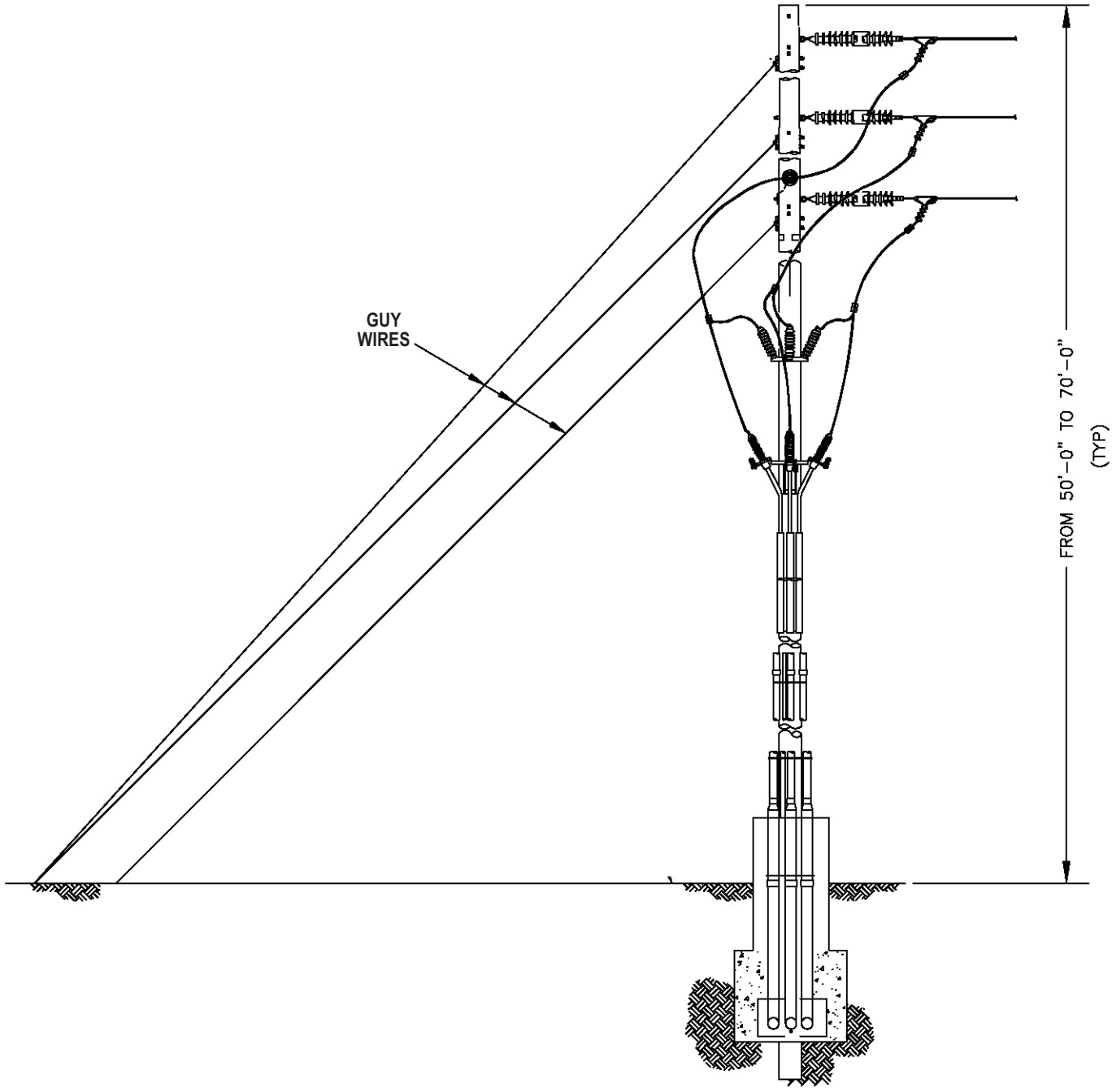


Note: Dimensions are approximate and may vary with site conditions.

Source: PEA, 2006

Sunrise Powerlink Project

Figure B-20
Typical 69 kV Double Circuit Tubular Steel Pole: Central Link



Aspen Environmental Group

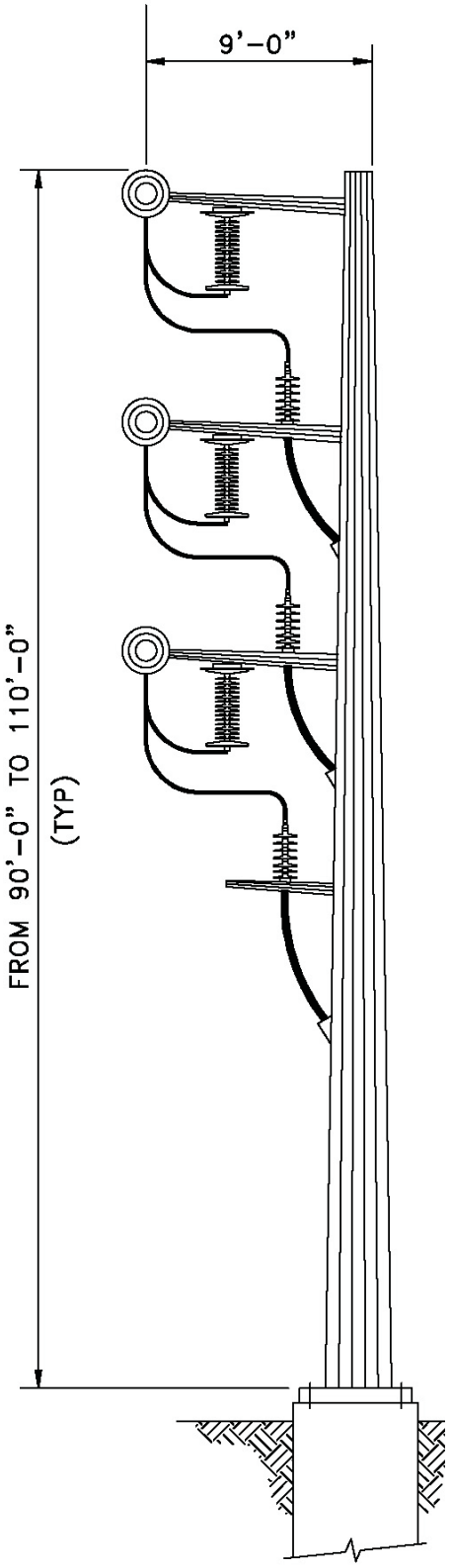
Note: Dimensions are approximate and may vary with site conditions.

Source: PEA, 2006

Sunrise Powerlink Project

Figure B-21

Typical 69 kV Single Circuit Wood Transition Tower: Anza-Borrego Link



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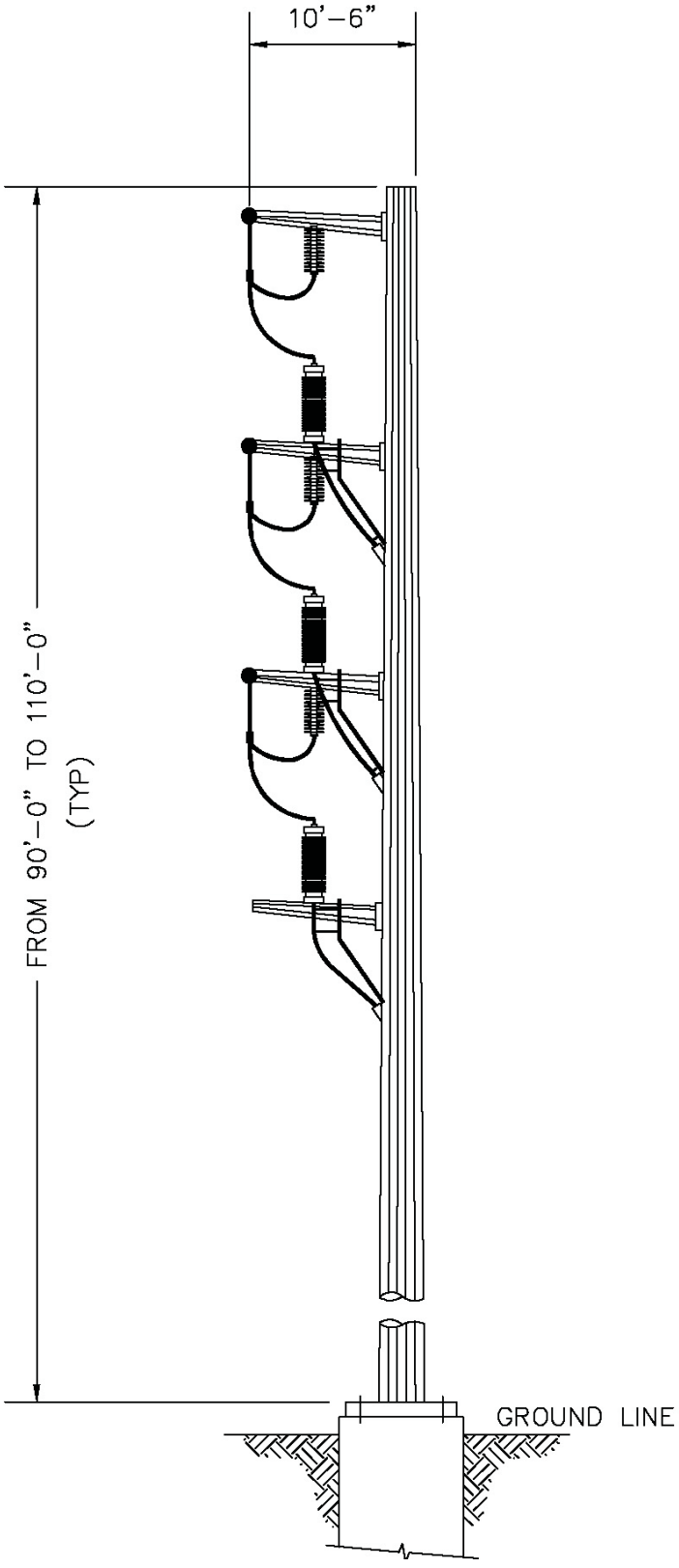
Note: Dimensions are approximate and may vary with site conditions.

Source: PEA, 2006

Sunrise Powerlink Project

Figure B-22
Typical 69 kV Single Circuit Steel Transition Tower: Anza-Borrego Link



Aspen Environmental Group

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

Source: PEA, 2006

Sunrise Powerlink Project

Figure B-23
Typical 92 kV Single Circuit Steel Transition Tower: Anza-Borrego Link

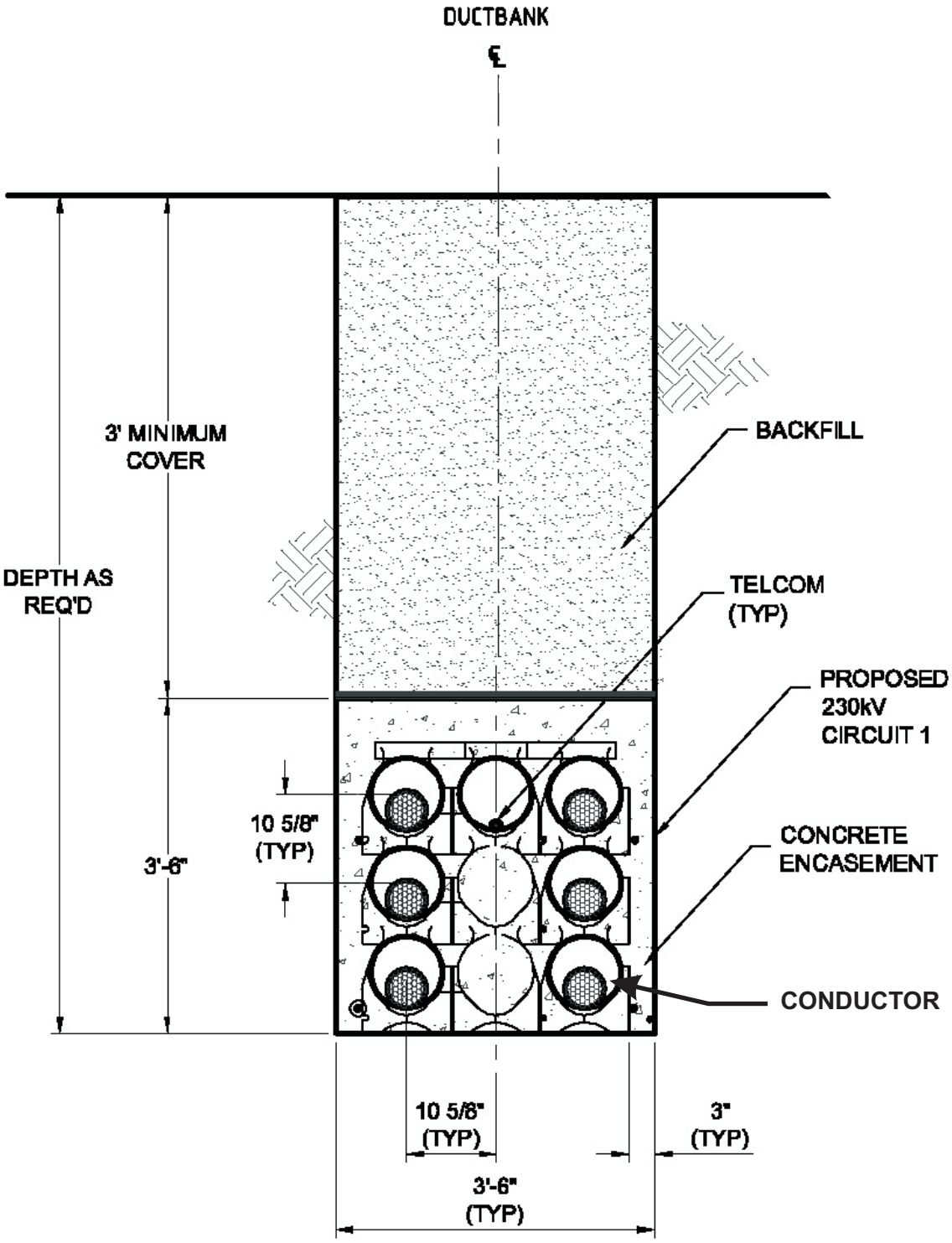
Central Link. The Central Link would include a total of 119 new 230 kV structures and 37 new 500 kV lattice towers ranging in height from 120 to 160 feet. Within this link, the 500 kV line through Grapevine Canyon would be supported by 21 lattice towers with the existing 69 kV line underbuilt. At the point where the 500 kV line turns due west (MP 87.6), the 69 kV line would drop off the 500 kV towers and continue on existing wood poles to the Warners Substation, and the 500 kV line would connect to the proposed Central East Substation on 16 lattice towers. The 230 kV portion of this segment would be supported by tubular steel poles. However, lattice towers would be required where inaccessible terrain requires helicopter construction as steel poles are too heavy for helicopters to transport (see Section B.4.4.2 for location of towers preliminarily identified as requiring helicopter construction). The existing 69 kV line that is currently located along SR79 would be relocated to the east on 117 new tubular steel poles within the proposed SRPL ROW. The new 69 kV poles would be located just east of the 230 kV structures in the Santa Ysabel Valley. The existing 69 kV wood poles would be removed.

Where the SRPL 230 kV line would turn southwest (MP 109.3), the relocated 69 kV line on steel poles would turn northeast to parallel a second existing 69 kV overhead transmission line on wood poles to connect to the Santa Ysabel Substation. Southeast of MP 109.3, the proposed SRPL 230 kV line would be constructed parallel to the existing 69 kV transmission line that is on wood poles.

Inland Valley Link. Within this link, 120 new double-circuit 230 kV structures would be constructed. SDG&E has proposed the use of lattice structures in areas where it believes that visual impacts are not an issue and where limited vehicle access would require helicopter construction (see Section B.4.4.2 for location of towers preliminarily identified as requiring helicopter construction). Two tubular steel transition structures would be located at each end of the underground segment south of Ramona to transition the overhead and underground segments. Each transition structure would support conductors for a single 230 kV circuit; two transition structures would be required at each transition point. Figure B-24 shows typical 230 kV duct bank configuration. Proposed SRPL structure heights within this link would range from 120 to 140 feet. The overhead portions of the SRPL within the Inland Valley Link would be constructed parallel to an existing 69 kV transmission line that is supported by wood and steel poles.

Coastal Link. This segment of the SRPL would require construction of 50 new structures ranging in height from 120 to 140 feet. Between the eastern boundary of the Coastal Link and the existing Chicarita Substation (MP 142.3), the single-circuit 230 kV SRPL line would be supported by 30 new 230 kV double-circuit tubular steel poles. Along this segment, the existing 138 kV overhead transmission line would be relocated from existing wood H-frame structures to the open position on the new tubular steel poles. The new structures would be designed to approximately match span for span the existing tubular steel poles east of Chicarita Substation that currently support 230 kV and 69 kV circuits. SDG&E proposes to remove the existing H-frame structures after the new 138 kV circuit is attached to the new SRPL tubular steel poles.

West of the Chicarita Substation, the new 230 kV line would be installed underground for approximately 4.3 miles. A single tubular steel transition structure would be required at each end of the underground segment to facilitate the transition between overhead and underground. At MP 146.7, the new 230 kV line would transition to an overhead circuit that would be supported by 16 double-circuit tubular steel poles and the existing 69 kV circuit would be relocated to the open position on the new SRPL tubular steel poles. Figures B-24 and B-26 show typical 230 kV duct bank configurations anticipated for this link.



Note: There would be two adjacent trenches with duct banks for the DC 230 kV segment (Inland Valley) and one for the SC 230 kV segment (Coastal).

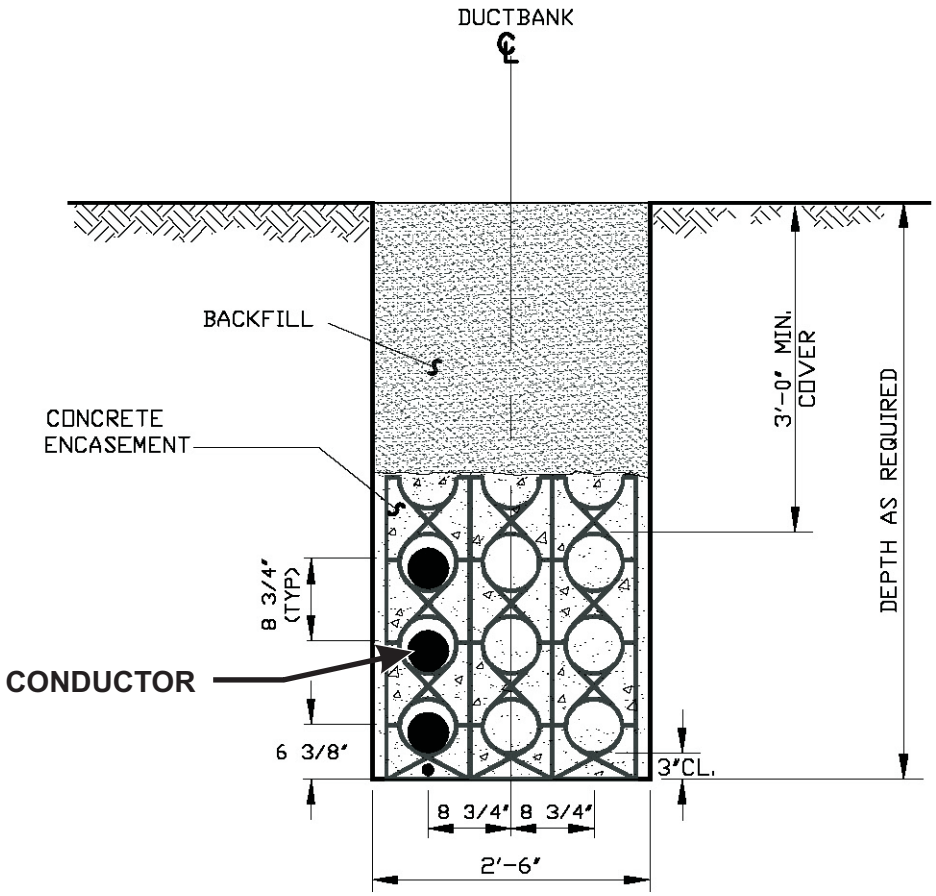
Dimensions are approximate and may vary with site conditions.

Source: PEA, 2006

Sunrise Powerlink Project

Figure B-24

Typical 230 kV Duct Bank: Inland Valley and Coastal Links (vertical configuration)



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

Source: PEA, 2006

Sunrise Powerlink Project

Figure B-25
Typical 69 or 92 kV Duct Bank: Anza Borrego Link

Figure B-26. Typical 230 kV Duct Bank: Coastal Link (horizontal configuration)
CLICK HERE TO VIEW

Table B-1. Proposed Structure Configuration

Milepost	Structure Type	Height (ft)	No. of Structures	Median Distance Between Structures (ft)	Permanent Disturbance Area per structure (sq. ft.)	EIR/EIS Figure Reference
Imperial Valley Link						
MP 0 – MP 7.6	500 kV lattice tower	160	24	1,705	79	B-13
MP 7.9 – MP 19.8	500 kV steel pole/lattice tower	160	47 steel poles 3 lattice towers	1,305	64 (steel pole) 79 (lattice tower)	B-13, B-14
MP 19.9 – MP 60.9	500 kV lattice tower	160	132	1,615	79	B-13
Anza-Borrego Link						
MP 61.0 – MP 67.9	500 kV lattice tower with 92 kV underbuild	130	46	800	79	B-19
MP 68.2, 69.7	92 kV transition structure	90-110	2	7,920	50	B-23
MP 68.1 – MP 75.0	500 kV H-frame	130	38	800	77	B-15
MP 69.7, 74.8	69 kV transition structure	50-70 (wood) 90-110 (steel)	2	26,928	50	B-21, B-22
MP 75.1 – MP 83.4	500 kV lattice tower with 69 kV underbuild	130	56	445	79	B-19
Central Link						
MP 83.5 – MP 87.6	500 kV lattice tower with 69 kV underbuild	160	21	1050	79	B-19
MP 87.8 – MP 90.6	500 kV lattice tower	150-160	16	990	79	B-13
MP 91.0 – MP 110.8	Double-circuit 230 kV lattice tower or steel pole	120	119	910	64 (steel pole) 79 (lattice tower)	B-16, B-17
MP 100.2 – MP 109.4	Double-circuit 230 kV tubular steel pole	60-100	117	425	64	B-17
Inland Valley Link						
MP 110.8 – MP 117.0	Double-circuit 230 kV lattice tower or steel pole	120	33	1000	64	B-17
MP 117.2, MP 122.0	Single-circuit 230 kV transi-tion structure	140	4	25,334	64	B-18
MP 122.0 – MP 136.3	Double-circuit 230 kV lattice tower or steel pole	120	87	800	64 (steel pole) 79 (lattice tower)	B-16, B-17
Coastal Link						
MP 136.5–MP 142.3	Double-circuit 230 kV steel pole	120	30	1000	64	B-17
MP 142.5, MP 146.7	Single-circuit 230 kV transition structure	140	2	22,176	64	B-18
MP 146.8 – MP 149.9	Double-circuit 230 kV steel pole	120	18	1100	64	B-17
Sycamore Canyon–Elliot Reconductor						
	69 kV wood pole	65-85	11 (to be replaced)	385	7	N/A

B.3.2 Hardware Including Conductors/Insulators/Overhead Ground Wires

B.3.2.1 Conductors

The new 500 kV triple-bundled circuit would consist of nine conductors, with three conductors for each of three phases. The 1033.5 kcmil[5] ACSR/AW conductors would be assembled in a triangular shape spaced 18 inches between each conductor. The triple-bundled configuration is proposed to provide adequate current carrying capacity with the potential to reduce audible noise and radio interference. Each 500 kV conductor would have a 45/7 aluminum/steel stranding,[6] a diameter of 1.212 inches, and a weight of 1.135 lb/ft.

For the 230 kV transmission line, a bundle of two 900 kcmil ACSS/AW conductors are proposed per phase, for a total of six conductors per circuit. The conductors would be spaced horizontally with 18 inches between their centers. Each 230 kV conductor would have a 54/7 aluminum/steel stranding, a diameter of 1.162 inches, and a weight of 1.111 lb/ft

Spacing parameters are determined according to CPUC General Order 95, which provides for minimum distances between the conductors and ground (sag), crossing structures, the transmission support structure, and other conductors. The values for all generally increase with the voltage of the line. Consistent with General Order 95, for each type of SRPL structure, the spacing between circuits would be as follows:

- 500 kV single-circuit lattice tower – 34.8 feet vertically and 34.8 feet horizontally
- 500 kV single-circuit tubular poles – 17.3 feet vertically and 18 feet horizontally
- 500 kV single-circuit H-frame tower – 34.8 feet vertically and 34.8 feet horizontally
- 230 kV double-circuit lattice tower – 18 feet vertically and 21 feet horizontally
- 230 kV double-circuit tubular pole – 18 feet vertically and 19 feet horizontally

B.3.2.2 Insulators

As shown in Figures B-13 through B-19, insulator assemblies for 500 kV and 230 kV tangent and angle structures would consist of two strings of insulators normally in the form of a "V." These strings are used to suspend each conductor bundle (phase) from the structure, maintaining the appropriate electrical clearance between the conductors, the ground, and the structure. The V-shaped configuration also restrains the conductor so that it will not swing into the structure in high winds. Dead-end insulator assemblies would use an I-shaped configuration, which consists of insulators hung from tower cross arms in the form of an "I". Insulators for the 500 kV lines would be composed of porcelain. All 230 kV insulators would be made of silicone-based polymer.

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[5] Kcmil (1000 cmils) is a quantity of measure for the size of a conductor; kcmil wire size is the equivalent cross-sectional area in thousands of circular mils. A circular mil (cmil) is the area of a circle with a diameter of one thousandth (0.001) of an inch.

[6] Aluminum/steel refers to the conductor material composition. The preceding numbers indicate the number of strands of each material type present in the conductor (i.e., 45/7 aluminum/steel stranding has 45 aluminum strands wound around 7 steel strands).

B.3.2.3 Overhead Shield Wires

Overhead fiber optic shield wires would be located on the peaks of each transmission structure and function to intercept lightning that would otherwise strike the conductor. All 230 kV structures would have a single wire fiber optic shield wire (OPGW) installed at the structure peak. All 500 kV structures would support two wires at each structure peak: an OPGW and an aluminum clad stranded steel wire. In addition to providing lightning protection for conductors, the OPGW would facilitate data transfer between SDG&E facilities. The data transferred would be required for system monitoring.

B.3.2.4 Other Associated Hardware

In addition to the conductors, insulators and overhead shield wires, other associated hardware would be installed on the tower as part of the insulator assembly to support the conductors and shield wires. This hardware would include clamps, shackles, links, plates, and various other pieces composed of steel and aluminum. Additionally, a grounding system would be installed at the base of each transmission structure that would consist of copper ground rods embedded into the ground in immediate proximity to the structure foundation and connected to the structure by buried copper lead.

Hardware that is not associated with the transmission of electricity would not be installed as part of the Proposed Project. However, aerial marker spheres or aircraft warning lighting may be required for the conductors or structures per Federal Aviation Administration, U.S. Customs and Border Protection, or U.S. Department of Defense regulations. Structure proximity to airports and structure height are the determinants of whether FAA regulations would apply. Although an assessment of wire/tower strike risk will be completed and submitted to the FAA for review, SDG&E does not anticipate that structure lighting would be required because proposed structures are less than 200 feet tall and are not near airports that require structure lighting.

B.3.3 ROW Requirements and Access Roads

B.3.3.1 ROW Acquisition

In selecting a route for the Proposed Project, SDG&E identified existing transmission line easements or rights-of-way and other utility corridors as the most desirable areas to site the SRPL (SDG&E, 2006c). Although the proposed SRPL ROW would follow existing utility easements in most areas, SDG&E would need to acquire additional ROW, as detailed in Table B-2. Within ABDSP, the proposed ROW would follow SDG&E's existing easement. However, the width and location of the existing easement through ABDSP is still being verified and there are short segments of the Proposed Project alignment that deviate completely from SDG&E's existing easements (0.4 acres within Grapevine Mountain Wilderness Area and 42.47 acres within Pinyon Ridge Wilderness Area) or that may be less than 100 feet in width (see Section B.2.2). Additional ROW would not be required for the Sycamore Canyon to Elliot Substation reconductor segment.

B.3.3.2 Access and Spur Roads

Construction of the new 500 kV and 230 kV transmission lines and associated relocations would require access to each new structure and existing structure site for construction crews, materials and equipment. Similarly, construction of other project components such as laydown areas and substation pads would require vehicle access. New access roads or access spur roads would be constructed using a bulldozer or grader, followed by a roller to compact and smooth the ground. Front-end loaders would be used to move the soil locally or offsite. Typically, 14-foot-wide straight sections of road and 16- to 20-foot-wide sections at corners would be required to facilitate safe movement of equipment and vehicles. Wherever possible, new access roads or spur roads would be constructed within the transmission line ROW, or existing streets and access roads would be used. Existing access roads may be improved for project use, as required. See detailed maps in Appendix 11 for locations of existing and proposed access roads and Table B-3 for a quantification of these access roads by link.

After project construction, existing and new permanent access roads would be used by maintenance crews and vehicles for inspection and maintenance activities. Temporary construction roads not required for future maintenance access would be removed and restored after project construction is complete. Gates would be installed as required to restrict unauthorized vehicular access to the ROW.

Table B-2. ROW Width Requirements

Link	Existing (feet)	Additional New ROW (feet)	Proposed (feet)
Imperial Valley			
IV Sub – MP 60.9	0	200	200
Anza-Borrego[1]			
MP 60.9 – MP 83.5	100	50	150
Central			
MP 83.5 – Central East Sub	0	200	200
Central East Sub – MP 110.8	0	300	300
Inland Valley			
MP 110.8 – MP 117.2	0	200	200
MP 117.2 – MP 121.9	0	60	60
MP 121.9 – MP 123.4	200	0	0
MP 123.4 – Sycamore Canyon Sub	100	0	0
Coastal			
Sycamore Canyon Sub – MP 142.3	200	0	0
MP 142.3 – MP 143.9	150	0	0
MP 143.9 – MP 146.4	0	60	60
MP 146.4 – MP 146.6	100	0	0
MP 146.6 – MP 146.7	0	100	100
MP 146.7 – Peñasquitos Sub	300	0	0

Source: SDG&E, 2006.

Table B-3. Proposed and Existing Access Roads

Link	Proposed Access Roads (acres)	Proposed Access Roads (miles)	Existing Access Roads (acres)
Imperial Valley	119.7	49.4	74.1
Anza-Borrego	19.4	8.0	76.2
Central	182.3	36.4	31.0
Inland Valley	24.7	8.0	133.0
Coastal	1.2	0.4	142.9

Source: SDG&E, 2006.

B.4 Construction Activities and Procedures

The proposed operational (in-service) date for SRPL is in spring 2010. Construction activities are expected to occur over a 24-month period, starting the first quarter of 2008. Work would commence upon approval of the Proposed Project by CPUC, BLM, and other permitting agencies. The following sections detail the construction activities and procedures of the Proposed Project, including required equipment, labor, and proposed construction schedule.

Water Usage and Sources. Table B-4a lists the water used for construction activities by link.

Table B-4a. Water Usage by Link during Construction

Activity	Desert Link (gallon)	Anza-Borrego Link (gallon)	Central Link (gallon)	Inland Valley Link (gallon)	Coastal Link (gallon)	SX-EL 69 kV Reconductor (gallon)	Central East Substation (gallon)
Average Lattice Tangent Structure	153,000	108,000	121,000	105,000	—	—	—
Average Lattice Angle/Dead-End Structure	87,000	255,000	151,000	90,000	—	—	—
Average Steel H-Frame Structure	—	75,000	—	—	—	—	—
Average Steel Pole Tangent Structure	71,000	—	188,000	N/A	46,000	—	—
Average Steel Pole Angle/Dead-End Structure	4,600	9,100	46,000	4,500	41,000	—	—
ROW Dust Control	7.6 MM	2.9 MM	4.5 MM	2.9 MM	1.1 MM	60,000	—
Insulator Washing (two times/yr max.)	124,800	86,000	—	—	—	—	—
Substation Grading/Site Work	—	—	—	—	—	—	50MM
Substation Landscape	—	—	—	—	—	—	1.28 MM
Substation Fire Protection	—	—	—		—	—	1.0 MM
Concrete for Substation from Batch Plant	—	—	—	—	—	—	160,000

Source: SDG&E Response to Data Request 12, dated May 25, 2007.

Table B-4b shows water sources on a link by link basis during both project construction and for operation (e.g., insulator cleaning) that is discussed in Section B.5. Table B-15 in Section B.4.7 shows the estimated trips per day and mileages to truck water to the project area for transmission line and substation construction.

Table B-4b. Assumed Water Source Distribution

Project Location	Concrete Source	Water Source (Dust Control/Minor Grading)	Water Source (Maintenance)
Desert Link (MP 0–MP 14)	Batch plants operated in El Centro, Seeley, or Brawley[1]	IID West Side Main Canal	De-ionized water from IID power plant in El Centro
Desert Link (MP 14-MP 31)	Batch plants operated in El Centro, Seeley, or Brawley[1]	IID East Highland Canal[7]	De-ionized water from IID power plant in El Centro
Desert Link (MP 31-MP 40)	Batch plants operated in El Centro, Seeley, or Brawley[1]	IID Thistle Canal near Hwy 78/86 connector	De-ionized water from IID power plant in El Centro
Desert Link (MP 40-MP 60)	Ocotillo Wells batch plant[2]	IID Thistle Canal near Hwy 78/86 connector	De-ionized water from IID power plant in El Centro
ABDSP Link (MP 60-MP 83)	Central East Substation batch plant[3]	Central East Substation batch plant[3]	De-ionized water from IID power plant in El Centro
Central Link (MP 83-MP 111)	Central East Substation batch plant[3]	Vista Irrigation District	De-ionized water from SDG&E Kearny O&M[8]
Inland Valley Link (MP 111-MP 124)	Batch plants operating near or in City of Ramona[4]	Ramona Municipal Water District and/or City of Poway Public Services	De-ionized water from SDG&E Kearny O&M[8]
Inland Valley Link (MP 124-MP 136)	Batch plants operating near or in City of Poway[5]	Ramona Municipal Water District and/or City of Poway Public Services	De-ionized water from SDG&E Kearny O&M[8]
Coastal Link (MP 136-MP 150)	Batch plants operating near or in City of San Diego[6]	City of San Diego Water District or other local municipal water supply, depending on location	De-ionized water from SDG&E Kearny O&M[8]
SX-EL 69 kV Recon-ductor	Batch plants operating near or in City of San Diego[6]	City of San Diego Water District or other local municipal water supply, depending on location	De-ionized water from SDG&E Kearny O&M[8]

Source: SDG&E Response to CPUC/BLM Data Request 14, dated June 1, 2007.

1 Water supplied to these batch plants will come from municipal vendors.

2 It is assumed that a temporary concrete batch plant will be set up at Ocotillo Wells. This batch plant will operate on 100% hauled water from either the Imperial Valley sources (IID via northern West Main Canal pick-up point or Westmoreland municipal supply), or from the temporary Vista Irrigation District (VID) supply at the proposed Suncrest Substation site.

3 It is assumed that a temporary concrete batch plant will be set up at the proposed Central East Substation site. This batch plant will operate on water supplied by VID wells by way of temporary pipe system to be determined or holding ponds at substation site.

4 Water supplied to these batch plants are supported by the Ramona Municipal Water District.

5 Water supplied to these batch plants are supported by the City of Poway municipal water supply.

6 Water supplied to these batch plants are supported by the City of San Diego Water District or other local municipal water supply, depending on location.

7 Dust control trucks split section north and south of pick up point.

8 Depending on voltage class, washing of insulators may utilize a diluted de-ionized water mixture which would include de-ionized water from SDG&E's Kearny O&M District plus water from the local municipal water supply.

Notes:

1. It is assumed that existing IID water contracts will not preclude hauling water from their sources, or from municipal sources, to areas outside the IID services area.
2. It is assumed that the Ocotillo Wells batch plant will not serve as storage for construction water (dust control, minor grading, etc.).

B.4.1 Transmission Line Construction

This section describes the activities that would occur during the construction of the SRPL transmission line. The discussion is divided into overhead and underground construction components. Since the general overhead construction techniques are similar for 230 and 500 kV lines, the construction activities for both are described together in Section B.4.1.1, with any differences noted. Also, underground

construction techniques are similar for 69, 92, and 230 kV lines and are described together in Section B.4.1.2, with any differences noted. Section B.4.7 details the labor and equipment required to complete the Proposed Project.

B.4.1.1 Overhead Construction

Overhead construction is proposed throughout the majority of the project area. A total of 140.9 miles of overhead lines and associated support structures would be constructed, including 91 miles of 500 kV transmission line and 49.9 miles of 230 kV transmission lines. Figures B-3 through B-9 illustrate which portions of the Proposed Project would be constructed overhead.

Estimated water usage for construction of the overhead segments and tower foundations is shown in Table B-5.

Table B-5. Estimated Water Usage for Construction of Overhead Structures

Activity	Gallon/Yard^3	Gallon/ Foundation Caisson	Gallon/Structure	Gallon/Day
Average Lattice Tangent Structure	36	335	1,340	4,021
Average Lattice Angle/Dead-End Structure	36	785	3,142	9,425
Average Steel H-Frame Structure	36	1,283	2,566	7,697
Average Steel Pole Tangent Structure	36	1,696	1,696	5,089
Average Steel Pole Angle/Dead-End Structure	36	2,545	2,545	7,634

Source: SDG&E Response to CPUC/BLM Data Request 12, dated May 25, 2007.

Site Access and Preparation

Constructing the overhead portions of the SRPL would begin with clearing and grading of unpaved access roads and spur roads to allow entry to individual structure locations. Section B.3.3.2 provides further details regarding the construction of access and spur roads.

After the access and spur roads are graded, individual structure sites would be cleared to install the transmission line support structures and facilitate access for future transmission line and structure maintenance. At each structure location, an area approximately 100 feet by 100 feet would be cleared using a bulldozer or backhoe. Additional equipment may be required if solid rock is encountered at a structure location. Rock-hauling, hammering, or blasting may be required to remove the rock. In inaccessible terrain, minimal clearing would occur because the site would only be accessed by helicopters for construction and maintenance operations.

Install Structure Foundations

As described in Section B.3.1, the overhead portion of the SRPL transmission lines would require the construction of 797 transmission support structures.

Each support structure would require the installation of foundations, which are typically drilled concrete piers. First, holes would be excavated for each structure: four holes for each lattice structure, two for each H-frame structure and one for each single shaft tubular steel pole and transition structure. The holes would be drilled using a truck mounted excavator equipped with augers of various sizes depending on the diameter and depth requirements of the hole to be drilled. Table B-6 provides the dimensions

of each of the foundation holes required for each structure. See Section B.3.1 for a description of each structure type and Figures B-13 through B-20 for structure illustrations. Each foundation would extend approximately 2 feet above the ground level.

Where solid rock is encountered, blasting (see Section B.4.4.1), rock hauling, or the use of a rock anchoring or mini pile system may be required. The rock anchoring or mini-pile system would be used in areas where site access is limited or adjacent structures could be damaged as a result of blasting or rock hauling activities. In environmentally sensitive areas, a HydroVac, which uses water pressure and a vacuum, would be used to excavate material into a storage tank. In areas where it is not possible to operate large drilling equipment due to access or environmental constraints, hand digging may be required.

Reinforcing steel anchor bolt cages would be installed after excavation and prior to structure installation. These cages are designed to strengthen the structural integrity of the foundations and would be assembled in pieces at the nearest project laydown yard and delivered to the structure site via flatbed truck or helicopter. These cages would be inserted in the holes prior to pouring concrete.

The excavated holes containing the reinforcing anchor bolt cages would be filled with concrete (Table B-6). Typically, concrete would be delivered directly to the site in concrete trucks with a capacity of up to 10 cubic yards. However, in areas with limited access or environmental constraints, the concrete would be pumped from several hundred feet away to the excavation site or flown in by helicopter.

Installation of the replacement poles for the Sycamore-Elliot 69 kV Reconductor would not require concrete foundations. Instead, wood poles would be embedded into native soil per the dimensions provided in Table B-6.

Table B-6. Foundation Excavation Dimensions

Structure	No. of Holes	Depth (ft)[1]	Diameter (ft)	Concrete (cu. yd.)
500 kV Structures				
Tangent lattice	4	10-22	4	25-45
Dead-end lattice	4	20-30	4.5-5	58-100
Larger angle lattice	4	20-25	4	45-55
Tangent H-frame	2	20-30	6-8	50-100
Tangent tubular steel poles	1	20-40	9	50-100
230 kV Structures				
Tangent lattice	4	15-22	4	25-45
Dead-end lattice	4	20-30	4.5-5	58-100
Larger angle lattice	4	20-25	4	45-55
Tangent tubular steel poles	1	20+	8	40-60
Dead-end tubular steel poles	1	20+	10	60-130
Larger angle tubular steel poles	1	20+	10	50-75
69 kV Structures				
Tubular steel poles	1	16-22	6-8	19-45
Wood poles	1	7-11	2.5-3	N/A

Source: SDG&E, 2006.
1 Depth depends on soil conditions

Erect Support Structures

Lattice towers and steel support structures would be assembled on site, except where helicopter delivery is required, as described in Section B.4.4.2. Steel members for each structure would be delivered to the site by flatbed truck. Assembly would be facilitated onsite by a small truck-mounted crane. Subsequent to assembly, the structures would be lifted onto the foundation using a large crane designed for erecting towers. The crane would move along the ROW as towers are erected.

String Conductors, Shield Wire, and Fiber Optic Ground Wire

Conductor, shield wire, and fiber optic ground wire would be placed on the transmission line support structures by a process called stringing. The first step to conductor and fiber optic shield wire stringing would be to install insulators and stringing sheaves. Stringing sheaves are rollers that are temporarily attached to the lower portion of the insulators at each transmission line support structure to allow conductors to be pulled along the line. Additionally, temporary clearance structures would be erected where required prior to stringing any transmission lines. The temporary clearance structures are typically vertical wood poles with cross arms and are erected at road crossings or crossings with other energized electric and communication lines to prevent contact during stringing activities. Bucket trucks may also be used to provide temporary clearance. Bucket trucks are trucks fitted with a hinged arm ending in an enclosed platform called a "bucket," which can be raised to let the worker in the "bucket" service aerial equipment.

Once the stringing sheaves and temporary clearance structures are in place, the initial stringing operation would commence. This would consist of pulling a sock line through the sheaves along the same path the SRPL transmission line would follow. The sock line is attached to the hard line, which follows the sock line as it is pulled through the sheaves. The hard line would then be attached to the conductor or fiber optic shield wire to pull it through the sheaves into its final location. Pulling the lines may be accomplished by attaching it to a specialized vehicle or a small helicopter that moves along the ROW.

Following the initial stringing operation, pulling and tensioning the line would be required to achieve the correct sagging of the transmission lines between support structures. Pulling and tensioning sites would be required every one to four miles along the ROW and would encompass approximately one to two acres each to accommodate required equipment. Equipment at sites required for pulling and tensioning activities would include tractors and trailers with spooled reels that hold the conductors and trucks with the tensioning equipment. To the extent practicable, pulling and tensioning sites would be located within the ROW. Depending on topography, minor grading may be required at some sites to create level pads for equipment.

Finally, the tension and sag of conductors and wires would be fine-tuned, stringing sheaves would be removed and the conductors would be permanently attached to the insulators at the support structures.

The Proposed Project includes underbuilding various segments of existing transmission line (69 kV, 92 kV, or 138 kV) onto the new SRPL transmission line support structures. Underbuilding is the term for attaching two or more transmission lines to the same transmission line support structure. These existing circuits would be relocated and strung following the same stringing procedures as outlined for the other overhead segments of the SRPL, described above. The existing 69 kV, 92 kV, and 138 kV transmission line structures would be removed and properly disposed of, as described in Section B.4.8.

B.4.1.2 Underground Construction

Underground construction is proposed in ABDSP, in the areas south of Ramona, and in the Rancho Peñasquitos area. The Proposed Project includes a total of 9.1 miles of new underground 230 kV lines and associated transition and support structures. A double-circuit 230 kV line would be constructed underground through Ramona and a single-circuit 230 kV line would be underground in Rancho Peñasquitos. Additionally, this section includes a description of the 69 kV and 92 kV transmission line segments that would be placed underground through ABDSP as part of the Proposed Project. The 69 kV and 92 kV underground portion extends approximately 6.6 miles through ABDSP. The 500 kV portion of the SRPL will be constructed entirely overhead, and thus is not included in this section.

Trenching

Trenching to install the underground duct banks would commence after SDG&E identifies all underground utilities along the proposed underground alignments. Actions to accomplish this would include notifying all applicable utilities via underground service alert to locate and mark existing utilities and conducting exploratory excavations (potholing) as necessary to verify the location of existing utilities. SDG&E would secure encroachment permits for trenching in public streets, if required.

The majority of the underground duct banks (described below) would be installed in a vertical configuration using open-cut trenching techniques. A vertical duct bank configuration would place the three cables of the circuit in a pyramid, with two cables on the bottom and one cable stacked on top and separated by spacers (Figures B-24 and B-25). In areas where underground utilities are highly congested, or areas where it is necessary to fan out the cables to reach termination structures, a flat configuration of the three-cable circuit may be required (Figure B-26). It is not anticipated that a flat underground duct bank configuration would be required. Trench for underground construction would be widened and shored where appropriate to meet California Occupation and Safety Health Administration requirements. Table B-7 provides the trench dimensions for each circuit and configuration.

Table B-7. Trench Dimensions

Circuit/Configuration	Depth (feet)[1]	Width (feet)
69/92 kV		
Flat	6	6
Vertical	6	3
230 kV		
Flat	6	7
Vertical	6	4

Source: SDG&E, 2006.

1 Depth may vary depending on soil stability and presence of existing substructures

One trench would be excavated for the 69 kV and 92 kV underground transmission line segments within the Anza-Borrego Link. Two trenches, separated by 20 feet, would be excavated for the double-circuit 230 kV underground segments within the Inland Valley Link. A single trench would be excavated within the Coastal Link for the single-circuit 230 kV line. Typically, the 230 kV circuit would require a larger excavation area than the 69 kV and 92 kV circuits because the cables, and thus the duct banks, are larger and require additional separation distance between the conductors.

Trenching would be staged so that open trench lengths would not exceed that required to install the duct banks. A maximum of 300 to 500 feet would be open at one time, depending on applicable permit requirements. Where needed, open trench sections that are not under active construction would have steel plates placed over them in order to maintain vehicular and pedestrian traffic. Provisions for emergency vehicle access would be arranged with local jurisdictions in advance of construction activities. Should groundwater be encountered, it would be pumped into a tank for disposal in accordance with project permits.

Excavated materials not temporarily stored to use for backfill would be hauled offsite to a materials storage yard. Based on the anticipated rate of construction progress (300 to 500 feet open at one time), approximately 400 cubic yards of excavated material would be off-hauled per day. Excavated materials would be tested for their suitability as a thermal backfill material in the trench.

Duct Bank Installation

As the trench for the underground transmission line is completed, SDG&E would begin to install the cable conduit, reinforcement bar, ground wire, and concrete conduit encasement, which collectively comprise the duct bank. The 69 kV and 92 kV duct banks would include 6- to 8-inch diameter PVC conduits, which house the electrical cables. Each duct bank would be approximately three feet in height by three feet wide.

As described above, the duct bank for the 230 kV underground transmission lines would be larger and would measure approximately 3.5 feet by 3.5 feet.

The 69 kV and 92 kV underground transmission line segments would be constructed with one cable per phase, which would require three conduits. However, six conduits would be placed in the trench, which would leave three spare conduits for any potential future circuit pursuant to SDG&E's current standards for 69 kV underground construction. The 230 kV lines would require two cables per phase (bundled). Therefore, six conduits would be installed in a trench for a single 230 kV circuit. Two trenches would be required for the double-circuit 230 kV line, with one circuit per trench. Additionally, ducts for communication cables, which are required for system protection and communication purposes, would be installed in the same duct bank as the transmission cables.

Where the electrical transmission duct bank would cross or run parallel to other substructures that operate at normal soil temperature (gas lines, telephone lines, water mains, storm drains, sewer lines), a minimal radial clearance of 12 and 24 inches would be required, respectively. Ideal clearances would be 2 to 5 feet. Where duct banks cross or run parallel to substructures that operate at temperatures significantly exceeding normal soil temperature (other underground transmission circuits, primary distribution cables, steam lines, heated oil lines), additional radial clearance may be required. Clearances and depths would meet requirements set forth with Rule 33.4 of CPUC GO-128. Preliminary engineering investigations have not identified any underground utilities that operate at high temperatures.

After the duct bank has been installed in the trench, the next step would be to cover the duct bank with backfill and compact the backfill. Each duct bank would require a minimum cover of 36 inches. Finally, a road base or slurry concrete cap would be installed within the trench, and the disturbed surface would be restored in compliance with the locally issued permits. As sections of the trench are covered and restored, additional sections would then be opened for duct bank installation. This process would continue until all PVC conduits have been installed in the duct bank. Note that at this point the PVC conduit does not contain the transmission line cable; see below (Cable Pulling, Splicing and Termination) for a description of how the underground transmission line would be installed.

Vault Installation

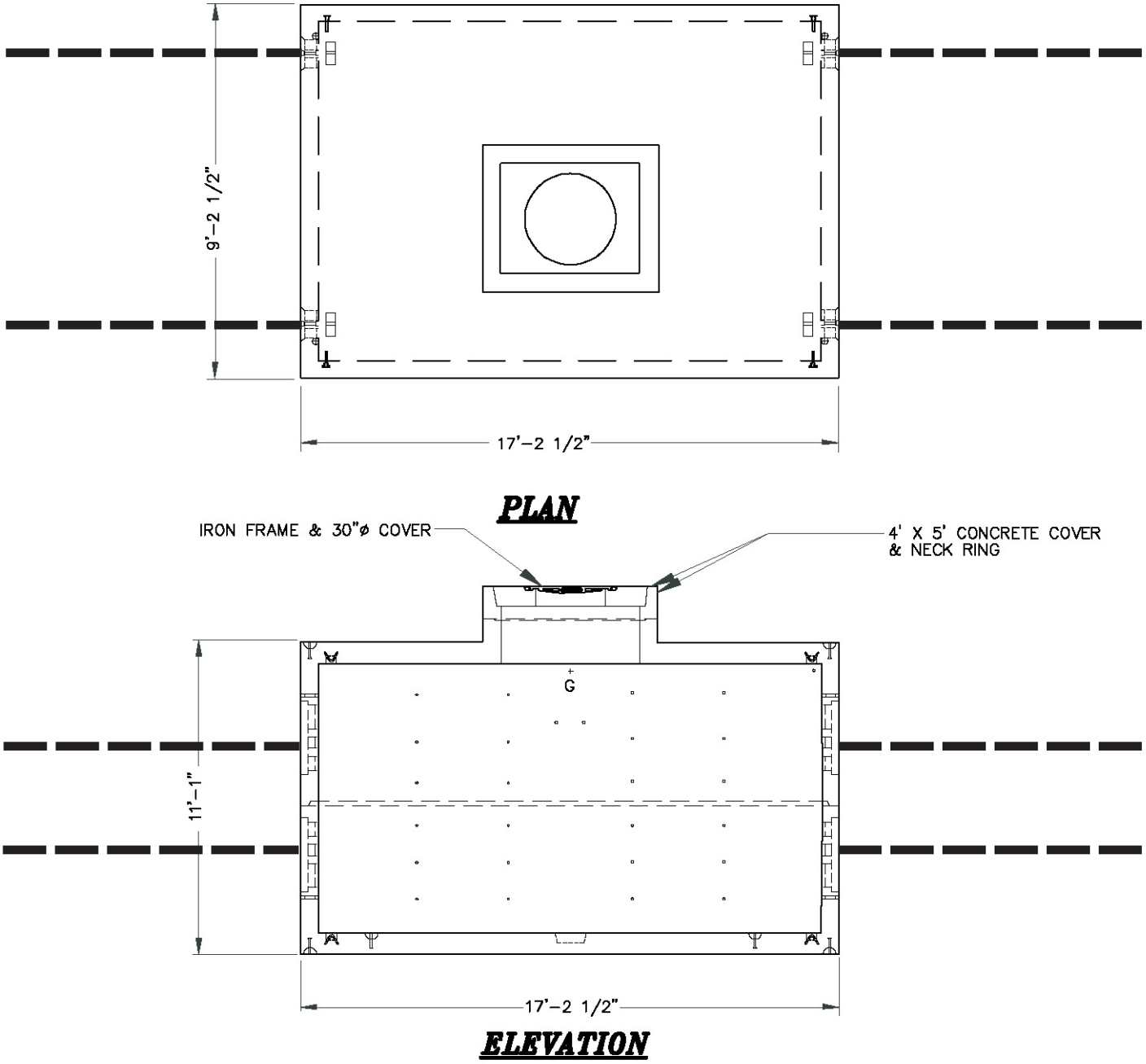
SDG&E would excavate and install pre-formed concrete splice vaults during trenching for the duct banks. Initially, the vaults would be used to pull cable through the conduits and splice the cables together during construction of the SRPL. During operation, the vaults would provide access to the underground cables for maintenance, inspections, and repairs.

Vaults would be constructed of prefabricated steel-reinforced concrete and designed to withstand the maximum credible earthquake in the area and heavy truck traffic loading. Specific vault dimensions are provided in Table B-8. Refer to Figures B-27, B-28, and B-29 for illustrations of the proposed 69 kV, 92 kV and 230 kV vaults, respectively. Vaults would occur

Table B-8. Vault Dimensions

Circuit	Depth	Width	Length	Vault Spacing Interval (feet)	Manholes per Vault	Manhole Diameter (inches)
69 kV	11'-1"	9'-2.5"	17'-2.5"	800-1600	1	30
92 kV	11'-1"	9'-2.5"	21'-2.5"	800-1600	1	30
230 kV	10'-0"	12'-0"	26'-0"	1500-2000	2	36

Source: SDG&E, 2006.



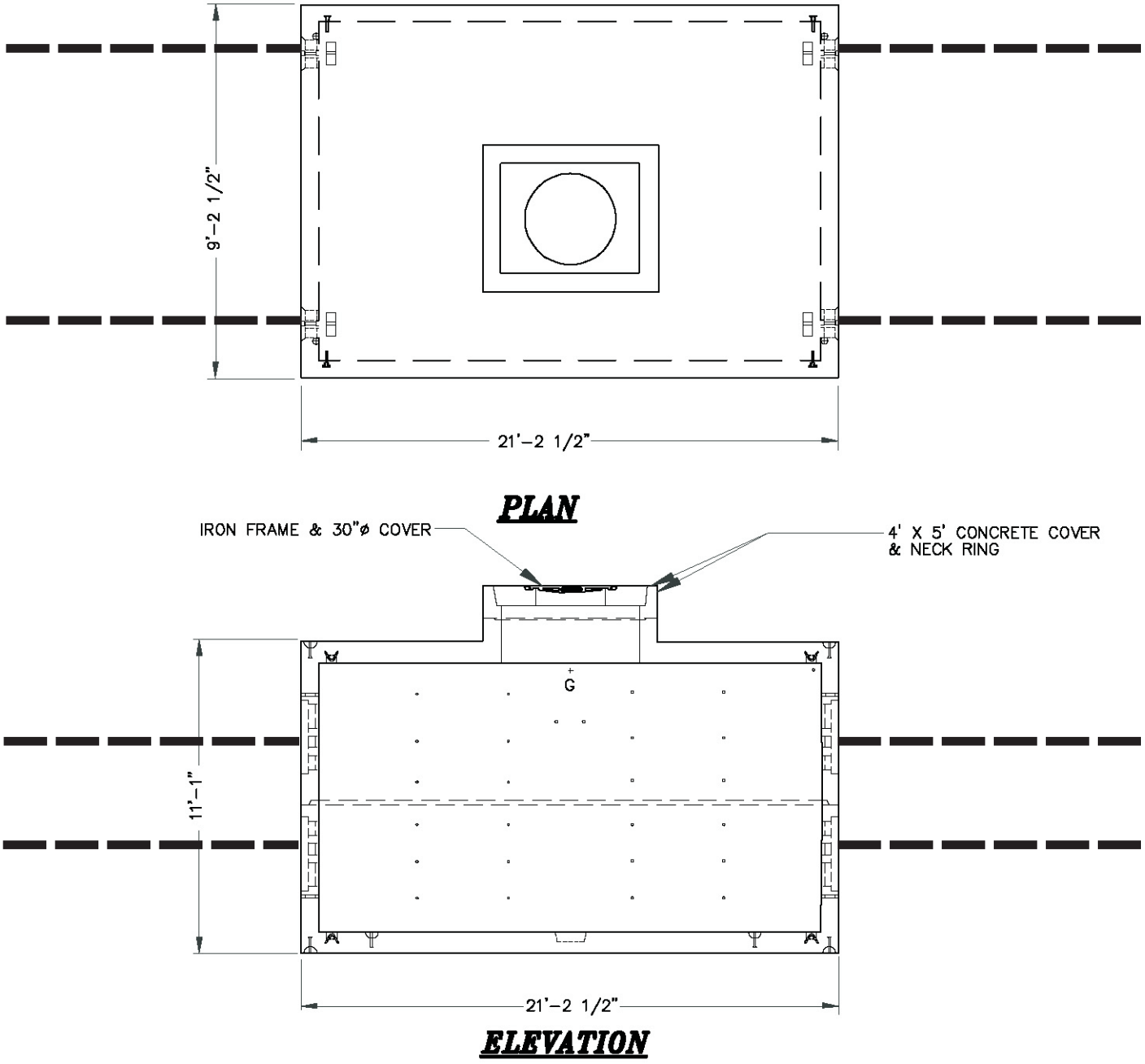
Conductors

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

Source: PEA, 2006

Sunrise Powerlink Project

Figure B-27
Typical 69 kV Vault: Anza-Borrego Link



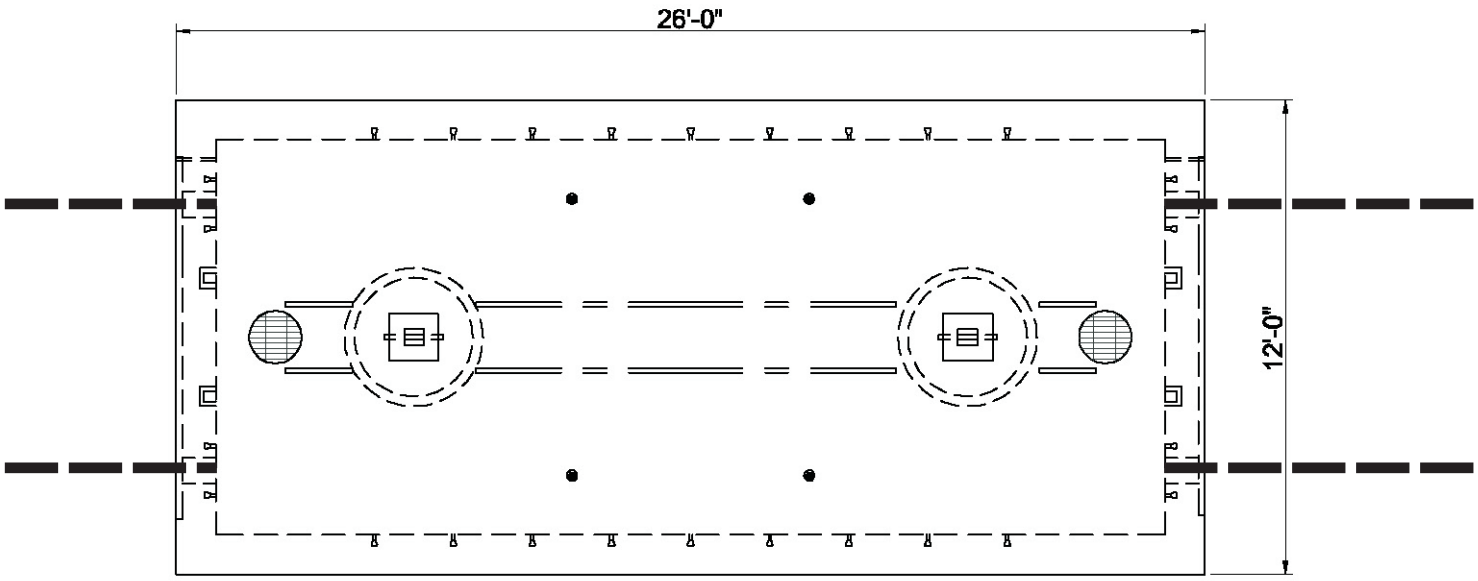
Conductors

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

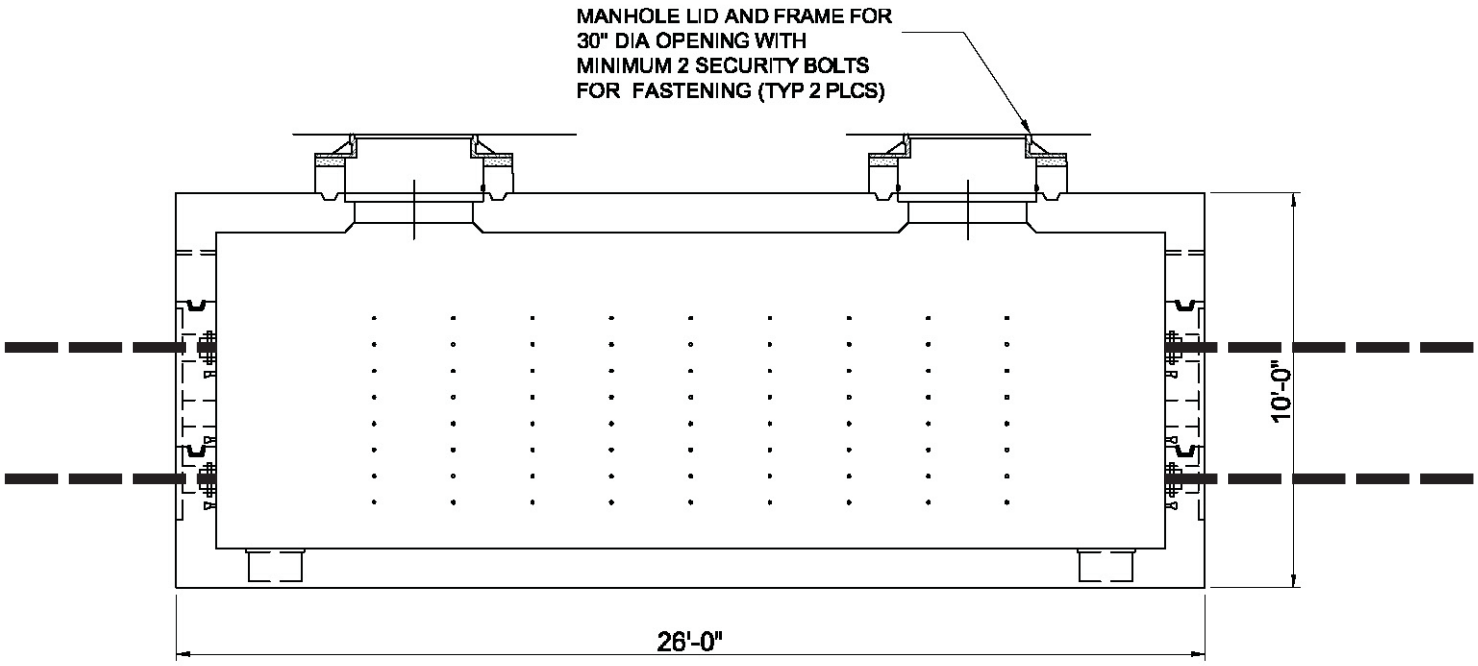
Source: PEA, 2006

Sunrise Powerlink Project

Figure B-28
Typical 92 kV Vault: Anza-Borrego Link



PLAN



ELEVATION

Aspen Environmental Group

Conductors

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

Source: PEA, 2006

Sunrise Powerlink Project

Figure B-29
Typical 230 kV Vault: Inland Valley and Coastal Links

approximately every 800 to 2000 feet along underground segments. Installation of each vault would take place over a one-week period. First, the vault pit would be excavated and shored, followed by delivery and installation of the vault. Next, the excavated area would be filled with backfill and compacted. Finally, the excavated area would be restored, as required.

Cable Pulling, Spicing and Termination

Following conduit and vault installation, SDG&E would pull cable through the duct banks, splice the cable segments at each vault and terminate cables at the transition stations where the line would transition from underground to overhead. To pull the cables through the duct banks, a cable reel would be placed at one end of the conduit segment, and a pulling rig would be placed at the opposite end. The cable from the cable reel would be attached to a rope in the duct bank, and the rope linked to the pulling rig, which would pull the rope and the attached cable through the duct banks. A lubricant would be applied as the cable enters the ducts to decrease friction and facilitate travel through the PVC conduits. The electric and communication cables for the 69 kV and 92 kV circuits would be pulled through the individual ducts at a rate of two to three segments between vaults per day. The 230 kV segment would require additional time because the cables are larger.

After cable pulling is completed, the cables would be spliced, or fused together, at each vault. A splice trailer would be stationed at the vault manhole opening with a power generator directly behind the trailer. Crews would enter the vault and splice the cables.

During splicing operations, the dryness of the vault must be continuously maintained to ensure that unfinished splices are not contaminated with water or impurities. It is estimated that splicing would take 12 to 16 hours per cable to complete for the 69 kV and 92 kV line and 50 hours per cable for the 230 kV line. As splicing is completed at a vault, the splicing apparatus (splicing trailer and power generator) would be moved to the next vault location, where splicing would resume.

Transition Structure Construction

At each end of an underground segment, the cables would rise out of the ground at transition structures, which accommodate the transition to overhead lines. Transition structures constructed as part of the Proposed Project would consist of a tubular pole structure with an anchor-bolted pier foundation for each circuit. The transition structure would support cable terminations, lightning arresters, and dead-end hardware for overhead conductors. Compared to the 69 kV and 92 kV transition structures, the hardware would be larger for the 230 kV structures (refer to Figure B-17). Construction methods for these structures would be substantially similar to those described in Section B.4.1.1 for overhead transmission line structures.

Special Construction Methods (Horizontal Boring and Directional Drilling)

In concert with the tasks outlined above, special construction methods (horizontal boring and/or directional drilling) may be required in areas where open trench construction is not feasible. These areas would include railroad and trolley tracks, large utility crossings, roads, drainage crossings, and other environmentally sensitive areas. SDG&E would secure the necessary permits to conduct these specialized construction activities, such as a special use permit, encroachment permit, helicopter lift plan, explosives permit, etc.

Horizontal Boring. Horizontal boring (jack-and-bore) simultaneously pushes a steel casing through the crossing and removes the spoil inside the casing with a rotating auger. First, boring pits would be excavated at the sending (entrance) and receiving (exit) ends of the bore. The bore equipment is inserted into the bore pit at the sending end, where a 36- to 42-inch steel casing is pushed through the earth, under the crossing. Depending on soil conditions, water is often used to lubricate the auger during boring operations. Casings would be welded together incrementally and installed at least three to four feet below the crossing, or as required by local permits. Once the casing is in place, the duct banks would be installed using plastic spacers to secure them in place. The steel casings would remain to protect the conduit once it has been strung. The duct banks and associated cables would consist of the same respective materials and strung by employing a similar method as those installed on the remainder of the underground portions of the SRPL.

Directional Drilling. Directional drilling uses a jet bit that can be steered to cut through the earth, creating a small pilot hole. A drill rig and control booth would be set up on one side of the directional drill to facilitate drilling operations. A small containment pit would be excavated around the drill stem to contain any drilling fluids used during the drilling process. Once the jet bit has reached the opposite side of the crossing, a reamer along with the casing would be attached to the auger and pulled back through the pilot hole to widen it. Multiple reamers of increasing diameters would be used to incrementally increase the size of the hole to the diameter necessary to install the conduit casings.

B.4.2 Substation Construction

The Proposed Project involves construction of one new substation and modifications to several existing substations. The proposed SRPL transmission line would connect the existing Imperial Valley Substation to the proposed Central East Substation and continue to the existing Sycamore Canyon Substation and finally terminate at the Peñasquitos Substation. The Imperial Valley, Sycamore Canyon, and Peñasquitos Substations are existing substations that would require modifications to physically accommodate the SRPL transmission line. To electrically accommodate the Proposed Project, modifications to other substations in San Diego County would also be needed (Sections B.2.5 and B.4.3). The proposed Central East Substation would be newly constructed to facilitate the SRPL transmission line as it transitions from a 500 kV line to a double-circuit 230 kV line. During construction and modifications to the substations, approximately 800,000 gallons of water a day would be required for grading and site work, landscaping, fire protection and concrete for substation from batch plant. Table B-9 lists the gallons of water needed per day for each construction activity.

Table B-9. Estimated Water Usage for Substation Construction

Activity	Gallon/Structure	Gallon/Day
Substation Grading/Site Work	—	600,000
Substation Landscape	—	190,000
Substation Fire Protection	85,000 gal.	—
Concrete for Substation from Batch Plant	—	10,000
Substation Construction (Below Grade)	—	Included in batch plant

Source: SDG&E Response to Data Request 12, dated May 25, 2007.

The following sections describe the modifications or new construction required at the subject substations as part of the Proposed Project. Section B.4.7 details the required labor and equipment to complete the proposed activities.

B.4.2.1 Imperial Valley Substation

The proposed modifications to the Imperial Valley Substation would occur within the existing fenced area of the substation property. Additionally, the associated staging areas would be located within the previously disturbed area of the substation property. Figure B-30 illustrates the location of the proposed modifications to the Imperial Valley Substation.

Modifications would include the installation of the following new facilities: seven line and bus dead-end structures, five 500 kV circuit breakers, seven 500 kV disconnect switches, communication interfaces and primary and back-up metering equipment, as required. The new structures and equipment would be similar to the respective structures already in place at the substation. No additional lighting would be installed at this substation.

B.4.2.2 Central East Substation

Generally, the scope of work required to construct the proposed substation would include site grading, installation of an access road extending from S-2 to the substation gate, a drainage plan, property and substation fencing, landscaping and installation of electrical facilities. The components of the proposed Central East Substation are illustrated in Figures B-31 through B-37.

The site would be excavated and graded to accommodate the required construction and permanent facility equipment. An eight-foot fence topped with barbed wire would be erected around the substation perimeter to enclose a 40 acres graded area. An additional 66 acres would be cleared and graded surrounding the substation for the access road, drainage and buffer. In total, approximately 106 acres would be disturbed to construct the substation pad and associated features, and approximately 1.5 to 1.8 million cubic yards of cut and fill earthwork would be needed. Table B-10 lists the acreage required within the substation footprint. See Figure B-37 for a graphic illustration of this information. The proposed substation fenced area would be adequate to accommodate future upgrades, if required and approved by the CPUC. However, these potential upgrades have not been defined by SDG&E.

Table B-10. Central East Substation Acreage Requirements (acres)

Substation Pad	39.09
Graded slopes and buffer of substation pad	17.00
Upper laydown pad	6.79
Graded slopes and pad of upper laydown pad	3.77
Lower laydown pad	3.80
Slopes and pad of lower laydown pad	2.16
Total pad areas	72.61
Access roads	2.79
Access road slopes	5.58
Additional developed area	25.02
TOTAL	106.00

Source: SDG&E, 2006.

The electrical facilities proposed for the Central East Substation would accommodate the termination of one 500 kV and two 230 kV transmission lines. These facilities would include 500 kV and 230 kV air insulated electrical buses, one 500 kV transmission line, two 230 kV transmission lines, two 500/230 kV 1120MVA transformer banks, one 500 kV series capacitor, two 230 kV shunt capacitors and associated breakers, disconnect switches, protective relays, metering and Supervisory Control and Data Acquisition (SCADA) system equipment. Other facilities would include an emergency power generator, a fire prevention system (including hydrants, water tank, and walls between transformer phases), two single-story relay/control shelters, a single-story storage building, an oil containment system and a radio antenna tower to enhance communications.

Figure B-30. Imperial Valley Substation: Proposed Modifications
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Figure B-31. Central East Substation: 500/230/12 kV Equipment One Line Diagram
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Figure B-32. Central East Substation: 500/230 kV Switchyard: General Arrangement
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Figure B-33. Central East Substation: 500/230 kV Switchyard: Section A-A
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Figure B-34. Central East Substation: 500/230 kV Switchyard: Section B-B & D-D
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Figure B-35. Central East Substation: 500/230 kV Switchyard: Section C-C
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Figure B-36. Central East Substation: Grading Plan
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Figure B-37. Central East Substation: Landscape Plan
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The tallest structures in the Central East Substation would be the 500 kV bus and transformer dead-end structures.[7] Maximum heights for 500 kV and 230 kV structures would be 135 feet and 85 feet, respectively. The height of the radio tower would be 135 feet.

Area lighting would be provided by multiple 300-watt tungsten-quartz lamps mounted near major electrical equipment. Additionally, downward-oriented 100-watt yellow flood lamps would be placed near entrances and the substation gate for night entry. Although yard lamps would normally be off, they may be occasionally turned on at night for troubleshooting and switching operations.

B.4.2.3 Sycamore Canyon Substation

The proposed modifications to Sycamore Canyon Substation would occur within the existing fenced area of the substation property. Additionally, the required staging areas would be located within the previously disturbed area of the substation property. Figure B-38 illustrates the location of the proposed modifications to the Sycamore Canyon Substation.

Modifications required to accommodate the termination of three new 230 kV lines at the existing Sycamore Canyon Substation would include installation of two line dead-end structures, four 230 kV circuit breakers, eight 230 kV disconnect switches, other bus support structures, required protection relay panels, and communication interface equipment. The new structures and equipment would be similar to the respective structures already in place at the substation. No additional lighting would be installed at Sycamore Canyon Substation.

B.4.2.4 Peñasquitos Substation

The proposed modifications to the existing Peñasquitos Substation would occur within the existing fenced area of the substation property. Additionally, the associated staging areas would be located within the previously disturbed area of the substation property. Figure B-39 illustrates the location of the proposed modifications to Peñasquitos Substation.

Modification required to accommodate the termination of one new 230 kV line would include installation of two 230 kV circuit breakers, four 230 kV disconnect switches, bus support structures, required protection relay panels, and communication interface equipment. The new structures and equipment would be similar to the respective structures already in place at the substation. No additional lighting would be installed at Peñasquitos Substation.

B.4.3 Other System Modifications

The system upgrades described in Section B.2.5 would be performed at the existing San Luis Rey and South Bay Substations, as described below. In addition, the existing 69 kV overhead transmission line between the existing Sycamore Canyon and Elliot Substations would be reconductored to accommodate increased power from SRPL. Section B.4.7 details the required labor and equipment to complete the proposed activities.

[7] Dead-end structures within the confines of the substation are where incoming and outgoing transmission lines end.

B.4.3.1 San Luis Rey Substation

Proposed system upgrades at the existing San Luis Rey Substation would include installation of a third 230/69 kV transformer and a 230 kV capacitor with associated surge arrestors and current limiting reactors. Other equipment would include two 230 kV gas circuit breakers, two 69 kV breakers, four 69 kV disconnect switches, two dead-end structures, and required protection relay panels and communication interfaces. No additional lighting would be installed at the substation. All construction activities and associated equipment would be within the existing substation fence on previously disturbed areas. The new structures and equipment would be similar to the respective structures and equipment already in place at the substation. Figure B-40 illustrates the location of the proposed modifications to the San Luis Rey Substation.

B.4.3.2 South Bay Substation

The Proposed Project includes modifications to the existing South Bay Substation. A 69 kV 50MVAR shunt capacitor would be added to provide system voltage support to the SRPL in the event of a power outage. Other associated equipment to be installed would include one 69 kV standard profile switch rack, one 69 kV circuit breaker, one 69 kV capacitor bank with associated reactors and surge arrestors, two disconnect switches, and the required protection relay panels. No additional lighting would be installed at this substation.

All construction-related activities and equipment would be contained within the existing substation property on previously disturbed areas. The new structures and equipment would be similar to the respective structures and equipment already in place at the substation. Figure B-41 illustrates the location of the proposed modifications to the South Bay Substation.

B.4.3.3 Sycamore Canyon to Elliot Substation 69 kV Transmission Line Reconductor

The existing Sycamore Canyon to Elliot Substation 69 kV transmission line includes an 8.2 miles overhead segment supported by 84 single wood poles and an underground segment that extends for approximately 350 feet from the Sycamore Canyon Substation. The reconductoring work would require improving the existing access roads and work pad areas as necessary, replacing some of the existing poles to ensure structural integrity, replacing porcelain insulators with polymer insulators and replacing the existing ACSR/AW overhead conductors with ACSS/AW conductors, which have a higher voltage capacity. There would not be an increase in voltage above that presently permitted. All construction activities related to the reconductor would take place within existing SDG&E ROW, easements, or other existing property rights. Construction access would be from existing access roads.

The porcelain insulators would be replaced with polymer insulators. Sheaves (pulleys) would be attached to the end of the new polymer insulators and the existing conductor would be placed into the sheaves. Before removing the existing conductor or stringing the new, higher-capacity conductor, temporary clearance structures would be erected along roadways and energized electrical and communication lines. Also, approximately 11 of the existing wood poles and all of the associated hardware that formerly supported the ACSR/AW conductors would be dismantled and disposed of at an offsite location according to the procedures outlined in Section B.4.8. A hole would be excavated adjacent to the old pole and the new pole would be set in the hole using a truck mounted crane. Native soils would be used to backfill the hole and set the pole.

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Figure B-38. Sycamore Canyon Substation: Proposed Modifications
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Figure B-39. Peñasquitos Substation: Proposed Modifications
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Figure B-40. San Luis Rey Substation: Proposed Modifications
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Figure B-41. South Bay Substation: Proposed Modifications
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After the new poles have been set, the existing conductor would be attached to a sock line and removed using pulling equipment. The old conductor would be coiled and hauled off site to be disposed of at a recycling facility. Subsequently, the new conductor would be installed and tensioned according to the procedures outlined in Section B.4.1.1.

B.4.4 Unique Construction Requirements

B.4.4.1 Blasting

As described in Section B.4.1.1, transmission line structure foundations would normally be installed using drilled shafts or piers. If hard rock is encountered within the planned drilling depth, blasting may be required to loosen or fracture the rock in order to reach the required depth to install the structure foundation.

Areas where blasting would likely occur have been identified based on the geologic setting of the proposed alignment. Table B-11 summarizes the hard rock conditions within each link. Blasting is not needed within the Imperial Valley Link. The Anza-Borrego Link has several areas of hard rock within the western portion of ABDSP, but blasting will not be necessary within this link. In contrast, the Central, Inland Valley, and Coastal Links are characterized by significantly more hard rock conditions and blasting will be required.

Table B-11. Summary of Hard Rock Conditions

Milepost	Rock Type	Comments
Anza-Borrego Link		
MP 69.7 – MP 74.8	Granitic	Very minor amounts of hard rock, blasting not needed
Central Link		
MP 106.1 – MP 110.3	Hybrid and Granitic	Some zones will be deeply weathered enough to allow shaft drilling; blasting will not be needed locally
MP 100.2 – MP 106.1	Hybrid	
MP 91.1 – MP 100.2	Granitic	
MP 91.1 – MP 92.6	Hybrid	
Inland Valley Link		
MP 123.4 – MP 136.3	Granitic and Metamorphic	Some zones will be deeply weathered enough to allow shaft drilling; blasting will be needed locally
MP 117.2 – MP 117.4	Granitic	Predominant rock type; some zones will be deeply weathered enough to allow shaft drilling; blasting will be needed locally
	Granitic and Gneiss (hybrid)	Some zones will be deeply weathered enough to allow shaft drilling; blasting will be needed locally
Coastal Link		
MP 136.3 – MP 142.3	Metavolcanic	One zone approximately 3,440 feet in length; blasting will be needed locally
MP 142.3 – MP 143.9	Metavolcanic	Two zones extending approximately 2,000 feet; blasting will be needed locally

Source: SDG&E, 2006.

Prior to blasting, a detailed blasting plan will be submitted from the construction contractor to SDG&E for each blast site that includes blasting methods, survey of existing structures and facilities, and scaled distance calculations that estimate the projection distance and speed of particles from blasting activities. Blasting would be very brief in duration (milliseconds), and the noise would dissipate with distance. Blasting produces less noise and vibration than comparable non-blasting methods to remove hard rock. Non-blasting methods include track rig drills, rock breakers, jack hammers, rotary percussion drills, core barrels, and rotary rock drills with rock bits, which would require much longer time duration to excavate approximately the same amount of rock as blasting. Refer to Section D.8 (Noise) for a detailed analysis.

B.4.4.2 Helicopter Construction

Helicopters would be used to support construction activities in areas where access is limited (e.g., no suitable access road, limited pad area to facilitate onsite structure assembly area) or there are environmental constraints to accessing the project area with standard construction vehicles and equipment. Project activities potentially facilitated by helicopters may include delivery of construction laborers, equipment and materials to structure sites, structure placement (except tubular steel poles), hardware installation, and wire stringing operations. It is anticipated that helicopters would be used for project activities in portions of the Anza-Borrego, Central, and Inland Valley Links. Specific towers requiring helicopter construction have been preliminarily identified as follows:

- MP 77.9 – MP 83.5: Structures SP034 to SP074 (41 towers)
- MP 92.6 – MP 97.6: Structures C94 to C104 (11 towers)
- MP 100.2 – MP 103.5: Structures C48 to C66 (19 towers)
- MP 123.4 – MP 136.3: Structures I35 to I74 (40 towers)

All helicopter construction activities would be based at a fly yard, which is a project-material staging area (see Table B-12). The fly yards would be approximately 10 to 15 acres and would be sited at locations to permit a maximum fly time of 4 to 8 minutes to reach structure locations. The anticipated locations of the proposed helicopter fly yards are shown in Figures B-3 through B-9. Primarily, fly yards would be used for material storage and erection of structure sections prior to transport to the final structure locations for installation. Additionally, fueling trucks, maintenance trucks and operations crews would be based in the fly yards.

Prior to installation, each tower structure would be assembled in three to six sections at the fly yard. Each section would weigh approximately 12,000 to 15,000 pounds, depending on the lifting capacity of the helicopter. Helicopters would be unable to lift and install typical 230 kV or 500 kV tubular steel poles, due to their excessive weight.

In areas requiring helicopter-aided construction, laborers, materials, and equipment would be flown in by helicopter. Foundation excavation would be completed using hand digging and/or portable equipment prior to delivery of structure sections. After assembly at the fly yard, the tower sections would be attached by cables from the helicopter crane to the top four corners of the structure section and airlifted to the structure location. Upon arrival at the structure location, the section would be placed directly on to the foundation or atop the previous structure section. Guide brackets attached on top of each section would assist in aligning the stacked sections. Once aligned correctly, line crews would climb the structures to bolt the sections together permanently.

It should be noted that the fly yard locations provided are considered approximate and subject to change, additions or deletions upon acquisition of an installation contractor prior to the beginning of construction. Upon completion of field review, a final determination will be made on the necessity of certain fly yards and the respective locations that provide the most efficient, economic, safest and least impact use of the fly yards that are needed. The locations of the fly yards provided were based on only general assumptions and guidelines of helicopter use.

Appropriate dust control measures will be implemented at these fly yard locations as well as the locations along the route on which they are utilized. As an example, dust control palliatives may be applied on fly yards and structure sites as needed to control down wash of the helicopter rotor dependent on the weight of the lifts, air temperature, humidity, soil type, and property owner requirements. SDG&E is

proposing to use two types of palliatives that have been identified by Caltrans as requiring no water quality testing and therefore have nominal impacts to water quality when properly applied. The two types proposed for use are psyllium and guar/plant gum based. While it is difficult to determine the exact area around each structure that would encounter ground disturbance due to a rotor's down wash, past experience has shown dust control measures may be needed as far as 500 feet from a central working area in certain situations.

B.4.5 Staging Areas

Construction of the SRPL would begin with the establishment of staging areas, which would be required for storing materials, construction equipment, and vehicles. Although the exact locations have not been determined, the staging areas would likely be sited near the center and endpoints of the proposed route of the SRPL and at several potential locations in between, as noted in the table below. Staging area locations would be finalized following negotiations with landowners. Table B-12 lists the location and current condition of each potential staging area; the location of these yards is shown on Figures B-3 through B-9.

In some areas, the staging area may need to be scraped by a bulldozer and a temporary layer of rock laid to provide an all weather surface. Unless otherwise directed by the land-owner, the rock would be removed from the staging area upon completion of construction and the area would be restored. All staging areas would be fenced for security.

Table B-12. Construction Staging Areas and Helicopter Fly Yards

Location	Approximate Acreage	Currently Disturbed?	Proposed Use
Drew Road at I-8 in Imperial Valley	5	Yes	Material and equipment storage
Westmorland near the IID 161 kV line and SR86	5	Yes	Material and equipment storage
Portion of Ocotillo Air Strip, north of SR78 in Ocotillo Wells	10-15	Yes	Helicopter fly yard, material and equipment storage
SDG&E property adjacent to Borrego Substation	5	Yes	Material and equipment storage
Portion of the Proposed Central East Substation pad and separate 4 and 7 acres sites for the batch plant and fly yard, respectively	10-15	No	Helicopter fly yard, concrete batch plant, material and equipment storage
Property adjacent to existing Warners Substation at intersection of SR79 and S-2	4	Portions	Material and equipment storage
SDG&E property adjacent to existing Santa Ysabel Substation	4	Yes	Material and equipment storage
North end of Gunn Stage Road at entrance to Mount Gower Preserve	2	Yes	Material and equipment storage
Existing 40 acres SDG&E parcel at northwest corner of Ashley Road and Creelman Lane	5	Yes	Material and equipment storage
East of the 200-ft ROW at existing Chicarita Substation	5	Yes	Material and equipment storage

Source: SDG&E, 2006 and 2007.

B.4.6 Construction Schedule

SDG&E intends to refine the design of the Proposed Project during the CPUC/BLM approval process in order to immediately commence construction if the project is approved. Final engineering surveys will determine the exact locations of towers, access roads, etc. prior to the start of construction. Due to the broad scope of construction, the varied nature of construction activities and the geographic diversity of the project area, SDG&E intends to hire multiple contractors to complete project work within the projected timeframe and in accordance with industry performance standards. SDG&E developed a project construction schedule based on this strategy; refer to Figures B-42a and B-42b for the construction labor expected each month. Construction of the Proposed Project is expected to require approximately 34 months from the date the CPCN is approved. If CPCN approval is obtained in August of 2008, the Project could be completed and in-service by June of 2011, subject to the conditions noted below. The majority of construction personnel will be on site between October 2008 and December 2010. The maximum number of construction workers on-site during peak construction activities is expected to be approximately 800. In addition, the anticipated construction duration for each transmission segment and substation is presented in Table B-13.

Prior to starting construction, SDG&E may be required to conduct onsite surveys in accordance with applicable protocols or mitigation measures adopted by the CPUC/BLM as project conditions. However, Arcadis and Helix Environmental Planning, Inc. have separately conducted baseline, special status and protocol surveys for the Proposed Project as well as alternatives in 2005, 2006, and 2007. Refer to Section D.2 (Biological Resources), Section D.12 (Water Resources), and Section D.13 (Geology, Mineral Resources, and Soils) for detailed information on on-site surveys. Accordingly, adjustments might occur to the project schedule as necessary to avoid sensitive resources.

Pre-construction activities, including pre-construction environmental surveys, materials procurement, design, contracting, ROW acquisition and permitting efforts are not shown in the summary schedule. The schedule is predicated upon SDG&E's ability to complete the following tasks in a timely manner:

- Secure all necessary permit approvals
- Secure agency support
- Complete biological and cultural survey work
- Construct within environmental time constraints
- Order and receive equipment
- Secure construction contractor resources and associated construction equipment
- Maintain continuous construction activity with no delay due to environmental, administrative or legal issues.

Figure B-42a. Construction Schedule Tasks 1-21
CLICK HERE TO VIEW

Figure B-42b. Construction Schedule Tasks 22-42
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Figure B-42c. Construction Schedule Tasks 43-6
CLICK HERE TO VIEW

Table B-13. Construction Duration (in months, approximate)

TRANSMISSION LINE						
Construction Activity	500 kV from Imperial Valley Substation to Central East Substation	Double-Circuit 230 kV from Central East Substation to Sycamore Canyon Substation	Single-Circuit 230 kV from Sycamore Canyon Substation to Peñasquitos Substation	Sycamore Canyon Substation to Elliot Substation 69 kV Reconductor		
Access road and structure pad development	9	8	2	0.5		
Install structure foundations	9	6	3	0.5		
Install structures	12	12	3	1.5		
Install conductor and shield wire	20	5	2	1.5		
Underground	14[8]	30	9	N/A		
Test and energize	2	2	2	0.5		
SUBSTATION						
Construction Activity	Imperial Valley	Central East	Sycamore Canyon	Peñasquitos	San Luis Rey	South Bay
Road construction	N/A	3	N/A	N/A	N/A	N/A
Site grading	N/A	7	N/A	N/A	N/A	N/A
Below grade construction	2	8	2	2	2	1
Above grade construction	2	8	2	2	2	1
Wiring	2	4-6	2	2	2	1
Test and energize	2	6	2	2	2	0.5

B.4.7 Labor and Equipment

The Proposed Project would be constructed primarily by contract personnel with SDG&E responsible for project administration and inspection. However, SDG&E also may use its own crews for certain portions of the work, as the schedule may require. It is anticipated that multiple contractors would be working concurrently on the separate links of SRPL in order to meet the projected in-service date of summer 2011. Construction would commence as early as the third quarter 2008 and conclude before summer 2011. The maximum estimated number of individuals required for construction labor would not exceed 800, with the majority of that labor required to install structure foundations. The majority of construction personnel will be on-site between October 2008 and December 2010. The maximum number of construction workers is expected to be approximately 800 during periods of peak construction activity. The maximum 800 individuals would be needed each month between October 2008 and December 2010 when the majority of foundation construction is anticipated. Figure B-43 presents the project labor force requirements for the Proposed Project.

Table B-14 presents the equipment requirements of the Proposed Project, including the anticipated duration of equipment use. Table B-15 shows the estimated trips per day and mileages to truck water to the project area for transmission line and substation construction.

[8] This construction estimate refers to the 14 months of construction related to undergrounding 69 kV through the ABDSP.

Figure B-43. Construction Labor
CLICK HERE TO VIEW

Table B-14. Equipment Requirements

TRANSMISSION LINE

Equipment	500 kV from Imperial Valley Substation to Central East Substation			Double-Circuit 230 kV from Central East Substation to Sycamore Canyon Substation			Single-Circuit 230 kV from Sycamore Canyon Substation to Peñasquitos Substation			Sycamore Canyon Substation to Elliot Substation 69 kV Reconductor		
	#	Hrs/Day	Days/Wk	#	Hrs/Day	Days/Wk	#	Hrs/Day	Days/Wk	#	Hrs/Day	Days/Wk
boom truck	8	10-12	6	8	10-12	6	8	10-12	6	2	10-12	6
backhoe	5	10-12	6	5	10-12	6	5	10-12	6	1	10-12	6
crane	7	10-12	6	5	10-12	6	5	10-12	6	–	–	–
aerial lift trucks	8	10-12	6	8	10-12	6	8	10-12	6	2	10-12	6
pickup trucks	15	10-12	6	12	10-12	6	12	10-12	6	2	10-12	6
overhead line trucks	4	10-12	6	4	10-12	6	4	10-12	6	2	10-12	6
underground line trucks	2	10-12	6	2	10-12	6	2	10-12	6	–	–	–
underground cable dolly (trailer)	1	6	6	1	6	6	1	6	6	–	–	–
stringing rig (trailer)	2	10-12	6	2	10-12	6	2	10-12	6	2	10-12	6
tensioner (trailer)	2	10-12	6	2	10-12	6	2	10-12	6	2	10-12	6
water truck	5	6	6	2	6	6	2	6	6	1	6	6
truck w/lowboy trailer	4	10-12	6	4	10-12	6	4	10-12	6	–	–	–
drill rig	2	10-12	6	2	10-12	6	2	10-12	6	–	–	–
front end loader	2	10-12	6	2	10-12	6	2	10-12	6	–	–	–
dump truck	4	10-12	6	4	10-12	6	4	10-12	6	1	10-12	6
concrete truck	6	8-10	6	6	8-10	6	6	8-10	6	–	–	–
crew truck	4	10-12	6	4	10-12	6	4	10-12	6	2	10-12	6
underground cable puller	1	6-8	6	1	6-8	6	1	6-8	6	–	–	–
underground splicing van	1	10-12	6	1	10-12	6	1	10-12	6	–	–	–
sock line trailer	2	10-12	6	2	10-12	6	2	10-12	6	1	10-12	6
wire trailer	2	10-12	6	2	10-12	6	2	10-12	6	1	10-12	6
dozer	2	10-12	6	2	10-12	6	2	10-12	6	1	10-12	6
grader	2	10-12	6	2	10-12	6	2	10-12	6	1	10-12	6
fuel/oiler truck	3	6	6	3	6	6	3	6	6	–	–	–
mechanic truck	2	10-12	6	2	10-12	6	2	10-12	6	1	10-12	6
air compressor	4	10-12	6	4	10-12	6	4	10-12	6	1	10-12	6
rock drill	2	10-12	6	2	10-12	6	2	10-12	6	–	–	–
small helicopter	1	6	6	1	6	6	1	6	6	1	6	6
heavy lift helicopter	2	6	6	2	6	6	2	6	6	–	–	–

Table B-14. Equipment Requirements, cont.

SUBSTATION																		
	Imperial Valley			Central East			Sycamore Canyon			Peñasquitos			San Luis Rey			South Bay		
Equipment	#	Hrs/Day	Days	#	Hrs/Day	Days	#	Hrs/Day	Days	#	Hrs/Day	Days	#	Hrs/Day	Days	#	Hrs/Day	Days
BELOW GRADE																		
auger	1	10	10	–	–	–	1	10	10	1	10	10	–	–	–	–	–	–
backhoe	1	10	40	6	8	120	1	10	20	1	10	40	1	10	40	1	8	5
front loader	1	10	20	–	–	–	1	10	20	1	10	20	1	10	20	1	8	10
ditch witch	1	10	20	4	8	60	1	10	20	1	10	20	1	10	20	1	8	5
concrete truck	5	4	20	8	6	120	2	4	20	2	4	10	1	4	20	1	4	5
water truck	1	4	40	2	8	120	1	4	20	1	4	40	1	4	40	1	4	5
dump truck	2	8	10	–	–	–	2	8	10	1	8	10	1	8	10	1	8	5
trailer	4	4	10	–	–	–	4	4	10	1	4	10	1	4	10	–	–	–
crew truck/car[1]	10	0	40	10	0	120	5	0	40	5	0	40	5	0	40	3	0	20
hauler	–	–	–	2	4	100	–	–	–	–	–	–	–	–	–	–	–	–
skid steer loader	–	–	–	2	4	120	–	–	–	–	–	–	–	–	–	–	–	–
batch plant	–	–	–	1	10	120	–	–	–	–	–	–	–	–	–	–	–	–
drill rig	–	–	–	3	8	80	–	–	–	–	–	–	–	–	–	–	–	–
truck w/trailer	–	–	–	2	2	100	–	–	–	–	–	–	–	–	–	–	–	–
compressor	–	–	–	2	2	60	–	–	–	–	–	–	–	–	–	–	–	–
construction fork	–	–	–	2	8	100	–	–	–	–	–	–	–	–	–	–	–	–
980 loader	–	–	–	1	4	60	–	–	–	–	–	–	–	–	–	–	–	–
vibrating roller	–	–	–	2	6	60	–	–	–	–	–	–	–	–	–	–	–	–
QA/QC truck	–	–	–	2	10	120	–	–	–	–	–	–	–	–	–	–	–	–
ABOVE GRADE																		
crane	1	10	40	2	10	30	1	10	40	1	10	40	1	10	40	–	–	–
bucket truck	1	10	40	2	6	10	1	10	40	1	10	40	1	10	40	1	8	20
boom truck	1	4	20	2	6	10	1	4	20	1	4	20	1	4	5	1	4	10
trailer	4	4	10	–	–	–	4	4	10	1	4	10	1	4	10	1	4	10
fork lift	1	4	40	–	–	–	1	4	40	1	4	40	1	4	20	–	–	–
overhead line rig	1	4	20	–	–	–	1	4	5	1	4	5	–	–	–	–	–	–

Table B-14. Equipment Requirements, cont.

SUBSTATION																		
	Imperial Valley			Central East			Sycamore Canyon			Peñasquitos			San Luis Rey			South Bay		
Equipment	#	Hrs/Day	Days	#	Hrs/Day	Days	#	Hrs/Day	Days	#	Hrs/Day	Days	#	Hrs/Day	Days	#	Hrs/Day	Days
crew truck/car[1]	10	0	40	10	0	120	5	0	40	5	0	40	5	0	40	3	0	20
man lift	–	–	–	8	10	160	–	–	–	–	–	–	–	–	–	–	–	–
construction fork	–	–	–	3	10	160	–	–	–	–	–	–	–	–	–	–	–	–
overhead line	–	–	–	2	10	20	–	–	–	–	–	–	–	–	–	–	–	–
cable dolly (trailer)	–	–	–	1	4	20	–	–	–	–	–	–	–	–	–	–	–	–
stringing rig (trailer)	–	–	–	2	4	20	–	–	–	–	–	–	–	–	–	–	–	–
oil rig (trailer w/generator)	–	–	–	1	8	15	–	–	–	–	–	–	–	–	–	–	–	–
SSF6 gas cart (trailer)	–	–	–	1	0	20	–	–	–	–	–	–	–	–	–	–	–	–
water truck	–	–	–	2	10	160	–	–	–	–	–	–	–	–	–	–	–	–
trucks w/trailers	–	–	–	2	2	160	–	–	–	–	–	–	–	–	–	–	–	–
compressor	–	–	–	2	2	40	–	–	–	–	–	–	–	–	–	–	–	–
CABLE PULL/WIRING																		
cable trailer	1	4	20	–	–	–	1	4	20	1	4	20	1	4	20	1	4	5
boom truck	1	4	20	–	–	–	1	1	20	1	4	20	1	4	20	–	–	–
crew truck/car[1]	10	0	40	8	0	60	5	0	60	5	0	60	5	0	40	2	0	20
man lift	–	–	–	2	5	60	–	–	–	–	–	–	–	–	–	–	–	–
bucket truck	–	–	–	1	5	60	–	–	–	–	–	–	–	–	–	–	–	–
SITE DEVELOPMENT																		
Caterpillar (D9 or larger)	–	–	–	2	10	60	–	–	–	–	–	–	–	–	–	–	–	–
Caterpillar (D9 or larger)	–	–	–	5	10	20	–	–	–	–	–	–	–	–	–	–	–	–
140H blade	–	–	–	1	10	60	–	–	–	–	–	–	–	–	–	–	–	–
16G blade	–	–	–	1	10	20	–	–	–	–	–	–	–	–	–	–	–	–
water truck	–	–	–	6	10	60	–	–	–	–	–	–	–	–	–	–	–	–
compactor	–	–	–	2	10	60	–	–	–	–	–	–	–	–	–	–	–	–
scraper	–	–	–	6	10	60	–	–	–	–	–	–	–	–	–	–	–	–
992 loader	–	–	–	3	10	20	–	–	–	–	–	–	–	–	–	–	–	–
773 rock truck	–	–	–	4	10	20	–	–	–	–	–	–	–	–	–	–	–	–

Table B-14. Equipment Requirements, cont.

SUBSTATION																		
	Imperial Valley			Central East			Sycamore Canyon			Peñasquitos			San Luis Rey			South Bay		
Equipment	#	Hrs/Day	Days	#	Hrs/Day	Days	#	Hrs/Day	Days	#	Hrs/Day	Days	#	Hrs/Day	Days	#	Hrs/Day	Days
rock drill	–	–	–	2	10	20	–	–	–	–	–	–	–	–	–	–	–	–
portable rock crusher	–	–	–	1	10	20	–	–	–	–	–	–	–	–	–	–	–	–
backhoe	–	–	–	1	10	40	–	–	–	–	–	–	–	–	–	–	–	–
ditch witch	–	–	–	1	10	10	–	–	–	–	–	–	–	–	–	–	–	–
concrete batch plant	–	–	–	1	10	15	–	–	–	–	–	–	–	–	–	–	–	–
concrete truck	–	–	–	1	10	15	–	–	–	–	–	–	–	–	–	–	–	–
water pump	–	–	–	1	10	160	–	–	–	–	–	–	–	–	–	–	–	–
asphalt paver	–	–	–	1	10	10	–	–	–	–	–	–	–	–	–	–	–	–
asphalt emulsion truck	–	–	–	1	10	10	–	–	–	–	–	–	–	–	–	–	–	–
vibrating roller	–	–	–	1	10	10	–	–	–	–	–	–	–	–	–	–	–	–
truck (delivery)	–	–	–	1	1	80	–	–	–	–	–	–	–	–	–	–	–	–
QA/QC truck	–	–	–	2	1	160	–	–	–	–	–	–	–	–	–	–	–	–

1 Assumes arriving onsite and parked all day.
Source: SDG&E, 2006.

Table B-15 shows the estimated trips per day and mileages to truck water to the project area for transmission line and substation construction.

Table B-15. Estimated Water Truck Usage

Project Location	Truck Trips/Day (Batch Plants)[1]	Estimated Round Trip Haul Mileage (Batch Plants)	Truck Trips/Day (Construction)[2,3,4]	Estimated Round Trip Haul Mileage (Construction)
Desert Link (MP 0 – MP 14)	N/A	N/A	9	40 miles
Desert Link (MP 14 – MP 31)	N/A	N/A	9	22 miles
Desert Link (MP 31 – MP 60)	1	60 miles	9	50 miles
ABDSP Link (MP 60 – MP 83)	N/A	N/A	4	70 miles
Central Link (MP 83 – MP 111)	N/A	N/A	6	38 miles
Inland Valley Link (MP 111 – MP 136)	N/A	N/A	3	50 miles
Coastal Link (MP 136 – MP 150)	N/A	N/A	2	28 miles
SX-EL 69 kV Reconductor	N/A	N/A	2	13 miles

1 Water delivery trucks assumed to have maximum capacity of 6,000 gallons (batch plant usage). N/A is shown for batch plants using municipal water supply where delivery system (piping, etc.) is unknown.
2 Water distribution trucks assumed to have maximum capacity of 4,000 gallons (insulator washing and dust control).
3 The number of truck trips per day is an approximation based upon review of the preliminary engineering design and known site conditions to date. Dust control measures will be known once an installation contractor is established.
4 Use of a soil stabilizer could help to minimize the number of truck trips per day.

B.4.8 Removal of Facilities and Waste Disposal

Solid Waste Generation

Substation and ROW construction would generate a variety of solid wastes including concrete, hardware, and poles. The solid wastes generated during construction would be hauled away for disposal. A detailed discussion of solid waste disposal and landfill capacity is included in Section D.14, Socioeconomics, Services, and Utilities. Excavation along the ROW and at substations would generate solid wastes that can potentially be used as fill; however, there would be approximately 24,431 cubic yards of excavation removed for disposal.

A percentage of excavate that is clean and dry would be 'spread' along the ROW. The volumes shown in Table B-16 reflect the waste that would be hauled away and not disposed of in the ROW. In calculating the volumes that would need to be hauled away, the following percentages were assumed:

- Imperial Valley Link: 20 percent of excavate would not be not clean and dry.
- ABDSP Link: 100 percent of excavate would be removed from site.
- Central Link: 75 percent of excavate would not be clean and dry.
- Inland Valley Link: 50 percent of excavate not clean and dry.
- Costal Link: 25 percent of excavate would not be clean and dry.

Table B-16. Solid Waste Generation from Excavation Activities

Activity	Excavation (yard^3/day)	Excavation Removal Total (yard^3)	Other Solid Waste Total (yard^3)
Average Lattice Tangent Structure	111	9,098	—
Average Lattice Angle/Dead-End Structure	261	5,799	—
Average Steel H-Frame Structure	213	2,708	—
Average Steel Pole Tangent Structure	141	5,014	—
Average Steel Pole Angle/Dead-End Structure	213	1,812	—
Substation Grading/Site Work	—	—	2,400 (vegetation, etc.)
Substation Construction (Below Grade)	—	—	3,500 (Foundation materials, lumber, etc.)
Substation Construction (Above Grade)	—	—	2,500 (Crating, boxes, etc.)

Construction of the transmission lines would generate solid waste that would need to be disposed of or hauled off-site. Table B-17 lists the solid waste amounts that would be generated for each link during construction of the SRPL.

Table B-17. Solid Waste Generation by Link during Transmission Line Construction

ACTIVITY	Desert Link (yard^3)	Anza-Borrego Link (yard^3)	Central Link (yard^3)	Inland Valley Link (yard^3)	Coastal Link (yard^3)	SX – EL 69 kV Reconductor (yard^3)
Average Lattice Tangent Structure	990	3,388	3,044	1,676	—	—
Average Lattice Angle/Dead-End Structure	454	960	3,076	1,309	—	—
Average Steel H-Frame Structure	—	2,708	—	—	—	—
Average Steel Pole Tangent Structure	443	—	4,206	—	365	—
Average Steel Pole Angle/Dead-End Structure	28	283	1,060	141	300	—
Wood pole & Misc. Hardware. Removal	—	352 Tons	134 Tons	8 Tons	125 Tons	17 Tons
Conductor Removal	—	80 Tons	20 Tons	2 Tons	60 Tons	33 Tons

Source: SDG&E Response to Data Request 12, dated May 25, 2007.

Existing Transmission Lines and Facilities

As described above, a total of 463 existing transmission structures would be removed as part of the Proposed Project (Table B-18). Transmission structure removal would be required as a result of the relocation, consolidation, or reconductoring of existing overhead transmission lines.

The first step in the removal of existing transmission lines would be to attach sheaves to the end of the insulators at each structure and place the conductor onto the sheaves. Next, the conductor would be attached to a sock line and removed using pulling equipment. The conductor would be coiled and hauled off site to a recycling facility. Existing wood poles would be removed by cutting the pole at the ground level, leaving the embedded portion in place. The wood poles, insulators, cross arms and all other associated hardware would be disposed of at an offsite location. No water would be required for wood pole, conductor, or miscellaneous hardware removal.

Table B-18. Transmission Structure Removal

Location	Number of Structures to be Removed (type)
Imperial Valley Link	0
Anza-Borrego Link	5 (wood H-frame)
	276 (wood pole)
Central Link	116 (wood pole)
Inland Valley Link	5 (wood pole)
Coastal Link	43 (wood H-frame)
	6 (wood pole)
	1 (steel pole)
Sycamore Canyon to Elliot Substation Reconductor	11 (wood pole)

Source: SDG&E, 2006.

Site Cleanup

At the conclusion of construction, where affected by project construction, SDG&E would:

- Restore all removed curbs, gutters, and sidewalks
- Repave all removed or damaged paved surfaces
- Restore removed or damaged landscaping or vegetation
- Remove all construction materials from project site and associated staging areas and disposed of at an off-site location, as appropriate.

B.5 Operation and Maintenance

Following project construction, operation and maintenance of the new line would commence. Operation and maintenance activities would include all operation and maintenance requirements set forth by CAISO and CPUC General Orders including activities such as patrol of the lines, climbing inspections, tower and wire maintenance, routine line washing, and repairs of access and spur roads. SDG&E would keep necessary work areas around all structures clear of vegetation and would limit the height of vegetation along the ROW. The following section provides details on the anticipated operation and maintenance requirements for the Proposed Project.

B.5.1 Routine System Inspection, Maintenance and Repair

Regular inspection of transmission lines, substations, and support systems is critical for safe, efficient, and economic operation. Early identification of items needing maintenance, repair, or replacement would ensure continued safe operation of the Proposed Project. The following sections describe SDG&E's proposed plan for inspecting and maintaining the Proposed Project.

B.5.1.1 Transmission Line Maintenance

Inspection Patrols

Regular ground and aerial inspections would be performed in accordance with the CAISO requirements per the Transmission Control Agreement between CAISO and SDG&E concerning transmission facility maintenance. SDG&E's overhead transmission lines and substations would be inspected for corrosion, equipment misalignment, loose fittings, and other mechanical problems. The need for vegetation management would also be determined during inspection patrols. As required by CAISO, aerial inspection (visual and infrared) of the entire system and climbing inspections of transmission structures would be conducted annually. Aerial inspection would be conducted by helicopter and would require two or three crewmembers, including the pilot. Ground inspections, including underground system components within each vault, would be conducted by up to three crewmembers every three years.

Hardware Maintenance and Repairs

Electrical equipment housed on poles or support structures may include conductors, insulators, switches, transformers, lightning arrest devices, line junctions, and other electrical equipment. This equipment may require addition, replacement or repair over time. Typically, equipment repair or replacement would be conducted by a four-person crew with two or three trucks, a boom or line truck, an aerial truck and an assist truck.

Insulator Washing

Arcing can occur when an electrical discharge is created from the combination of atmospheric condensation and dust on porcelain insulators. Arcing may cause electrical outages, but can be prevented by routinely washing the insulators to keep them free of dust. Insulator washing involves driving a water truck to within six feet of a tower base and using a high-pressure hose to spray deionized water at the insulators. Two crewmembers and a water truck are required for insulator washing. Typically, insulator washing takes approximately 30 minutes per transmission structure. Insulator washing is not expected more than twice a year and would require 300 gallons of water per structure and 3,000 gallons of water per day.

Right-of-Way Repair

ROW repairs would include grading or repair of existing maintenance access roads and work areas, and spot-repair of sites subject to flooding or scouring. Activities related to ROW repair are usually conducted after the rainy season, when water has caused erosion damage. Required equipment may include a motor grader, backhoe, four-wheel drive pickup truck, and a cat-loader. The cat-loader has steel tracks whereas the grader, backhoe, and truck would typically have rubber tires.

Vegetation Management

SDG&E would maintain a minimum clearance of 10 feet around the base or foundation of all electrical transmission structures. In addition, SDG&E maintains work areas adjacent to access roads and electric transmission structures for vehicle and equipment access necessary for operations, maintenance and repair. Shrubs and other obstructions would be regularly removed near structures to facilitate inspection and maintenance of equipment and to ensure system reliability. In addition, vegetation with a mature height of 15 feet or taller would not be allowed to grow within 10 vertical feet of any overhead conductor in order to protect system reliability and public safety.

Vegetation would be removed using mechanical equipment such as chain saws, weed trimmers, rakes, shovels, mowers and brush hooks. The duration of activities and the size of crew and equipment required would be dependent on the amount and size of the vegetation to be trimmed or removed. Most vegetation removal or tree trimming activities can be completed in one day.

Occasionally, herbicide is applied subsequent to vegetation clearing to prevent re-growth of vegetation. SDG&E normally uses one or a combination of 16 different herbicides, which are listed in a U.S. Fish and Wildlife Service (USFWS) letter to SDG&E along with USFWS recommendations. In addition, SDG&E follows the application protocols outlined in Sempra's "Physical and Climatic Target Area Evaluation Form". Local application of herbicide would occur within a ten-foot radius of each structure. Aerial application of herbicide would not be allowed under USFWS recommendations.

B.5.1.2 Substation Maintenance

Substation maintenance activities would include equipment testing, monitoring and repair to prevent service interruptions. It is anticipated that routine maintenance activities would require approximately six trips per year to each SRPL substation by a two to four person crew. General substation monitoring and control functions are performed remotely from SDG&E's central operations facility located at 9060 Friars Road, San Diego. Regular operation of the substation would require one or two workers in a light utility truck to visit the substation on a weekly basis. Once per year, a major maintenance inspection would be conducted that would require 20 personnel for approximately one week.

To prevent unauthorized entry, warning signs would be posted and fencing and locked gates would be present at all SRPL substations. In addition, a remotely monitored security system may be installed at the proposed Central East Substation.

B.5.2 Emergency Response

Emergencies are any event requiring immediate response to a condition by SDG&E personnel. These may include, but are not limited to, car-to-pole contacts, downed poles, fires, transformer outages and/or outages due to down wire as a result of extreme weather. Responding crews would vary in number and equipment needs depending on the size and severity of the emergency. Typically, a four-person crew with a line truck, aerial lift truck, and an assist truck would respond to the emergency to make repairs. Crews may be required to respond to an emergency in a remote area without roads. In areas without vehicle access, helicopters may be used to respond quickly to emergencies.

B.5.3 Fire Protection and Security

SDG&E employs a full time Fire Coordinator and Pole Protection Crews who work closely with local fire protection jurisdictions, including the California Department of Forestry and Fire Protection (CDF) to ensure implementation and effectiveness of safety requirements and procedural protocols. Additional requirements and protocols are contained in SDG&E's Fire Plan Standard Practice, which is currently under SDG&E's review and has not yet been approved as of the end of 2007. This document is intended to serve as an educational tool to prevent work-related fires and the associated protocols and policies related to fire prevention.

SDG&E implements the following practices to prevent fire during construction and maintenance/repair activities: brush clearing prior to work, stationing a water truck at the job site to keep the ground and vegetation moist in extreme fire conditions, enforcing red flag warnings, and providing "fire behavior" training to all pertinent personnel. SDG&E does not directly fight fires. However, SDG&E personnel will extinguish any remaining pole fires once a fire has passed through the work area.

B.6 Connected Actions and Indirect Effects

Connected actions are addressed in Section B.6.1 and projects that could create indirect effects are addressed in Section B.6.2.

B.6.1 Connected Actions

The CPUC and BLM have evaluated a range of projects to determine whether they are so closely related to the Proposed Project as to be considered "connected actions" under the National Environmental Policy Act (NEPA). Projects that are considered "connected actions" under NEPA (40 C.F.R. 1508.25(a)(l)) include actions that:

(i) are automatically triggered by the proposed action,

(ii) cannot or will not proceed unless the proposed action occurs first or simultaneously, or

(iii) are interdependent parts of a larger action and depend upon the larger action for their justification.

In general, the approach to identifying connected actions has been driven by an analysis of power purchase agreements (PPAs) between SDG&E and developers of generation and a review of actions proposed by other transmission system owners (i.e., Imperial Irrigation District, IID). When SDG&E makes a Request for Offers (RFO) for renewable projects, some offers to generate power for SDG&E in Imperial County have been made contingent on SDG&E gaining approval of Sunrise or a similar 500 kV line from Imperial Valley.

Each of the four projects is described in detail below. They have been found to be connected to the Sunrise Powerlink Project for the following reasons:

- Stirling Energy Systems solar facility, considered to be connected because a new 500 kV transmission line would be required in order for the entire 900 MW facility to have transmission capacity.
- Components of the IID 230 kV transmission system upgrades, considered to be connected because the 230 kV line and new 500/230 kV San Felipe Substation would be used to export power to San Diego via the 500 kV Sunrise Powerlink.
- Esmeralda–San Felipe Geothermal Project, considered to be connected the PPA states that new transmission would be required.
- Jacumba Substation, considered to be connected because testimony of SDG&E has indicated that the construction of the Sunrise Powerlink would allow development of additional wind generation in San Diego County and in Mexico, and that this generation would be transmitted via the existing SWPL, which passes through the Jacumba area.

These four projects are described below, and the environmental impacts of these projects are presented in Section D of this EIR/EIS, following the discussion of the SDG&E transmission line and associated facilities.

Several other renewable projects in the Imperial Valley, such as Bethel Energy, LLC Solar Thermal Project (100 MW) and any respondents to SDG&E's 2006 Renewable RFO, were considered as possible connected actions, because they have Power Purchase Agreements (PPA) that in the absence of adequate transmission capability are contingent upon SDG&E obtaining approval for and being able to license and construct a new 500 kV line from Imperial Valley to the San Diego area. However, because these projects have a relatively small generation capacity and because they are expected to interconnect

with the IID system, they are not dependent on the Sunrise Powerlink Project and can go forward with or without the proposed SRPL. Where appropriate, these projects are considered to be cumulative projects and are analyzed in Section G of this EIR/EIS.

B.6.1.1 Stirling Energy Systems (SES) Solar Two LLC

Under a Power Purchase Agreement approved by the CPUC, SDG&E has committed to purchase the electrical energy produced at a Concentrating Solar Power (CSP) plant that will be owned and operated by SES Solar Two, LLC, an affiliate of Arizona-based Stirling Energy Systems, Inc (SES). SES and SDG&E have agreed to an initial 20-year contract to purchase 300 MW of net solar power from the first phase of a three-phased project that would ultimately comprise 37,440 solar concentrating devices on a 12.5 square-mile site. The proposed SES Solar Two Project site and the location of an associated 230 kV generation interconnection transmission line are shown on Figure B-44a.

CPUC Resolution E-3965 (December 15, 2005), which granted approval of the SES contract, states:

> *As explained in its RFO, SDG&E's ability to procure from resources bid from locations in the Imperial Valley area are contingent upon SDG&E successfully being able to license and construct a new 500 kV line from the Imperial Valley area to San Diego by 2010. As such, the PPAs for resources in the Imperial Valley are contingent upon SDG&E providing each seller with a notice to proceed with construction once the conditions precedent related to SDG&E's ability to proceed with construction of a new 500 kV have been met.*
>
> *In addition, the Stirling's Project, which is located in Imperial Valley, is contingent upon completion of new transmission. Should new transmission not be constructed in the time necessary to effect delivery of Stirling's Project, SDG&E will further evaluate other solutions along with congestion and deliverability risks and make a final determination as to whether to proceed with the PPA at that time.*

After the initial 20-year contract, SDG&E has options on two future phases of the Stirling Project that would provide an additional 600 MW of net peaking renewable capacity to SDG&E's resource mix for a total of 900 MW. Therefore, the Stirling Project consists of three phases:

- Phase 1 – 300 MW for 20 yrs
- Phase 2 – Option (300 MW for 20 yrs)
- Phase 3 – Right of First Refusal (300 MW – terms and conditions to be determined).

The SES solar facility site would be located on approximately 8,000 acres of primarily undeveloped BLM land bounded to the north by the Plaster City OHV Open Area and bounded to the south by I-8 and the Yuha Basin Area of Critical Environmental Concern (ACEC). The associated 230 kV generation interconnection transmission line would traverse the Yuha Basin ACEC for seven miles within a new ROW adjacent to the existing SWPL ROW and interconnect to the existing Imperial Valley Substation. Related project components include a new 230 kV substation, on-site overhead distribution lines, overhead transmission infrastructure for interconnection to SCE's electrical grid, approximately 525 miles of on-site gravel access roads, a pumped filtration system to connect to IID's existing canal, telecommunications facilities, and operations and maintenance buildings.

As listed above, each phase of the Stirling Project is contracted in a separate Confirmation Letter (contract) between SES and SDG&E. If SDG&E elects to purchase power from Phase 2 and 3 operations,

SES would build out its project site with about 12,480 collector units and associated access roads and distribution infrastructure in each 300 MW Phase. For the purpose of environmental analysis, this document assumes build-out through Phase 3 for delivery over the Proposed Project.

To comply with the Confirmation Letter for Phase 1, SES must have 300 MW in operation by December 31, 2010 regardless of the progress of the SRPL. The first 300 MW would be transmitted independently of the SRPL over a new 230 kV generation interconnection transmission line (gen-tie) between the CSP plant and the Imperial Valley Substation. This gen-tie would be built and operated by SES and would allow the power to be transmitted via existing lines. There is no available evaluation of how energy from Phases 2 and 3 would be transmitted if the SRPL is not built by the time they are in operation.

Application Status. In 2006, SES submitted an application to the BLM for the Stirling Solar Project (ROW Grant Application No. CA-47740). For the CSP Project to be carried forward, SES must receive a ROW Grant Permit from BLM. SES would also require permission from the California Energy Commission (CEC), because the CEC has approval authority for thermal power generation facilities of 50 MW or greater. SES supplemented its application with BLM by filing a Plan of Development in September 2007 and is expected to file an Application for Certification (AFC) with CEC in early 2008. BLM and the CEC expect to initiate preparation of a joint NEPA/CEQA document after the AFC is determined to be complete.

Facility Description

Stirling Technology. The Stirling dish technology converts thermal energy to electricity by using a mirror array to concentrate and focus sunlight on the receiver end of a Stirling engine. The curved dishes that focus the sun's energy onto Stirling engines are 45 feet tall and occupy a maximum horizontal space of approximately 1,135 square feet (0.026 acres) and have an anchored footprint of 12.5 square feet (assumed four-foot diameter caisson). The internal side of the receiver heats hydrogen gas, which expands. The pressure created by the expanding gas drives a piston, crankshaft, and drive shaft. The drive shaft turns a small electricity generator. The entire energy conversion process takes place within a canister the size of an oil barrel. The generation process requires no water and the engine does not produce emissions as no combustion takes place. Each CSP device consists of one Stirling engine mounted above one mirror array, and once installed, each CSP device requires very little maintenance aside from periodic washing of the mirrored surfaces of the dish. Figure B-44c illustrates the Stirling engine and dish technology.

Facility Location and Layout. Figure B-44b illustrates the location and extent of the SES Project as shown in its applications to the BLM. It would roughly be bounded by I-8 to the south and by Union Pacific Railroad (formerly the Arizona and San Diego Railroad) ROW and Evan Hewes Highway to the north. The site would extend to the section line east of Dunaway Road to the east and approximately seven miles west of Dunaway Road to the west. The site would be bisected by the existing 500 kV Southwest Powerlink (SWPL) #1 transmission line corridor. The CSP facility would occupy approximately 5,700 acres of the 8,000 acres site with approximately 2,300 acres of the site unusable, being comprised of unworkable terrain and wash areas. Construction and operation of the CSP facility would result in permanent surface disturbance of approximately 2,500 acres, with the balance of approximately 3,200 acres within the CSP facility left undisturbed or for drainage. Approximately 4,000 acres of the site would be shaded by the 37,440 CSP dishes. Specifications for any related facilities would be included in the application to the CEC and BLM.

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Figure B-44a. Connected Actions, SES Solar Two Project and 230 kV Transmission Line
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Figure B-44b. Connected Actions, SES Solar Two Project Site
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Figure B-44c. Connected Actions, SES Solar Two Project Components
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Transmission Line to Imperial Valley Substation. SES would build a 230 kV generation interconnection transmission line from the project site into the Imperial Valley Substation. The new transmission line would start at the southern boundary of the site and parallel the SWPL ROW for approximately seven miles through the Yuha Basin ACEC to the Imperial Valley Substation. For the final four miles into Imperial Valley Substation, the new line would also parallel the proposed SRPL route. Phase 1 (300 MW) would use the SWPL #1 transmission line to transport power from Imperial Valley Substation to the San Diego area; however, Phases 2 & 3 would use the Sunrise Powerlink transmission line.

Specifications for any related facilities would be included in SES's application to the CEC and BLM. On-site permanent gravel access roads would vary in width with a median of 12 feet. Based on specifications of the 230 kV structures proposed by SDG&E for the Proposed Project (see Table B-1), tower footprints would be approximately 64 square feet. Tower heights would be approximately 120 feet with a median span of 800 to 1,100 feet between the towers. Given that the line would be approximately seven miles (36,960 feet) long, it would require 37 to 38 structures depending on the span. Data provided by SES, however, indicate that they would use towers somewhat shorter than the Proposed Project (between 70 and 110 feet), which would provide spans of shorter distance and require between 50 and 60 towers (SES, 2007).

No new transmission line access roads would be required for the gen-tie because it would parallel the existing SWPL and use existing access roads.

Construction

SES expects to begin construction in the first or second quarter of 2009, and construction would take place over a period of five to six years. SES estimates that 400 to 500 construction-related jobs would be created during peak construction (for approximately six to 12 months). For the balance of the five-year construction period, 300 to 400 workers would be required. A number of these jobs would be filled by the local labor force and the remaining positions would be filled with workers from the surrounding metropolitan areas.

Construction of the 230 kV transmission line would be largely identical to the process described in Section B.4.1 for the proposed SRPL 230 kV line.

Operation

As discussed above under Stirling Technology, the entire energy conversion process would take place within a canister the size of an oil barrel. The generation process would require no water and the engine would not produce emissions as no combustion would take place. Little maintenance would be required aside from periodic washing of the mirrored surfaces of the solar concentrating dishes.

Following project construction, operation and maintenance of the new 230 kV transmission line would commence. Activities such as patrol of the lines, climbing inspections, tower and wire maintenance, routine line washing, and repairs of access and spur roads would be required (see Section B.5 above). SES would keep necessary work areas around all structures clear of vegetation and would limit the height of vegetation along the ROW. Section B.5 provides details on the anticipated operation and maintenance requirements for the Proposed Project (including the 230 kV transmission line components), which would be similar to the operation and maintenance requirements for the SES 230 kV gen-tie transmission line.

B.6.1.2 IID Transmission System Upgrades

The Imperial Valley Study Group (IVSG), formerly known as the Salton Sea Study Group (SSSG), is a study group for the Imperial Valley area that was created under a policy directive from the CPUC (Decision D.04-06-010 under Proceeding I.00-11-001), and supported by several initiatives at the California Energy Commission (CEC). The IVSG specified a phased development plan for the construction of transmission upgrades capable of exporting up to 2,200 MW of geothermal power from the Imperial Valley region of California. One of the intents of the plan was to represent, to the extent possible, the consensus recommendation of the stakeholder participants in the study group, who included all regional transmission owners, CAISO, CPUC, CEC, generation developers, local, state and federal agencies, environmental and consumer groups and other interested parties. A background on the IVSG is also included in Section A of this EIR/EIS.

The final IVSG transmission plan consists of three development phases, designed to provide market access for 2,200 MW of renewable resources, primarily geothermal and solar, in the Imperial Valley region. Phase 1 would accommodate three new geothermal plants or equivalent resources (645 MW total) capable of being in service by the end of 2010. Among other components, a major element of Phase 1 would be a new 500 kV line from the Imperial Valley Substation to San Diego County, with 230 kV connections to SDG&E's load center. IVSG studies established that a line from the Imperial Valley Substation to San Diego County would make Imperial Valley generation deliverable to load centers in San Diego and to other load centers in southern California and to the north. That line is the proposed Sunrise Powerlink Project.

Once Phase 1 of the IVSG plan is in place (including SRPL), Phase 2 would accommodate an additional three geothermal plants or equivalent resources (645 MW) of incremental generation, bringing the export capacity total to 1,290 MW. As part of Phase 2 of the IVSG plan, IID would construct a new 230 kV line from the Bannister 230 kV Substation (a 10 acres substation, located at approximately MP 32 and planned for completion by IID in 2009) to a new 500/230 kV San Felipe Substation that would interconnect to the Imperial Valley to San Diego 500 kV line (i.e., the Sunrise Powerlink line).

The new 230 kV line from Bannister and the 20 acres 500/230 kV San Felipe Substation could potentially provide an additional interconnection between the IID and CAISO systems, and thus another point for the delivery of renewable resources to southern California loads. IID would construct, own and operate these upgrades.

These transmission system upgrades are considered to be connected to the Sunrise Powerlink Project because the 230 kV line and new 500/230 kV San Felipe Substation would be used to export power to San Diego via the 500 kV Sunrise Powerlink. While the development plan established by the IVSG could be used in the absence of the Sunrise Powerlink to export power from the Imperial Valley to load centers in Riverside, San Bernardino, and Los Angeles Counties, the primary purpose of the IVSG plan was to export renewable power from IID territory to SDG&E (to minimize congestion at SCE's Devers Substation). Although IID may independently develop a 500 kV substation in the San Felipe area, there appears to be little reason for a 500/230 kV substation here without the Sunrise Powerlink. Similarly, without a 500/230 kV San Felipe Substation then the 230 kV line from Bannister would not be necessary. Also, the application filed by SDG&E for the Proposed Project (Purpose and Need, Table IV-27) indicates that the 500/230 kV substation at San Felipe and the 230 kV line from Bannister would only occur with the Sunrise Powerlink.

Upgrades made during Phase 3 of the IVSG plan could make an additional 910 MW of Imperial Valley generation deliverable to the CAISO grid, bringing overall incremental export capacity to 2,200 MW. Increased flows to SDG&E over Phases 1 and 2 of IVSG plan, including the Sunrise Powerlink Project, could trigger the need for additional transmission lines, as described in Section B.2.7.

Phase 3 would also require upgrades to IID's 230 kV system through the Coachella Valley (known as Path 42). These IID transmission upgrades would maintain current and future delivery of renewable resources to the Coachella Valley area and SCE's Mirage/Devers 230 kV system in Riverside County. IID transmission system upgrades related to the Coachella Valley and Path 42 to the SCE area from Phase 3 of the IVSG plan were considered but rejected as possible connected actions to the Proposed Project. Upgrades to Path 42 are not dependent on the Sunrise Powerlink Project and can go forward with or without the Proposed Project depending on the need to schedule deliveries to SCE. Where appropriate, these projects are considered to be cumulative projects and are analyzed in Section G of this EIR/EIS.

Facility Description

Figure B–45 illustrates the planned Bannister–San Felipe 230 kV double-circuit transmission line and the new San Felipe 500/230 kV Substation.

San Felipe 500/230 kV Substation. The IVSG plan includes construction by IID of a new San Felipe 500/230 kV Substation to allow for connection to the SDG&E Sunrise Powerlink line into San Diego. IID would be responsible for site selection, permitting and construction of the 20 acres substation. IID has stated that it would be located south of Highway SR78, east of the existing San Felipe Substation (MP 58.8), and near the Imperial/San Diego County line. In the event that an alternative SDG&E San Felipe 500/230 kV Substation is approved and built east of the existing San Felipe Substation as part of the Partial Underground 230 kV ABDSP SR78 to S2 Alternative (instead of the Proposed Project), this IID San Felipe Substation would be adjacent to the new SDG&E substation to its east. The substation is scheduled for completion in 2010 (IID, 2006).

New 230 kV line into San Felipe Substation. SDG&E has stated in its response to UCAN's DR 2-54f that "absent the Sunrise Powerlink, or some approximately equivalent project, there would appear to be no reason to build a 230 kV line to the San Felipe Substation to 'deliver' geothermal energy." Therefore, as part of Phase 2 of the IVSG plan and only subsequent to the completion of the Proposed Project, a new 230 kV double-circuit transmission line would be built from a planned Bannister Substation (located at MP 32 of the proposed SRPL route) to a new 500/230 kV San Felipe Substation, as shown in Figure B-45.

Although final routing has not been determined, based on information provided by IID, the 230 kV transmission line would likely parallel the 500 kV SRPL transmission line (IID, 2006) for its entire length. Therefore, the route would begin at Bannister Substation on the east side of the proposed SRPL 500 kV route at SRPL MP 32. It would travel northwest for 8.1 miles to the intersection of SR78 and SR86. At this point the route would turn west, paralleling SR78 to its south-side for 7.0 miles and passing just north of the BLM San Sebastian Marsh/San Felipe Creek Area of Critical Environmental Concern (ACEC). Like the proposed route, at SRPL MP 47.1, the 230 kV route would diverge from SR78 and would turn south, following section lines for 3.0 miles. From there the route would turn southwest and then west for 3.9 miles to join Old Kane Springs Road at SRPL MP 54. The route would parallel Old Kane Springs Road and the proposed 500 kV corridor to the west-northwest for 4.8 miles to the new San Felipe Substation, which would be east of the existing San Felipe Substation.

Based on 230 kV structures proposed by SDG&E for the Proposed Project (see Table B-1), tower footprints would be approximately 64 to 79 square-feet depending on tower type. Tower heights would be approximately 120 feet with a median span of 800 to 1,100 feet between the towers. Given that the line would be approximately 26.8 miles (141,504 feet) long, it would require approximately 129 to 177 structures, depending on span length. This would result in roughly 8,256 square-feet (0.19 acres) to 11,328 square feet (0.26 acres) of tower disturbance for the overall route, assuming a 64-square-foot disturbance.

Construction

Although construction would be performed by IID and its crews, construction activities of the San Felipe 500/230 kV Substation would generally be similar to that described for the proposed Central East Substation in Section B.4.2, except the San Felipe Substation would be 20 acres smaller (about half the size of Central East Substation), because it would not be built for future expandability. The new San Felipe Substation would initially be built to accommodate only one 230 kV double-circuit transmission line into the substation. Additionally, the terrain at the San Felipe Substation is generally flat and therefore, less grading and earthwork would be required than at the Central East Substation site described in Section B.4 above.

Construction of the approximately 26.8-mile 230 kV double-circuit transmission line would be largely similar to the process described in Section B.4.1 for the proposed SRPL 230 kV line. The terrain in the area is generally flat with desert vegetation. The route would pass though the U.S. Naval Air Facility El Centro Military Height Limitation area (20 to 200 feet); however, because the transmission towers would be approximately 120 feet tall and would be adjacent to 160-foot 500 kV lattice towers the height limitation should not present any engineering/constructability challenges or regulatory infeasibility.

Operation

Both the Bannister–San Felipe double-circuit 230 kV transmission line and the San Felipe Substation are estimated for completion in 2010. Section B.5 above provides details on the anticipated operation and maintenance requirements for the Proposed Project (including the 230 kV transmission line components and substation operations, which generally would be similar to the IID operations and maintenance procedures).

Following project construction, operation and maintenance of the 230 kV line would commence and the required activities would include: patrol of the lines, climbing inspections, tower and wire maintenance, routine line washing, and repairs of access and spur roads would be required. IID would keep necessary work areas around all structures clear of vegetation and would limit the height of vegetation along the ROW.

Substation maintenance activities would include equipment testing, monitoring and repair to prevent service interruptions. It is anticipated that routine maintenance activities would require approximately six trips per year to the San Felipe Substation by a two to four person crew and one major annual inspection. General substation monitoring and control functions would be performed remotely by IID. Regular operation of the substation would require one or two workers in a light utility truck to visit the substation on a weekly basis.

To prevent unauthorized entry, warning signs would be posted and fencing and locked gates would surround the site. In addition, a remotely monitored security system may be installed at the new San Felipe Substation.

Figure B-45. Connected Actions, IID Transmission System Upgrades
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B.6.1.3 Esmeralda–San Felipe Geothermal Project

An EIS is currently being prepared by BLM to analyze the leasing of geothermal resources exploration, development, and utilization in the Truckhaven Geothermal Leasing Area (Truckhaven) located in western Imperial County, California (refer to Figure B-46). Truckhaven encompasses 40,320 acres, of which 14,731 are managed as federal minerals by BLM, El Centro Field Office. The remainder of the lands within the leasing area are privately owned or owned by California State Land Commission (CSLC) and administered by CDPR as part of the Ocotillo Wells State Vehicular Recreation Area (SVRA). Currently, BLM has non-competitive geothermal lease applications pending for portions of this land, including lease applications from Esmeralda Energy, LLC (Esmeralda); however, before any leases can be issued, the NEPA process must be completed. Under the proposed Truckhaven Geothermal Leasing Area action, BLM could approve the pending non-competitive leases and offer competitive leases for all other available lands at Truckhaven, totaling 14,731 acres.

Esmeralda has secured a Power Purchase Agreement (PPA) with SDG&E for 20 MW of geothermal power that would likely be developed within Truckhaven. In March 2007, the CPUC approved this renewable contract. The project that would develop the 20 MW of geothermal resources at Truckhaven is referred to as the Esmeralda–San Felipe Geothermal Project. Geothermal energy uses heat from the earth, extracted through geothermal wells in the form of steam or brine, which is then transported via pipeline and used to drive turbines, which drive electricity generation.

Because no project application has been submitted for the Esmeralda–San Felipe Geothermal Project, no clear project description exists. The assessment of environmental impacts resulting from this project is based on the Reasonably Foreseeable Development (RFD) scenario in the Truckhaven DEIS, which describes the anticipated development that would occur at Truckhaven to facilitate geothermal resources exploration, development and utilization should the leases be approved by BLM. It should be noted that if leasing occurs, additional site-specific environmental analysis would be conducted by BLM to determine whether to issue specific permits. The RFD scenario assumes that 50 net megawatts (MW) of geothermal generation would be developed at Truckhaven, including the 20 MW developed for the Esmeralda–San Felipe Geothermal Project, which is 40 percent of the total. Therefore, in the absence of a formal project application, it is assumed that roughly half of the components identified under the RFD scenario would apply to the Esmeralda–San Felipe Geothermal Project.

New Wells

It is anticipated that approximately 20 new wells for production and injection would be initially required to support 20 MW of geothermal generation, with a new replacement well drilled every three years to access additional steam reserves and to replenish the water supply. Each well would be approximately 3,000 to 6,000 feet deep and would require a two acres well pad. Each well would require one mile of 30-foot-wide access road, resulting in 3.6 acres of surface disturbance per well. Additionally, one mile of pipeline would be required for each well, resulting in 1.2 acres of surface disturbance per pipeline. The pipeline would follow the access roads and add 10 feet to the total width of the road. Pipelines would be used to gather geothermal fluids and to inject fluids after heat extraction by the power plant. Typically, pipelines are less than 24 inches in diameter and would be located a few feet above ground (< 5 feet) on supports. Cumulatively, the total surface disturbance for the new wells, including pipelines, would be approximately 170 acres. It is expected that each well would require between 60 to 120 days of drilling depending on projected depth and geologic conditions of the well site.

Power Plants and Electric Interconnection

It is anticipated that a new power plant, capable of generating a minimum of 20 MW of electricity, would be constructed to utilize the geothermal resources from Truckhaven. It has not been determined whether the power plants would use binary power generation or a flash generation system, but it is expected that binary power generation would be the type of plant constructed at Truckhaven. In a binary-cycle geothermal power plant, the heat from the extracted geothermal fluid is transferred to a working fluid that boils at a lower temperature than water. The working fluid (e.g., iso-butane or n-pentane) expands through a turbine to generate electricity. The power plant would be sited on approximately 17 acres and would require one mile of access roads.

In order to interconnect with the electricity grid, the power plant would require new transmission lines from Truckhaven to the IID transmission system, at either the future Bannister or San Felipe Substations. Additionally, a new 20-foot access road would facilitate access to the transmission support structures. Construction of the transmission intertie lines would result in 100 acres of disturbance, which would be restored following construction activities, with the exception of the permanent access road. Permanent disturbance resulting from construction and operation of the power plants and associated facilities would be approximately 65 acres.

Facility Decommissioning

Decommissioning of a geothermal facility, including the exploration wells and associated generation infrastructure would occur if a geothermal resource has been depleted or for economic, environmental or technological reasons. All hardware and infrastructure would be removed and the land would be restored according to a BLM-approved reclamation plan.

B.6.1.4 Jacumba Substation

In its testimony during the CPUC's Phase 1 hearings on the need and economics of the Proposed Project, SDG&E staff stated that a new 230/500 kV substation would be required to allow future wind generation projects to transmit generated power via the existing 500 kV Southwest Powerlink (SWPL) transmission line. The SWPL currently has limited available capacity, but if the Sunrise Powerlink Project is approved and constructed, some electricity currently carried by the SWPL will be transmitted via Sunrise, making more capacity available on the SWPL. There are a number of possible new wind generation projects near the Jacumba area (about 5 miles west of the San Diego/Imperial County line), some in San Diego County (Crestwood wind area) and some in Mexico (La Rumorosa wind area). Only one of these projects, "Rumorosa Wind Developers II", is currently described in an Advice Letter[9] Number 2143-A filed by SCE at the CPUC on July 27, 2007; this potential future project is considered to be unlikely to occur unless Sunrise is approved. Therefore, the impacts of this substation are evaluated as part of the Proposed Project.

This 230/500 kV substation would allow incoming transmission lines at 230 kV from wind farms in either the Crestwood or La Rumorosa areas. The power would be transformed to 500 kV in order to allow it to be transmitted via the SWPL to the Miguel Substation in San Diego. The substation is assumed to occupy about 20 acres, and while its location has not been defined by SDG&E, for the purposes of this EIR/EIS it is assumed to be located just east of the point where the Interstate 8 Alternative diverges from the SWPL. Figure B-47 illustrates the approximate location and size of the substation area. The impacts of this substation are also evaluated as a part of the wind component of the Non-Wires In-Area Renewable Generation Alternative, as defined and analyzed in Section E.5.

[9] An Advice Letter is filed with the CPUC to define contents and terms of utility contracts.

Figure B-46. Connected Actions: Esmeralda–San Felipe Geothermal Project
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Figure B-47. Connected Actions: Jacumba Substation
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B.6.2 Indirect Effects of the Proposed Project

Potential Mexican wind farms are outside the jurisdiction of the United States and are not subject to federal control or responsibility even though they may be constructed as a result of a contract with a U.S. entity (SCE). As such, their construction and operation is not considered to be a "major federal action."

Using the CEQ Guidance on NEPA Analyses for Transboundary Impacts, this EIR/EIS will evaluate the "Rumorosa Wind Developers II" project as a potential "indirect effect" of the Sunrise Powerlink Project. The analysis will attempt to define transboundary environmental effects, paying particular attention to actions that may affect migratory species, air quality, watersheds, and other components of the natural ecosystem that cross borders, as well as to interrelated social and economic effects. This analysis relies on available professional sources of information and contact agencies in the affected country with relevant expertise, and analyzes and discloses reasonably foreseeable transboundary effects using reasonably available information.

B.6.2.1 SCE La Rumorosa Wind

The project evaluated in this EIR/EIS is called "Rumorosa Wind Developers II" and is a 250 MW wind facility located in Mexico close to the San Diego / Imperial County lines. The project would interconnect to a new substation (presumed to be the Jacumba Substation defined in Section B.6.1.4 above) located in southeastern San Diego County that would be interconnected with the existing 500 kV Southwest Powerlink. The developer has indicated that transmission upgrades would be needed to interconnect the project.

It is assumed, based on current technology, that a 250 MW wind facility would be constructed using 125 2-MW turbines. Assuming that turbines of this size generally require between 5 to 17 acres per turbine, this wind facility would require between 625 and 2,125 acres.

No maps are available to illustrate the specific site and configuration of this project, but Figure B-48 illustrates the general area of the La Rumorosa wind resource area. Figure B-49 maps the quality of wind resources available and Figure B-50 includes photographs of the landscape in the La Rumorosa project area.

Background

La Rumorosa is a small town (pop. 1,615) located in the Municipality of Tecate, in Baja California (Mexico Census, 2005). It is located on Kilometer 78 (Milepost 48) of Mexico Highway 2 that joins Mexicali and Tijuana (Mexicali, 2007). La Rumorosa is situated among the Sierra de Juárez Mountains, an extension of the San Diego Mountains. It borders on the Sonoran Desert, which comprises the majority of the northeastern region of Baja California (GobBC, 2007). Figure B-48 illustrates the approximate location of La Rumorosa and its surrounding area, and the location of the La Rumorosa Substation.

A report published by the National Renewable Energy Laboratory (NREL) in 2004 identifies the La Rumorosa region's wind resource areas by classifications that range between Wind Classes 3 (Fair) and 7 (Superb) for wind power density at 50 meters (W/m^2) and wind speed at 50 m (m/s) (see Figure B-49). (California Energy Commission, 2005) The NREL drew upon the Kenetech Wind-Power (U.S. Wind-Power) data, as well as Vestas Wind Systems A/S which installed several anemometric towers in the area in 2002-2003. After the State of Oaxaca, the La Rumorosa region has the second highest potential for wind energy in Mexico.

According to press releases, two potential wind projects are currently being considered in La Rumorosa. One project is being considered by Unión Fenosa, a Spanish company, which purchased 50% of the Mexican company Zemer Energía, with the goal of completing a wind project in the La Rumorosa region with the capacity of between 500 MW and 1000 MW (BizNews, 2007). Unión Fenosa is considering selling this wind-power to Pacific Gas & Electric (PG&E) and Southern California Edison (SCE) and has also begun the permitting process to gain access to transmission within California (BizNews, 2007). Unión Fenosa already has use permits for the area and for the exportation of energy, according to their president, Pedro López Jiménez. Unión Fenosa is the third largest independent energy producer in Mexico (BizNews, 2007). The second potential wind project is the "Rumorosa Wind Developers II"(RWD) and is evaluated in this EIR/EIS as an indirect effect of the Proposed Project. The RWD is being evaluated because of the agreement that was signed between Sempra Generation and SCE in which Sempra Generation has agreed to sell SCE up to 250 MW of power from the La Rumorosa wind power facility under development (Sempra, 2007).

Mexican Environmental Regulations

The Government of Baja California signed the Environmental Protection Law (Ley de Protección al Ambiente) on November 30, 2001 to complement the already existing Federal Environmental Code (Ley General del Equilibrio Ecológico y la Protección al Ambiente) ratified in 1988. Both laws are dedicated to preserving and protecting the environment, and dictate guidelines for the use of natural resources. In addition, the Federal Environmental Code sets out pollution prevention and control methods for the national territory. Both Mexican and international companies and facilities are subject to Mexican environmental law.

Mexican Electric Commission

The Mexican Federal Electricity Commission (Comisión Federal de Electricidad, or CFE) is responsible for siting and constructing transmission lines throughout Mexico and in Baja California. The CFE is subject to regulations designed to preserve both the environmental and historical integrity of the regions traversed by their infrastructure. The CFE is required to identify any possible implications of their work that may be subject to the Federal Environmental Code (Ley General del Equilibrio Ecológico y la Protección al Ambiente), the Law of Sustainable Forest Development (Ley General de Desarrollo Forestal Sustentable), and the Law of Monuments and Archeological, Artistic, and Historic Zones (Ley Federal Sobre Monumentos y Zonas Arqueológicos, Artísticos e Históricos). An Environmental Impact Statement is required by the Secretary of the Environment and Natural Resources (Secretaria del Medio Ambiente y Recursos Naturales) for any proposed siting and construction of transmission lines or substations, and a Justification/Technical Study is necessary to obtain authorization for any change to forested lands resulting from such works. (CFE, 2007)

Rumorosa Wind Developers II (RWD)

The project evaluated in this EIR/EIS as an indirect effect of the Proposed Project is the "Rumorosa Wind Developers II" (RWD) also located near La Rumorosa, Baja California. On June 30th, 2007, SEMPRA, the parent company of SDG&E, entered into an agreement with Cannon Power Corporation of San Diego to develop a wind farm east of the town of La Rumorosa in the municipality of Tecate. La Rumorosa is approximately 70 miles southeast of San Diego, across the U.S./Mexico border. The RWD Project would create up to 250 MW of power with up to 125 2 MW wind turbines and would be installed along the eastern side of the Sierra de Juárez Mountains (Sempra, 2007).

Figure B-48. Indirect Action: La Rumorosa Wind Project
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Figure B-49. Indirect Action: Border Region Wind Power
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Figure B-50. Indirect Action: Views from La Rumorosa
CLICK HERE TO VIEW

RWD Siting

The specific location and the design of the wind farm has not been disclosed by Sempra, Cannon, or SCE, so in order to evaluate the potential indirect effects of this project, a hypothetical description has been developed. The site was selected based on the location of the existing CFE La Rumorosa Substation and the wind resource areas defined for the region as shown on Figure B-48. Wind resources within the chosen site have the maximum energy potential within the Baja California region and range between Class 5 and Class 7 wind potential. Wind farms typically require 5 to 17 acres per MW generated (CEC, 2005), therefore it is assumed that this wind facility would require between 750 and 2,125 acres of land. However, wind facility "footprints" (including wind turbines, access roads, and other facility buildings) utilize only about 5 percent of the land on which the system is built, resulting in a footprint of 37.5 to 212.5 acres. The land that would be occupied by the RWD is generally characterized by rolling to steep foothills. The area is mostly treeless; however, some coniferous forest occurs in the area and is a highly valued resource.

The design of the wind energy project would require initial site testing and monitoring, followed by engineering of an actual wind facility. SEMPRA has said it could begin delivering wind from the RWD Project to Southern California Edison as early as 2010, and future expansion of this Proposed Project is under consideration (Sempra, 2007). According to Sempra, the RWD Project would not require significant transmission upgrades but rather could link into the existing SWPL transmission line (Rose, 2007). The RWD Project, placed in Mexico, would be subject to the Mexican Environmental Regulations.

The 250 MW SEMPRA RWD Project would be located within designated Wind Class 4, 5, 6, and 7 areas illustrated on Figure B-50. The property is located in La Rumorosa, Baja California, next to the communal region of Jácume.

Site Testing and Monitoring

Site monitoring and testing that is done before building a wind project involves the collection of sufficient amounts of meteorological data to accurately characterize the wind regime. Meteorological data, such as data on wind speed and direction, wind shear, temperature, and humidity, are typically collected over a period of at least one year. However, some developers may choose to collect data for as long as 3 years to account for anticipated annual weather variations. The collected data is used to support decisions on whether the wind resources at a site are suitable for development and, if so, the appropriate number, type, and location of wind turbines to be incorporated into the facility design.

The collection of meteorological data requires the erection of meteorological towers equipped with weather instruments. These towers can be as high as 165 feet (50 meters). For purposes of the RWD it is assumed that the alternative sites can be adequately characterized with 10 or fewer towers. Meteorological towers are typically metal, lattice-type structures and many are permanently mounted to their own trailers since they are relatively lightweight. As a result, installation of permanent foundations is not required unless the tower will stay in service during operation of the wind facility. Guy wires may be necessary for meteorological towers in very windy areas. Signal cables used during the site monitoring and testing phase are not likely to be buried, unless the tower will remain in service during operation of the wind facility. Remote tower sites may require the construction of minimum-specification access roads (i.e., two-track). During the site testing and monitoring phase, the towers would be unattended except for periodic visits by maintenance personnel. At the end of this phase, the temporary towers would be removed. For this analysis, it is assumed that meteorological towers will be made permanent (i.e., improvement of access roads, installation of foundations, and undergrounding of cabling) during construction of the wind facility.

Wind Facility Design

Although site monitoring and testing activities have not been fully completed for the proposed RWD sites, for purposes of this analysis it is assumed that the sites are viable as demonstrated by the NREL report drawing upon the Kenetech Wind-Power data and Vestas Wind Systems A/S data (2002-2003) (CEC, 2005). The RWD Project would include the installation of approximately 125 new 2-MW propeller-type turbines, mounted on tubular towers and utilizing a three-blade upwind nacelle orientation. Alternatively, based on wind conditions and topographical constraints, larger turbines could be used and therefore, less turbines would be required. For analysis of this hypothetical project, the RWD Project is assumed to include the following design and operational elements:

- Maximum rotational speed of turbine rotor blades averaging approximately 20 revolutions per minute (rpm) (compared to the historic turbines' faster rotational speed of 36 to 38 rpm). The rotational speed of a 3.6 MW turbine is variable but averages between 8.5 to 15.3 rpm.
- The turbines would be mounted on enclosed tubular towers. The total height of the turbine and tower structures would likely range from 380 to 440 feet depending on the turbine size, elevation, and topography at each tower location. The rotor-diameter would be approximately 300 feet for a 2 MW turbine and up to 340 feet for a 3.6 MW turbine.
- The total distance from blade tip at the 6 o'clock position to the ground surface would be at least 24 meters, or about 80 feet.
- Siting and spacing of wind turbines depends on site-specific conditions that are influenced by terrain and wind conditions. The ultimate location of turbines would be determined after a detailed analysis of the terrain and wind in the La Rumorosa areas. Turbines would likely be located on ridge-tops and in some areas with sufficient upwind space, multiple rows of turbines could be used. The wake of upwind turbines can substantially diminish the velocity and increase the turbulence at downwind turbines. Where the rows are sufficiently spaced, the losses can be minimized. Crosswind spacing is less likely to diminish turbine productivity. This project would space the turbines in rows between 8 to 10 rotor-diameters apart.
- The new turbines would not require any guy wire support.
- Maintenance access to the nacelle[10] will be in the form of ladders inside the towers, accessed from locked doors at the base of the towers.
- The turbine nacelle and rotor design is 3-bladed, with an upwind active yaw[11] horizontal-axis configuration, which is the predominant design standard in the wind industry today (Small Wind Energy, 2007).
- All turbine interconnect systems will be placed underground.

In addition to the turbine structures, the following facilities would also be required:

- A new **switchyard** would need to be constructed as part of the RWD Project at the eastern end of the proposed site, just west of the La Rumorosa Substation.

[10] A nacelle is the body, shell, or casing of a propeller-type wind turbine, covering the gearbox, generator, blade hub, and other parts.

[11] A yaw is the movement of the tower top turbine that allows the turbine to stay into the wind.

- **Connection to Transmission Grid**. A new 230 kV transmission line would be required to connect the RWD switchyard to the existing 500 kV SWPL transmission line, assuming a new substation (the Jacumba Substation) would be constructed. It is assumed the new transmission line would follow the existing Tijuana/Mexicali 230 kV ROW west for 20 miles around the town of La Rumorosa until Luis Echeverria Alvarez, adjacent to the *Las Manantiales* ranch. At this point the new 230 kV line would go north, northeast on a new ROW for 8.7 miles to reach the Jacumba Substation at MP I8-35. The new ROW would follow 7 miles north, northeast in Mexico, passing approximately 1.1 miles west of the existing community of Jácume. The new ROW would be cross the U.S./Mexico border and require 1.7 miles in the United States, passing approximately 1000 feet west of the outskirts of the town of Jacumba (see Figure B-48).
- **Jacumba Substation.** Assuming that the RWD wind power is transmitted to the SWPL via a new 230 kV transmission line a new 20 to 25 acres substation would be constructed north of the town of Jacumba. Figure B-48 shows the approximate location of this substation.
- **Operation and maintenance facility**. A new operation and maintenance facility would need to be constructed as part of the RWD Project. Depending on the geographical separation of the groups of wind turbines, multiple facilities could be required. Each operation and maintenance facility is assumed to be approximately 5,000 square feet plus parking.
- Main **access roads** would be required for construction and to access the turbine areas and various RWD facilities. Spur roads off of the main access roads would also be required to allow access to individual or clusters of turbine sites. Approximately 5 to 10 miles of access roads would be needed depending on the turbine siting.

Construction and Grading

Installation of the new wind turbines associated with the RWD Project would require the grading and construction activities described below.

Upon completion, each turbine pad would occupy approximately a 40-foot by 40-foot site (or approximately 1,600 square feet), including a concrete pad and drain rock surround. During the construction period, relatively flat temporary pads would be constructed at each turbine site to provide a base for construction equipment, including the large crane needed to erect the tower and assemble the turbine. Installation of tower foundations would involve excavations to depths up to 40 feet below grade, with the diameters of excavations being roughly the same as the diameter of the tower base, approximately 15 to 20 feet depending on turbine model selected. Approximately 160 cubic yards of concrete, requiring an average of 6,000 gallons of water, would be required for each tower foundation (BLM, 2005). After backfilling of foundation voids, remaining excavated materials would need to be disposed of offsite or redistributed on the site. Contour grading would be conducted at each new turbine pad location as needed to match construction grade with the existing grade. The temporary area of disturbance for new turbines is estimated to be approximately one to three acres per turbine, or approximately 125 to 375 acres (assuming 2 MW turbines) of which 4.5 acres would be permanent disturbance.

Based on the remoteness of the RWD sites, it may be necessary to construct a temporary concrete batch plant on site, especially if haul distances from existing or specially constructed off-site concrete plants are over an hour away (BLM, 2005). Depending on available materials on site, constituents of concrete (aggregate and sand) may also need to be hauled to the on-site batching plant. Electrical power for the batching plant would be provided by a portable diesel engine/generator set (nominally 125-kW capacity). Up to 10 acres would be required for a typical batching plant. This area would need to be cleared of

vegetation and some grading might be required to level the site. The soils at the batch plant would be expected to be heavily compacted as a result of plant activities including associated truck traffic (each wind turbine foundation would require about 18 to 20 concrete-hauling truck trips) for a total of up to 2500 trips. The concrete batch plant would also be utilized for other foundations required for the RWD Project, including the switchyard and operation and maintenance facilities.

New access and spur roads would also be constructed to provide construction and maintenance access to each new turbine site. Access and spur roadways that would be needed for construction vehicle access would be cleared of vegetation and graded to a width of approximately 30 to 40 feet for the construction period, and then restored to widths of 16 to 24 feet once the construction period is complete. Depending on subsurface stratigraphy, surface soils may need to be excavated, and gravel and/or sand may need to be imported to establish a sufficiently stable road base. Engineered storm water control may be necessary, and natural drainage patterns are likely to be altered, at least on a local scale. Final grading plans would be developed pursuant to subsequent building permits, and would be required to be approved by the local government and would be subject to local requirements. The length and resultant disturbance resulting from the improvement of existing access roads and construction of new access and spur roads would be dependant upon the final siting of turbine pads within the RWD Project site.

Laydown areas would also be required for equipment and material staging. The construction of equipment laydown areas would involve the removal of vegetation for the purposes of safety, access, and visibility during lifting operations. Although surface soils may not need to be removed, some regrading might be required to create relatively level areas, and rock and/or gravel are expected to be laid down to give these areas all-weather accessibility and to support the weights of construction vehicles and staged equipment. The number and size of laydown areas will be subject to the construction contractor's discretion, but could reasonably be assumed to be at least 1.4 acres per wind turbine for a total of 175 acres.[12]

Trenching would be required for the installation of turbine and switchyard interconnection systems. A minimum three foot trench depth is assumed, requiring a 20- to 40-foot construction right-of-way depending upon topography and the presence of other physical obstacles. The length and area of disturbance resulting from turbine and switchyard interconnection installation would be dependent upon the final siting of turbine pads.

A switchyard would be located near the eastern end of the RWD Project site, just west of the La Rumorosa Substation. The switchyard site is expected to result in an approximate total disturbance of two to four acres. Depending upon switchyard siting, construction of new permanent access route might also be required.

Site preparation for one or two new operation and maintenance facilities is assumed, equating to an approximate total disturbance of 1.25 to 1.5 acres, including parking areas. Each operation and maintenance site would include an approximately 5,000-square-foot storage facility. Depending upon facility siting, construction of new permanent access routes might also be required.

For the meteorological towers that would remain in place during the operation of the RWD Project, construction of permanent foundations and access roads, and undergrounding of cable would be required. Each tower site would occupy approximately a 30-foot by 30-foot area (or approximately 900 square feet), including a concrete foundation, drain rock surround, and guy wires. During the construc-

[12] This assumes a 250 ft x 250 ft area for each turbine, or 62,500 square feet. (Maiden Wind Farm, 2002)

tion period, relatively flat temporary pads would be constructed at each meteorological tower location to allow for construction vehicle access, and foundation and tower installation. The total graded area for permanent towers is estimated to be approximately 1/2 acres per tower, of which 0.25 acres would be permanent disturbance. It is most likely that fuel would be stored on site in portable tanks. These tanks are expected to be staged at or near the laydown areas and resupplied throughout the construction period by commercial vendors. The total volume of fuel (primarily diesel fuel) to be present on site is not expected to exceed 1,000 gallons. No major equipment maintenance is expected to be performed on site on construction equipment, other than maintenance of fluid levels.

A new 230 kV transmission line would be placed above ground for an approximate distance of 20 miles along the existing Tijuana/Mexicali 230 kV ROW, and approximately 8.7 miles of new ROW to connect the RWD switchyard to the existing 500 kV SWPL, at which point the new Jacumba Substation would also need to be constructed.

Standard tubular steel pole (TSP) structures standing approximately 100 to 120 feet tall are assumed for the transmission line. TSP structures would be installed approximately every 700 to 1,200 feet depending on site conditions (i.e., terrain, roadways, utilities; etc.) and transmission line alignment, so the 28.7 miles new transmission line would require approximately 150 to 180 new towers. Construction would involve the installation of foundations, erection of TSP structures, and cable pulling, tensioning, and splicing. A large auger would be used to dig foundation holes for each structure that would be 5 to 7 feet in diameter, and 15 to 30 feet deep. A cage of reinforced steel with anchor bolts would be installed and concrete would be placed in the hole. Cranes would most likely be used to erect the pre-assembled structures; helicopters are also an option. Temporary disturbance around each TSP structure site resulting from construction activity would be approximately 100-foot diameter centered on each new tower; permanent disturbance at the TSP structures sites would be limited to the diameter of the foundations. Additional temporary disturbance would occur as a result of construction access roads and cable pulling, tensioning, and splicing sites. Permanent access roads would also be required for the transmission line. The exact number of access roads, both temporary and permanent, and temporary pulling/tensioning/splicing sites required will be a function of terrain; existing buildings, roadways, utilities, etc.; and transmission line alignment.

The new 230/500 kV substation (the Jacumba Substation) for the 500 kV SWPL transmission line interconnect would also result in the permanent disturbance of approximately 20 acres at approximately MP I8-35 of the Interstate 8 Alternative, about one-half miles north of the town of Jacumba, along the existing SWPL, as illustrated in Figure B-48. While the site has an existing dirt road for access, construction of an expanded permanent access route would also be required.

All temporarily disturbed areas, including crane pads, the outside shoulders of all construction access roads, and interconnect and power line rights-of-way would be re-seeded and reclaimed to native vegetation once the construction period is completed.

The final footprint or permanent disturbance of the RWD Project would be 5 to 10 percent of the total acreage of the RWD Project sites, approximately 37.5 to 212.5 acres (BLM, 2005). This area does not include the permanent disturbance resulting from the required 230 kV transmission line and substation interconnect to the grid, requiring up to an additional 40 acres.

Construction Personnel and Schedule

It is assumed that construction of the RWD Project would occur within three or more phases to accomplish installation of turbines and associated facilities (access roads, interconnections, switchyard, meteorological towers, and operation and maintenance facilities), construction of the 230 kV transmission

line and associated substation, and site restoration. Staffing for the construction of the RWD Project would require approximately 50 to 75 people to construct each phase of the project and an additional 50 people per phase to support overall construction activities. Construction would occur following completion of the environmental review process, approval of a Land Use Permit, should any forest be removed according to Mexican Environmental regulations, and obtaining all other necessary permits for construction. Each phase would take approximately nine to 18 months to complete. According to SEMPRA, construction of all phases would occur prior to 2010.

Operations and Maintenance

Upon completion, approximately 6 or fewer full time on-site employees along with a plant manager would operate the project. Maintenance activities include monitoring operations, securing the site, changing fluids on the turbines, replacing worn parts, and repairing broken equipment. Wastes resulting from wind facility maintenance typically include small amounts of gear oil and lubricating oils from yaw motors or transmission and glycol-based coolants from transmissions equipped with forced-flow radiator cooling loops. Most turbine designers construct their turbines in modular fashion. Thus, it is likely that most major overhauls or repairs of turbine components would involve removing the component from the site to a designated off-site repair facility. Because most towers are equipped with lifting devices of sufficient capacity to lower or raise individual drive train components, a crane should not be needed for such component replacements. In general and with the exception of major overhauls and repairs, maintenance and operations is a low-intensity activity that could be shared with other projects in the area. Major overhauls or upgrades (repowering) of wind turbines would require separate permitting and environmental review.

B.7 Applicant Proposed Measures

Table B-19 identifies SDG&E's Applicant Proposed Measures (APM) that would be followed during all project-related construction activity. SDG&E proposes to implement these measures, as illustrated in Section 2 of the Proponent's Environmental Assessment, dated August 4, 2006, and as modified slightly by SDG&E in late 2006. SDG&E has committed to implementing these measures in order to reduce the potential direct and indirect impacts that could result from the Proposed Project activities. Therefore, the APMs are considered part of the project description.

The impact analysis in this EIR/EIS assumes implementation of all SDG&E APMs. However, where other impacts are identified that are not addressed by these APMs, or where the APMs are not adequate to reduce impacts to less than significant levels, the EIR/EIS recommends additional mitigation measures. APMs will be incorporated into the Mitigation Monitoring, Compliance, and Reporting Program developed for this Proposed Project, and implementation of the APMs will be monitored in the same fashion as the mitigation measures developed in this EIR/EIS.

Table B-19. Applicant Proposed Measures

APM No.	Description
	AIR QUALITY
AQ-APM-1	For activities in Imperial County, the project will comply with ICAPCD Rule 800 (Fugitive Dust Requirement for Control of Fine Particulate Matter [PM10]). A Dust Control Plan for construction activities would be filed with the ICAPCD.
AQ-APM-2	1. Prohibit construction grading on days when the wind gusts exceed 25 mph to the extent feasible to control fugitive dust. 2. All trucks hauling soil and other loose material will be covered or maintain at least two feet of freeboard. 3. Snow fence-type windbreaks will be erected in areas identified as needed by SDG&E. 4. Vehicle speeds will be limited to 15 mph on unpaved (no gravel or similar surfacing material) roads. 5. Unpaved roads will be treated by watering as necessary. 6. Soil stabilizers will be applied to inactive construction areas on an as-needed basis. 7. Exposed stockpiles of soil and other excavated materials will be contained within perimeter silt fencing, watered or treated with soil binders, as necessary.
AQ-APM-3	To minimize mud and dust from being transported onto paved roadway surfaces, pave, gravel, use rattle plates or apply chemical stabilization at sufficient concentration and frequency to maintain a stabilized surface starting from the point of intersection with the public paved surface. SDG&E will implement this measure where applicable and not conflicting with other requirements.
AQ-APM-4	If suitable park-and-ride facilities are available in the project vicinity, construction workers will be encouraged to carpool to the job site to the extent feasible. The ability to develop an effective carpool program for the Proposed Project would depend upon the proximity of carpool facilities to the job site, the geographical commute departure points of construction workers, and the extent to which carpooling would not adversely affect worker show-up time and the project's construction schedule.
AQ-APM-5	To the extent feasible, unnecessary construction vehicle and idling time will be minimized. The ability to limit construction vehicle idling time is dependent upon the sequence of construction activities and when and where vehicles are needed or staged. Certain vehicles, such as large diesel-powered vehicles, have extended warm-up times following start-up that limit their availability for use following start-up. Where such diesel-powered vehicles are required for repetitive construction tasks, these vehicles may require more idling time. The project will apply a "common sense" approach to vehicle use; if a vehicle is not required for use immediately or continuously for construction activities, its engine will be shut off. Construction foremen will include briefings to crews on vehicle use as a part of pre-construction conferences. Those briefings will include discussion of a "common sense" to vehicle use.
	BIOLOGICAL RESOURCES
BIO-APM-1	SDG&E would perform any detailed on-the-ground protocol surveys, with regard to specific sensitive plant or wildlife species whose habitat would be impacted by the project based on final design, in accordance with state or federal regulations or statutes. SDG&E would submit results of these surveys to the USFWS and CDFG and consult on reasonable and feasible mitigation measures for potential impacts, prior to any ground disturbing activities in a particular area. Mitigation would prioritize avoidance as the primary means to address impacts. If avoidance is not feasible, then relocation/restoration would be implemented. Where relocation/restoration is not feasible or deemed not to fully address impacts, then mitigation through SDG&E's NCCP mitigation credits or if necessary compensation via another on- or off-site purchase or dedication of habitat at a ratio of 2:1 for impacts inside preserves and 1:1 for impacts outside of preserves would be identified and implemented.
BIO-APM-2	Prior to construction, all SDG&E's contractors, subcontractors and project personnel would receive training regarding the appropriate work practices necessary to effectively implement the biological APMs and to comply with the applicable environmental laws and regulations including appropriate wildlife avoidance, and impact minimization procedures, the importance of these resources and the purpose and necessity of protecting them; and methods for protecting sensitive ecological resources.

Table B-19. Applicant Proposed Measures

APM No.	Description
BIO-APM-3	Except when not feasible due to physical or safety constraints, all project vehicle movement would be restricted to existing access roads and access roads constructed as a part of the project and determined and marked by SDG&E in advance for the contractor, contractor-acquired accesses, or public roads. New access road construction for the project would be allowed year-round. However, when feasible, every effort would be made to avoid constructing roads during the nesting season. When it is not feasible to keep vehicles on existing access roads or to avoid constructing new access roads during the nesting, breeding, or flight season, SDG&E would perform a site survey, or more as appropriate, in the area where the work is to occur. This survey would be performed to determine presence or absence of endangered nesting birds, or other endangered species in the work area. SDG&E would submit results of this survey to the USFWS and CDFG and consult on reasonable mitigation measures to avoid or minimize for potential impacts, prior to vehicle use off existing access roads or the construction of new access roads. However, this survey would not replace the need for SDG&E to perform detailed on-the-ground surveys otherwise required by BIO-APM-1. Parking or driving underneath oak trees is not allowed in order to protect root structures. In addition to regular watering to control fugitive dust created during clearing, grading, earth-moving, excavation, and other construction activities which could interfere with plant photosynthesis, a 15 miles per hour speed limit shall be observed on dirt access roads to reduce dust and allow reptiles and small mammals to disperse.
BIO-APM-4	The area limits of project construction and survey activities would be predetermined based on the temporary and permanent disturbance areas noted on the final design engineering drawings, with activity restricted to and confined within those limits. Survey personnel shall keep survey vehicles on existing roads. During project surveying activities, brush clearing for footpaths, line-of-sight cutting, and land surveying panel point placement in sensitive habitat would require prior approval from the project biological resource monitor in conformance with the APMs. Hiking off roads or paths for survey data collection is allowed year-round as long as other APMs are met. Stringing of new wire and reconductoring for the project would be allowed year round in sensitive habitats if the conductor is not allowed to drag on the ground or in brush and all vehicles used during stringing remain on project access roads. Where stringing requires that conductor drop within brush of drag on or through the brush or ground or vehicles leave project access roads, SDG&E would perform a site survey, or more as appropriate, to determine presence or absence of endangered nesting birds or other endangered species in the work area. SDG&E would submit results of this survey to the USFWS and CDFG and consult on reasonable and feasible mitigation measures for potential impacts, prior to dropping wire in brush, dragging wire on the ground or through brush, or taking vehicles off project access roads. However, this survey would not replace the need for SDG&E to perform detailed on-the-ground surveys as otherwise required by BIO-APM-1. No paint or permanent discoloring agents would be applied to rocks or vegetation to indicate limits of survey or construction activity where any sensitive biological resources or wildlife habitats are encountered in the field.
BIO-APM-5	To the extent feasible, access roads would be built at right angles to the streambeds and washes. Where it is not feasible for access roads to cross at right angles, SDG&E would limit roads constructed parallel to streambeds or washes to a maximum length of 500 feet at any one transmission line crossing location. Such parallel roads would be constructed in a manner that minimizes potential adverse impacts on "waters of the U.S." or waters of the state. Streambed crossings and roads constructed parallel to streambeds would require review and approval of necessary permits from the ACOE, CDFG, and RWQCB. Culverts would be installed where needed for right angle crossings, but rock crossings would be utilized across most right angle drainage crossings. All construction and maintenance activities would be conducted in a manner that would minimize disturbance to vegetation, drainage channels and stream banks (e.g., structures would not be located within a stream channel, construction activities would avoid sensitive features). Prior to construction in streambeds and washes, SDG&E would perform a pre-activity survey, or more as appropriate, to determine the presence or absence of endangered riparian species. However, this survey would not replace the need for SDG&E to perform detailed on-the-ground surveys as otherwise required by the BIO-APM-1.
BIO-APM-6	In the construction, operation, and maintenance of the project, SDG&E would comply with all applicable environmental laws and regulations, including, without limitation, those regulating and protecting wildlife and its habitat.
BIO-APM-7	Littering is not allowed. project personnel would not deposit or leave any food or waste in the project area, and no biodegradable or non-biodegradable debris would remain in the right-of-way following completion of construction.

Table B-19. Applicant Proposed Measures

APM No.	Description
BIO-APM-8	Prior to construction, the boundaries of plant populations designated as sensitive by USFWS or CDFG and other resources designated sensitive by SDG&E and the resource agencies would be clearly delineated with clearly visible flagging or fencing. The flagging and fencing shall remain in place for the duration of construction. Flagged areas would be avoided to the extent practicable during construction activities in that area. Where these areas cannot be avoided, focused surveys for covered plant species shall be performed in conformance with BIO-APM-1, and the responsible resource agency(s) would be consulted for appropriate mitigation and/or re-vegetation measures prior to disturbance. Notification of the presence of any covered plant species to be removed in the work area would occur within ten (10) working days prior to the project activity, during which time the USFWS or CDFG may remove such plant(s) or recommend measures to minimize or reduce the take. If neither USFWS nor CDFG has removed such plant(s) within the ten (10) working days following the written notice, SDG&E may proceed with the work and cause a take of such plant(s), if minimization measures are not implemented.
BIO-APM-9	Brush clearing around any project facilities (e.g., structures, substations) for fire protection, visual inspection or project surveying, in areas which have been previously cleared or maintained within a two-year or shorter period shall not require a pre-activity survey. In areas not cleared or maintained within a two-year period, brush clearing shall not be conducted during the breeding season (March through August) without a pre-activity survey for vegetation containing active nests, burrows, or dens. The pre-activity survey performed by the on-site biological resource monitor would make sure that the vegetation to be cleared contains no active migratory bird nests, burrows, or active dens prior to clearing. If occupied migratory bird nests are present, fire protection or visual inspection brush clearing work would be avoided until after the nesting season, or until the nest becomes inactive. If no nests are observed, clearing may proceed. Where burrows or dens are identified in the reconnaissance-level survey, soil in the brush clearing area would be sufficiently dry before clearing activities occur to prevent mechanical damage to burrows that may be present.
BIO-APM-10	No wildlife, including rattlesnakes, may be harmed except to protect life and limb. Firearms shall be prohibited in all project areas except for those used by security personnel.
BIO-APM-11	Feeding of wildlife is not allowed.
BIO-APM-12	Project personnel are not allowed to bring pets to any project area in order to minimize harassment or killing of wildlife and to prevent the introduction of destructive animal diseases to native wildlife populations.
BIO-APM-13	Plant or wildlife species may not be collected for pets or any other reason.
BIO-APM-14	All steep-walled trenches or excavations used during construction shall be inspected twice daily (early morning and evening) to protect against wildlife entrapment. If wildlife is located in the trench or excavation, the on-site biological resource monitor shall be called immediately to remove them if they cannot escape unimpeded. The on-site biological resource monitor would make the required contacts with the USFWS and CDFG resource personnel and obtain verbal approval prior to removing any entrapped wildlife. If the biological resource monitor is not qualified to remove the entrapped wildlife, a recognized wildlife rescue agency (such as Project Wildlife) may be employed to remove the wildlife and transport them safely to other suitable habitats.
BIO-APM-15	Emergency repairs may be required during the construction and maintenance of the project to address situations (e.g., downed lines, slides, slumps, major subsidence, etc.) that potentially or immediately threaten the integrity of the project facilities. During emergency repairs the APMs shall be followed to the fullest extent practicable. Once the emergency has been abated, any unavoidable environmental damage would be reported to the project biological construction monitor, who would promptly submit a written report of such impacts to the USFWS and CDFG and any other government agencies having jurisdiction over the emergency actions. If required by the government agencies, the biological construction monitor would develop a reasonable and feasible mitigation plan consistent with the APMs and any permits previously issued for the project by the governmental agencies.

Table B-19. Applicant Proposed Measures

APM No.	Description
BIO-APM-16	Environmentally sensitive tree trimming locations for the project would be identified in SDG&E's existing vegetation management tree trim database utilized by tree trim contractors. The biological field construction monitor shall be contacted prior to trimming in environmentally sensitive areas. Whenever feasible, trees in environmentally sensitive areas, such as areas of riparian or native scrub vegetation, would be scheduled for trimming during non-sensitive (i.e., outside breeding or nesting) times. Where trees cannot be trimmed during non-sensitive times, SDG&E would perform a site survey, or more as appropriate, to determine presence or absence of endangered nesting bird species in riparian or native scrub vegetation. SDG&E would submit results of this survey to the USFWS and CDFG and consult on mitigation measures for potential impacts, prior to tree trimming in environmentally sensitive areas. However, this survey would not replace the need for SDG&E to perform detailed on-the-ground surveys as otherwise required by BIO-APM-1. Where riparian areas with over-story vegetation are crossed, tree removal (i.e., clear-cut) widths would be varied where feasible to minimize visual landscape contrast and to maintain habitat diversity at established wildlife corridor edges. Where tree removal widths cannot be varied, SDG&E would consult with the USFWS and CDFG to develop alternative tree removal options that could reasonably maintain edge diversity.
BIO-APM-17	All new access roads or spur roads constructed as part of the project that are not required as permanent access for future project maintenance and operation would be permanently closed. Where required, roads would be permanently closed using the most effective feasible and least environmentally damaging methods appropriate to that area with the concurrence of the underlying landowner and the governmental agency having jurisdiction (e.g., stockpiling and replacing topsoil or rock replacement). This would limit new or improved accessibility into the area. Mowing of vegetation can be an effective method for protecting the vegetative understory while at the same time creating access to the work area. Mowing should be used when permanent access is not required since, with time, total re-vegetation is expected. If mowing is in response to a permanent access need, but the alternative of grading is undesirable because of downstream siltation potential, it should be recognized that periodic mowing would be necessary to maintain permanent access. The project biological construction monitor shall conduct checks on mowing procedures to ensure that mowing for temporary or permanent access roads is limited to a 14-foot-wide area on straight portions of the road and a 16- to 20-foot-wide area at turns, and that the mowing height is no less than 4 inches from finished grade.
BIO-APM-18	In areas designated as sensitive by SDG&E or the resource agencies, to the extent feasible structures and access roads would be designed to minimize impacts to sensitive features. These areas of sensitive features include but are not limited to high-value wildlife habitats, sensitive vegetation communities, and high value plant habitats, and/or to allow conductors to clearly span the features, within limits of standard structure design. If the sensitive features cannot be completely avoided, structures and access roads would be placed to minimize the disturbance to the extent feasible. When it is not feasible to avoid constructing poles or access roads in high value wildlife habitats, SDG&E would perform a site survey to determine presence or absence of endangered species in sensitive habitats. SDG&E would submit results of this survey to the USFWS and consult on mitigation measures for potential impacts, prior to constructing structures or access roads. However, this survey would not replace the need for SDG&E to perform detailed on-the-ground surveys as otherwise required by BIO-APM-1. Where it is not feasible for access roads to avoid sensitive water resource features, such as streambed crossings, such crossings would be built at right angles to the streambeds. Where such crossings cannot be made at right angles, roads constructed parallel to streambeds would be limited to a maximum length of 500 feet at any one transmission line crossing location. Such parallel roads would be constructed in a manner that minimizes potential adverse impacts on "waters of the U.S." Streambed crossings or roads constructed parallel to streambeds would require review and approval of necessary permits from the ACOE, CDFG, and RWQCB.
BIO-APM-19	Restoration and habitat enhancement and mitigation measures developed during the consultation period with the BLM under Section 7 of the Endangered Species Act (ESA) would be implemented and complied with as specified in the Biological Opinion (BO) of the USFWS. The Section 7 process would be used to obtain an incidental take authorization through a compensation-based mitigation program for permanent impacts to occupied sensitive plant and animal habitat at a ratio of 1:1 or 2:1 based on site-specific studies, as outlined in BIO-APM-1. The Section 7 process may include consideration of SDG&E's existing NCCP mitigation credits as compensation for project impacts.
BIO-APM-20	In construction areas where re-contouring is not required, vegetation shall be left in place wherever possible to avoid excessive root damage and allow for re-sprouting.
BIO-APM-21	Structures shall be constructed to conform to "Suggested Practices for Raptor Protection on Power Lines" (Raptor Research Foundation, Inc. 1981), to minimize impacts to raptors.

Table B-19. Applicant Proposed Measures

APM No.	Description
BIO-APM-22	Species identified as sensitive by the land managing agency shall be salvaged where avoidance is not feasible in accordance with state law. Generally, salvage may include: • removal and stockpiling for replanting on site, • removal and transplanting out of surface disturbance area, • removal and salvage by private individuals, • removal and salvage by commercial dealers, or • any combination of the above.
BIO-APM-23	Only the minimum amount of vegetation necessary for the construction of structures and facilities will be removed. Topsoil located in areas containing sensitive habitat shall be conserved during excavation and reused as cover on disturbed areas to facilitate re-growth of vegetation. Topsoil located in developed or disturbed areas is excluded from this APM.
BIO-APM-24	Construction holes left open over night shall be covered. Covers shall be secured in place nightly, prior to workers leaving the site, and shall be strong enough to prevent livestock or wildlife from falling through and into a hole. Holes and/or trenches shall be inspected prior to filling to ensure absence of mammals and reptiles.
BIO-APM-25	Disturbed soils shall be re-vegetated with an appropriate seed mix that does not contain invasive, non-native plant species.
BIO-APM-26	Excavations shall be sloped on one end to provide an escape route for small mammals and reptiles.
BIO-APM-27	1. Prior to construction, SDG&E shall remove all existing raptor nests from structures that would be affected by project construction. 2. Removal of nests shall occur outside the raptor breeding season (January to July). 3. If it is necessary to remove an existing raptor nest during the breeding season, a qualified biologist shall survey the nest prior to removal to determine if the nest is active. A nest would be considered active if it contains eggs or fledglings. If the nest does not contain eggs or nestlings and is inactive, it shall be removed promptly. If a nest is determined to be active, the nest shall not be removed and the biologist shall monitor the nest to ensure nesting activities/breeding activities are not disrupted. If the biological monitor determines that project activities are disturbing or disrupting nesting activities, the monitor shall make feasible recommendations to reduce the noise and/or disturbance in the vicinity of the nest.
BIO-APM-28	Potential roost trees that must be removed will be surveyed and identified in the field for application of the following procedures: *Before felling the tree:* 1. Trees should be removed under the warmest possible conditions. 2. Peel any sections of the exfoliating bark off the tree gently and search for any roosting bats underneath. 3. Create noise and vibrations on the tree itself. Noise and vibrations include: a. Running chain saw and making shallow cuts in the trunk (where bark has been peeled off). b. Striking the tree base with fallen limbs or tools such as hammers. *Felling the tree:* 4. Disturbance should be near-continuous for ten minutes, and then another ten minutes should pass, before the tree is felled. 5. When cutting sections of the bole, if any hollows or cavities (such as woodpecker holes) are discovered, be especially careful to check for the presence of bats in those areas. Cut slowly and carefully at all times. If possible, section bole near cavities to focus noise and vibrations, and open hollows by sectioning off a side.
BIO-APM-29	Reduce construction night lighting on sensitive habitats. Exterior lighting within the project area adjacent to preserved habitat shall be of the lowest illumination allowed for human safety, selectively placed, shielded, and directed away from preserved habitat to the maximum extent practicable. Vehicle traffic associated with project activities would be kept to a minimum volume and speed to prevent mortality of nocturnal wildlife species that may be moving about.
	CULTURAL RESOURCES
CR-APM-1	Prior to construction, construction personnel shall be instructed on the protection and avoidance of cultural resources. To assist in this effort, the construction contract will address state and federal laws regarding antiquities, fossils, and plants and wildlife, including the collection and removal, as well as the importance of these resources and the purpose and necessity of protecting them.

Table B-19. Applicant Proposed Measures

APM No.	Description
CR-APM-2	Archeological sites that are eligible or potentially eligible for the National Register will be flagged in the field and spanned or otherwise avoided through routing during construction activities to the extent feasible. Impact avoidance and APMs for cultural resources developed in consultation with appropriate land managing and regulatory (e.g., park personnel and State Historic Preservation Office) and other interested parties will be implemented prior to and during construction.
CR-APM-3	Any previously unidentified cultural resource (historic or prehistoric site or object) discovered by SDG&E or any person working on its behalf during construction on public or park land shall be immediately reported to the appropriate land manager or authorized park officer within 24 hours of discovery. Operations in the immediate area of the discovery shall be suspended until authorization to proceed is issued by the appropriate land manager or authorized park officer. An evaluation of the discovery will be made by the appropriate land manager, authorized park officer or SDG&E in consultation with the former to determine appropriate actions to prevent the loss of significant cultural or scientific values. SDG&E shall be responsible for the cost of evaluation. SDG&E will develop a treatment plan to mitigate the impacts.
CR-APM-4	SDG&E will conduct maintenance, repair, stabilization, rehabilitation, restoration, preservation, conservation, and reconstruction of a historical resource in a manner consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings (1995 – Weeks and Grimmer).
CR-APM-5	SDG&E will use the following as guidance in the implementation of the project: 1. Preservation in-place is the preferred manner of mitigating impacts to archaeological sites. Preservation in-place maintains the relationship between the artifacts and the archaeological context to the extent feasible. Preservation may also avoid conflict with religious or cultural values of groups associated with the site. 2. Preservation in-place may be accomplished by, but is not limited to, the following: a. planning construction to avoid archaeological sites; or b. incorporation of sites within parks, green space, or other open space; or c. deeding the site into a permanent conservation easement. 3. When data recovery through excavation is the only feasible mitigation, a data recovery plan which makes provisions for adequately recovering the scientifically consequential information from and about the historical resources shall be prepared and adopted prior to any excavation being undertaken. Such study shall be deposited with the California Historical Resources Regional Information Center. Archaeological sites known to contain human remains shall be treated in accordance with the provisions of Section 7050.5, Health and Safety Code. If an artifact must be removed during project excavation or testing, curation may be appropriate. 4. Data recovery shall not be required for an historical resource if the lead agency through discussion and consultation with Indian Tribes, professional archaeologists and SHPO determines that testing or studies already completed have adequately recovered the scientifically consequential information from and about the archaeological or historical resource, provided that the determination is documented in the EIR and that the studies are deposited with the California Historical Resources Regional Information Center.
CR-APM-6	1. Historic property will be avoided and fenced or barricaded for protection. 2. Contributing portions and sensitive features of the historic property will be avoided and fenced or barricaded for protection. 3. If historic property cannot be avoided, an approved plan for recordation, relocation, or data recovery will be implemented. Recordation of buildings or structures may include Historic American Building Survey (HABS) or Historic American Engineering Record (HAER) documentation.

Table B-19. Applicant Proposed Measures

APM No.	Description
CR-APM-7	1. Erosion, sedimentation, or indirect displacement that could indirectly deteriorate historic property will be controlled by limitation of activities near property, stabilization of sediments or structures, and erosion control. 2. Protective measures will be implemented to minimize erosion and prevent invasion by aggressive weeds near historic property. 3. Control measures will be implemented to minimize vibration, dust, or fumes affecting property. 4. Protective barriers or materials will be used to minimize the effects of vibration, dust, fumes, or changes in vegetation. 5. Buildings or structures will be stabilized or rehabilitated to minimize deterioration that might be accelerated by construction or operations. 6. If deterioration cannot be avoided, SDG&E will implement an approved plan for recordation, relocation, or data recovery.
CR-APM-8	1. In addition to the historic property itself, those elements of the landscape that are essential to the historic setting of the property will be avoided and protected to the extent feasible. 2. The location, appearance, or operational procedures of the undertaking will be modified to minimize intrusion on the historic setting (e.g., qualifications on height, color, emissions, or operational noise levels).
CR-APM-9	1. Permanent fencing or barriers will be installed, or access to the historic property will be controlled as deemed appropriate by the relevant agencies. 2. Use of access for construction or operation will be restricted. 3. Construction and maintenance personnel will be instructed in protection of sensitive properties.
CR-APM-10	1. Project structures will be located so that conductors span linear historic property to the extent feasible. 2. Pipelines or conductors, placed underground, will bore under linear property to avoid disturbance or intrusion.
CR-APM-11	SDG&E would implement its standard practices for cultural and paleontological resources on private lands (see Appendix D).
CR-APM-12	SDG&E will conduct cultural surveys for staging areas that have not yet been identified.
	GEOLOGY, SOILS, AND PALEONTOLOGY
GEO-APM-1	No widening or upgrading of existing access roads will be undertaken where soils are very sensitive to disturbance, except repairs, widening or upgrades necessary to make roads passable.
GEO-APM-2	1. Vehicle and construction equipment use will be restricted to access roads and areas in the immediate vicinity of construction work sites to help reduce soil disturbance. 2. In agricultural areas, topsoil would be left in roughened condition. 3. When practical, construction activities will be avoided on wet soil to reduce the potential for soil compaction, rutting, and loss of soil productivity. 4. Disturbed areas will be returned to their pre-construction contours and allowed to re-vegetate naturally, or will be reseeded with an appropriate seed mixture if necessary. 5. Affected landowners having property directly impacted by the project will be compensated to disc or till soil upon construction completion. 6. Construction of access roads in inaccessible terrain will be reduced by using helicopters to place structures in select locations.
GEO-APM-3	Structure placement in areas of high shrink/swell potential will be avoided where possible.
GEO-APM-4	Structures will be placed in geologically stable areas, avoiding fault lines, brittle surface rock and bedrock, etc.
GEO-APM-5	Project construction activities shall be designed and implemented to avoid or minimize new disturbance, erosion on manufactured slopes, and off-site degradation from accelerated sedimentation. Maintenance of cut and fill slopes created by project construction activities would consist primarily of erosion repair. Where re-vegetation is necessary to improve the success of erosion control, planting or seeding with native seed mix would be done on slopes.

Table B-19. Applicant Proposed Measures

APM No.	Description
GEO-APM-6	In areas where ground disturbance is substantial or where re-contouring is required (e.g., marshaling yards, tower sites, spur roads from existing access roads), surface restoration will occur as necessary for erosion control and re-vegetation. The method of restoration will normally consist of returning disturbed areas back to their original contour, reseeding (if required), installing cross drains for erosion control, placing water bars in the road, and filling ditches for erosion control. Potential for erosion will be minimized on access roads and other locations primarily with water bars. The water bars will be constructed using mounds of soil shaped to direct the flow of runoff and prevent erosion. Soil spoils created during ground disturbance or re-contouring shall be disposed of only on previously disturbed areas, or used immediately to fill eroded areas. Cleared vegetation can be hauled off-site to a permitted disposal location, or may be chipped or shredded to an appropriate size and spread in disturbed areas of the ROW with the approval of the biological monitor. To limit impact to existing vegetation, appropriately sized equipment (e.g., bulldozers, scrapers, backhoes, bucket-loaders, etc.) will be used during all ground disturbance and re-contouring activities.
GEO-APM-8	During construction, SDG&E would remove or stabilize boulders uphill of structures that pose potentially high risk of landslide damage to those structures and would position structures to span over potential landslide areas to the greatest extent feasible.
GEO-APM-9	If paleontological resources are encountered, appropriate field mitigation efforts would be implemented to protect the resources. For example, if significant resources are discovered, such as vertebrate fossils, construction would be stopped in the immediate area of the find while SDG&E and its designated paleontologist determine the appropriate method and schedule to recover or protect the resource. However, work may continue in areas outside the immediate area of the find with the approval of the paleontologist. When it is not feasible to avoid paleontological sites, SDG&E would consult with the appropriate federal, state, and resource agencies and specialists to either develop alternative construction techniques to avoid paleontological resources or develop appropriate APMs. Appropriate mitigation field measures may include actions such as protection-in-place by covering with earthen fill, removal and cataloguing, and/or removal and relocation.
	LAND USE AND AGRICULTURAL RESOURCES
LU-APM-1	SDG&E will provide advance notice to residents, property owners, and tenants within 300 feet of construction activities and will appoint a public affairs officer to address public concerns or questions.
LU-APM-2	Place new transmission structures more than 330 feet from an existing residence to the extent feasible.
LU-APM-3	1. Farmers will be compensated for losses of crops along ROW based upon a professional appraisal. 2. Construction activities in croplands will be scheduled to minimize or avoid planting, growing, and harvesting seasons to the extent feasible.
LU-APM-4	To facilitate access to properties obstructed by construction activities, SDG&E will notify property owners and tenants in advance of construction activities. Provide alternative access if feasible.
LU-APM-5	To remedy encroachment and safety conflicts with irrigation canals and flood management structures during construction, SDG&E will coordinate construction activities with appropriate water management representatives.
LU-APM-6	The limits of construction activities within and outside the ROW will typically be predetermined, with activity restricted to and confined within those limits. The ROW boundary and limits of construction activity inside and outside the ROW will be flagged in environmentally sensitive areas to alert construction personnel that those areas should be minimize or avoided.
LU-APM-7	To the extent feasible, project facilities would be installed along the edges or borders of private property, open space parks, and recreation areas. When it is not feasible to locate project facilities along property borders, SDG&E would consult with affected property owners to identify facility locations that create the least potential impact to property and are mutually acceptable to property owners to the extent feasible. SDG&E would pay just compensation to affected property owners based on the facility locations identified by SDG&E.
LU-APM-8	SDG&E will continue its current coordination efforts with the Counties of Imperial and San Diego General Plan Updates and the City of San Diego General Plan Updates to include the Proposed Project in their respective General Plans.
LU-APM-9	SDG&E would obtain all necessary and/or appropriate ministerial land use permits.
LU-APM-10	SDG&E will match structure locations with existing transmission facilities where feasible and appropriate.

Table B-19. Applicant Proposed Measures

APM No.	Description
	NOISE AND VIBRATION
NOI-APM-1	Provide notice prior to construction by mail to all sensitive receptors and residences within 300 feet of construction sites, staging areas, and access roads. The announcement shall state specifically where and when construction will occur in the area. Notices shall provide tips on reducing noise intrusion, for example, by closing windows facing the planned construction. SDG&E would identify and provide a public liaison person before and during construction to respond to concerns of neighboring receptors, including residents, about noise construction disturbance. Procedures for reaching the public liaison officer via telephone or in person would be included in the above notices. SDG&E would also establish a toll free telephone number for receiving questions or complaints during construction and develop procedures for responding to callers.
NOI-APM-2	SDG&E will coordinate with ABDSP to minimize potential construction noise impacts at Tamarisk Grove campground during peak times of use.
	PUBLIC HEALTH AND SAFETY / HAZARDOUS MATERIALS
HS-APM-1	All personnel involved in using hazardous materials shall be trained in the proper use and safety procedures for the chemical and provided with the necessary Personal Protection Equipment (PPE). A Hazardous Communication (HAZCOM) Plan with Material Safety Data Sheets on all hazardous materials used for the project shall be developed.
HS-APM-2	Only personnel trained in refueling vehicles would be allowed to perform this operation. All refueling operation shall be in designated areas or preformed by assigned vehicles.
HS-APM-3	All applicable environmental safety plans associated with hazardous materials shall be developed for the project. These plans include but are not necessary limited to Hazardous Material Business (HMB) Plan; HAZCOM Plan; Spill Response Plan; 90-days temporary storage and disposal (TSD) facility permit; and Spill Prevention Control and Countermeasure (SPCC) Plan (only if storage is over 1,350 gallons at one location).
HS-APM-4	SDG&E will develop a site specific blasting plan blasting of tower footing is required. A California licensed Blasting Contractor shall be used for all blasting operation.
HS-APM-5	All Government Code §65962.5 sites or other known contamination sites along the transmission line ROW or such sites that would affect construction work shall be investigated to determine potential impacts to the project.
HS-APM-6	An Unexploded Ordinance (UXO) investigation of known and potential areas used by the military along the ROW shall be undertaken by a trained contractor. If UXO are found, they shall be removed by trained personnel.
HS-APM-7	All personnel involved in excavation and grading or for ROW clearing shall be trained to recognized UXO and/or potential soil, surface water, and groundwater potential contamination sites.
HS-APM-8	SDG&E will assign Environmental Field Representative and/or General Contractor assigned Health & Safety Office to the project.
HS-APM-9	SDG&E will contact airport representative and/or Federal Aviation Administration Authorities regarding work within all existing and proposed transmission line corridors within 2 miles of an airport.
HS-APM-10	All hazardous waste and solid waste shall be stored and disposed of in accordance with federal, State, and local regulations. Whenever feasible, hazardous material minimization methods shall be employed and all hazardous materials recycled.
HS-APM-11	SDG&E will develop project-specific Fire Prevention and Response Plan (FPRP), which will be developed and reviewed by pertinent regulatory authorities. A project Fire Marshal shall be assigned to enforce all provisions of the FPRP as well as performing all other duties related to fire prevention activities for the Proposed Project.
HS-APM-12	A Traffic Control Plan (TCP) shall be developed that addresses all roadway crossings that would be used by the project and could interfere with emergency vehicles.
HS-APM-14	All construction workers shall undergo environmental training regarding potential exposure in accordance with federal, State, or local regulations.
HS-APM-15	If during excavation soil or groundwater contamination is suspected (e.g., unusual soil discoloration or strong odor), the contractor or subcontractor shall immediately stop work and notify the General Contractor's assigned Health & Safety Officer and/or SDG&E's Field Environmental Representative.

Table B-19. Applicant Proposed Measures

APM No.	Description
HS-APM-16	If soil or groundwater contamination is suspected, work near the immediate excavation site shall be terminated, the work area cordoned off, and appropriate health and safety procedures implemented for the location by the General Contractor's assigned Health & Safety Officer and/or SDG&E's Field Environmental Representative. Preliminary samples of the soil, groundwater, or material shall be taken by an OSHA trained individual. These samples shall be sent to a California Certified Laboratory for characterization. Work outside the immediate excavation site may continue as determined by the General Contractor's assigned Health and Safety Officer and/or SDG&E's Field Environmental Representative.
HS-APM-17	If the sample testing determines that contamination is not present, work would be allowed to proceed at the immediate excavation site. However, if contamination is found above regulatory limits, the regulatory agency (e.g., RWQCB or CUPA) responsible for responding to and for providing environmental oversight of the region shall be notified in accordance with State or local regulations.
	PUBLIC SERVICES AND UTILITIES
PSU-APM-1	SDG&E has and will continue to coordinate with all utility providers with facilities located within or adjacent to the Proposed Project to ensure that design does not conflict with other facilities. In the event of a conflict, the project will be aligned vertically and/or horizontally as appropriate to avoid other utilities and provide adequate operational and safety buffering. Alternately, the other existing facilities may be relocated. Long-term operations and maintenance of the project will be negotiated through easement, purchased right-of-way, franchise agreement, or joint use agreement.
PSU-APM-2	Underground Service Alert would be notified a minimum of 48 hours in advance of earth-disturbing activities in order to identify any buried utility lines.
PSU-APM-3	SDG&E will coordinate construction schedules, lane closures, and other activities with installation of the project with emergency and police services to ensure that disruption to response times and access is minimized.
	RECREATION RESOURCES
R-APM-2a	Advance notice of restriction of conflicts with access routes to recreational use areas will be provided.
R-APM-2b	No construction that affects trail use will be conducted in that area on federal holidays.
R-APM-2c	SDG&E will coordinate all construction activities, including temporary trail closures, affecting the parklands and trail systems of San Diego and Imperial Counties with the counties' Parks and Recreation Department and the California State Parks Department (for ABDSP), respectively, before construction begins in these areas.
R-APM-2d	Signs directing vehicles to alternative park access and parking will be posted in the event construction temporarily obstructs parking areas near trailheads.
R-APM-2e	Signs advising recreation users of construction activities and directing them to alternative trails or bikeways will be posted on both sides of all trail intersections or as determined through SDG&E's coordination with the respective jurisdictional agencies.
R-APM-2f	Where helicopters are used for construction, signage advising equestrians of construction timeframes with helicopter use will be posted at all equestrian trail-access points within the vicinity of the flight paths. These signs will be checked and maintained regularly.
R-APM-3a	Construction-related traffic shall be restricted to routes approved by the authorized agencies. New access roads or cross-county vehicle travel will not be permitted on ABDSP or state lands unless prior written approval is given by the authorized ABDSP officer. Authorized roads used by the project shall be rehabilitated when construction activities are complete as coordinated with California State Parks.
	TRANSPORTATION AND TRAFFIC
T-APM-2a	Required permits for temporary lane closures will be obtained from the County of Imperial, County of San Diego, CALTRANS, and California State Parks (if applicable).
T-APM-2b	Detour plans will be submitted to the counties, CALTRANS, and/or California State Parks as part of the permit requirements. Within the ABDSP, a Right-of-Entry permit is required for any construction and maintenance activities that would occur outside of existing easements, including access roads (would not need ROE for access road maintenance if practical rights of ingress and egress are granted in easements). SDG&E will provide California State Parks a request in writing for maintenance or other earth-disturbing activities.
T-APM-4a	SDG&E shall coordinate in advance with emergency service providers to avoid restricting movements of emergency vehicles. The counties and cities will then notify respective police, fire, ambulance and paramedic services. SDG&E shall notify counties and cities of the proposed locations, nature, timing, and duration of any construction activities and advised of any access restrictions that could impact their effectiveness.

Table B-19. Applicant Proposed Measures

APM No.	Description
T-APM-5a	SDG&E will consult with the Imperial County Office of Education, Borrego Springs Unified School District, Warner Unified School District, Julian Union School District, and the Julian Union High School District at least one month prior to construction to coordinate construction activities adjacent to school bus stops. If necessary, school bus stops will be temporarily relocated or buses will be rerouted until construction in the vicinity is complete. SDG&E will also consult with Imperial Valley Transit and the Metropolitan Transit System at least one month prior to construction to reduce potential interruption of transit services.
T-APM-6a	Parking is permissible on Imperial County-maintained roadways when vehicles are within 18 inches of the curb; or if no curb is present, vehicles must not be more than 18 inches away from the right-hand edge of the roadway's boundary. Vehicles must also be parallel to the roadway when parked, unless otherwise indicated. Parking is prohibited where signage indicates no parking. Parking shall comply within the County of Imperial ordinances whenever possible or as indicated in an approved traffic control plan.
T-APM-6b	Parking on San Diego County-maintained roads and highways is not permissible by law unless otherwise noted at specific locations. Parking is prohibited where signage and painted curbs indicates no parking. Where the project crosses major roadways, parking shall be prohibited in the project work area. Parking shall comply within the County of San Diego Department of Public Works Traffic Guidelines, 2001 whenever possible or as indicated in an approved traffic control plan.
T-APM-8a	Required permits for entering railroad right-of-way will be obtained from Union Pacific Railroad, San Diego & Arizona Eastern Railroad and the U.S. Gypsum Mine.
T-APM-9a	Eligible and Officially Designated Scenic Highways are located within Imperial and San Diego Counties. The California Public Utilities Code Section 320 requires that all new or relocated utility facilities within 1,000 feet of an Officially Designated Scenic Highway be undergrounded where feasible. SDG&E will bury all new or relocated utilities where feasible to avoid possible revocation of SR78 as an Officially Designated Scenic Highway within the ABDSP.
T-APM-10a	SDG&E or its construction contractor shall provide at all times the ability to quickly lay a temporary steel plate trench bridge upon request in order to ensure driveway access to businesses and residences, and shall provide continuous access to properties when not actively constructing the underground cable alignment.
	HYDROLOGY AND WATER QUALITY
WQ-APM-1	All construction and maintenance activities shall be conducted in a manner that minimizes disturbance to riparian/ wetland vegetation, drainage channels, and intermittent and perennial stream banks to the extent feasible.
WQ-APM-2	To the extent feasible, structures shall be placed so as to avoid sensitive features such as watercourses, or to allow conductors to clearly span the features, within limits of safety and standard structure design.
WQ-APM-3	Specific sites as identified by authorized agencies (e.g., fragile watersheds) where construction equipment and vehicles are not allowed shall be clearly marked on-site before any construction or surface disturbing activities begin. Construction personnel shall be trained to recognize these markers and understand the equipment movement restrictions involved.
WQ-APM-4	1. Adequate distance from stream banks and beds will be maintained during construction activities. 2. Construction activities will use existing bridges to cross major streams and culverts in most dry intermittent streams. 3. Surface water, riparian areas and floodplains will be spanned where feasible. 4. A Storm Water Pollution Prevention Plan (SWPPP) will be prepared and implemented. 5. Storm Water Best Management Practices (BMPs) for construction will be implemented per the requirements of the project's SWPPP. 6. Silt fencing, straw mulch, straw bale check dams would be installed as appropriate to contain sediment within construction work areas and staging areas. Where soils and slopes exhibit high erosion potential, erosion control blankets, matting, and other fabrics and/or other erosion control measures. 7. The potential for increased sediment loading will be minimized by limiting road improvements to those necessary for project construction, operation and maintenance. 8. Upland pull sites will be selected to minimize impacts to surface waters, riparian areas, wetlands and floodplains. 9. Structures will not be placed in streambeds or drainage channels to the extent feasible.
WQ-APM-5	Any stream crossings will be constructed at low flow periods and, if necessary, a site-specific mitigation and restoration plan would be developed.

Table B-19. Applicant Proposed Measures

APM No.	Description
WQ-APM-6	1. Designated surface water protection areas (source water) will be avoided. 2. There will be no diversions, detention, retention or consumption of surface waters for the project. 3. Prior to construction, interviews would take place with affected landowners regarding location of water supply wells located on their property. 4. SDG&E will negotiate with affected landowner to provide alternative water supplies in the event a supply well or springs dry up directly caused by project activities.
WQ-APM-8	1. In no case will groundwater removed during construction be discharged to surface waters or storm drains without first obtaining any required permits. 2. If dewatering is necessary, the water will be contained and sampled to determine if contaminants requiring special disposal procedures are present. 3. If the water tests sufficiently clean and land application is determined feasible per applicable SWRCB and RWQCB requirements, the water would be directed to relatively flat upland areas for evaporation and infiltration back to the water table, used for dust control, or used as makeup for a construction process (e.g., concrete production). 4. Water determined to be unsuitable for land application or construction use would be disposed of in another appropriate manner, such as treatment and discharge to a sanitary sewer system in accordance with applicable permit requirements or hauled offsite to an approved disposal facility.
WQ-APM-9	Storage of fuels and hazardous materials will be prohibited within 200 feet of groundwater supply wells and within 400 feet of community or municipal wells.
WQ-APM-10	At locations where the project would cross below or pass adjacent to streams with erodible bed or banks, the burial depth shall be extended below the estimated 100-year depth of scour for that stream, or located at a sufficient distance from the bank as to avoid erosion that can reasonably be expected to occur during the life of the project.
WQ-APM-11	Groundwater levels along the underground portion of the project will be tested by drilling pilot borings. The location, distribution, or frequency of such tests shall be determined to give adequate representation of the conditions. Locations where groundwater depth is less than eight feet below ground surface shall be identified prior to excavation activities and avoided, where possible. Avoidance is especially recommended where shallow groundwater flow direction is not parallel to the orientation of the alignment. Where avoidance is not possible, SDG&E shall consider constructing underground facilities in a shallower excavation, depending upon requirements of the underground method or existing underground facilities and other practical concerns. SDG&E shall document results of test drilling in a letter report to the CPUC construction starts and shall propose specific measures to minimize the impact on groundwater.
WQ-APM-13	Hazardous materials will not be disposed of onto the ground, the underlying groundwater, or any surface water. Totally enclosed containment will be provided for trash. Petroleum products and other potentially hazardous materials would be removed to a hazardous waste facility permitted or otherwise authorized to treat, store, or dispose of such materials. In the event of a release of hazardous materials to the ground, it will be promptly cleaned up in accordance with applicable regulations.
WQ-APM-14	Secure any required General Permit for Storm Water Discharges Associated with Construction Activity (NPDES permit) authorization from the State Water Resources Control Board and/or the RWQCB to conduct construction-related activities to build the project and establish and implement a SWPPP during construction to minimize hydrologic impacts.
WQ-APM-15	To the extent feasible, where the construction of access roads would disturb sensitive features such as streambeds, the route of the access road would be adjusted to avoid such impacts. Whenever practicable, construction and maintenance traffic would use existing roads or cross-country access routes (including the ROW) which avoid impacts to the sensitive feature. To minimize ground disturbance, construction traffic routes will be clearly marked with temporary markers such as easily visible flagging. Construction routes, or other means of avoidance, must be approved by the appropriate agency or landowner before use. Where it is not feasible for access roads to avoid streambed crossings, such crossings would be built at right angles to the streambeds whenever feasible. Where such crossings cannot be made at right angles, SDG&E would limit roads constructed parallel to streambeds to a maximum length of 500 feet at any one transmission line crossing location. Such parallel roads would be constructed in such a manner that minimizes potential adverse impacts on waters of the U.S. or waters of the state. Streambed crossings or roads constructed parallel to streambeds would require review and approval of necessary permits from the ACOE, CDFG, and SWRCB/RWQCB.

Table B-19. Applicant Proposed Measures

APM No.	Description
WQ-APM-16	If sensitive water resource features contain riparian areas, habitats of endangered species, streambeds, cultural resources, and wetlands which cannot be avoided, a qualified biological contractor shall conduct site-specific assessments for each affected site. These assessments shall be conducted in accordance with ACOE wetland delineation guidelines, as well as CDFG streambed and lake assessment guidelines, and shall include impact minimization measures to reduce wetland impacts to a less than significant effect (e.g., through creation or restoration of wetlands). Though construction or maintenance vehicle access through shallow creeks or streams is allowed, staging/storage areas for equipment and materials shall be located outside of riparian areas. Construction of new access through streambeds that require filling for access purposes would require a Streambed Alteration Agreement from the CDFG and/or consultation/approval with the ACOE and SWRCB/RWQCB. Where filling is required for new access, the installation of properly sized culverts and the use of geo-textile matting should be considered in the CDFG/ACOE consultation process.
	VISUAL RESOURCES
VR-APM-1	At highway, canyon, and trail crossings, structures shall be placed at the maximum feasible distance from the crossing to reduce visual impacts as long as other significant resources are not negatively affected.
VR-APM-2	SDG&E will use dulled metal finish transmission structures and non-specular conductors in visually sensitive areas including the ABDSP, new ROW in the Central Link and Peñasquitos Junction to Peñasquitos Substation in the Coastal Link.
VR-APM-3	Where the line parallels existing transmission lines, the spacing of structures shall match the existing transmission structures, where feasible, to minimize visual effects.
VR-APM-4	No paint or permanent discoloring agents will be applied to rocks or vegetation to indicate survey or construction activity limits.
VR-APM-5	Transmission line structures will not be installed directly in front of residences or in direct line-of-sight from a residence where possible. SDG&E will consult with affected property owners on structure siting to reduce land use and visual impacts.
VR-APM-6	In scenic view areas as designated by land management agencies, structures would be placed to avoid sensitive features and/or allow conductor to clearly span the features, within limits of standard design where possible.

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