4.0 Project Description

TL674A Reconfiguration and TL666D Removal Project

San Diego Gas & Electric Company Application No. 17-06-029

San Diego Gas & Electric Company (SDG&E) is a regulated public utility that provides electric and natural gas service to approximately 3.4 million consumers within an approximately 4,100-square-mile service area, covering 25 cities and unincorporated areas within San Diego County and southern Orange County.

The proposed TL674A Reconfiguration and TL666D Removal Project (hereafter, "proposed project") involves removal of an existing 69-kilovolt (kV) overhead tie line (TL666D), ~~reconductoring~~ reconfiguring of approximately 700 feet of TL674A, and installation of approximately 1.1 miles of new underground duct bank that would connect TL674A (renamed TL6973 as part of the proposed project) to the Del Mar Substation. Connecting TL674A/6973 to the Del Mar Substation could increase ampacity[1] through and may necessitate possible removal and replacement of an existing circuit breaker located within the substation. The proposed project would also include the conversion of a combined 4,530 feet of existing overhead 12-kV lines (C510 and ~~C630~~ C738) to an underground configuration and removal and elimination of service of 6 miles of existing 69-kV overhead line TL666D for the purpose of addressing safety, environmental quality, and reliability of the local area electrical network. SDG&E estimates that construction of the proposed project would take 12 months.

Lead Agency Name and Address

California Public Utilities Commission (CPUC)
Energy Division Infrastructure Permitting and CEQA Section
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Lead Agency Contact Person and Phone Number

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[1] Ampacity is defined as the maximum amount of current that an electrical conductor can safely carry.

4.1 Project Location

The proposed project would be located in the city of San Diego and city of Del Mar almost entirely within the coastal zone, and partially located in the San Dieguito Lagoon, Los Peñasquitos Lagoon, Torrey Pines State Natural Reserve, and Torrey Pines State Natural Reserve Extension (Torrey Pines Extension), as illustrated in Figures 4-1 and 4-2. The main ~~activity~~ activities associated with the proposed project involve~~s~~ the removal of an existing overhead 69-kV power line (TL666D) between the existing Del Mar Substation (located northwest of the intersection of Interstate 5 [I-5] and Via De La Valle in the city of San Diego) and an existing steel pole (located near the intersection of Vista Sorrento Parkway and Pacific Plaza Drive, also in the city of San Diego), and the potential replacement of an existing circuit breaker on substation property.

4.2 Project Applicant Objectives

The applicant, SDG&E, indicates that implementation of the proposed project would address the following two objectives:

- ***Address the safety, environmental, and system reliability concerns in the Del Mar Substation area.*** TL666D is located within environmentally sensitive areas, including the San Dieguito Lagoon, Los Peñasquitos Lagoon, and Torrey Pines Extension. The project area's physical setting accommodates a variety of special status animal and plant species in diverse landscapes that include sandy beach, coastal wetlands, and bluff with terraces, plateaus, and ridges that reach up to 400 feet above sea level, interspersed with eroded canyons. Landscape features limit, and at some locations may completely impede, vehicular and equipment access necessary for repair and maintenance work on the power line and supporting infrastructure. Moreover, prior to conducting maintenance within the project area, SDG&E must first obtain permits from various government agencies with jurisdiction over natural resources and wetlands, waterways, and other protected lands in the project area. Multiple agency coordination and lead-time for processing, reviewing, and authorizing maintenance permits could affect SDG&E's responsiveness to outages, resulting in more time needed for restoration of service, which may conflict with standards required by CPUC General Order (G.O.) 165.
- ***Meet mandatory North American Electric Reliability Corporation (NERC) reliability criteria in the Del Mar Substation area***. The proposed project would bring a more direct transmission source to the Del Mar Substation by replacing TL666D, which currently operates in an open position with TL6973, a new line with a higher rating that would be routed underground, away from environmentally sensitive areas. The applicant states that TL6973 would not experience thermal overload under the N-2 outage of TL610 and TL667 and could abate previously identified NERC reliability violations. By removing TL666D from the Del Mar tap and avoiding the need to address maintenance and repair work within environmentally sensitive areas, the proposed project would enhance SDG&E's Grid Operation Department's flexibility to configure the system for operation and maintenance (O&M) activities.

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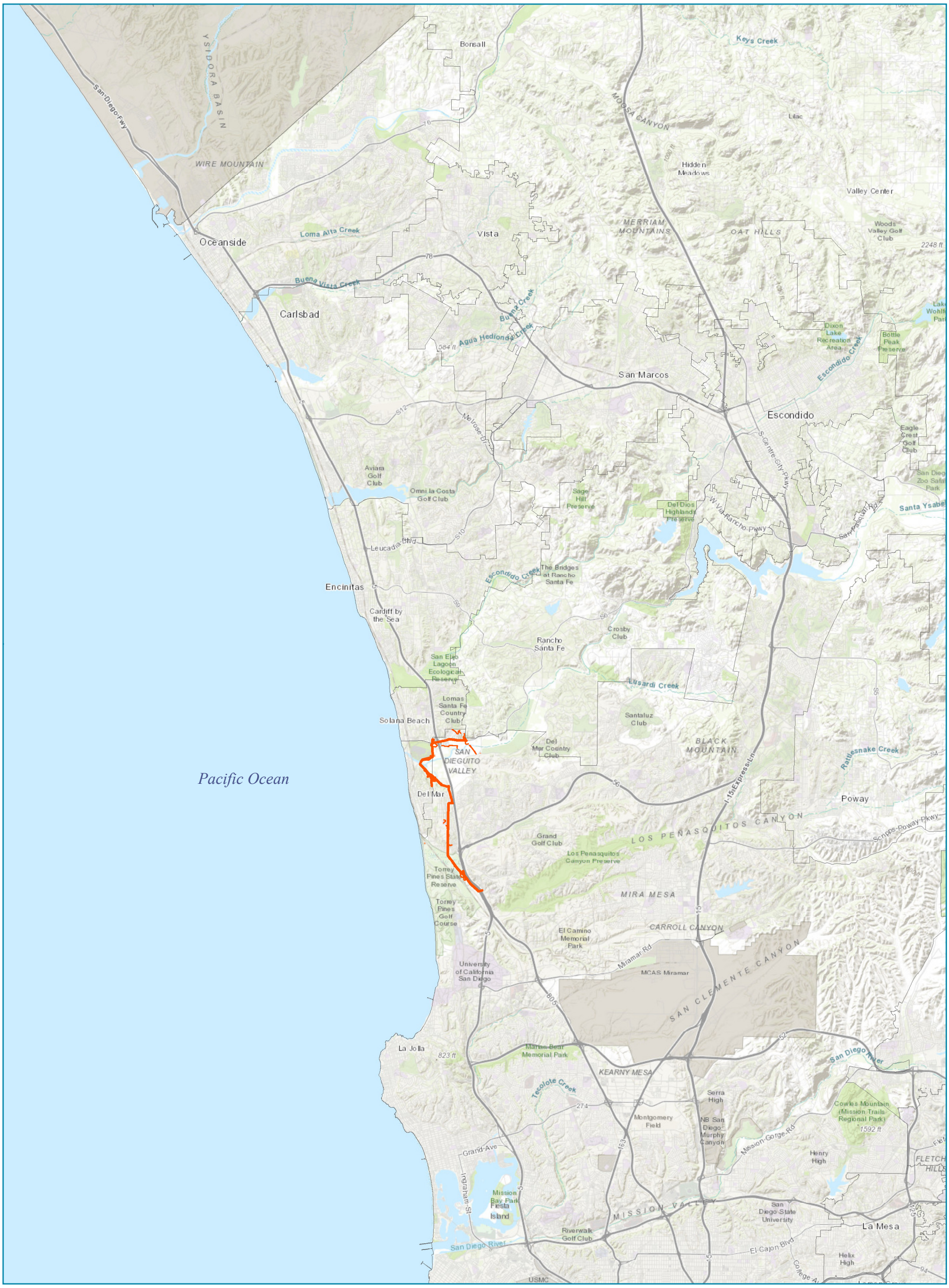

Project Location

Sources: San Diego Gas and Electric (SDG&E) 2018; Earth Systems Research Institute (ESRI) 2018

Figure 4-1
Project Location
TL 674A Reconfiguration and TL666D Removal Project
San Diego County, California
June 2018

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Project Components

- C510 Conversion
- C738 Conversion
- TL666D Removal
- TL674A Reconfiguration
- Access Roads
- Drop Zone
- Fly Yard
- Staging Yard
- Stringing Site
- Work Area

Sources: San Diego Gas and Electric (SDG&E) 2018; Earth Systems Research Institute (ESRI) 2018; DigitalGlobe 2016

Figure 4-2
Project Overview
TL674A Reconfiguration and TL666D Removal Project
San Diego County, California
June 2018

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4.3 Required Approvals

The California Public Utilities Commission (CPUC) serves as lead agency under the California Environmental Quality Act (CEQA), meaning it has primary responsibility for carrying out the environmental review of the proposed project. The CPUC must consider the proposed project's potential environmental impacts and mitigate them to the extent feasible prior to any decision on whether to approve the proposed project and issue a Permit to Construct. CEQA Guidelines Section 15124(d)(2) states that if a public agency must make more than one decision on a project, all of its decisions subject to CEQA should be listed, preferably in the order in which they will occur. Table 4-1 identifies the permits that the lead and responsible agencies may require of the applicant in order to implement the proposed project.

Table 4-1 Potential Permits and Approvals

Permit or Approval	Agency	Requirement
Federal Agencies		
Nationwide Permit	U.S. Army Corps of Engineers	Consultation to determine necessity for permit to conduct project-related activities in or adjacent to Waters of the United States
State Agencies		
Permit to Construct	California Public Utilities Commission	Environmental clearance under CEQA
Coastal Development Permit	California Coastal Commission[(a)]	For construction, operation and maintenance within the coastal zone.
Right-of-Entry Permit	California Department of Parks and Recreation	For construction, operation and maintenance within state park land.
Encroachment Permit	California Department of Transportation	For construction, operation and maintenance within, under, or over a state right-of-way.
General Permit	Water Resources Control Board	For stormwater discharges during construction.
Archaeological Resources Investigation and Collection Permit	California Department of Parks and Recreation	Permit to Conduct Archaeological Investigation/Collections on State Parks land
Paleontological Resources Investigation and Collection Permit.	California Department of Parks and Recreation	Permit to Conduct Paleontological Investigation/Collections on State Parks land
Local Agencies		
Encroachment Permit Traffic Control Permit	City of San Diego	For construction, operation and maintenance within, under, or over City of San Diego rights-of way
Access Permit	City of Del Mar	For construction, operation and maintenance within, under, or over City of San Diego rights-of way

Key:
[(a)] The California Coastal Commission extends its approval authority to local agencies that have adopted a Coastal Development Plan.

SDG&E must comply with CPUC G.O. 131-D Section III-B, which contains the permitting requirements for the construction of the proposed project.

4.4 Existing Electrical System

Figure 4-3 illustrates the existing configuration of the electrical circuitry and the circuits that are part of the proposed project. Table 4-2 lists the nine 69-kV power lines in the project vicinity and describes the interconnectivity of these lines. As shown in Figure 4-3, three existing tie lines (TL674A to North City West, TL674B to Rancho Santa Fe, and TL674C to Encinitas) create the Santa Fe tap at Pole Z119809. Three 69-kV power lines—TL610, TL666, and TL667—sourced from SDG&E's Peñasquitos Substation feed into the Del Mar Substation. TL666 is a multi-terminal line that feeds into the Del Mar, Torrey Pines, Dunhill, and Doublet Substations.

Table 4-2 Existing Project Area Circuitry

Circuit	Network Component and Location
TL6662	Torrey Pines Substation to Del Mar Substation
TL666D	Del Mar tap to Del Mar Substation
TL667	Peñasquitos Substation to Del Mar Substation
TL610	Peñasquitos Substation to Del Mar Substation
TL660	Del Mar Substation to Encinitas Substation
TL6952	Peñasquitos Substation to North City West Substation
TL674A	North City West Substation to Rancho Santa Fe tap
TL674B	Rancho Santa Fe Substation to Rancho Santa Fe tap
TL674C	Rancho Santa Fe tap to Encinitas Substation

Segment D of TL666 (i.e., TL666D) extends approximately 6 miles from the Del Mar Substation to the Del Mar tap and, according to the applicant, has been highly susceptible to outages. Figure 4-4 illustrates the connectivity of the project area's electrical network following implementation of the proposed project. In the proposed configuration, TL666D would be removed from the Del Mar Substation. TL674A would be removed from the Rancho Santa Fe tap, would be renamed TL6973, and would terminate at the Del Mar Substation. The proposed project involves removal of TL666D, comprising approximately 6 miles of existing 69-kV overhead tie line and the undergrounding of 12-kV distribution lines C510 and C738, as detailed in the following four components:

- **Reconfiguration of TL674A**, ~~which entails~~ Proposes the removal of approximately 700 feet of 69-kV overhead ~~tap~~ conductor and installation of about 1.1 miles of new underground duct bank to connect TL674A (renamed TL6973 as part of the proposed project) to the Del Mar Substation;
- **Removal of TL666D**, which would eliminate approximately 6 miles of 69-kV overhead ~~tap~~ tie line between the Del Mar Substation and the intersection of Vista Sorrento Parkway and Pacific Plaza Drive;
- **Conversion of C510**, comprising approximately 3,900 feet of an existing 12-kV overhead distribution line that would be undergrounded within San Dieguito and Racetrack View Drive as part of the proposed project; and
- **Conversion of C738**, approximately 630 feet of the existing C738 overhead 12-kV distribution line to an underground configuration.

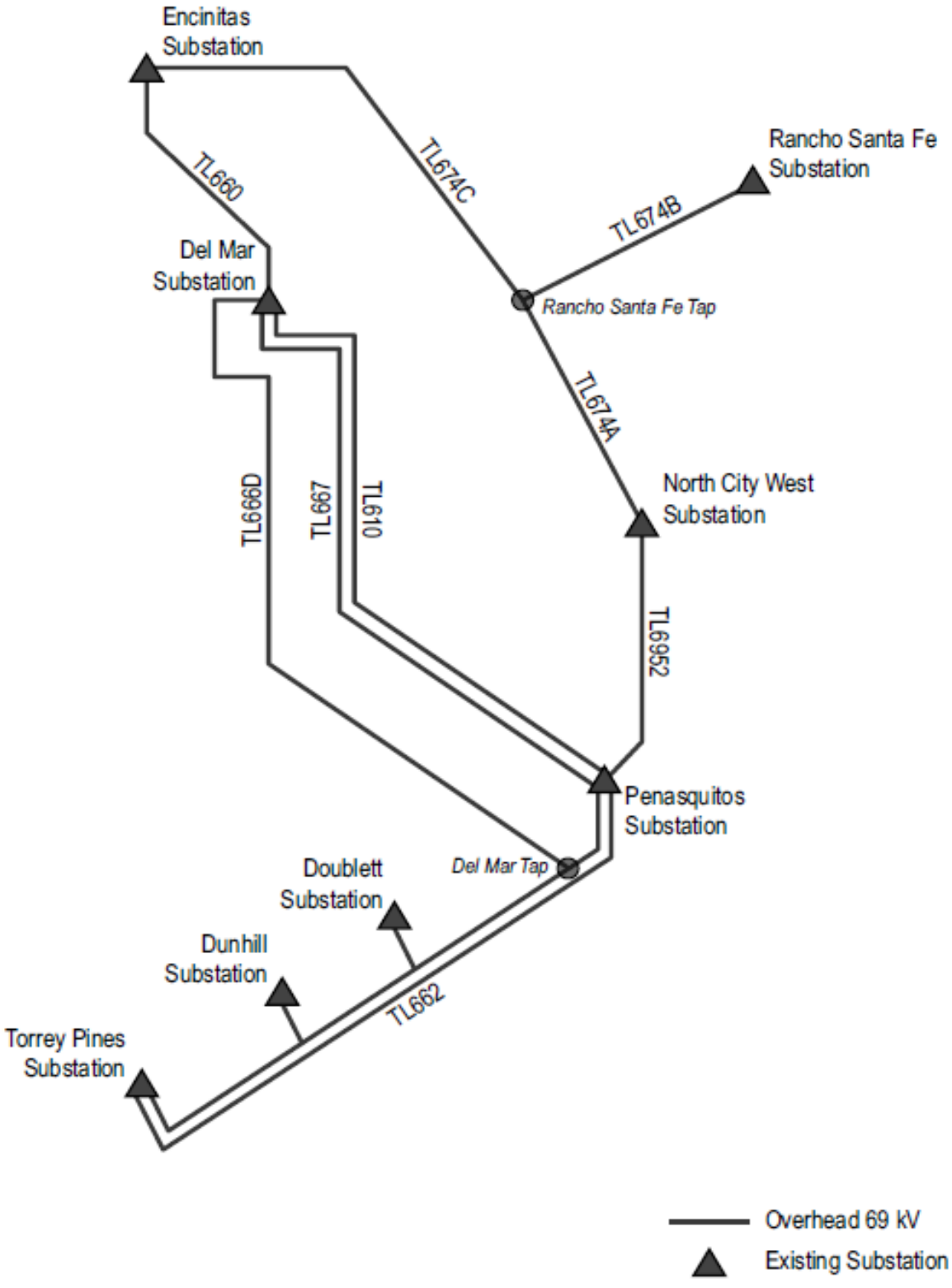

Figure 4-3 Existing System Configuration
Source: SDG&E 2017

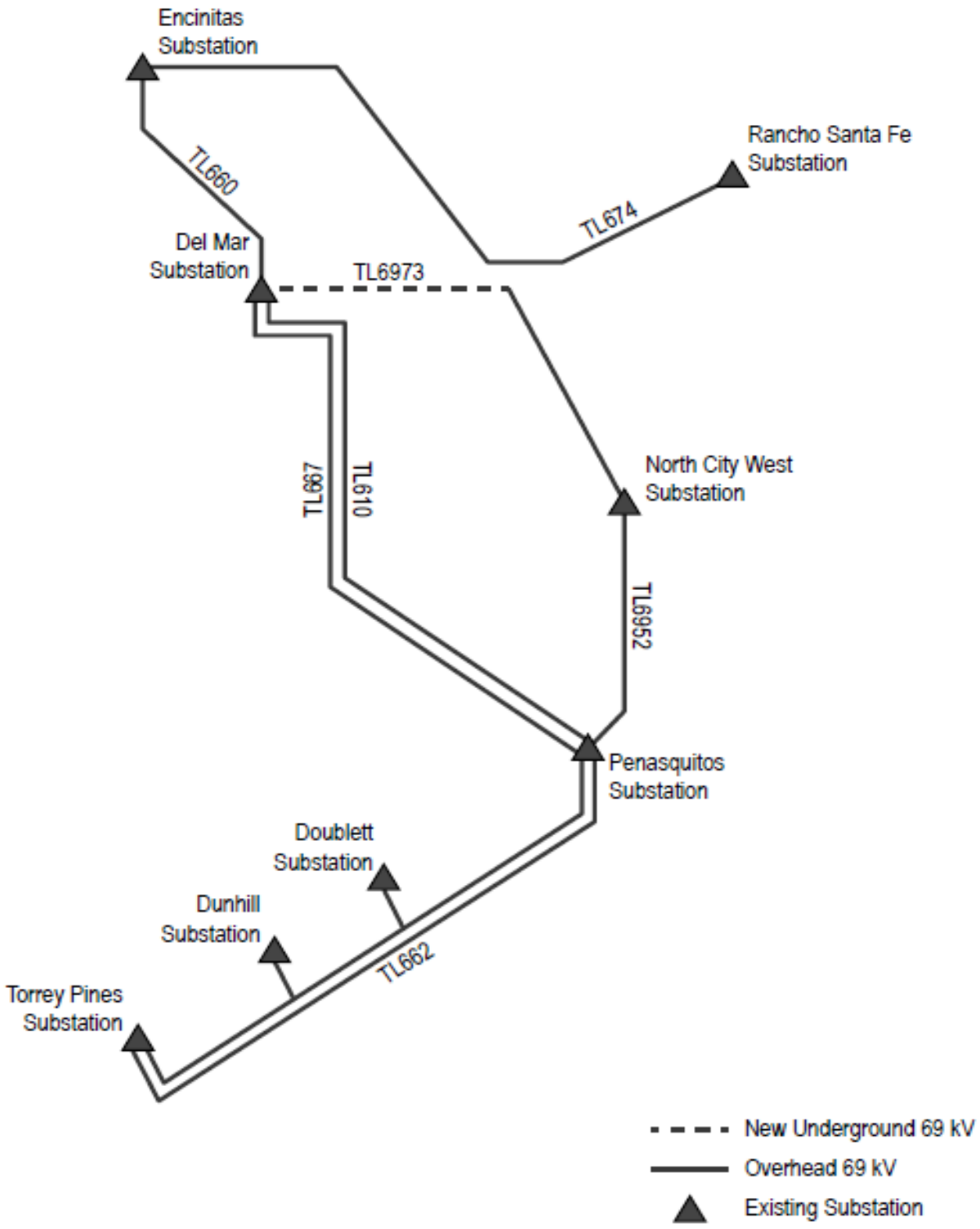

Figure 4-4 Proposed System Configuration
Source: SDG&E 2017

The proposed project may also require removal and replacement of a circuit breaker at the Del Mar Substation to accommodate the increased ampacity of TL6973D, which would have a higher voltage rating (and would be renamed TL6973).

4.5 Project Components

4.5.1 TL674A Reconfiguration

TL674A is an existing 69-kV overhead power line that connects the North City West Substation to the Rancho Santa Fe tap. SDG&E proposes to remove about 700 feet of existing overhead alignment as part of the proposed project. The remaining conductors would terminate at a new steel riser pole, where the line would transition to an underground configuration. Beginning at this location, SDG&E would install approximately 1.1 miles of underground 69-kV cable within a new duct bank that would terminate at the Del Mar Substation.

4.5.1.1 Overhead Poles and Conductors

To facilitate the reconfiguration of TL674A, one existing pole would be modified and two poles would be installed.

- Pole 1 currently functions as the Rancho Santa Fe tap, where TL674A, TL674B, and TL674C meet. The pole is approximately 70 feet tall in line with the existing TL674A overhead alignment, approximately 500 feet north of Via De La Valle. The pole's base diameter is approximately 4.5 feet, and it tapers to a diameter of 2.5 feet at its tip. SDG&E would remove existing framing, jumpers, and hardware as part of removing the TL674A overhead span between Pole 1 and Pole 2.
- Pole 2 would be a new, approximately 85-foot-tall, dulled steel pole that SDG&E would install directly adjacent to and south of Via De La Valle within the Del Mar Horsepark. The pole would be 3 to 4 feet in diameter at its base and taper to 1.5 feet at its tip. It would be installed on an approximately 7-foot-diameter concrete pier foundation with footings extending to a depth of 32 feet below ground surface (see Figure 4-5).
- Pole 3 would be a new, up to 85-foot-tall, dulled steel pole that SDG&E would install within the Del Mar Horsepark, directly in line with the existing TL674A overhead span. This direct-buried pole would measure 3 to 4 feet in diameter at its base and would taper to 1.5 feet at its tip (see Figure 4-6).

The overhead portion of TL674A would maintain its current single-circuit configuration. Each pole would carry three individual conductors. Pole 3 would transition the conductors from a horizontal to vertical configuration, with two conductors on one side of the pole and one conductor on the other. Pole 2 would have a vertical configuration, with three conductors located on one side. These conductors would connect to three polymer insulators mounted to cross arms. The span length between Pole 2 and Pole 3 would be approximately 550 feet; horizontal and vertical conductor spacing would be 6 to 7 feet.

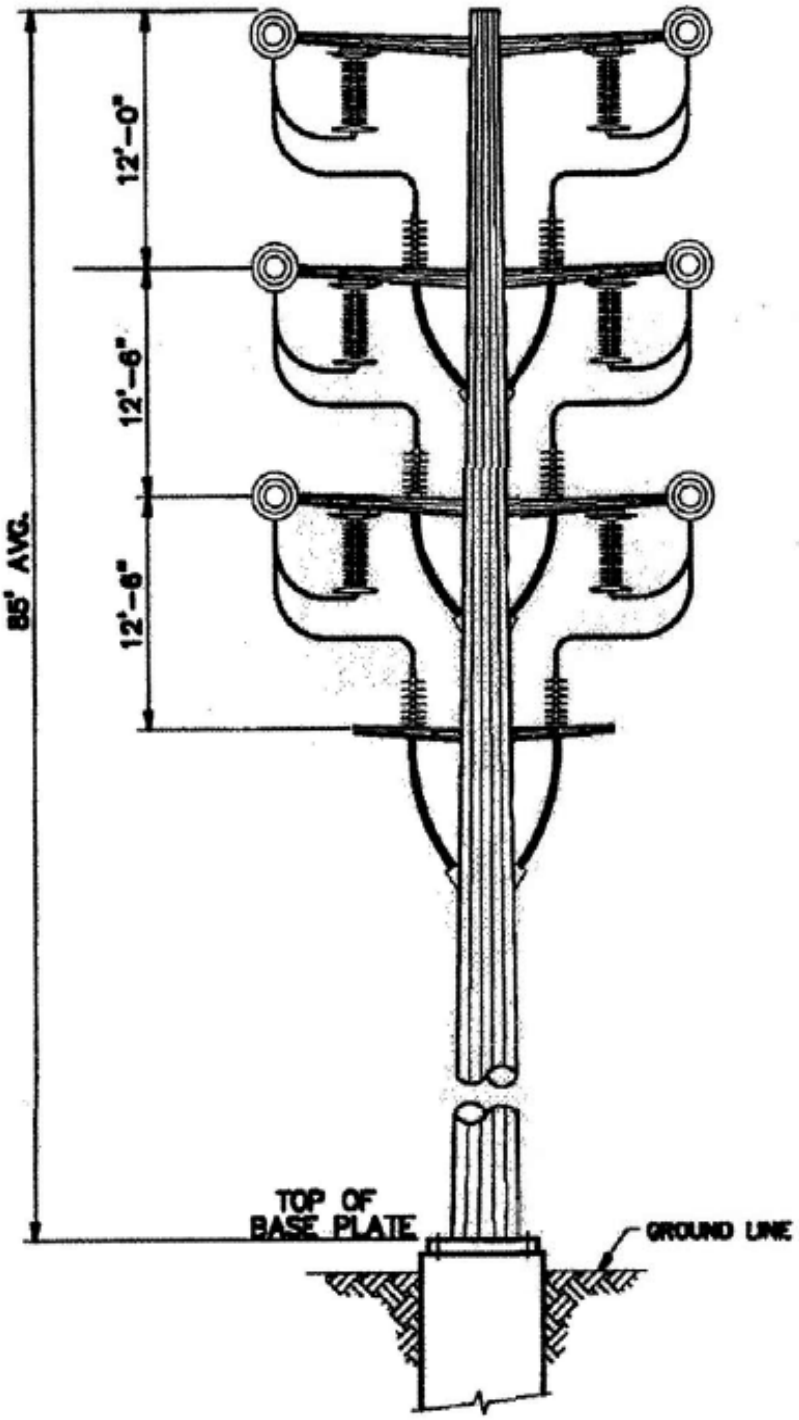

Figure 4-5 Proposed 69-kV Steel Riser Pole
Source: SDG&E 2017

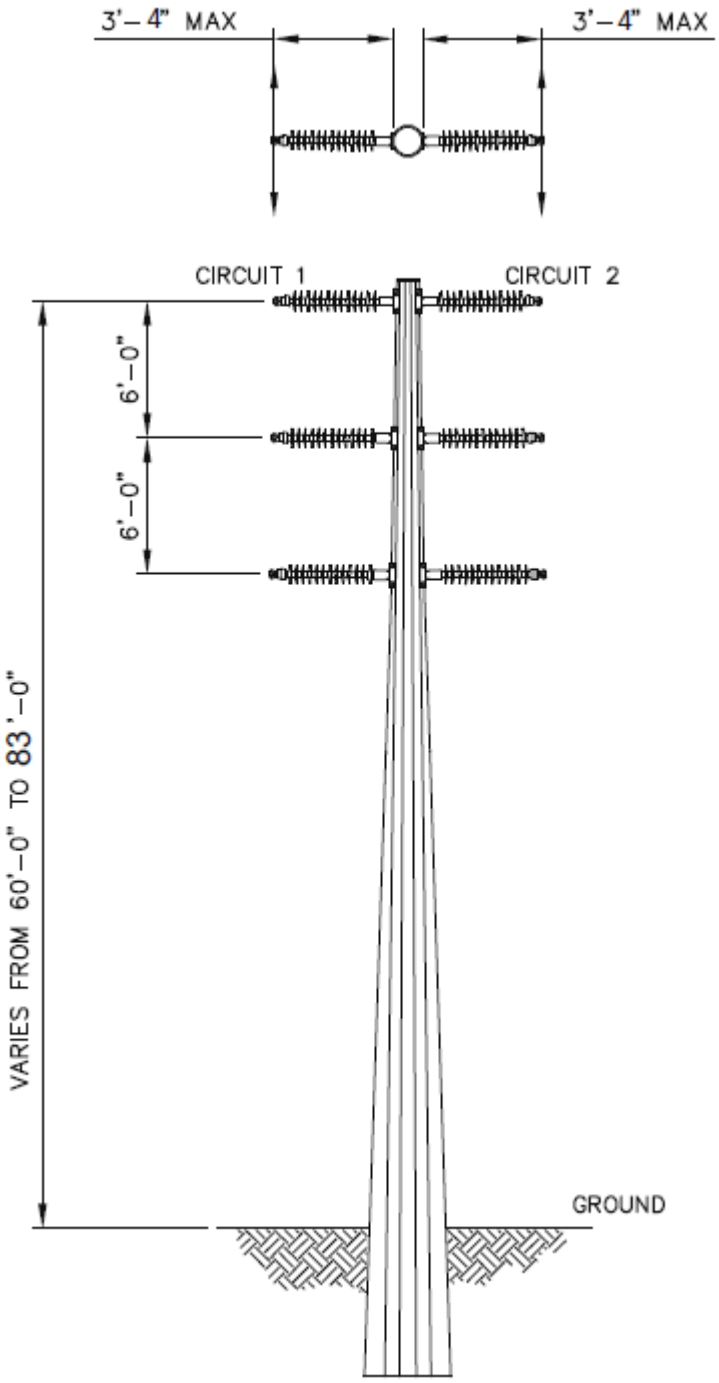

Figure 4-6 Proposed 69-kV Steel Pole
Source: SDG&E 2017

4.5.1.2 Underground Duct Bank, Splice Vaults and Cables

TL674A would transition from an overhead to underground configuration at Pole 2. From this point, SDG&E would construct approximately 1.1 miles of new underground duct bank to connect the 69-kV power line to the Del Mar Substation. The Underground duct bank would consist of ~~one~~ six approximately 6-inch-diameter and one approximately 4-inch-diameter polyvinyl chloride (PVC) conduits encased in concrete, as illustrated in Figure 4-7.

SDG&E would install four underground splice vaults along the TL674A alignment to facilitate pulling and splicing during installation and project operation and maintenance. ~~Ducts~~ Splice vaults would be constructed of precast concrete measuring approximately 17 feet in length and 9 feet in width, extending to a depth of about 11 feet, as shown in Figure 4-8. SDG&E would install three individual 3,000 thousand circular mil (kcmil) copper cables within the duct bank to connect the new riser pole to the Del Mar Substation.

4.5.2 TL666D Removal

As described above, the reconfiguration of TL674A would eliminate the current Santa Fe tap by removing the overhead portion of the line from a pole at Via De La Valle. TL674A would be removed from the Rancho Santa Fe tap and would be henceforth known as TL6973 (or, the North City West-Del Mar Tie Line) upon project implementation. The newly established TL6973 circuit at the Del Mar Substation would also facilitate removal of about 6 miles of existing TL666D overhead line~~, eliminating a distribution line from the Del Mar Substation~~.

A description of the TL666D alignment is presented as the area where SDG&E would depower and remove existing overhead utilities from service. TL666D begins by exiting the fenced portion of the Del Mar Substation to the north, approximately 115 feet west following the substation's parcel line. It then veers south for approximately 690 feet, where it crosses Via De La Valle. The line spans Jimmy Durante Boulevard between two points (one entering the city of Del Mar, the other returning to the city of San Diego). TL666D continues approximately 2,200 feet to the south, then west for approximately 1,600 feet, entering the city of Del Mar, spanning Jimmy Durante Boulevard again, where it enters the Del Mar Fairgrounds parking lot. TL666D continues 850 feet to the southwest, adjacent the Del Mar Fire Department on Jimmy Durante Boulevard, veering southeast for about 550 feet while passing land containing commercial and light industrial uses before it enters the San Dieguito Lagoon.

TL666D extends 2,400 feet southeast across the lagoon and enters the city of San Diego. TL666D continues in the lagoon another roughly 800 feet to the southeast until reaching Racetrack View Drive. At Racetrack View Drive, TL666D continues to the southeast for about 2,300 feet through a residential neighborhood, where it veers to the south and parallels I-5 for approximately 2,700 feet adjacent to residential land uses before it orients to the west for approximately 650 feet, parallel to the southern boundary of Del Mar Hills Elementary School. TL666D then continues south on Mango Drive through residential neighborhoods for approximately 2,400 feet. It reaches the Torrey Pines State Natural Reserve Extension and generally parallels Red Ridge Loop Trail for approximately 1,950 feet to the south. TL666D exits the reserve and continues south for approximately 2,100 feet, through a residential community to Carmel Valley Road.

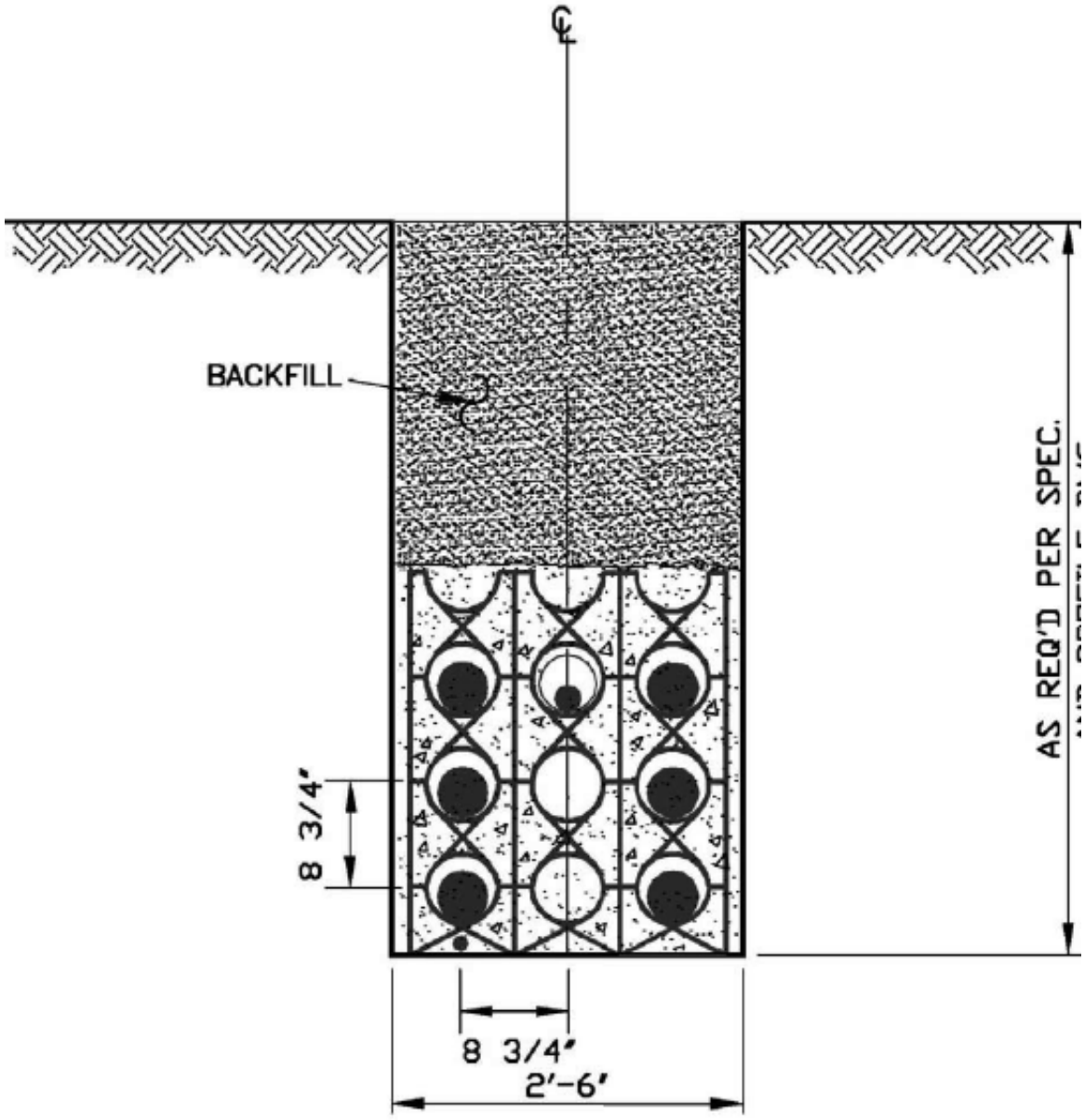

Figure 4-7 Proposed 69-kV Underground Duct Bank Cross Section
Source: SDG&E 2017

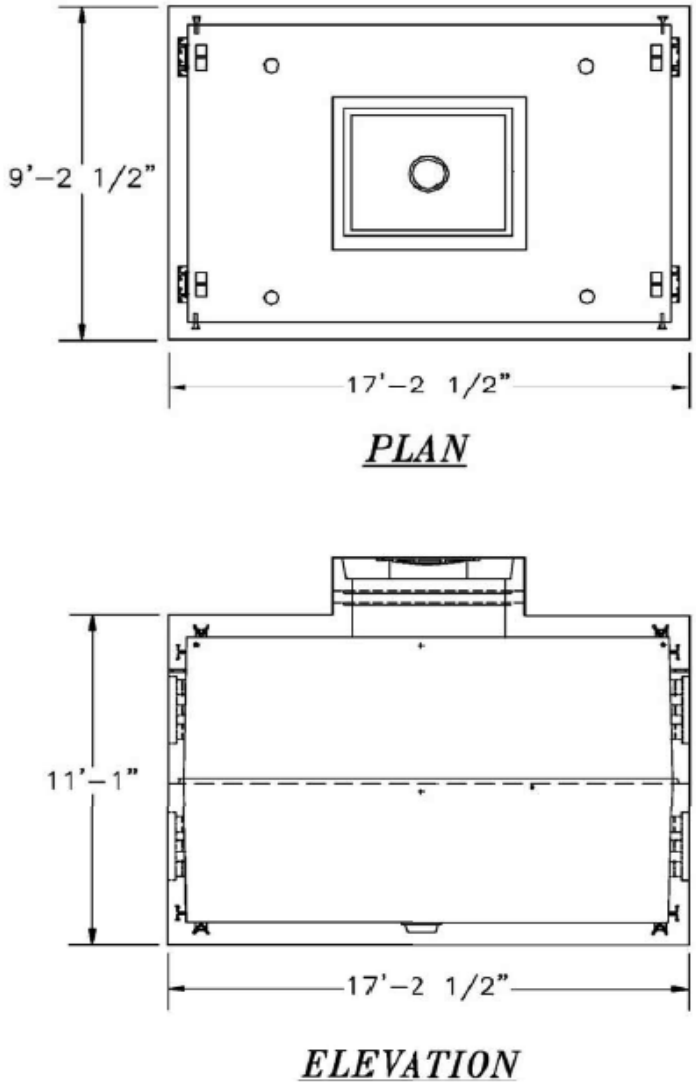

Figure 4-8 Proposed 69-kV Splice Vault (typical)
Source: SDG&E 2017

After crossing Carmel Valley Road, TL666D enters the Torrey Pines State Natural Reserve and Los Peñasquitos Lagoon, where the alignment continues about 3,800 feet to the southeast. TL666D then exits the reserve and continues for approximately 600 feet until reaching Sorrento Valley Road. The line continues for approximately 3,600 feet to the southeast through undeveloped and industrial areas, generally parallel to I-5. It then turns east and spans I-5 for approximately 650 feet until reaching a terminus at an existing steel pole on the eastern side of I-5.

Overhead Poles

A combination of 93 existing wood and steel single-circuit poles support the approximately 6-mile segment of TL666D that would be removed from service. Sixty-one of the 93 poles also support underbuilt 12-kV distribution conductors. Third-party telecommunication cables are also collocated at various locations along this section proposed for removal.

Table 4-3 inventories the changes in the number and type of utility poles resulting from reconfiguring TL674A and removing TL666D from service as part of the proposed project.

Table 4-3 Modified 69-kV Pole Summary

Pole Type	Action	Quantity	Top Diameter (feet)	Base Diameter (feet)	Height (feet)
Reconfiguration of TL674A					
New steel riser pole	Install	1	1.5	3.0 to 4.0	85
New steel pole	Install	1	1.5	3.0 to 4.0	65 to 85
Existing steel pole	Reconfigure hardware	1	2.5	4.5	70
Removal of TL666D					
Existing wood pole	Remove	34	1.0	1.5 to 2.0	65 to 85
	Top	51	1.0	1.5 to 2.0	65 to 85
	Reconfigure hardware	1	1.0	1.5 to 2.0	65 to 85
Existing steel pole	Top	6	1.5	3.0 to 4.0	65 to 85
	Reconfigure hardware	1	1.5	3.0 to 4.0	65 to 85

Source: SDG&E 2017

Existing wood poles are typically 65 to 85 feet tall, measure 1.5 to 2 feet in diameter at the base, and taper to approximately 1 foot at the tip. The existing steel poles range in height from 65 to 85 feet, measure 3 to 4 feet in diameter at the base, and taper to approximately 1.5 feet at the tip, as shown in Figure 4-9.

SDG&E would top all 69-kV poles that also support 12-kV distribution approximately 1 foot above the distribution level and would remove remaining poles entirely. Poles located within the San Dieguito and Peñasquitos Lagoons and the Torrey Pines Extension would be cut near ground level, and pole bases would be left in place to reduce the potential impact from disturbance to the surrounding area. In sum, SDG&E would remove 13 poles and would top five poles associated with the proposed project's TL666D component within the San Dieguito and Peñasquitos Lagoons and the Torrey Pines Extension.

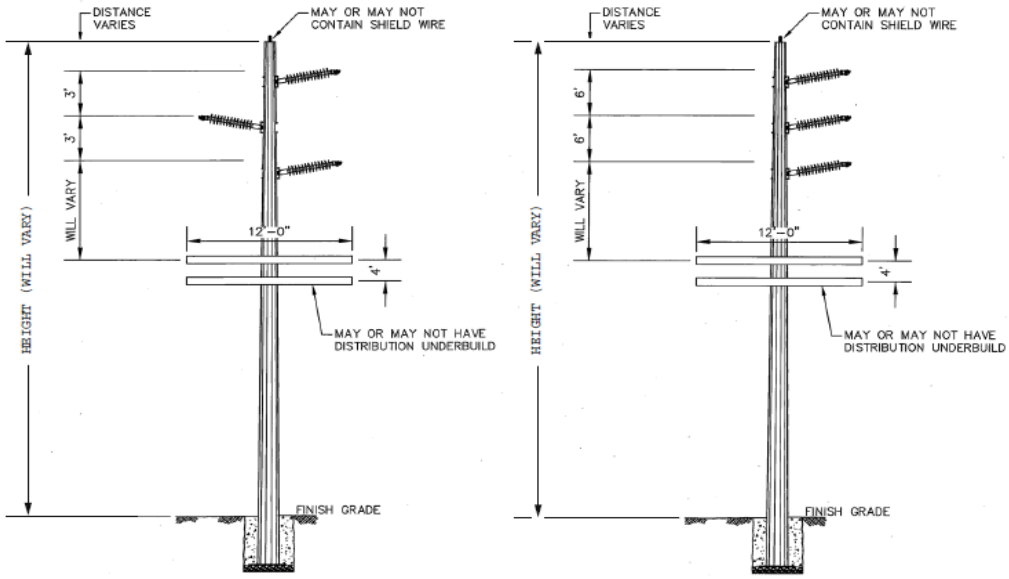

Figure 4-9 Existing Wood and Steel Pole, (typical)
Source: SDG&E 2017

Circuit Breaker Removal and Replacement

Circuit breakers safely control the flow of energy at all voltage levels across a grid by switching electrical currents on and off through the use of mechanical switching devices. When switched to an open position, breakers use insulation to cut currents immediately. When switched to a closed position, breakers ensure optimal current flow. Types of circuit breakers differ based on the method used to extinguish electrical arcs and interrupt current. The four most common types of breakers use air, oil, sodium hexafluoride (SF_6) or vacuum.

A total of eight 69-kV and 14 12-kV circuit breakers, transformers, switch gears, and other equipment are located at the Del Mar Substation, an approximately 48,520-square-foot outdoor facility enclosed by perimeter fencing underlain by a concrete pad. Since filing the project application and Proponent's Environmental Assessment (PEA) (SDG&E 2017) with the CPUC in June 2017, SDG&E has identified a possible need to replace one existing oil-filled circuit breaker, installed in 1990, in order to accommodate increased ampacity associated with TL6973, where it would feed into the substation as part of the proposed project. The breaker subject to possible removal is located along the substation's northern edge, about 60 feet east of its existing control building. According to the applicant, the removal of TL666D and connection of TL6974D with a higher voltage rating provides opportunity to modernize the breaker and associated hardware to current design standards, which specify use of SF_6 breakers.

SDG&E would prepare a detailed engineering review of the current substation foundation to determine whether the foundation would be adequate to support the new breaker. If the original foundation is not adequate to support the new circuit breaker, a new foundation would be designed and constructed. To commission the new circuit breaker, wiring within the boundary of the substation would be modified and/or replaced, as needed. If construction work were required, the replacement activities would occur

within the existing substation fence line. (See Sections 4.6.1, "Construction Workforce and Equipment"; 4.6.10, "Access;" 4.7.4, "Circuit Breaker Removal and Replacement"; and 4.8, "Schedule" for additional information relating to circuit breaker removal/replacement construction activities.)

4.5.3 C510 Conversion

C510 consists of approximately 2,800 feet of power line supported by poles associated with TL666D and about 1,100 supported feet by four existing wooden distribution poles that are 40 to 55 feet tall and measure approximately 1.5 feet in diameter at their base, tapering to about 0.75 feet in diameter at their tops. SDG&E proposes to remove five existing poles and convert 3,900 feet of C510 conductor from an overhead to an underground configuration.

Overhead Poles and Conductors

A new approximately 41.5-foot-tall wood riser pole (Pole 28) would be directly buried at the northwest end of the conversion segment, and one new, approximately 50-foot-tall, dulled steel riser pole (Pole 35) would be installed on a foundation at the southeast end of the conversion segment. In addition, one new, approximately 80-foot-tall, temporary direct-buried wood pole (Pole 122) would be installed near the steel riser pole to provide clearance for the existing wire. This temporary pole would be removed once the wood riser pole is installed.

These poles would connect the existing overhead portions of C510 to the new underground duct bank. They would measure approximately 1.5 feet in diameter at the base and taper to approximately 0.75 feet at the top. The foundation-mounted pole would be installed on an approximately 6- to 7-foot-diameter concrete pier foundation. The foundation would be approximately 20 to 30 feet deep and would include a concrete reveal or stickup of approximately 2 feet above grade. Pole 28 would be installed adjacent to an existing 69-kV wood pole east of San Dieguito Road, and Pole 35 would be installed where the current TL666D alignment spans Racetrack View Drive on the east side of the street. A drawing of these proposed poles is included in Figure 4-10.

Two new, approximately 50-foot-tall wood riser poles (Pole 38 and Pole 41) would also be installed to connect the new underground duct bank to existing overhead 12-kV distribution poles. These poles would measure approximately 1.5 feet in diameter at the base and would taper to approximately 0.75 feet at the top, illustrated in Figure 4-11.

C510 is currently configured with four individual conductors that are supported by associated poles in a horizontal configuration. These bare, stranded, copper conductors typically attach to poles by four individual polymer insulators. The overhead span lengths between poles currently vary, but average about 275 feet. Existing conductor would be transferred to the new wood riser poles near the new duct bank or may be replaced, if necessary. The remainder of the existing conductor would be removed.

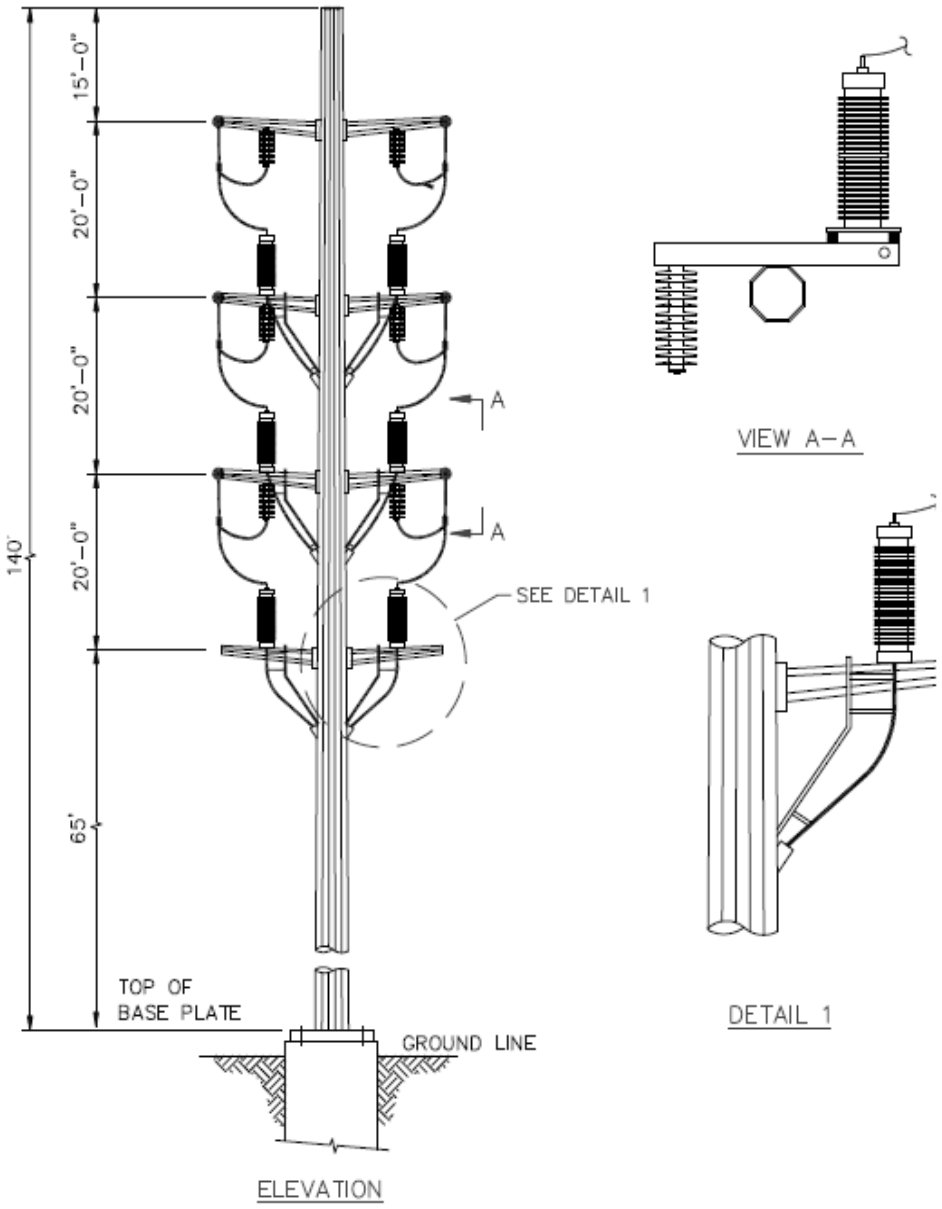

Figure 4-10 Proposed 12-kV Steel Riser Pole, (typical)
Source: SDG&E 2017

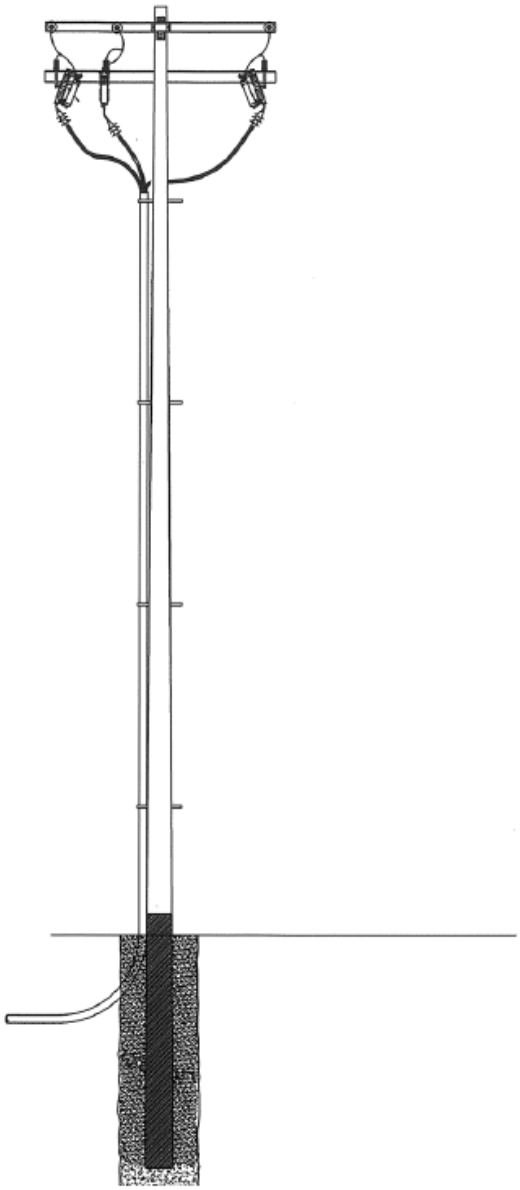

Figure 4-11 Proposed 12-kV Wood Riser Pole, (typical)
Source: SDG&E 2017

Underground Duct Bank, Hand Holes, Transformer and Cable

At each end of the conversion segment, C510 would transition from an overhead to underground configuration at the two riser poles installed along San Dieguito Drive and Racetrack View Drive. Between these two poles, approximately 3,600 feet of new underground duct bank would be constructed to maintain distribution service in the area. Each underground duct bank would comprise four 5-inch-diameter PVC conduits and one 4-inch-diameter PVC conduit encased in concrete, as depicted in Figure 4-12. The finished duct bank would be approximately 32 inches tall and 18 inches wide. Up to five underground hand holes with traffic covers would be installed along the alignment to facilitate pulling and splicing during installation and inspection, and repair during operation and maintenance. Precast hand holes would measure approximately 6 feet long, 9.5 feet wide, and 7 feet deep and are depicted in Figure 4-13.

As illustrated in Figure 4-14, an aboveground transformer would be installed on a 78- by 59-inch concrete pad along the underground route to facilitate the conversion of C510. The transformer would be contained within a steel enclosure and mounted on top of a pad. The pad would measure approximately 46 inches long by 46 inches wide by 50 inches tall, as illustrated in Figure 4-15. Insulated 1,000-kcmil aluminum cables would be installed within the duct bank to connect the two new riser poles and adjacent equipment.

4.5.4 C738 Conversion

SDG&E proposes to convert approximately 630 feet of existing overhead distribution within its rights-of-way (ROW) and the Sorrento Valley Pedestrian/Multi-Use Path to an underground configuration.

Overhead Poles and Conductors

The conversion of C738 would involve installation of one new 50-foot-tall, direct-buried wood riser pole (Pole 107) at the start of the conversion segment; conversion of one existing direct-buried TL666D wood pole to a riser pole (Pole 108) at the end of the conversion segment; and removal of two existing direct-buried wood poles from service (Pole 124 and Pole 125) between the beginning and ending poles. The poles would have a base diameter of approximately 1.5 feet and taper to approximately 0.75 feet at the top. SDG&E would modify one existing foundation-mounted steel distribution pole (Pole 127) and convert it to a stub pole to support the new, adjacent riser pole. This pole is approximately 45 feet tall, has a diameter of approximately 4 feet at the base, and tapers to approximately 1.5 feet at the top.

Currently, C738 is configured with four individual stranded copper conductors supported by associated poles in a horizontal configuration. The conductors are attached to poles using four individual grey polymer insulators. The overhead span lengths that SDG&E would remove within Peñasquitos Lagoon as part of the proposed project average approximately 190 feet.

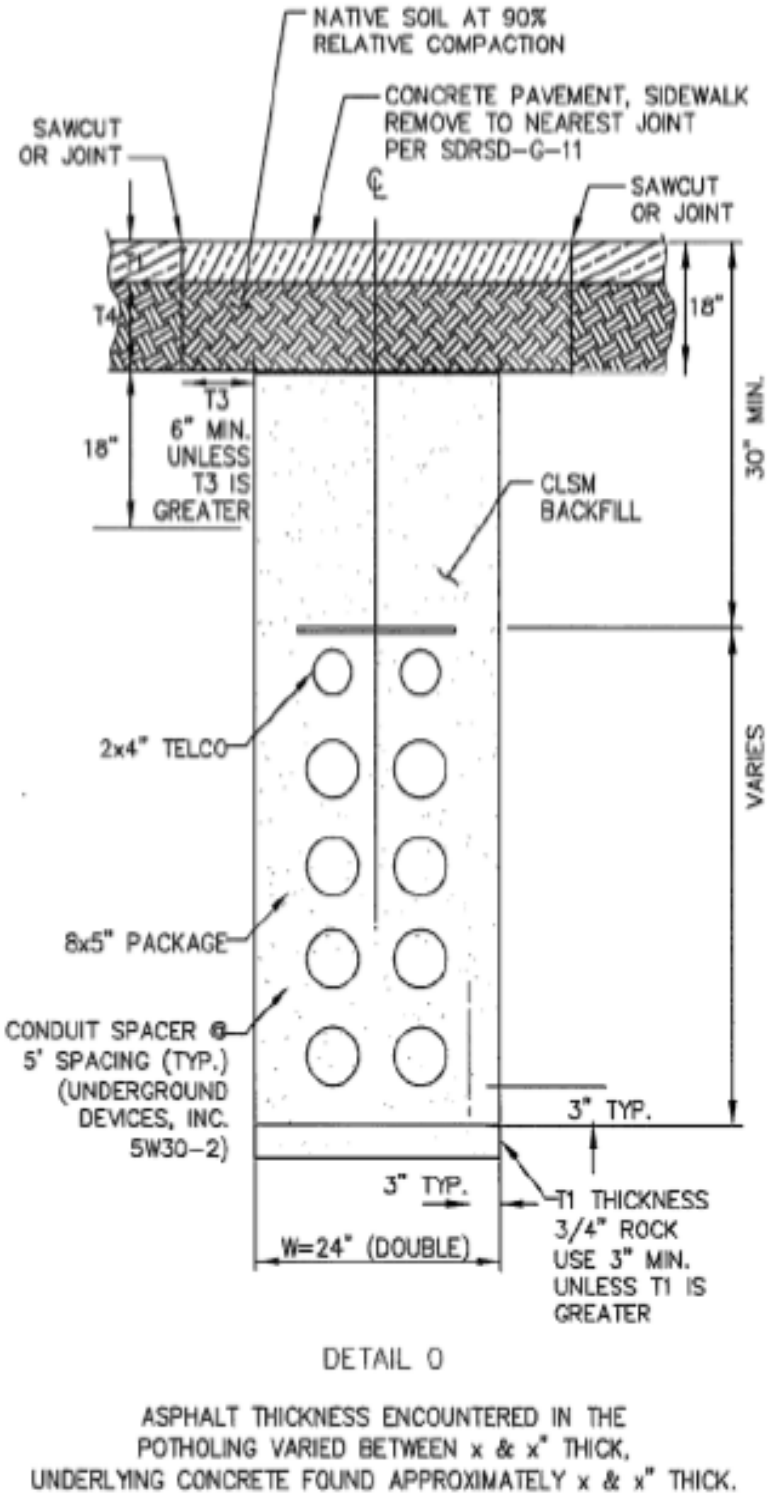

Figure 4-12 Proposed 12-kV Underground Duct Bank Cross-section (typical)
Source: SDG&E 2017

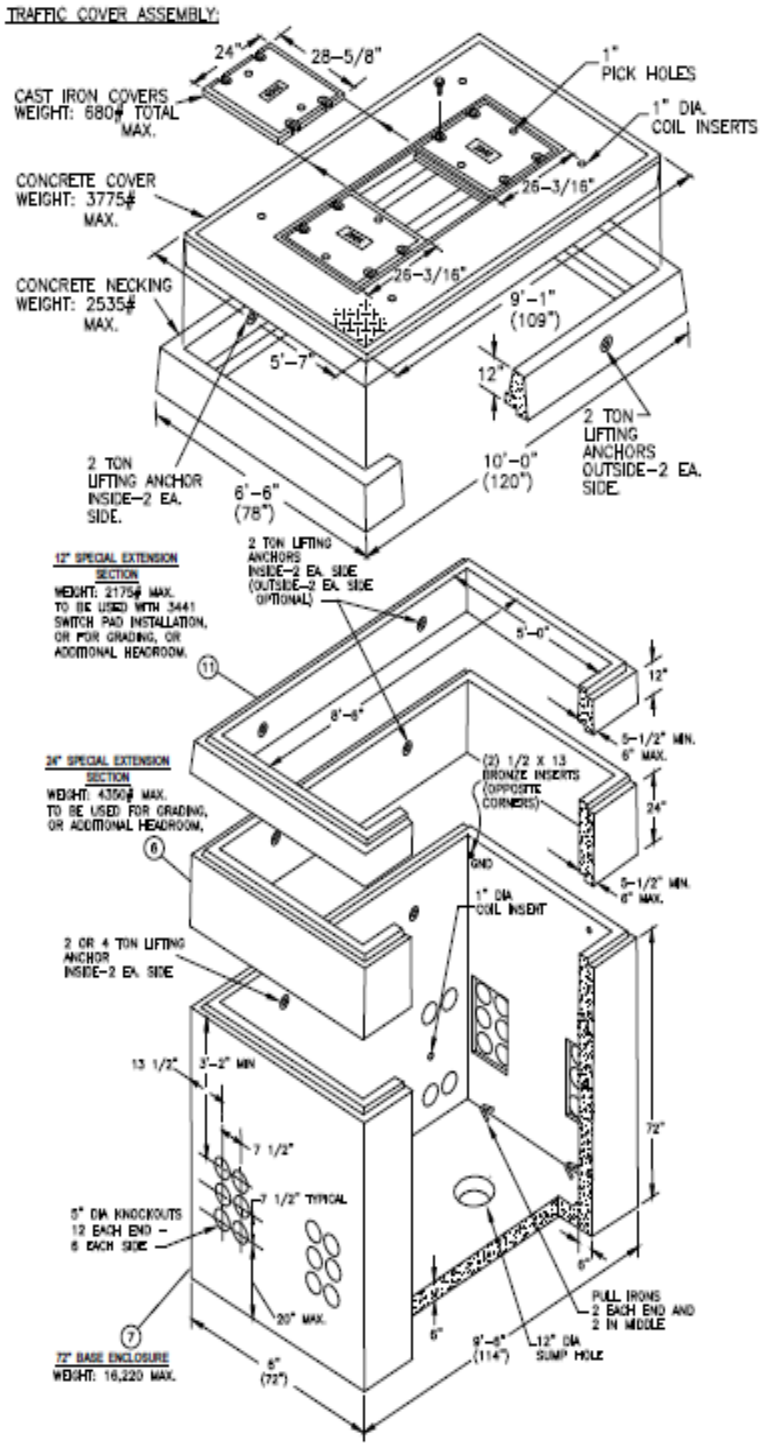

Figure 4-13 Proposed 12-kV Hand Hole (typical)
Source: SDG&E 2017

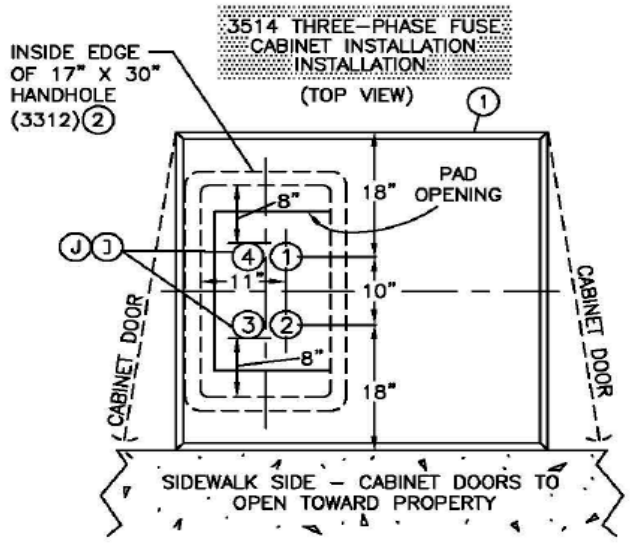

Figure 4-14 Proposed 12-kV Transformer Pad (typical)
Source: SDG&E 2017

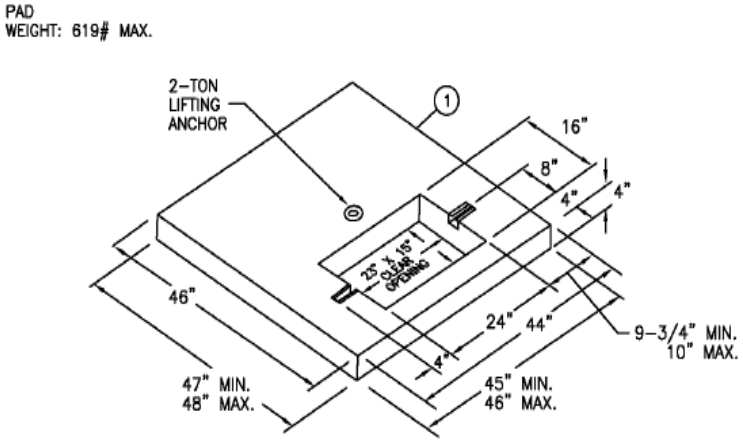

Figure 4-15 Proposed 12-kV Pad-mounted Transformer (typical)
Source: SDG&E 2017

The C738 line would transition from an overhead to underground configuration at the two riser poles that SDG&E would install along Sorrento Valley Pedestrian/Multi-Use Path at each end of the conversion segment. SDG&E would also install approximately 630 feet of new underground duct bank between these two poles to maintain distribution service in the area. Each underground duct bank would consist of two 5-inch-diameter PVC conduits encased in concrete. A single 1,000-kcmil aluminum cable installed within the duct bank would connect the ~~two~~ new riser poles to the newly converted riser pole. The finished duct bank would be about 8 inches tall and 18 inches wide. An existing underground hand hole would be used along the new underground alignment to facilitate cable pulling and splicing during installation and inspection, and for repair during operation and maintenance.

4.6 Project Construction

This section describes the construction workforce, equipment, and required temporary work areas, access, and methods that SDG&E and its contractors would typically implement to construct the proposed project. The entirety of project construction activities would be carried out within SDG&E's existing ROWs or within the franchise position of city of Del Mar and city of San Diego streets. According to the applicant, acquisition of new permanent ROW would not be required for the proposed project. For work that would occur within, under, or above a state or interstate highway ROW, such as removal of power line crossing I-5, the California Department of Transportation (Caltrans) requires applicants to obtain an encroachment permit.

4.6.1 Construction Workforce and Equipment

Construction of the proposed project would involve the work of construction crews, environmental monitors, inspectors, and SDG&E personnel. It is conservatively anticipated that a crew of up to 125 contractors and construction personnel could be actively employed onsite during peak construction periods. The overall number of crew members would fluctuate based on the specific daily scheduled task. Table 4-4 presents the types of construction equipment that SDG&E would use during project construction. Construction schedule information is presented under Section 4.8 "Construction Schedule."

Table 4-4 Construction Equipment Type and Use

Equipment Type	Equipment Use
Air Compressor	Operating air tools
Backhoe	Excavating trenches
Bucket Truck/Manlift	Erecting towers and installing conductors
Chainsaw	Cutting existing poles
Compactor	Compacting soil around structure
Concrete Truck	Pouring concrete
Crane Truck	Lifting and placing materials during excavation
Drill Rig with Augers	Excavating foundation
Dump/Haul Truck	Transporting excavated materials and importing backfill and debris disposal
Flatbed Truck	Delivering and removing poles to and from site
Forklift	Delivery and disposal of circuit breaker equipment
Handheld Compactor	Compacting soil around foundation

Table 4-4 Construction Equipment Type and Use

Equipment Type	Equipment Use
Helicopter	Removing poles/pole segments
Large Crane	Erecting and removing
Loader	Tractor with front bucket for moving materials
Maintenance Truck	Maintaining and refueling equipment
Pickup Truck	Transporting construction personnel
Puller and Tensioner	Pulling and securing conductor into correct position and tension
Reel Trailer	Feeding new conductor or collecting old conductor
Small Mobile Crane (12 ton)	Loading and unloading materials
Splice Trailer	Storing splicing supplies
Trencher/Ditch Witch	Excavating trenches
Water Truck	~~Suppressing dust~~ Non-potable water transport for dust suppression

Source: SDG&E 2017.

4.6.2 Temporary Work Areas

Temporary work areas are defined in this Initial Study as publicly or privately owned spaces that SDG&E and its contractors would use to store and stage construction equipment and vehicles to conduct the various activities needed to complete construction of the proposed project within an estimated 12-month period. Temporary work areas are depicted in Figure 4-2, Appendix J, and in Table 4-5.

Table 4-5 Temporary Work Area Requirements

Project Component	Workspace Type	Quantity	Dimensions (feet)	Area (acres)
TL674A Reconfiguration	Pole Work Area	1	250 by 100	0.36
		1	230 by 100	0.23
	Overhead Stringing Site	1	100 by 15	0.03
	Underground Stringing Site[a]	4	150 by 25	0.34
	Underground Work Area	1	6,000 by 30	4.13
TL666D Removal	Pole Work Area	94	20 (diameter)	0.68
	Stringing Site	22	250 by 100	2.53
		1	250 by 100	0.06
	Guard Structure Work Area	17	50 by 50	0.39
	Helicopter Drop Zone	6	16 by 16	0.04
		10	10 by 10	0.02
C510 Conversion	Pole Work Area	1	3 (diameter)	< 0.01
		1	4 (diameter)	< 0.01
		6	20 (diameter)	0.04
		1	215 by 30	0.15
		1	150 by 60	0.21
	Underground Work Area[b]	1	3,600 by 20	1.65
	Pad-mounted Transformer/ Fuse Cabinet Installation Area	1	100 by 20	0.05
C738 Conversion	Pole Work Area	5	20 (diameter)	0.04
	Underground Work Area	1	630 by 20	0.29

Table 4-5 Temporary Work Area Requirements

Project Component	Workspace Type	Quantity	Dimensions (feet)	Area (acres)
All	Staging Area/Fly Yard	1	390 by 200	1.1
		1	400 by 400	3.67
		1	250 by 250	1.43
		1	200 by 200	0.92
	Total	180	--	18.19

Source: SDG&E 2017.

Notes: Information is considered preliminary and is subject to adjustment based on final engineering and ground conditions at the time of construction. Total actual workspace area required would be less than the total indicated in the table due to overlapping workspaces.

(a) Stringing sites associated with reconfiguration of TL674A would also be used to install underground vaults.

(b) Underground work area associated with C510 conversion would also be used for installation of hand holes and installation/removal of cable/conductor.

Temporary work areas are intended to accommodate installation of new poles (see Section 4.6.4, "Pole Work Areas," for more information); facilitate access to and construction of underground duct banks and related facilities; enable removal and modification of existing poles and installation and removal of conductor and cable; and store and stage construction equipment and materials. Preliminary staging and temporary work area locations are illustrative of the types of spaces that could be used for construction staging and storage. For example, the majority of temporary work areas are related to the removal or modification of utility poles. For each pole where removal, topping, or replacement work is scheduled, SDG&E has designated a work area sufficient to access and complete the construction activities necessary at that particular site.

The precise locations, configurations, and quantity of temporary work areas may change, as necessary, at or prior to commencement of construction due to specific site conditions, to ensure that a safe and adequate work area is available for crews in the field.

All temporary work areas would be accessed by construction equipment using a combination of existing access roads, overland travel, all-terrain vehicle paths, or on-foot access, as described in Section 4.6.10 "Access." All work areas would be restored as described in Section 4.7, "Methods." Temporary work sites may be altered to avoid potential impacts associated with construction activities on environmentally sensitive land or on biological resources, in light of analyses and mitigation, as applicable in Chapter 5, "Environmental Setting and Impacts."

4.6.3 Stringing Sites

Approximately 24 stringing sites would be established to provide a safe working space for the installation and removal of overhead conductors. Stringing sites would typically be approximately 100 feet long and 50 feet wide; however, in some locations, smaller sites may be deemed sufficient. Stringing sites would be located adjacent to existing or proposed poles in line with the overhead alignment. The approximately 24 stringing sites would require approximately 2.62 acres of land in total. SDG&E does not anticipate a need to grade any of the temporary stringing sites.

SDG&E would designate four stringing sites for the installation of new underground conductors associated with the TL674A reconfiguration. Each stringing site would be centered on a vault location and require about 150 by 25 feet of space. Pull sites would require approximately 0.34 acres of land in

total. While grading of these sites is not expected, excavation for trenches and vaults would occur in these locations.

4.6.4 Pole Work Areas

To accommodate construction equipment and installation, topping, and removal of the power line and distribution poles, temporary work areas would be established at each pole location identified for removal or topping. A total of approximately 111 work areas, with a combined total of approximately 1.72 acres of land area, would be required for pole work as summarized in Table 4-5. Pole work areas would generally surround existing or proposed pole locations; however, the actual workspace would vary in shape and size and would be determined based on-site conditions and access requirements to ensure a safe and adequate work area for construction crews.

Construction vehicles, equipment, and materials may need to be staged away from existing access roads and/or outside of delineated temporary work areas to maintain a safe working space for crewmembers working directly under poles. For work in environmentally sensitive areas, an onsite biological monitor would direct crews to appropriate staging areas for construction vehicles, equipment, and materials.

4.6.5 Underground Construction Areas

SDG&E would establish underground construction areas centered on each duct bank alignment to accommodate installation of underground duct banks, vaults, and hand holes associated with the proposed reconfiguration of TL674A and conversion of C510 and C738 conductors. Reconfiguring TL674A's 69-kV duct bank would require an approximately 30-foot-wide workspace. Converting the C510 and C738 12-kV duct banks would require an approximately 20-foot-wide workspace. SDG&E would establish underground construction areas prior to the commencement of construction for removal of conductors and for installation of hand holes and cable. Construction areas would be located predominately within existing streets and previously disturbed areas and would require a total of approximately 5.8 acres of space.

4.6.6 Guard Structures and Temporary Poles

Prior to removing existing conductors and installing new overhead conductors, SDG&E would install temporary guard structures at road crossings and other locations where the existing or new conductors could come in contact with existing electrical and communication facilities, or with vehicular and/or pedestrian traffic in the event the line were to accidentally fall during stringing operations. Guard structure types could include boom and bucket trucks and embedded wood poles with cross beams. Local site conditions would dictate guard structure type. In paved areas, for example, SDG&E may use boom or bucket trucks. Depending on configuration and location, installation of each guard structure could require a footprint of approximately 1,000 square feet of temporary workspace. SDG&E estimates that project construction would require 17 guard structures that would amount to 0.39 acres to accommodate all proposed project guard structures.

SDG&E anticipates that the C510 conversion would require installation of two temporary poles, depicted in Appendix J, to hold conductor while new riser poles would be installed. SDG&E estimates that each

temporary pole would require an approximately 20-foot-diameter work area (approximately 0.01 acre in total).

4.6.7 Temporary Construction Staging Areas and Fly Yards

As shown in Figure 4-2 and Appendix J, the proposed project would include four temporary construction staging areas and fly yard sites that would have footprints ranging from approximately 200 by 200 feet to 400 by 400 feet. These temporary spaces include:

- Durante Fly Yard: Jimmy Durante Boulevard between Del Mar Fairgrounds and Golf Center;
- Del Mar Heights Fly Yard: Mira Montana Drive at Del Mar Heights Elementary School softball diamond;
- Torrey Pines Fly Yard: McGonigle Road, North Beach parking lot at Torrey Pines State Beach; and
- Pumpkin Patch Fly Yard: near the intersection of El Camino Real and San Dieguito Drive.

Because temporary staging areas and fly yards would be located on flat, previously disturbed, or developed areas, grading of staging areas is not anticipated. Construction staging areas would function as locations where crews could park at the beginning of the morning shift. If not already present, SDG&E would install perimeter fencing around construction staging yards to ensure adequate security and screening of these sites. Crews may also use gravel as a surface cover to reduce fugitive dust and avoid unnecessary off-site sediment transport. Staging area sites could be used for the following purposes:

- Refueling areas for vehicles, helicopters, and construction equipment by a mobile fueling truck;
- Equipment wash stations;
- Pole assemblage;
- Storage of material and equipment;
- Storage containers;
- Construction trailers;
- Portable restrooms;
- Parking;
- Lighting; and
- Generator use for temporary power in construction trailers.

SDG&E would use the four staging areas and fly yards to stage helicopters and refuel, store, assemble, and pick up construction equipment and materials. SDG&E would use helicopters to facilitate conductor and pole removal in wetland and other sensitive areas where access limitations would preclude the use of ground-based crews, such as within the San Dieguito and Peñasquitos Lagoons. SDG&E would stage helicopter flights from local airports (e.g., Montgomery Field, Gillespie Field, or Palomar Airport) and would use construction-staging sites as collocational landing areas.

Helicopter flight paths would follow SDG&E's existing ROW, to the greatest extent practical. In instances where helicopters would depart from surface ROWs, they would be directed to follow the most direct path feasible between points of departure and supporting staging area and fly yard. Helicopters could be in use for up to 10 days during project construction. SDG&E would implement best management practices at the staging areas and fly yards intended to minimize the potential operational effects associated with helicopter use (see Sections 5.3, "Air Quality," 5.8, "Hazards and Hazardous Materials," and 5.12, "Noise" for more information).

4.6.8 Helicopter Drop Zones

Figure 4-2 and Appendix J depicts the 16 drop zones that SDG&E has established to support helicopter operations during construction. SDG&E intends that drop zones would be used for delivery and removal of equipment, materials, and construction crewmembers conducting pole removal and topping work within the San Dieguito and Peñasquitos Lagoons. SDG&E notes that drop zones would be located in dry, upland areas, thus avoiding the need to grade or substantially prepare. There would be two sizes of drop zones in use during project construction, which would have footprints of roughly 10 by 10 feet (100 square feet) or 16 by 16 feet (256 square feet). The sum of the area of all 16 drop zones would account for approximately 0.1 acres of land. The drop zones would facilitate equipment transfer and crew access to pole sites where SDG&E would remove 13 poles, top five poles, and replace one pole where jurisdictional wetland areas and survey data suggest associated with the TL666 component of the proposed project.

4.6.9 Permanent Work Areas

The proposed project would be located predominantly within existing utility corridors and paved franchise areas that are currently improved and maintained. Existing work areas and roads in addition to a limited number of additional permanent work areas would remain following construction. Permanent work areas, as summarized in Table 4-6, are those that SDG&E anticipates using for access and maintenance when the proposed project is operational. These work areas would be created from and contained within the temporary work areas described in Section 4.6.2, "Temporary Work Areas," and summarized in Table 4-5.

Table 4-6 Permanent Work Area Summary

Work Area Type	Quantity	Dimensions (feet)	Total Area (acres)
New Structure Operation Work Pads[a]	8	30 (diameter)	0.13
69-kV Vaults[b]	4	50 by 20	0.10
12-kV Hand Holes[b]	5	6.5 by 2	<0.01

Source: SDG&E 2017.

Notes: The information presented herein is based on preliminary engineering and is subject to change. All new structure work pads would be located within SDG&E's existing power line corridors. All permanent work areas associated with underground vaults and hand holes would be located within City of Del Mar and City of San Diego streets.

[a] Permanent structure operation work pads would be contained within the temporary structure installation work areas.

[b] Most underground vaults and hand holes would be located below ground; therefore, only the size of the opening is considered a permanent work area.

4.6.10 Access

Access to proposed work sites would be provided by existing public roadways and a network of existing access roads, all-terrain vehicle (ATV) roads, and footpaths. Existing and temporary access roads and paths are depicted in Figure 4-2. Access road and path characteristics are summarized in Table 4-7.

Table 4-7 Road Access Characteristics

Type of Road	Description	Width (feet)	Length (feet)	Area (acres)
Existing Dirt / Gravel Road	Typically, a double-track road that may have been graded previously. No other preparation required, although a few sections may need to be re-graded and crushed rock may be applied in very limited areas for traction.	12	4,030	1.11
Existing ATV Road	Vegetation trimming/removal may be required.	8	1,400	0.26
Existing Footpath	No preparation required. Typically, grassy areas that are relatively flat. No restoration will be necessary.	2	5,350	0.25
Temporary Footpath	Vegetation trimming/removal may be required.	2	47,700	0.35
Paved public roadway characterized as two-lane Community Collector, with continuous turning lane in project area.	Access to Del Mar Substation provided from private driveway off of Via de la Valle	N/A	N/A	N/A

Source: SDG&E 2017.
Key:
ATV = all-terrain vehicle
N/A = not applicable

The various road types are intended to allow construction crews and their equipment access to pole locations where removal or topping work is planned. SDG&E may determine that smoothing or refreshing of access road surfaces and/or vegetation clearance along access ways may be necessary to ensure safe conveyance prior to use. When warranted, SDG&E would remove any cleared vegetation from the work site or access road and would dispose of it at approved off-site facilities. Vehicle access would be restricted to existing roads, previously disturbed areas, and designated temporary work areas, where feasible and as condition by project-specific access and construction traffic management plans (see Section 5-16, "Transportation and Traffic," for more information).

Vehicle access to the Del Mar Substation would be achieved from the substation's existing private driveway that leads from Via de la Valle. At the beginning of the workday, crew members would typically meet at one of the proposed project's staging areas/fly yards and leave personal vehicles parked at these locations. From there, crew trucks and other vehicles would travel to and park within the existing substation. Some temporary parking south of the substation along Via de la Valle may be required, depending on the construction activities occurring on a particular day. Additional temporary parking (outside of the substation parking lot) would allow for maneuvering of vehicles, equipment, and material deliveries, including during peak construction periods. The applicant does not anticipate a need for street parking on the west side of the substation.

SDG&E would establish a network of temporary footpaths for crews to access the San Dieguito and Peñasquitos Lagoons. These footpaths would link pole work sites to adjacent roadways and helicopter drop zones. Temporary footpaths would be approximately 2 feet wide and in some locations would cross environmentally sensitive areas characterized as wetlands or non-wetland waters by any or all of the following public agencies with jurisdictional regulatory authority over such lands: U.S. Army Corps of Engineers, California Department of Fish and Wildlife, Regional Water Quality Control Board, and/or California Coastal Commission. Access and activity in such areas would be subject to the provisions of those authorities and conditions identified in this Initial Study (see Sections 5-4, "Biological Resources," 5-8, "Hazards and Hazardous Materials," and 5-9, "Hydrology and Water Quality," for more information).

4.6.11 Vegetation Clearance

Because much of the proposed project's electrical alignments are predominately within existing urban settings, extensive vegetation clearance is not expected to occur as part of project construction. It is anticipated that project construction may necessitate some vegetation removal to prepare construction areas for use. SDG&E would use mowers, excavators, and/or hand tools to clear vegetation from work sites. Section 5.4, "Biological Resources," contains a detailed discussion of the proposed project's vegetation clearing requirements. Furthermore, the proposed project would also not necessitate removal of any trees; however, a limited number of trees may require pruning to ensure that construction areas are accessible and clear of obstruction. Trimming would reduce the potential of exposing trees to electrical lines, which could result in power outages. When necessary, tree trimming would be managed by a two-person crew using a one-person aerial lift truck, and a chipper trailer.

4.7 Methods

The following section describes the activities and methods that SDG&E and its construction contractors would commonly employ in electrical infrastructure projects. The following descriptions of construction and installation methods are broadly representative of the methods used for similar types of projects. Construction procedures may vary slightly along each proposed project component's alignment or at any ~~particular location~~location because physical conditions are variable in the field and circumstances may require reducing, avoiding, or eliminating the proposed project's potential environmental impacts at a given work site. As such, construction methods describing the implementation of the proposed project are generalized but are sufficient for purposes of environmental review.

4.7.1 Overhead Power Line Construction

Foundation-Mounted Pole Installation

Prior to installation of pole foundations, SDG&E or its contractors would prepare pole sites by clearing vegetation and grading sites flat or in a terraced fashion, as needed. SDG&E would spread excavated soils over existing access roads and work pads as appropriate~~,~~ or would dispose of them off site according to all applicable laws.

Crews would use a large auger to excavate 6- to 7-foot-diameter holes to a depth of 20 to 30 feet to construct and secure concrete pier foundations. ~~In the event that~~ If crews determine soils to be unstable,

steel casings may be incorporated into the excavated cavity to stabilize the sides of excavated pits. Following excavation, a reinforcing steel cage and anchor bolt cage would be installed in each hole. Steel cages and anchor bolt cages would typically be assembled at one of the proposed project's staging areas or fly yards and transported to the pole site. Foundations would require approximately 20 to 45 cubic yards of excavation, and a slightly greater volume of concrete would be placed into the holes, because foundations would extend approximately 2 feet above ground surface. Once poured, concrete foundations would cure for seven days to up to one month, during which time crews would remove concrete forms and backfill around the foundations, as needed.

Once foundations cured, flatbed trucks would deliver new steel poles to work sites in one or more sections. Crews would use a truck-mounted crane to raise the pole into place at its designated location for assembly. Single-circuit riser poles would have three cross-arms and would support one circuit on one side of the pole. Cross-arms would be bolted to the pole, and insulators would be bolted to the cross-arms. After assembly, a large crane would lift and set pole sections into place on anchor bolts embedded in the concrete foundation. Nuts would then be threaded onto the anchor bolts and tightened.

Direct-Buried Pole Installation

Installation of direct-buried poles would begin with the excavation of holes measuring approximately 3 feet in diameter and approximately 8 to 12 feet deep, depending on the type and height of the pole. Holes would typically be drilled using a truck-mounted auger or similar equipment and would result in excavation of 2.1 to 3.1 cubic yards of soil. New poles would then be delivered to the site and placed in the excavated area with a small crane. The annular space (annulus) between the poles and holes would then be backfilled with concrete. Any remaining excavated material would be placed around the poles, spread at adjacent areas, or disposed of off-site at an approved facility.

Guard Structure Installation

SDG&E would install temporary guard structures at road crossings and other locations where existing or new conductors could come in contact with existing electrical and communication facilities, or vehicular and/or pedestrian traffic in the event that the line ~~were~~ was to accidentally fall during stringing operations.

Guard structures would be installed using the same methods employed for direct-buried wood poles. As a result, concrete foundations would not be required, and no grading or other site work for guard structures is anticipated. The temporary guard structure poles would be removed following the completion of conductor stringing operations, and holes would be backfilled with excavated soil. Staged boom or bucket trucks may be used as a substitute for embedded wood guard structures.

For construction within ROWs under jurisdiction of Caltrans, any work involving highway crossings would require an encroachment permit from Caltrans. The proposed project would include removing approximately 615 feet of overhead powerline associated with eliminating service on TL666D. A portion of TL666D spans between Pole 106 on the northeast (northbound) side of I-5 and Pole 105 on I-5's southwest (southbound) side. SDG&E would be required to obtain an encroachment permit and road crossing approvals for the work and implement permit conditions, which may include special guard structure procedures, traffic control, and/or netting, as directed by Caltrans.

Conductor Removal

Following guard structure installation, SDG&E would coordinate with the California Independent System Operator to obtain all necessary line clearances prior to removing or installing conductors to ensure that the existing power lines can be taken out of service and that power could be redistributed to service centers and customers. SDG&E would coordinate line outages to maintain system reliability and construction personnel safety. Based on preliminary engineering, SDG&E does not anticipate any project-based interruption of service to customers during construction.

Conductor removal would begin with the installation of travelers or "rollers" on the bottom of each of the existing insulators using helicopters or aerial manlifts (i.e., bucket trucks). The travelers would allow the conductor to be pulled through each pole until the existing line is removed. After the installation of the travelers, the old conductor would be pulled onto the travelers from pole to pole using helicopters or aerial manlifts traveling along the ROW. Once in place, the old conductor would be attached to a steel cable, pulled through the travelers using conventional tractor-trailer pulling equipment located at the stringing sites, and stored on conductor reels. Placement of temporary anchors may be required in order to stabilize pulling equipment. Alternatively, helicopters may employ specialized equipment for work in areas with limited access. Figure 4-16 depicts the typical conductor stringing process.

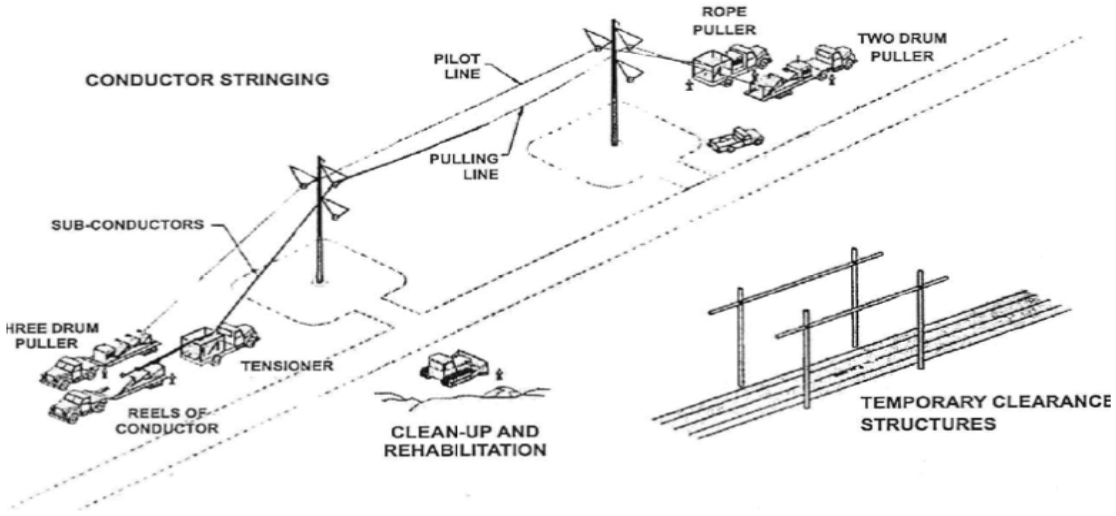

Figure 4-16 Typical Overhead Conductor Stringing Process
Source: SDG&E 2017

In some cases, sleeves or splices may be installed on power lines. This may occur in locations where the existing conductor has been repaired, was not long enough during installation, and was joined to another segment. In some instances, it may not be feasible to pull these splices through the travelers due to their size or integrity. In these instances, the spliced section may be lowered to the ground and the splice would be replaced. The replacement would involve removing the old splice, wrapping a repair sleeve around the outside of the conductor, and pressing it into place to protect the conductor.

Full-tension splices, or compression splices, would be used if conductors were too damaged for a repair sleeve. During full-tension splices, the two ends of the conductor would be connected with the use of heavy-duty vices. Alternatively, a small, engineered, implosive charge would be wrapped around a specially designed metallic sleeve, creating a controlled implosive compression that connects the two conductors.

Twenty-four designated stringing sites would be required in order to stage the required heavy equipment and collect the removed conductor onto reels for transport off site. Figure 4.2 depicts the locations of the proposed stringing sites. Each stringing site would require clearing approximately 0.1 acres of vegetation. As described previously, depending on topography, some incidental grading may be required at stringing sites to create level pads for equipment. In some locations (e.g., where short distribution spans would be transferred to the new poles or replaced), stringing would be done by hand. Hand-stringing would be conducted within the previously identified pole work areas.

4.7.2 Existing Facilities Removal/Modification

The proposed project would involve removal or topping of certain existing power line poles. Once conductor is removed, SDG&E would remove—or "top"—existing poles as described in below.

Wood Pole Removal

The Proponent's Environmental Assessment originally considered the use of a Hughes 500 or similar model helicopter to facilitate the removal of poles by air for a number of pole locations in sensitive areas (SDG&E 2017). This description includes two methods for removing existing poles. The first method entails the use of a single helicopter and crew; the alternate method would entail the use of two helicopters working in tandem at the same removal site. The applicant or its contractors would determine which of these methods to employ in the field based on a consideration of site and environmental conditions (e.g., weather, access, presence of environmental resources); pole integrity and availability of equipment at the time of the scheduled activity. Single craft pole removal would occur according to the following process.

The helicopter would approach the lagoon or cliff area and hover next to the pole designated for removal. A lineman, strapped in with feet on the helicopter skid, would lean out of the craft and unclip conductors from the insulators. The helicopter would descend to near ground level and drop a construction crew equipped with a chainsaw in the "helicopter drop zone" near the affected pole. Construction personnel would fell the pole as a single piece if feasible, though sometimes multiple cuts may be required. The helicopter would then hover over the drop zone personnel and lower a sling/collar. Construction personnel would attach the collar to the pole or pole segments, which would then be lifted to a safe altitude and flown out of the work area and back to a fly yard where poles would be collected and off-hauled for disposal.

Alternately, two helicopters could be used, in the following manner, to remove poles without the need to first fell them. This alternative entails the use of a Kaman K-MAX or similar model helicopter in conjunction with the Hughes 500 model to remove the poles. Because a Kaman K-MAX is a single occupancy helicopter, the previously identified Hughes 500 model would be used to assist in the process as described below.

A Hughes 500 (or similar) helicopter would hover next to the pole identified for removal, and a lineman, standing on the helicopter skid, would unclip the conductors from the insulators. The same helicopter would drop construction personnel equipped with a chainsaw in the helicopter drop zone near adjacent the pole. The construction crewmember would climb the pole and await the other helicopter to approach with a collar/sling that would be lowered to the crewmember. The crewmember would attach the lifting sling to the pole and lower herself down and off the pole. The K-MAX helicopter, attached to the pole with the collar, would lift and hover above the pole until the connecting line is taught. Construction personnel would then use the chainsaw to cut the pole near its base, and the helicopter, with the entire cut section attached, would lift to a safe altitude and transport the pole (segment) out of and away from the worksite, back to the fly yard, where poles would be collected and later off-hauled for disposal.

Where complete pole removal is not practical (e.g., if the pole cannot be removed from the ground or doing so could affect sensitive plant or aquatic species), poles would be cut into one or more sections to a depth of 6 to 24 inches below grade. The pole's base would be abandoned in place and the void backfilled and compacted with native soil. In some locations, the poles may be cut off near ground level to avoid impacts to sensitive resources or private property. All associated anchors and stub poles would be removed. Old poles, associated hardware, and any other debris generated from project activities would be removed from project sites and recycled or disposed of properly at an approved facility.

Pole Topping

As described previously, power line poles that contain a distribution circuit in the under-build position would be topped approximately 1 foot above the distribution circuit. Pole-topping work would begin with the removal of the existing hardware, as described previously. A crewmember would then climb each pole and cut it approximately 1 foot above the distribution infrastructure. Wood poles would be cut with a chain saw and steel poles with a mechanical saw, and a new top cover plate would be welded to the top of the pole. Pole-tops would then be removed and transported to an approved facility for recycling or disposal. Boom/bucket trucks would be used for pole topping in areas that can be accessed by ground-based vehicles traveling on existing developed areas, paved roads, or access roads. Helicopters would be used where vehicular access is not available.

4.7.3 Underground Power Line Construction

The typical underground power line construction process is described in the subsections that follow and is depicted in Figure 4-17.

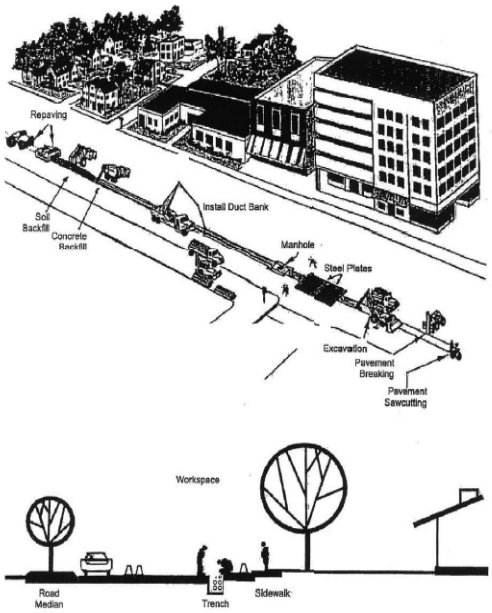

Figure 4-17 Typical Underground Construction Process within Roadways
Source: SDG&E 2017

Trenching

SDG&E would conduct exploratory excavations (i.e., potholing) to verify locations of existing facilities marked out in the field prior to excavation. SDG&E would use open-cut trenching techniques to install duct banks. Figures 4-7 and 4-12 illustrate the typical duct banks. Typical trench dimensions for the installation of a duct bank are 6 to 9 feet deep and 24 to 30 inches wide, depending on the circuit voltage class. The excavation may expand in width to accommodate a flat configuration, if required. Depth may also vary depending on soil stability and the presence of existing facilities. The trench would be widened and shored where necessary to meet California Occupational Safety and Health Administration safety requirements.

Concrete saw-cutting slurry produced during trenching would be cleaned from the street and not allowed to reach the curb or storm drain inlet. If trench water were encountered, trenches would be dewatered using a portable pump and disposed of in accordance with acquired permits.

Trenching operations would be staged in intervals so that only approximately 300 to 500 feet of trench would be left open at any one time or as allowed by permit requirements. This would generate 200 to 333 cubic yards of excavated material per day. At any ~~one~~ time, open trench length would not exceed that required to facilitate the installation of the duct banks. Steel plating would cover open trenches, where appropriate, to maintain vehicular and pedestrian traffic across areas that are not under active construction. Traffic controls would also be implemented to direct local traffic safely around work areas, as stipulated by required individual encroachment permits. SDG&E would coordinate provisions for

emergency vehicle and local access with local jurisdictions, as necessary, as discussed further in Section 5.16, "Transportation and Traffic."

Throughout trench excavation, asphalt, concrete, and excavated materials would be transported off site for disposal. All non-hazardous materials would be transported to a landfill. Should hazardous materials be found, SDG&E would transport these materials to an appropriately permitted and approved disposal facility. Excavated materials would be tested and may be used as backfill if the material is deemed geotechnical suitable. Testing is not required if the soil is used as backfill for the trench where it was excavated. In the locations where existing concrete would be removed to facilitate trenching activities, concrete saws and other pavement-breaking machines would be used. If equipment is unable to access required removal areas, jackhammers would be used on an as-needed basis to break up concrete.

Should contaminated soil be encountered during trenching activities, SDG&E would sample in place, test, profile, and transport this material to an appropriately permitted disposal facility in accordance with all federal, state, and local laws and regulations. The number of truck trips to transport excavated materials to storage yards and/or disposal facilities would vary based on the rate of the trenching, the area excavated to install the vaults, and the proximity of the storage yards/disposal facilities to the ROW. It is anticipated that approximately 15 to 20 truck trips per day would be required during trenching activities at one site. Other miscellaneous equipment may include a concrete saw, backhoe, excavator, roller compactor, water truck, various paving equipment, and standard 1-ton pickup trucks.

Duct Bank Installation

As each section of the trench for the underground duct banks is completed, cable conduits (separated by spacers) would be installed and concrete would be poured around the conduits to form the duct bank encasement. Ducts would typically consist of 5- to 6-inch-diameter PVC conduits, which would house the electrical cables, and 4-inch-diameter PVC conduits for the telecommunications cable used for system protection and communication. Duct banks would be approximately 3 feet wide by 3 feet high, and they would be located in the trench at a minimum depth of 3 feet from top of the encasement to the surface.

Once PVC conduits are installed and encased, engineered backfill or excavated native soil would be imported, placed, and compacted. Each duct bank would have a minimum of 36 inches of cover. A road base backfill or slurry concrete cap would be installed to restore the road in compliance with local requirements. As discussed previously, all non-hazardous soil and grub material that is transported off site may be disposed of at Miramar Landfill, Sycamore Landfill, or Otay Landfill, and material found to contain hazardous substances would be disposed of at an approved facility. While the completed trench sections are being restored, additional trench would be opened farther down the alignment. This process would continue until the entire duct bank is in place.

Where the duct banks cross or run parallel to other substructures that operate at normal soil temperature (e.g., gas lines, telephone lines, and water mains), a minimum radial clearance of 12 to 24 inches would be required. Where the duct banks cross or run parallel to other substructures with operating temperatures that significantly exceed the earth's temperature (e.g., other underground transmission circuits, primary distribution cables, steam lines, and heated oil lines), an increased radial clearance may be required. Clearances and depths would meet requirements set forth in Rule 33.4 of CPUC G.O. 128.

Vault/Hand Hole Installation

To facilitate the pulling and splicing of the underground cables, vaults would be installed in line with the 69-kV duct banks, and hand holes would be installed in line with the 12-kV duct banks. During operation, these structures would provide access to the underground cables for maintenance inspections, repairs, and replacement, if needed. During the trenching, trenches would be widened at underground vault and hand hole locations. The pre-formed, steel-reinforced, pre-cast concrete splice vaults and hand holes would be delivered to the work site on flatbed trucks and would be lowered into place using cranes, then connected to the underground duct banks before being covered with the appropriate level of compacted fill. The surface above the vaults and hand holes would be repaved or restored as appropriate.

Cable Pulling, Splicing, and Termination

After installation of conduit and splicing vaults, cables would be installed in the duct banks. Each cable segment would be pulled into the duct bank, spliced at each of the vaults/hand holes along the route, and terminated at a transition area. To pull the cable through the ducts, a cable reel would be placed at one end of the section and a pulling rig at the other end. A large rope would then be pulled into the duct using a fish line, and attached to the cable pulling eyes. The cable pulling eyes would then be attached to the conductor, and the cable pulled through the duct. A lubricant would be applied to the cable as it enters the duct to decrease friction during pulling.

Electric cables would be pulled through the individual ducts at the rate of approximately two to three segments between vaults/hand holes per day. A splice trailer would be positioned adjacent to the vault/ hand hole openings to facilitate cable splicing after the cables are pulled through the ducts. Each splice would require approximately three working days to complete.

4.7.4 Circuit Breaker Removal and Replacement

While the actual number and type of equipment and vehicles required for the proposed circuit breaker removal and replacement would vary depending on the construction activities occurring each day, the common types anticipated for the work are presented in Table 4-4. It is anticipated that a forklift would be used to remove the existing circuit breaker and place the new breaker into position. The forklift would operate within the fenced portion of the substation during replacement work. Nighttime work is not anticipated during this phase of the proposed project. Anticipated work hours would be consistent with the remainder of the proposed project and, unless dictated otherwise by permit conditions, would comply with applicable local noise ordinances regarding nighttime noise levels

The circuit breaker and associated hardware would be removed from the substation site and then taken to an existing SDG&E yard. If possible, parts would be separated to serve as emergency replacement parts for other equipment currently in service. The remaining parts would be brought to a local contracted middle scrap company for disposal. SDG&E's best management practices would be implemented as applicable during this process.

~~4.7.4~~ 4.7.5 Cleanup and Post-Construction Restoration

Removed wood poles would be re-used, recycled, or disposed of at an approved facility. Non-reusable treated wood would be disposed of in a composite-lined portion of a municipal solid waste landfill

approved by the Regional Water Quality Control Board. In San Diego County, the Otay Landfill is currently the only composite-lined landfill that would accept utility poles and treated wood. This facility is located approximately 35 miles south of the project vicinity in the city of Chula Vista.

SDG&E would restore all areas that are temporarily disturbed by project activities (e.g., stringing sites, pole work areas, and staging areas) to near pre-construction conditions and as consistent with fire break requirements. Restoration could include reseeding; planting replacement vegetation; restoring removed curbs, gutters, and sidewalks; repaving all removed or damaged paved surfaces; or replacing structures (e.g., fences), as appropriate. In addition, all construction materials and debris would be removed from the project work areas and recycled or properly disposed of off-site. SDG&E would conduct a final survey to ensure that cleanup activities are successfully completed as required.

4.8 Construction Schedule

SDG&E anticipates project construction to be complete within 12 months, beginning in 2019 with below-grade construction at the Del Mar Substation. The new pole and underground duct bank installation for TL674A is anticipated to occur within approximately four months. Once TL674A is reconfigured, SDG&E would begin work on removal of TL666D. It is anticipated that C510 and C738 would be relocated in parallel with the proposed TL674A Reconfiguration. The circuit breaker replacement process would be initiated after the TL674A Reconfiguration is complete. As a result, it would overlap with the TL666D Removal, C510 Conversion, and C738 Conversion. Construction work is anticipated to occur during normal work hours from Monday through Saturday pending jurisdictional requirements. A detailed construction schedule is included in Table 4-8.

Table 4-8 Construction Schedule by Activity, Duration and Project Component

Project Component, Activity	Duration (months)	Number of Crew
TL674A Reconfiguration		
Duct Bank and Vault Installation	4.0	20
Foundation Installation	3.5	7
Underground Cable Installation	2.0	13
Pole Installation	2.0	5
Reconfigure Tap	0.25	8
Component Duration	4 months (approx.)	
TL666D Removal		
General Construction	N/A	N/A
Conductor Removal	1.0	12
Pole Removal	1.5	5
Component Duration	2 months (approx.)	
C510 Conversion		
Duct Bank and Hand Hole Installation	1.0	12
Foundation Installation	1.5	5
Pole Installation and Removal	N/A	N/A
Conductor, Cable Installation and Removal	1.0	12
Component Duration	3.5 months (approx.)	
C738 Conversion		
Duct Bank and Hand Hole Installation	1.0	20
Foundation Installation	1.0	5
Pole Installation and Removal	1.0	5
Conductor, Cable Installation and Removal	1.0	12

Table 4-8 Construction Schedule by Activity, Duration and Project Component

Project Component, Activity	Duration (months)	Number of Crew
Circuit Breaker Removal and Replacement		
Below-grade construction (circuit breaker removal, foundation system, conduit from TL673)	1.75	N/A
Above-grade construction (circuit breaker installation)	2.0	N/A
Component Duration	4 months (approx.)	

Key:
N/A = not applicable

4.9 Operation and Maintenance

As part of the TL674A reconfiguration, SDG&E proposes to install approximately 1.1 miles of new underground duct bank and two new 69-kV poles. SDG&E currently operates and maintains TL610 and TL667, which are installed parallel to the proposed underground duct banks within Via De La Valle. In addition, two new 69-kV poles would be installed within an established power line corridor, meaning that any O&M activities that would be necessary to service the proposed project are represented by those already conducted on overhead and underground 69-kV power lines in the area. The TL666D removal would eliminate all future O&M activities associated with this line. SDG&E would maintain and operate poles topped to allow for existing overhead distribution conductors to operate in the same manner as under existing conditions (prior to implementation of the proposed project).

Conversion of C510 would eliminate the O&M requirements associated with approximately 3,900 feet of existing overhead distribution line. The riser poles that would be installed adjacent to existing poles would be removed and avoid new O&M requirements in these locations. The approximately 3,600 feet of new underground duct bank that would operate in areas where SDG&E services other existing distribution facilities would not represent a net new source of electrical energy or increase in energy capacity.

Following completion of the proposed project, SDG&E would establish service to the new and converted lines. Thereafter, SDG&E would inspect, maintain, and repair power lines as necessary and in accordance with established practice and state law as required. O&M activities would involve both routine preventive maintenance and emergency procedures to maintain service continuity. SDG&E would perform aerial and ground inspections of proposed project facilities; aboveground components would be inspected annually (at a minimum) for corrosion, equipment misalignment, loose fittings, and other common mechanical problems.

4.10 Project Design Features and Ordinary Construction Restrictions

SDG&E would incorporate a number of project design features and ordinary construction restrictions into all phases of the proposed project as applicable, and include actions and activities to:

- Control and suppress fugitive dust during construction work (see Section 5.3, “Air Quality”);
- Secure bulk materials during transport to and from staging areas (see Section 5.3, “Air Quality”);

- Minimize emissions from vehicles during loading and unloading and exhaust from heavy machinery used in construction activities to avoid emissions peaks (see Section 5.3, "Air Quality");
- Reduce volatile organic compounds (VOCs) by using low- and non-VOC-containing coatings, sealants, adhesives, solvents, asphalt, and architectural coatings (see Section 5.3, "Air Quality");
- Train, identify, alert, and, if necessary, stop work if monitoring construction activities results in identification of archeological or cultural artifacts that may be discovered during excavation and other soils-moving activities (see Section 5.5, "Cultural Resources"); and
- Work within established and permitted hours of construction to ensure that construction-related noise conforms to local noise standards and to address the possibility that the applicant would seek to either work beyond the times of day normally allowed for construction, or temporarily relocate sensitive receptors exposed to noise levels above thresholds stipulated and conditioned by relevant local noise ordinances and permit conditions (see Section 5.12, "Noise").

The relevant project design features and related requirements to address the proposed project's air quality, transportation, hazardous materials, cultural resources, and construction noise effects are discussed in the sections noted above.

4.11 Applicant Proposed Measures

SDG&E included applicant-proposed measures (APMs) in its June 2017 PEA, as listed in Table 4-9, Applicant Proposed Measures (SDG&E 2017). SDG&E proposes to implement APMs as part of project construction or operation as applicable, as a way to reduce or avoid environmental impacts.

Table 4-9 Applicant Proposed Measures

Topic and Measure	Description
Biological Resources	
APM BIO-01	During the appropriate phenological (i.e., blooming) periods, pre-construction surveys for special-status plants (specifically, federally listed, state-listed, and California Rare Plant Rank 1 and 2 plants) would be conducted within one year prior to the start of construction in areas that have the potential for special-status plants to occur. A hand-held Global Positioning System unit with submeter accuracy would be used to record the locations of special-status plant occurrences. Prior to construction, any occurrences of special-status plants that SDG&E determines to be avoidable will be marked with fencing or flagging, for avoidance during construction activities. Where disturbance to these areas cannot be avoided, SDG&E would restore temporarily impacted areas, as described in APM-BIO-05.
APM BIO-02	Biological monitors would be present during all activities within special-status species habitat and sensitive natural communities. The biological monitors would conduct a pre-construction clearance survey of the work area and would verify that activities comply with the Project APMs and SDG&E's Subregional NCCP Operational Protocols.
APM BIO-03	To minimize the spread of noxious and invasive weeds during construction, SDG&E would ensure that construction vehicles arrive to work sites clean and weed-free prior to entering the ROW in cross-country areas, ensure straw wattles (non-plastic) used to contain storm water runoff are weed-free, and document the extent of noxious weeds within the construction areas prior to construction. Noxious weeds are defined as species rated as High on the California Invasive Plant Inventory Database, published by the California Integrated Pest Council.

Table 4-9 Applicant Proposed Measures

Topic and Measure	Description
APM BIO-04	Impacts to oak trees, Torrey pines, and other native trees will be avoided and/or minimized to the extent possible during construction. In the event that any native trees are required to be removed, SDG&E will comply with all applicable City of San Diego and/or City of Del Mar requirements for tree preservation and mitigation.
APM BIO-05	All areas disturbed as a result of construction activities will be re-contoured and restored to the original conditions to the extent feasible including using soil salvaging and special-status plant protections as described in SDG&E's Habitat Enhancement Measures. These areas will be allowed to revegetate naturally.
APM BIO-06	A Nesting Bird Management Plan will be prepared to outline procedures for minimizing impacts to nesting birds protected by the Migratory Bird Treaty Act during construction. The plan will address how to avoid direct or indirect impacts to nesting birds through various measures, including: • conducting pre-construction nesting bird surveys during specified breeding times within a certain distance of the construction areas; • establishing avoidance and minimization buffers for active nests based on species-specific noise tolerances; • describing construction activities that can occur within avoidance and minimization buffers; • implementing procedures for reducing buffers as appropriate; and • monitoring protocols to document compliance with the Nesting Bird Management Plan, including daily nesting bird reports, during construction. The Nesting Bird Management Plan will be implemented during construction for all potentially affected bird species.
APM BIO-07	If a special-status wildlife species is identified on site during construction, crews will temporarily stop work in the immediate vicinity of the animal and immediately contact the biological monitor or designated SDG&E representative. Work will not proceed until the animal has moved out of harm's way on its own or has been relocated by a qualified biologist.
APM BIO-08	Nighttime construction lighting in suitable habitat for special-status wildlife and nesting birds will be minimized to the extent feasible. Exterior lighting within and adjacent to potential special-status wildlife habitats will utilize the lowest illumination allowed for human safety and will be selectively placed, shielded, and directed away from suitable special-status species habitat, to the maximum extent practicable.
APM BIO-09	Prior to construction, a habitat survey for potential bat roosts that may be impacted by construction activities will be conducted. During the survey, potential roost sites will be searched for signs of bat use, such as urine streaking, grease marks and droppings, moth wings, and dead bats. Up to two weeks prior to construction, a qualified biologist will conduct bat surveys at roost sites identified as potentially active from signs of bat use identified during the survey. If bats are detected, SDG&E will avoid conducting construction activities that may directly impact the active roost site. If an active maternal roost is identified, no construction will occur within 200 feet of the maternal roost during the pupping season (typically April 1 through August 31).
APM BIO-10	To the maximum extent feasible, construction vehicles and equipment will be refueled, maintained, and repaired at least 100 feet away from a wetland or water feature. If refueling, maintaining, or repairing equipment and vehicles in or within close proximity to wetlands is unavoidable, appropriate secondary spill containment will be used to prevent spills in sensitive habitats.

Table 4-9 Applicant Proposed Measures

Topic and Measure	Description
Geology and Soils	
APM GEO-1	SDG&E will consider the recommendations and findings of a final geotechnical investigation and the contractor's Geotechnical Engineer regarding the potential for seismic activity, landslides, expansive soils, slope instability and differential settling. SDG&E will incorporate those recommendations, as appropriate, into the final design of the proposed project. The final proposed project design will be reviewed and approved by a Professional Engineer registered in the State of California prior to construction.
Public Services	
APM PS-01	No less than 60 days prior to beginning construction, SDG&E will coordinate with schools (or the appropriate school district) that are located within 250 feet of proposed project activities. These schools include the following: • Therapeutic Learning Center • Del Mar Hills Elementary School • Del Mar Hills Nursery School • Brighter Future Preschool and Child Development Center • Del Mar Heights Elementary School SDG&E and the schools (or school district) will determine the best time to conduct construction activities that have the potential to impact schools in an effort to avoid major school events and to minimize any disruption to learning. Where feasible, SDG&E will conduct construction activities outside of the scheduled school year, during seasonal breaks, outside of peak drop-off and pick-up hours for the standard school day, at night, or during weekends to reduce potential impacts to local schools.
Recreation	
APM REC-01	SDG&E will post signage at access points to recreational facilities that may be subject to access restrictions due to the proposed project no less than four weeks prior to the beginning of construction activities within or adjacent to the facilities. These facilities will include Torrey Pines State Natural Reserve, Torrey Pines State Beach, Del Mar Horsepark, and Sorrento Valley Pedestrian/Multi-Use Path. This signage will notify users of the impending construction activities; construction impacts (e.g., increased noise and dust); the affected locations; and the estimated duration of any necessary temporary closures or access restrictions. Contact information for the proposed project's public liaison will be provided on the signage, and the public liaison will address any complaints related to dust, noise, and access restrictions.
APM REC-02 (Revised by SDG&E in response to Data Request 01 by the CPUC [SDG&E 2017c])	Authorities for recreational facilities that may be subject to access restrictions (i.e., the California Department of Parks and Recreation and the City of San Diego) will be directly contacted and given advance notice of proposed project activities no less than ~~four~~ eight weeks prior to construction. SDG&E will also coordinate with the 22nd District Agricultural Association that manages and operates the Del Mar Horsepark at least ~~four~~ eight weeks prior to construction to minimize potential impacts to the facility and its users during construction.
Transportation	
APM TRA-01	At least 30 days prior to construction of the proposed project, SDG&E will coordinate with the Del Mar Fire Department and the San Diego County Sherriff's Department to inform them of the planned lane closures along Jimmy Durante Boulevard and to minimize potential disruptions to emergency vehicle response times.

Table 4-9 Applicant Proposed Measures

Topic and Measure	Description
APM TRA-02	At least 30 days prior to construction, SDG&E will coordinate with the North County Transit District on the planned construction activities, including the timing and duration of construction in the vicinity of existing bus stops along Via De La Valle. This coordination will include the identification of potential temporary relocation of bus stops in order to maintain service during construction. At least 10 days prior to the bus stop closure, SDG&E will post signs near any affected bus stops to notify bus riders of any potential modifications the standard bus schedule, alternate stops in the area, and a phone number to call to obtain more information.

Source: SDG&E 2017.

4.12 Electric and Magnetic Fields Summary

Background

On January 15, 1991, the CPUC initiated an investigation to consider its role in mitigating the health effects, if any, of electric and magnetic fields (EMF) from utility facilities and power lines. A working group of interested parties, called the California EMF Consensus Group, was created by the CPUC to advise it on this issue. It consisted of 17 stakeholders representing citizens groups, consumer groups, environmental groups, state agencies, unions, and utilities. The Consensus Group was charged to 1) consider a balanced set of facts and concerns; 2) define near-term research objectives; and 3) develop interim policies and procedures to guide the electric utilities in educating their customers, reducing electric and magnetic fields, and responding to potential health concerns. The Consensus Group's fact-finding process was open to the public, and its report incorporated concerns expressed by the public. Its recommendations were filed with the CPUC in March of 1992. In August of 2004, the CPUC opened an Order Instituting Rulemaking to update the CPUC's policies and procedures related to electric and magnetic fields emanating from regulated utility facilities. The final decision was issued in 2006 (D.06-01-042).

Magnetic Fields Design Guidelines

The California Public Utilities Commission (CPUC) requires SDG&E to apply its *EMF Design Guidelines for Electrical Facilities* ("Guidelines") to all new and upgraded electric power and transmission projects to reduce public exposure to magnetic fields. SDG&E filed its Guidelines with the CPUC in accordance with CPUC Decision 93-11-013 and updated them in accordance with the 2006 CPUC Decision 06-01-042.

Consistent with SDG&E's Guidelines and with the CPUC order, magnetic fields and possible magnetic field management measures were evaluated along the power line locations associated with the proposed project. Moreover, reducing the magnetic field strength is but one of many factors to be considered in planning and designing a transmission system, along with other issues such as safety, environmental concerns, reliability, insulation and electrical clearance requirements, aesthetics, cost, operations and maintenance.

The scope of magnetic field analysis conducted by the applicant does not include the distribution lines, per SDG&E's Guidelines, which state: "For distribution facilities, utilities would apply no-cost and low-cost measures by integrating reduction measures into construction and design standards, rather than

evaluating no-cost and low-cost measures for each project." Thus, for purposes of this description, the term "Project" includes only the 69-kV lines TL666D, TL674A and TL6973.

Magnetic Fields Management Methodology

In Decision 06-01-042, the CPUC noted "Utility modeling methodology is intended to compare differences between alternative EMF mitigation measures and not determine actual EMF amounts."[2] The CPUC also noted that "modeling indicates relative differences in magnetic field reductions between different transmission line construction methods but does not measure actual environmental magnetic fields." In accordance with its Guidelines, SDG&E considered the following measures for the proposed project:

- Apply its EMF Guidelines to the proposed project design.
- Identify and implement appropriate "no-cost" measures, i.e., those that will not increase overall project costs but will reduce the magnetic field levels.
- Identify and implement appropriate "low-cost" measures, i.e., those measures costing in the range of 4 percent of the total budgeted project cost that will reduce the magnetic field levels by 15 percent or more at the edge of the right-of-way (ROW).
- When a sufficiency of "low-cost" measures is available to reduce magnetic field levels, such that it is difficult to stay within the 4 percent cost guideline, apply these "low-cost" measures by priority of adjacent land uses.

The 15 percent minimum reduction required for low-cost measures is in addition to any field reduction due to "no-cost" measures. It is not cumulative. Since the proposed project requires permitting under General Order 131-D, a Detailed Field Management Plan (FMP) was developed by SDG&E. The FMP consists of a project description, a checklist table showing evaluation of magnetic field reduction measures adopted or rejected, and a summary with recommendations.

For EMF modeling purposes, the areas where power lines are being removed where not modeled since removing the lines drastically reduces EMF fields in the surrounding areas. The segment that was modeled was the new underground 69-kV powerline running parallel to Via de la Valle (TL6973).

Checklist Magnetic Field Management Plan for the Del Mar Substation

Generally, magnetic field values along the substation perimeter are low compared to the substation interior because of the distance to the energized equipment. Normally, the highest values of magnetic fields around the perimeter of a substation are caused by overhead power lines and underground duct banks entering and leaving the substation, and not by substation equipment. Therefore, the magnetic field reduction measures generally applicable to a substation project are as follows:

- Site selection for a new substation;

[2] CPUC Decision D.06-01-042, Finding of Fact 14, p. 20

- Setback of substation structures and major substation equipment (such as bus, transformers, and underground cable duct banks, etc.) from perimeter;
- Field reduction for transmission lines entering and exiting the substation

The Substation Checklist used by SDG&E evaluated the no-cost and low-cost measures considered for the substation project, the measures adopted, and reasons that certain measures were not adopted.

No-cost and low-cost steps to reduce EMF

In response to a situation of scientific uncertainty and public concern, the CPUC felt it appropriate for utilities to take no-cost and low-cost measures where feasible to reduce exposure from new or upgraded utility facilities. It directs that no-cost mitigation measures be undertaken, and that low-cost options be implemented through the project certification process. Four percent of total project budgeted cost is the benchmark in developing EMF mitigation guidelines, and mitigation measures should achieve some noticeable reductions. The CPUC will continue to monitor these issues. If new information develops in the future, the CPUC may amend its decision to reflect new scientific evidence.

Exemption Criteria

The CPUC agreed that "Utility management should have reasonable latitude to deviate and modify their guidelines as conditions warrant and as new EMF information is received. However, if the EMF guidelines are to be truly used as guidelines, the utilities should incorporate criteria which justify exempting specific types of projects from the guidelines." Utilities may use the following guidelines to determine those specific types of projects that will be exempt from no/low cost field reduction:

1. Operation, repair, maintenance replacement or minor alteration of existing structures: facilities or equipment.
2. Restoration or rehabilitation of deteriorated or damaged structures, facilities or equipment to meet current standards of public safety.
3. Addition of safety devices.
4. Replacement or reconstruction of existing structures and facilities on the same site and for the same purpose as the replaced structure or facility.
5. Emergency restoration projects.
6. Re-conductoring projects except when structures are reframed or reconfigured.
7. Projects located on land under the jurisdiction of the Forest Service, Bureau of Land Management or other governmental agency.
8. Privately owned tree farms.
9. Agricultural land within the Williamson Act.
10. Areas not suited to residential/commercial development. Such areas might include steep slopes, areas subject to flooding or areas without access to public facilities.

The intent of the exemption criteria is to exclude two types of projects. The first type of projects are those that either replace or make minor additions or modifications to existing facilities. This will include pole

replacements or relocations less than 2,000 feet in length. Those projects where more than 2,000 feet of line is relocated or reconstructed or where the circuit is reinsulated or reconfigured should be considered for low cost magnetic field management techniques. The second type projects are those located in undeveloped areas.

Magnetic Field Reduction Measures Considered for the Project

Per SDG&E's Guidelines, all portions of power lines within the scope of the proposed project were reviewed for suitable application of magnetic field reduction measures. Table 4-10 summarizes the measures considered for the proposed project.

Table 4-10 Magnetic Field Reduction Measures Adopted or Rejected

Component	Adjacent Land Use	Reduction Measure Considered	Measure Adopted? (Yes/No)	Estimated Cost to Adopt
TL6973	Commercial/industrial, limited residential	Phase circuits to reduce magnetic fields	No	No-Cost
	Reason(s) if not adopted: This single power line installation does not allow arrangement of phasing to achieve cancellation with the phasing of another line. Therefore, this option was rejected.			
TL6973	Commercial/industrial, limited residential	Locate power lines closer to center of the utility corridor to extent possible	No	No-Cost
	Reason(s) if not adopted: The preliminary design of the underground trench was developed to not conflict with the existing utilities along Via De La Valle. Therefore, this option was rejected.			
TL6973	Commercial/industrial, limited residential	Increase trench depth	No	Low-Cost
	Reason(s) if not adopted: The required increased depth to reach a 15% reduction would require a depth greater than 8 feet and would degrade the capacity, not allowing the needed 102 MVA rating.			

Key:
MVA = megavolt ampere

Utilities must use the following Guidelines in the application of no and low-cost steps to reduce magnetic field strengths:

1. Take low cost steps to reduce fields from new and upgraded facilities in accordance with CPUC decision D.06-01-042 on EMF.
2. No cost measures will be implemented when available and practical.
3. Mitigation measures should not compromise the reliability, operation, safety or maintenance of the system.
4. Total cost of mitigation measures should not exceed 4 percent of the total cost of the project.
5. Mitigation measures should have a noticeable reduction in the magnetic field level approximately 15 percent or more.

References

Digital Globe. 2016. Georeferenced Project Overview and Components on Aerographical Map for the TL674A Reconfiguration & TL666D Removal Project.

Esri. 2018. Georeferenced Project Location and Components on Aerographical Map for the TL674A Reconfiguration & TL666D Removal Project.

San Diego Gas & Electric (SDG&E). June 2017. Proponent's Environmental Assessment for the TL674A Reconfiguration & TL666D Removal Project.

San Diego Gas & Electric (SDG&E). 2018. Georeferenced Project Location and Components on Aerographical Map for the TL674A Reconfiguration & TL666D Removal Project.