CEQA ALTERNATIVES SCREENING REPORT

SAN DIEGO GAS & ELECTRIC COMPANY'S
SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT PROJECT

APPLICATION NO.: A.12-05-020
SCH NO.: 2013011011

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California Public Utilities Commission
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List of Abbreviations, Acronyms, and Technical Terminology

ACSR	Aluminum Conductor Steel Reinforced
ACSS	Aluminum Conductor Steel Supported
CAISO	California Independent System Operator
Camp Pendleton	U.S. Marine Corps Base Camp Pendleton
Category B event	Contingencies that involve the loss of a single element of a bulk electric system
Category C event	Contingencies that involve the loss of two or more elements of a bulk electric system
Category D event	Extreme contingencies (catastrophic failures) that involve the loss of two or more elements of a bulk electric system
CEC	California Energy Commission
CEQA	California Environmental Quality Act
Circuit 315	Distribution line (12 kV) from Capistrano Substation to the San Juan Hills High School and Rancho San Juan residential development area
CPCN	Certificate of Public Convenience and Necessity
CPUC	California Public Utilities Commission
E & E	Ecology and Environment, Inc.
EIR	Environmental Impact Report
FERC	Federal Energy Regulatory Commission
I-5	Interstate 5
kcmil	thousand circular mils (conductor diameter)
kV	kilovolt
MW	megawatts
MVA	megavolt ampere
MVAR	megavolt ampere reactive
NERC	North American Electric Reliability Corporation
N-1 contingency	Refers to a Category B event
N-1-1 contingency	A type of Category C event that ensues when a Category B event (N-1 contingency) is followed by a system adjustment and then a subsequent failure of a bulk electric system element prior to correcting the initial N-1 contingency
N-2 contingency	A type of Category C event that involves the simultaneous or nearly simultaneous loss of multiple elements of a bulk electric system
PEA	Proponent's Environmental Assessment

List of Abbreviations and Acronyms (cont.)

proposed project	South Orange County Reliability Enhancement Project
PVC	polyvinyl chloride
ROW	right-of-way
SCE	Southern California Edison
SDG&E	San Diego Gas and Electric
SOCRE project	South Orange County Reliability Enhancement Project
SOCRUP	South Orange County Reliability Upgrade Project
SONGS	San Onofre Nuclear Generating Station (retired in 2013)
STATCOM	static synchronous compensator
SR	State Route
TL13812	San Mateo–Talega 138-kV Transmission Line (now part of TL13846 as configured in 2013)
TL13816	Pico–Capistrano 138-kV Transmission Line
TL13831	Rancho Mission Viejo–Talega 138-kV Transmission Line
TL13833	Trabuco–Pico 138-kV Transmission Line (as reconfigured in 2013)
TL13835	Laguna Niguel–San Mateo–Talega 138-kV Transmission Line (as reconfigured in 2013)
TL13836	Pico–Talega 138-kV Transmission Line
TL13846	Pico—San Mateo –Talega 138-kV Transmission Line (as reconfigured in 2013)
TPL-002-0	NERC standard for system performance following the loss of a single bulk electric system element
TPL-003-0	NERC standard for system performance following the loss of two or more bulk electric system elements
TPL-004-0	NERC standard for system performance following extreme bulk electric system events
TRB	Transportation Research Board
USEIA	United States Energy Information Administration
VAR	volt-amperes reactive
WECC	Western Electricity Coordinating Council

Executive Summary

The California Public Utilities Commission (CPUC) is lead agency for review of San Diego Gas & Electric Company's (the applicant's or SDG&E's) proposed South Orange County Reliability Enhancement Project (SOCRE project or proposed project) pursuant to the California Environmental Quality Act (CEQA). Per the requirements of CEQA, the CPUC is preparing a Draft Environmental Impact Report (EIR) to assess the environmental impacts of the proposed project, which will include the comparison and analysis of alternatives to the project. This report presents the results of the CPUC's screening analysis of project alternatives.

Ten of the 12 project alternatives identified would fulfill three fundamental requirements established by CEQA for project alternatives to be analyzed in an EIR: the alternatives would meet most of the basic objectives of the proposed project; would be feasible; and would substantially lessen one or more potentially significant effects of the proposed project (CEQA Guidelines Section 15126.6(c)). Therefore, the CPUC will carry forward these ten alternatives for further analysis in the EIR. The No Project Alternative will also be evaluated in the EIR (CEQA Guidelines Section 15126.6(e)).

The following alternatives are evaluated in this report and are described in Chapter 3:

- Alternative A: No Project
- Alternative B1: Reconductor Laguna Niguel–Talega 138-kV Line
- Alternative B2: Use of Existing Transmission Lines (Additional Talega–Capistrano 138-kV Line)
- Alternative B3: Phased Construction of Alternatives B1 and B2
- Alternative B4: Rebuild South Orange County 138-kV System
- Alternative C1: SCE 230-kV Loop-in to Capistrano Substation
- Alternative C2: SCE 230-kV Loop-in to Capistrano Substation Routing Alternative
- Alternative D: SCE 230-kV Loop-in to Reduced-Footprint Substation at Landfill
- Alternative E: New 230-kV Talega–Capistrano Line Operated at 138 kV
- Alternative F: 230-kV Rancho Mission Viejo Substation
- Alternative G: New 138-kV San Luis Rey–San Mateo Line and San Luis Rey Substation Expansion
- Alternative H: New 230-kV Line from Escondido to Capistrano
- Alternative I: Other Substation Alternatives

Basic Objectives: CEQA requires that EIRs include a statement of objectives of the proposed project, and that the statement of objectives should include the underlying purpose of the project (CEQA Guidelines 15124). To determine whether an alternative would meet most of the basic objectives of the proposed project, the CPUC reviewed documentation published by the California Independent

System Operator (CAISO) and SDG&E's application and Proponent's Environmental Assessment (PEA) that describe the purpose of the proposed project. The CPUC also reviewed the applicant's electrical load forecast and power flow data applicable to the 10-year planning horizon (2014–2024). The underlying purpose of the proposed project is to increase the reliability of the applicant's South Orange County 138- kilovolt (kV) electrical system by reducing the risk of instances that could result in the loss of power to customers through the 10-year planning horizon. Each of the alternatives to be carried forward for further consideration in the EIR would achieve the project's underlying purpose.

Feasibility: To evaluate the feasibility of each alternative, the CPUC reviewed the applicant's PEA, conducted an independent engineering review, and met with the applicant (including a site visit held in 2010). Four of the alternatives described in this report were identified by the applicant in their PEA or in responses to requests made by the CPUC for further information about the proposed project. Each of the other alternatives identified by the CPUC were developed based on components of the proposed project, or on modified alternatives that originated from the PEA, with the exception of Alternative B2, which is based, in part, on information gathered during the 2010 site visit with the applicant. Each of the alternatives to be carried forward for further consideration in the EIR are potentially feasible from a technological, legal, and economic perspective pursuant to CEQA Guidelines Section 15126.6.

Significant Effects: Significant environmental effects that may result from construction and operation of the proposed project include, among others, impacts related to visual resources, air quality (including cumulative effects), biological resources, cultural resources, increased risk of wildland fire, transportation and traffic, and construction noise. Ten of the alternatives evaluated in this report and the No Project Alternative would each reduce one or more significant effect that may result from the proposed project.

Alternatives to New Transmission Facilities: California Public Utilities Code Section 1002.3 requires that the CPUC consider cost-effective alternatives to transmission facilities when evaluating project applications for a Certificate of Public Convenience and Necessity (CPCN). Alternatives A, B1, B2, and B3 would be cost-effective alternatives that meet Section 1002.3 requirements.

No Project Alternative and Environmentally Superior Alternative: Disturbance area is among the most basic considerations when evaluating the environmental effects of alternatives in comparison to the proposed project. The No Project Alternative (Alternative A in this report) typically results in less land disturbance and, in this respect, is often considered environmentally superior in comparison to a proposed project. However, when the Environmentally Superior Alternative is the No Project Alternative, an EIR must also identify an Environmentally Superior Alternative among the other alternatives (CEQA Guidelines Section 15126.6).

Alternatives B1, B2, and B3 would also disturb less land than proposed project. These alternatives would reconductor existing 138-kV lines or, to the extent feasible, make use of transmission lines that are currently not in use. Under Alternative B2, for example, a 138-kV line currently energized for use as a 12-kV distribution line would be repurposed to create a new 138-kV line from Talega Substation to Capistrano Substation. A replacement 12-kV distribution line would be installed as proposed by the applicant. This alternative may require three fewer miles of transmission line construction and may not require that Capistrano Substation be rebuilt.

Other alternatives evaluated in this report would also result in a smaller area of land disturbance than the proposed project, and have the potential to reduce a number of potentially significant effects of the proposed project. Alternatives B1, B2, B3, or one of the other seven alternatives to be carried forward for further analysis in the EIR could ultimately be selected as the Environmentally Superior Alternative at the conclusion of the CPUC's CEQA review process.

1 Introduction

San Diego Gas & Electric (the applicant or SDG&E) initially submitted a transmission project to address electrical system reliability issues in South Orange County to the California Independent System Operator (CAISO) in 2008. Over the course of several years, the project was refined and modified, and in 2011, the CAISO included the project in their adopted 2010–2011 Transmission Plan (CAISO 2011a), and in May 18, 2012, the applicant filed application A.12-05-020 with the CPUC for a CPCN to construct the South Orange County Reliability Enhancement Project (SOCRE project or proposed project). The CPUC is the lead agency for review of the proposed project pursuant to the California Environmental Quality Act (CEQA) and is preparing a Draft Environmental Impact Report (EIR) per the requirements of CEQA.

This report presents the results of the CPUC's process of selection and review of project alternatives to be included for analysis in the EIR. Project alternatives were identified by the applicant in their Proponent's Environmental Assessment (PEA), formulated by the CPUC, and proposed during public scoping for the EIR. The alternatives screening process identified and reviewed 12 potential alternatives to the proposed project and a No Project Alternative. This report:

- Presents a brief description of the proposed project and the project's objectives, and a summary of the review of the project by the CAISO and CPUC;
- Describes the approach and methods used for screening each alternative as required by CEQA;
- Describes and discusses the range of alternatives identified and evaluated; and
- Describes each alternative and the results of the screening evaluation (i.e., identifies the alternatives eliminated from further consideration or carried forward for full analysis in the EIR).

The proposed project would serve customers within SDG&E's South Orange County service area (Figure 1). The project would include a rebuilt 230/138/12-kV substation at the location of an existing 138/12-kV substation site in San Juan Capistrano, California, and the construction of a new double-circuit 230-kV transmission line from this substation to the applicant's 230/138/69-kV Talega Substation within an existing transmission line corridor. The proposed 230-kV transmission line would be approximately 7.8-miles long. The applicant estimates that construction would take approximately 64 months, which includes four months for restoration activities that would occur throughout construction. If approved and construction began in 2015, the proposed project could be operational in 2020.

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Figure 1

Project Vicinity and SDG&E South Orange County Service Area

South Orange County Reliability Enhancement Project

1.1 Proposed Project Overview and Background

This section describes the existing South Orange County electrical system (also referred to as the South Orange County 138-kV system) and provides an overview of the proposed project.

1.1.1 Existing and Proposed South Orange County 138-kV System

SDG&E is a public utility that provides energy service to 3.4 million consumers through 1.4 million electric meters and more than 830,000 natural gas meters in San Diego County and the southern portion of Orange County. All power that flows into SDG&E's South Orange County service area is transmitted through Talega Substation via three 230-kV transmission lines—Talega Substation is therefore described by SDG&E as the main source of power for South Orange County. The South Orange County 138-kV system includes seven 138/12-kV substations, each of which receives its power from Talega Substation, as shown in Figure 2. The proposed project would reconfigure the South Orange County 138-kV system such that both the rebuilt Capistrano Substation and modified Talega Substation would be capable of receiving power through 230-kV transmission lines, and either substation would be capable of providing power to the South Orange County 138-kV system during planned maintenance outages or emergency events that would cause operations at either substation to temporarily cease.

1.1.2 Project Components, Construction, and Operation

The applicant proposes to rebuild their 138/12-kV Capistrano Substation (in the City of San Juan Capistrano) as a 230/138/12-kV substation called San Juan Capistrano Substation. The applicant also proposes to construct a double-circuit 230-kV transmission line to connect the proposed San Juan Capistrano Substation to Talega Substation (in San Diego County, east of the City of San Clemente). The primary components of the proposed project (Figure 3) would include:

1. Rebuilding and upgrading the 138/12-kV 60 megavolt ampere (MVA)[1] air-insulated Capistrano Substation (2 acres) as a 230/138/12-kV 700 MVA gas-insulated substation (6.4 acres) called San Juan Capistrano Substation;[2]
2. Replacing a single-circuit 138-kV transmission line between the applicant's Capistrano and Talega substations with a new double-circuit 230-kV transmission line (approximately 7.8-miles long);
3. Relocating several transmission line segments (approximately 1.8 miles, total) adjacent to Talega and Capistrano substations to accommodate the proposed San Juan Capistrano Substation and new 230-kV line; and
4. Relocating a 12-kV distribution line[3] (approximately 6 miles long) and several distribution line segments into new and existing underground conduit[4] and overhead on new structures to provide power from the proposed San Juan Capistrano Substation to the San Juan Hills High School and Rancho San Juan residential development area and Prima Deschecha Landfill.

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[1] Substation capacity is typically expressed in terms of MVA for alternating current electrical systems.

[2] If needed in the future, space would be available at the proposed substation site for a total of three 230/138-kV 352 MVA transformers with a combined capacity of 1,050 MVA and four 138/12-kV 30 MVA transformers with a combined capacity of 120 MVA.

[3] According to CPUC General Order No. 131-D, *distribution lines* are electrical lines that operate at voltages below 50 kV (CPUC 1995).

[4] The term *conduit* refers to protective tubing through which electrical transmission and distribution cables and telecommunications cables are installed. PVC (polyvinyl chloride) conduit is typically used for power line installations.

Source: San Diego Gas and Electric Company

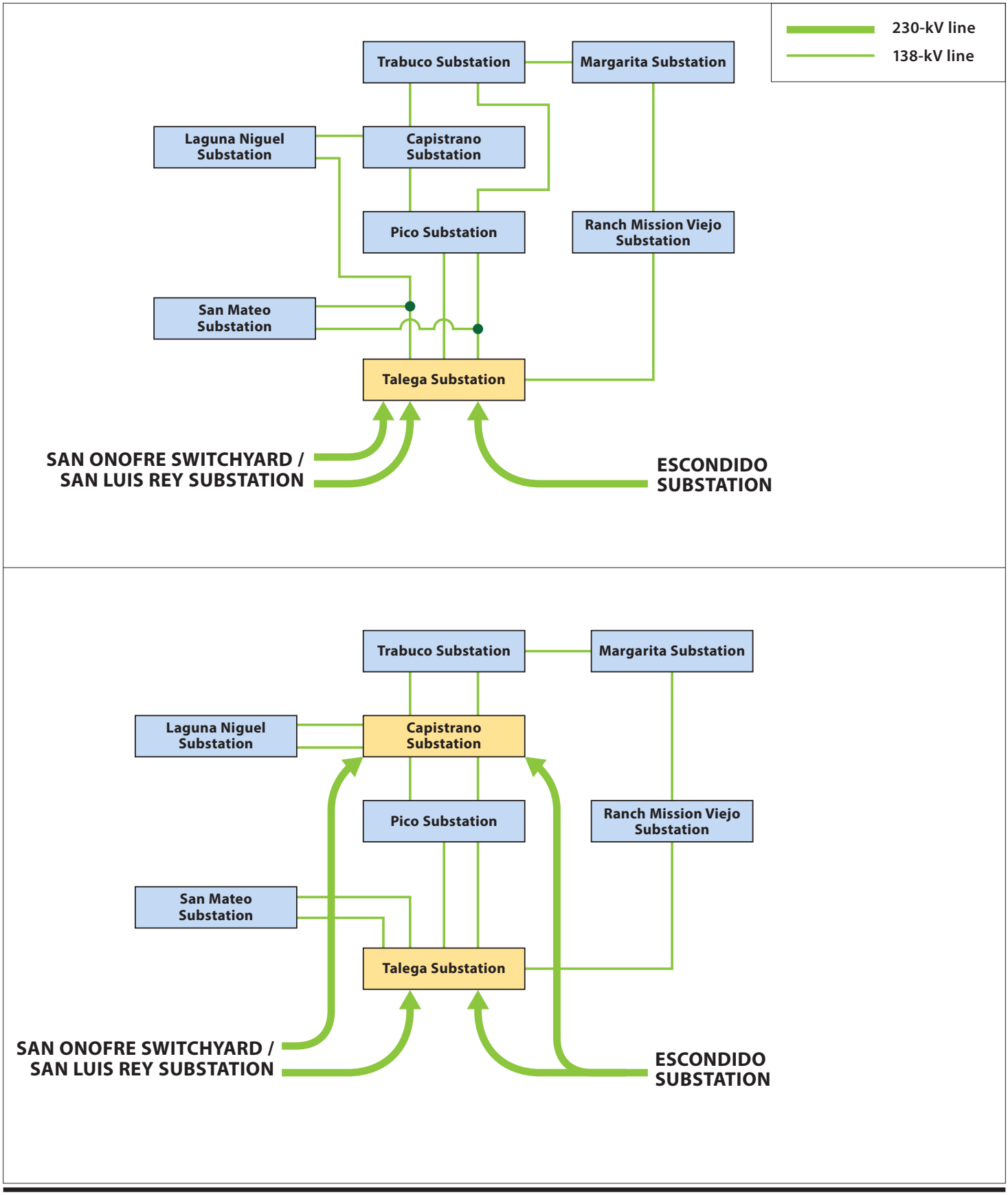

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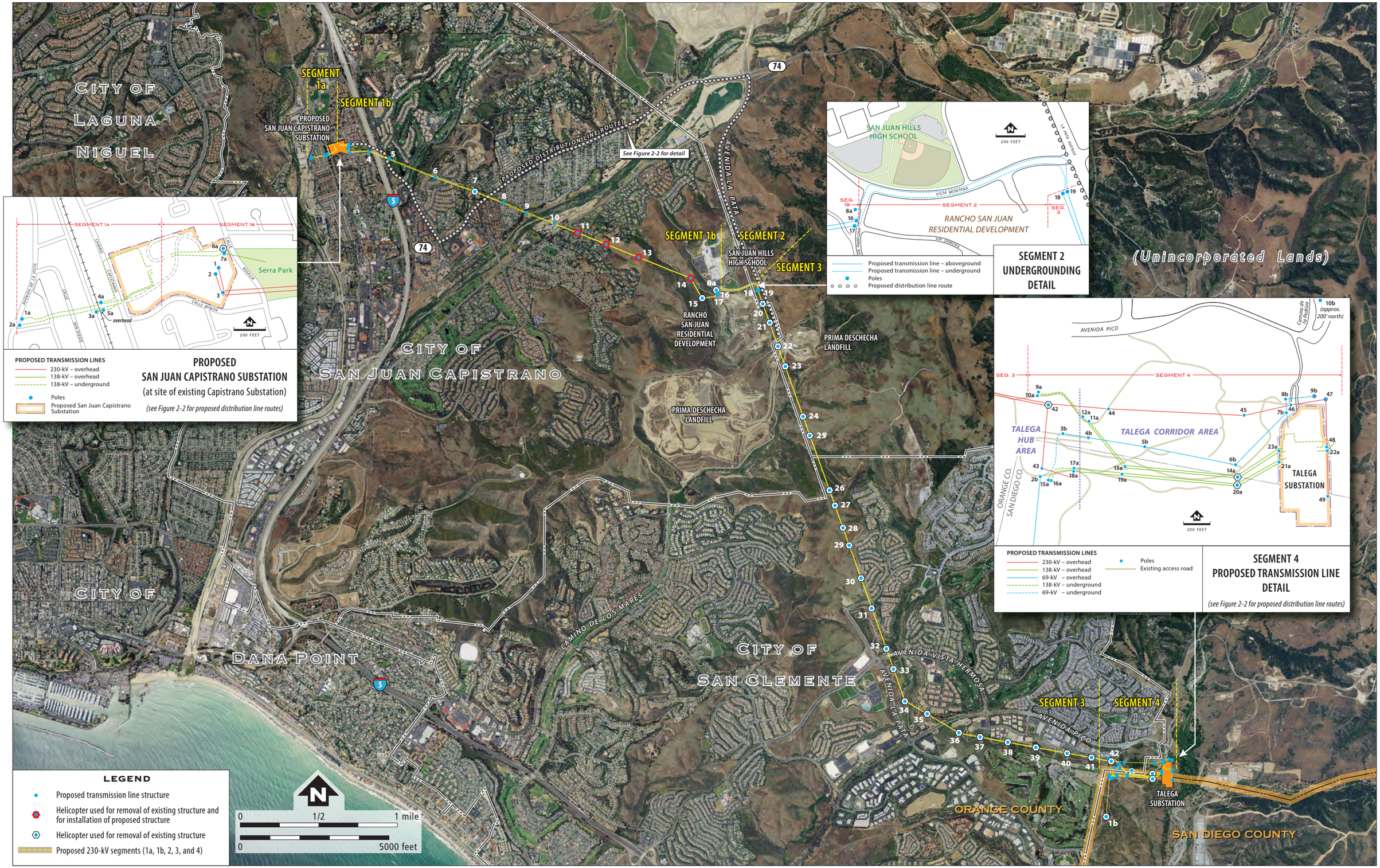
Figure 2

Existing and Proposed SDG&E South Orange County 138-kV System

South Orange County Reliability Enhancement Project



PROPOSED TRANSMISSION LINES
- 230-kV – overhead
- 138-kV – overhead
- 138-kV – underground
- Poles
- Proposed San Juan Capistrano Substation

PROPOSED SAN JUAN CAPISTRANO SUBSTATION
(at site of existing Capistrano Substation)
(see Figure 2-2 for proposed distribution line routes)

- Proposed transmission line – aboveground
- Proposed transmission line – underground
- Poles
- Proposed distribution line route

SEGMENT 2 UNDERGROUNDING DETAIL

PROPOSED TRANSMISSION LINES
- 230-kV – overhead
- 138-kV – overhead
- 69-kV – overhead
- 138-kV – underground
- 69-kV – underground
- Poles
- Existing access road

SEGMENT 4 PROPOSED TRANSMISSION LINE DETAIL
(see Figure 2-2 for proposed distribution line routes)

LEGEND
- Proposed transmission line structure
- Helicopter used for removal of existing structure and for installation of proposed structure
- Helicopter used for removal of existing structure
- Proposed 230-kV segments (1a, 1b, 2, 3, and 4)

0 1/2 1 mile
0 5000 feet

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Figure 3 **Components of the Proposed Project**
South Orange County Reliability Enhancement Project

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To construct the proposed project, approximately 142 transmission and distribution line structures would be removed (125 wood poles, 12 steel poles, and 5 steel lattice towers) and 120 steel structures (82 tubular steel poles and 38 steel distribution line poles) would be installed. Approximately 0.4 miles of the proposed 230-kV transmission line, 0.7 miles of the relocated transmission line segments, and 0.5 miles of the relocated distribution lines would be installed in new underground conduit (approximately 1.6 miles, total).

Figure 4 shows a view of the single-circuit 138-kV transmission line (TL13835) that would be replaced by the proposed double-circuit 230-kV line and provides a simulated view of the proposed 230-kV structures. The proposed transmission line work areas are organized along five route segments (Segments 1a, 1b, 2, 3, and 4) as shown in Figure 3. Figure 4 presents a view of a section of Segment 4 located a few miles northwest of Talega Substation near the intersection of Calle Saluda and Avenida La Pata.

Location of the Proposed Project Components

The components of the proposed project would be primarily located in the applicant's existing rights-of-way (ROWs) within the cities of San Juan Capistrano and San Clemente as well as unincorporated Orange and San Diego counties (Figure 3). A portion of the 138-kV transmission line that would be replaced by the proposed double-circuit 230-kV transmission line crosses Interstate 5 (I-5) east of the Capistrano Substation. The proposed route would continue within existing ROW southeast to the San Juan Hills High School and Rancho San Juan residential development area and then southeast through Prima Deschecha Landfill. From there, the transmission line would continue southeast through the City of San Clemente and unincorporated Orange and San Diego counties to the Talega Substation. Talega Substation is located within San Diego County on land owned by the United States Marine Corps within their Camp Pendleton base. The applicant operates the substation through a lease agreement.

Distribution circuit 315, the 12-kV distribution line that would be relocated as part of the proposed project would be routed from Capistrano Substation in the City of San Juan Capistrano to the San Juan Hills High School and Rancho San Juan residential development area and Prima Deschecha Landfill. It would extend east from Capistrano Substation across I-5; after crossing I-5, it would be installed as underground cable in existing conduit along a route extending south to State Route-74 (SR-74). At SR-74, the distribution line would connect to an existing underground line that would extend along the road to Avenida La Pata; extending south along Avenida La Pata, the distribution line would be installed in an overhead position to the San Juan Hills High School and Rancho San Juan residential development area and Prima Deschecha Landfill (Figure 3).

Rights-of-Way

Electrical lines between Capistrano Substation and Talega Substation are located within a transmission line corridor that includes multiple SDG&E and Southern California Edison (SCE) lines of various voltages. The applicant acquired the easement within the transmission corridor between Talega and Capistrano substations in the 1960s. Southern California Edison owns and operates 220-kV transmission lines within the transmission corridor. The average width of the applicant's easement within the corridor is 150 feet. The applicant owns the Capistrano Substation property and has easements for Talega Substation and the areas west of Talega Substation known as the Talega Hub and the Talega Corridor. The applicant would acquire new ROW for approximately 0.3 miles of the proposed transmission lines.

The applicant estimates that 0.1 acres of new ROW would be acquired south of the intersection of Vista Montana and Via Pamplona for installation of the proposed 230-kV transmission lines underground. The ROW would be acquired from the Woodbridge Homes company, the developer of

the Rancho San Juan residential area. Within the Talega Hub/Corridor area west of Talega Substation, 9.6 acres of new ROW would be acquired for installation of the proposed 230-kV transmission lines and 0.4 acres for the relocation of 138-kV and 69-kV transmission lines. The ROW would be acquired from the Talega Home Owners Association and the Transportation Corridor Agencies. In total, the applicant estimates that 10.1 acres of new ROW along 0.3 miles of the proposed transmission line would be acquired for the proposed project.

Existing Capistrano Substation and Proposed San Juan Capistrano Substation

The 138/12-kV Capistrano Substation is located on approximately 2 acres of a 6.4-acre site within an urbanized area in the City of San Juan Capistrano. The substation is *open-air insulated*—its switchgear is insulated by open space rather than being enclosed and insulated by sulfur hexafluoride gas. The substation site is bounded by residential property to the north and streets to the west, east and south (Camino Capistrano, Calle Santa Rosalia, and Calle Bonita, respectively). It is located approximately 700 feet west of I-5. Along the southeastern border of the site, a number of camper and recreational-use trailers and motorhome vehicles are stored within a parking/storage lot. Serra Park, a City of San Juan Capistrano park, is located east of the substation site across Calle Santa Rosalia.

The proposed San Juan Capistrano Substation, including access roads, fencing, and masonry wall, would require the development and use of the entire 6.4-acre site. The main components of the existing and proposed substations are presented in Table 1.

Table 1 Existing Capistrano Substation and Proposed San Juan Capistrano Substation Components

Capistrano Substation	San Juan Capistrano Substation
- 60 MVA electrical capacity - All open-air insulated switchgear - Three 138-kV transmission lines - Seven 12-kV distribution lines - Two 138/12-kV 30 MVA transformers - Capacitor banks - Concrete control shelter	- 700 MVA electrical capacity [1.] - Gas-insulated 230-kV and 138-kV switchgear - Two 230-kV transmission lines - Six 138-kV transmission lines - Seven 12-kV distribution lines - Two 230/138-kV 352 MVA transformers - Three 138/12-kV 30 MVA transformers - Capacitor banks - Two concrete control shelters - Two switchgear buildings with metal siding [2.]

Source: SDG&E 2012

Key: MW = megawatts, MVA = megavolt ampere

Notes:

1 If needed in the future, space would be available at the proposed substation site for a total of three 230/138-kV 352 MVA transformers with a combined capacity of 1,050 MVA and four 138/12-kV 30 MVA transformers with a combined capacity of 120 MVA.

2. The proposed gas-insulated switchgear would be housed in two buildings. One would be approximately 65-feet wide, 180-feet long, and 50-feet tall and the other would be approximately 85-feet wide, 150-feet long, and 45-feet tall.

Upper and Lower Yard Areas

The Capistrano Substation site has an upper yard area and lower yard area. The substation's existing facilities are located on approximately 2 acres of land on the upper yard. A concrete structure (approximately 5,200 square feet) is located on the lower yard. This building, built in 1918 and referred to in this report as the "former utility structure," was previously used for electrical utility purposes and is currently used by a leaseholder for storage. The difference in elevation between the upper and lower yard areas is approximately 47 feet.

Source: SDG&E, 2012

Existing view from Calle Saluda at Prima Desecha Trail looking northwest

Visual simulation of proposed 230-kV transmission line at proposed pole site No. 30

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Figure 4

Existing and Proposed Transmission Lines

South Orange County Reliability Enhancement Project

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For the proposed San Juan Capistrano Substation, new 138-kV facilities would be installed within the lower yard area. Once the new facilities are operational, the existing 138-kV facilities would be removed from the upper yard area, and the proposed 230-kV substation facilities would be constructed on the upper yard area and a section of the lower yard area.

Perimeter Masonry Wall and Fencing

The proposed substation would be partially enclosed by a 10-foot-tall masonry wall along the western, northern, and southern sides of the substation property, which would partially screen the substation facilities from view. Landscaping would also be installed to soften the visual appearance of the masonry wall. An 8-foot-tall chain link fence topped with two feet of barbed wire would be installed to replace the existing chain link fence located along the eastern boundary of the substation site. The chain links would have vinyl privacy slats woven between the links. A 6- to 8-foot-tall chain link fence without barbed wire would be installed along the northern side of the substation site adjacent to private residences. In these areas, the masonry wall would be set back a minimum of 10 feet from the property line to provide a landscaped buffer zone between the wall and residential properties.

The applicant hosted a two-hour meeting (a design charrette) with the local community and City of San Juan Capistrano officials at the San Juan Hills Golf Club on April 18, 2012 to identify an architectural design theme for the proposed San Juan Capistrano perimeter wall. The applicant is working with the City to finalize the proposed design.

Talega Substation

The applicant's 230/138/69-kV Talega Substation is located within San Diego County on Camp Pendleton on approximately 6.1 acres of land owned by the United States Marine Corps. Three 230-kV transmission lines, four 138-kV transmission lines, and one 69-kV transmission line connect to Talega Substation. The substation has five transformers: two 230/138-kV 392 MVA transformers, one 230/138-kV 168 MVA transformer, one 230/138-kV 150 MVA transformer; and one 138/69-kV 25 MVA transformer, as well as two 230-kV capacitor banks, one Static Synchronous Compensator (STATCOM),[5] and a concrete control shelter. The normal operating capacity of the substation is 1,100 MVA.

A number of 230-kV, 138-kV, and 69-kV transmission line structures within and in proximity to Talega Substation would be relocated and replaced to allow for installation of the proposed new double-circuit 230-kV line.

Transmission and Distribution Line Construction

The proposed 230-kV and 138-kV transmission line poles would be steel, range in height from 80 to 160 feet, and be 4-feet to 6-feet wide. The proposed 69-kV and 12-kV poles would be steel, range in height from 50 to 80 feet, and be 3-feet to 4-feet wide. The proposed steel poles would be delivered in two or more sections to each structure installation site by flatbed truck or helicopter. The proposed double-circuit poles would have six cross arms (three on each side) that would support three conductors (electrical wires) on each side of the pole. Each set of three conductors creates a single alternating-current circuit. After assembly on site, a large crane or helicopter would be used to lift and install each pole section into place on the anchor bolts embedded in the concrete foundation or

[5] A STATCOM is a regulating device used to optimize the power transfer capability of alternating current transmission systems. Reactive power (volt-amperes reactive or VARs) is regulated in AC transmission systems to maintain required voltage levels. STATCOMs are one option for regulating reactive power. Talega Substation has a STATCOM rated for 100 megavolt-amperes reactive power, which may be referred to as 100 Mega VARs or 100 MVARs. It is connected to SDG&E's 138-kV system.

directly into the ground if direct buried. After installation, trucks would be used to access the structures for modifications as needed.

Prior to stringing conductor on the new structures, the applicant would install temporary, wood, H-frame guard structures at each side of roadway crossings near the curb, railway crossings, and other locations where the new conductor could come in contact with existing electrical and communication facilities, vehicles, or pedestrians should the conductor accidentally fall during stringing operations. Guard structures would also be installed at each side of waterway crossings.

In some cases, the applicant may use flaggers to stop traffic temporarily while overhead line is installed at road crossings, and not install guard structures. Typically, guard structures are used for installing overhead conductor across large roadways, sensitive waterways, and utility corridors. Traffic control is typically used for small roadway crossings. For very large roadway crossings, such as freeways, both guard structures and traffic control are typically used.

Transmission-Line Stringing (Wire Stringing)

Wire stringing operations begin with the installation of travelers (rollers) on the transmission line structures using helicopters or bucket trucks. The rollers allow conductor to be pulled through structure cross arms. Following installation of the rollers, a sock line (a small cable used to pull the conductor) is pulled onto the rollers from structure to structure using helicopters or bucket trucks. Once the sock line is in place, it is attached to the conductor and used to pull (or string) the conductor into place on the rollers using pulling equipment. It generally takes about 5 hours to pull three conductor cables (one complete circuit) through one side of the double-circuit structures along a typical segment (up to 12,000-foot section) of a transmission line route. Helicopters would be used for transmission-line stringing depending on proximity to residences, site accessibility, and safety considerations. Helicopters would not be used for distribution-line stringing.

Underground Installations

Where underground conduit would be installed, the majority of the conduit would be placed using open-cut trenching techniques. Single-circuit transmission line trenches would generally be 7-feet deep and 3-feet wide, and trenches for double-circuit installations would generally be 8-feet deep and 3-feet wide. Trench depth could vary somewhat depending on soil stability and the presence of existing substructures. A jack-and-bore underground construction method would be used to install new underground conduit beneath Camino Capistrano and under the railroad tracks west of the proposed San Juan Capistrano Substation. The jack-and-bore method pushes a steel casing laterally through the soil, removing excess soil with a rotating auger. After conduit installation is complete, conductor would be pulled through.

Removal of Existing Structures

Existing transmission line poles and components (e.g., cross arms and insulators) would be dismantled by crane or helicopter and hauled away by truck. After the poles have been removed, concrete foundations (where present) would be jack hammered to below grade and debris would be removed. Where the pole is direct buried and no foundation is present, the poles would be completely removed. If a pole cannot be pulled from the ground, it would be cut into sections from the top down to a point located 6 to 12 inches below the surface. If necessary, poles may be cut at or slightly above ground level to avoid impacts to sensitive resources. The remaining hole would be backfilled with clean fill soil or ground materials similar to those in the immediate area of the hole, and the site would be restored.

The applicant would remove conductor using methods similar to those used during the conductor installation process but reversed. Old conductor would be wound onto wooden spools. Old poles,

associated hardware, conductor, and debris would be removed from the site using flatbed trucks, and would be recycled or disposed in accordance with all applicable laws and regulations.

Operation and Maintenance

The applicant does not anticipate that operations and maintenance activities, including the routine inspection, maintenance, and repair of its transmission, distribution, and telecommunications lines and substations, would increase in intensity, frequency, or duration because the proposed project would be constructed within the applicant's existing substation sites and transmission and distribution line corridors.

The proposed San Juan Capistrano Substation and upgraded Talega Substation would be unstaffed. No new staff would be required for operation and maintenance of the proposed San Juan Capistrano Substation, proposed modifications at Talega Substation, or proposed transmission lines and 12-kV distribution lines.

1.2 CAISO and CPUC Review of the Proposed Project

The CAISO manages the flow of electricity across the high-voltage, long-distance power lines that make up 80 percent of California's and a small part of Nevada's bulk-electric power grid. Transmission projects that would connect to the bulk-electric power grid managed by the CAISO are proposed by investor-owned utilities such as SDG&E for inclusion in the CAISO's annual transmission planning process. If a project is approved by the CAISO, the applicant then submits the project for subsequent review and approval by the CPUC, if CPUC approval is required. CPUC approval is required for the proposed project because it meets the requirements specified in General Order 131-D for a CPCN (CPUC 1995). CAISO review and approval of the proposed project and subsequent review by the CPUC pursuant to CEQA are summarized in this section. The following transmission planning terms are applied in this section and subsequent sections of this report:

- *Load shedding* refers to the deliberate disconnection of electric current from specific lines. Load shedding (specifically, involuntary load shedding, where a utility such as SDG&E drops customer load without customer permission or notification) is used to maintain reliability when there is a system emergency, such as an unplanned outage of a transmission line or transformer, which forces operators to take action to reduce power flows. Load shedding is used sparingly by transmission system operators to prevent damage to equipment and to remain in compliance with regulatory requirements. It should not be confused with "dispatch-able demand" or "demand side management" that calls upon customers to reduce power consumption and the customers, in return, receive compensation (SDG&E 2012). Where load shedding occurs or is planned for in compliance with all applicable transmission planning standards, it is commonly referred to as *non-consequential load shedding*, which indicates it is allowable without regulatory approval.
- *Category B events* are contingencies that involve the loss of a single generation or transmission element, such as a substation transformer or a single circuit of an existing transmission line, of a bulk electric system (e.g., the electrical grid managed by the CAISO). This type of event is often referred to as an *N-1 contingency* by transmission planners. Load shedding is not allowed after Category B events (NERC 2005a, 2007, SDG&E 2014a).
- *Category C events* are contingencies that involve the loss of two or more generation or transmission elements of a bulk electric system. The failure of two generation or transmission elements is often referred to as an *N-2 contingency* by transmission planners. Load shedding, when planned for and controlled in compliance with all applicable transmission planning standards, is allowable after Category C events (NERC 2005b, 2007, SDG&E 2014a).

- *Category D events* are extreme contingency events (catastrophic failures) that involve the loss of two or more bulk electric system elements, e.g., an entire substation (NERC 2005c, SDG&E 2014a)
- An *N-1-1 contingency* is a type of Category C event that ensues when a Category B (N-1) event is followed by a system adjustment (e.g., load shedding) and then a subsequent generation or transmission element failure event prior to correcting the initial N-1 contingency. For comparison, N-2 contingencies typically involve multiple failures that occur simultaneously or nearly simultaneously (rather than subsequently). Load shedding, in general, is allowable after a Category C, N-1-1 event depending on the amount of load to be shed and other system-specific factors (FERC 2013, NERC 2007, SDG&E 2014a).
- A *common mode failure* can be defined as the failure of multiple parts of a transmission system caused by a single fault, particularly a random fault due to environmental conditions (e.g., fire) or aging. The loss of a single tower that supports a double-circuit transmission line is an example of a common mode failure (and is also an example of an N-2 contingency). Within the South Orange County 138-kV system, a number of 138-kV lines share structures. One example is the double-circuit transmission line that supports both the Pico–Talega 138-kV Line (TL13836) and Pico–Talega–San Mateo 138-kV Line (TL13846).
- *Special Protection Systems* (also referred to as Remedial Action Schemes) are automatic protection systems designed to detect abnormal or predetermined system conditions (e.g., the outage of a specific transmission line segment) and implement corrective action to ensure that system reliability is maintained. Such action may include changes on the demand side, in power or reactive power generation, or in system configuration to maintain system stability, acceptable voltage, or power flows. Implementing Special Protection Systems instead of building new transmission facilities may be recommended because these systems can generally be implemented faster and for much a lower cost. As the number of Special Protection Systems in place increases, maintenance outages become more difficult to schedule, and it becomes difficult to assess the interdependency of these various protection schemes on system reliability (CAISO 2011a, NERC 2013a).
- *Peak electrical load* (or peak demand) generally refers to a single hour (or single 15-minute or half-hour period) that represents the period of highest customer consumption of electricity. On a daily basis, peak demand typically occurs about 5:30 p.m. when a high percentage of businesses and households demand electricity at the same time. On an annual basis, peak demand periods typically occur from June through September in South Orange County (Grigsby 2001, SDG&E 2012).

1.2.1 CAISO Transmission Planning and Approval of the Proposed Project (2008–2011)

The CAISO conducts its transmission planning process on an annual basis. During this process, the CAISO requests project proposals, performs technical studies and a transmission plan, and may request competitive proposals to sponsor transmission projects identified in the approved plan. Among the types of transmission projects identified in the plan are *reliability projects* and *policy-driven/economically-driven projects*. Policy-driven projects approved by the CAISO are those that the CAISO determines would be required to meet state policy and economic objectives. CAISO-approved reliability projects are those that CAISO technical studies show are needed to maintain compliance with North American Electric Reliability Corporation (NERC), Western Electricity Coordinating Council (WECC), and CAISO transmission planning standards or are otherwise found to address important reliability concerns (CAISO 2013a).

During a preliminary review of a conceptual version of the proposed project in 2008, the CAISO classified the proposed project as a reliability project. During its 2008 and 2009 review processes, the CAISO stated that the proposed project would require further review and would need CAISO Board approval because it would cost more than $50 million. The conceptual version of the proposed project described was referred to as the Orange County Long-Term Expansion Plan in 2008 and Capistrano–Talega Reliability Upgrade in 2009 (CAISO 2008, 2009).

In 2010, CAISO technical studies identified a potential Category B, N-1 event that would overload the Talega Tap–Laguna Niguel 138-kV Line (TL13835) with the loss of the Talega–Pico 138-kV Line (TL13836) that could occur within the 10-year planning horizon. The potential overload would require load shedding that would not be in compliance with NERC, WECC, or CAISO standards. The CAISO found that while conceptual versions of the proposed project would mitigate this potential contingency, it recommended a much less expensive mitigation that included implementation of a Special Protection System and reconductoring of the Talega–San Mateo 138-kV Line. The applicant proposed to reconductor TL13835 as an alternate mitigation,[6] but the CAISO found that this would cost substantially more than the Special Protection System and smaller 138-kV reconductoring project. The CAISO also noted that TL13835 could ultimately be upgraded as part of a larger conceptual version of the proposed project, if approved in the future (CAISO 2010).

The same potential Category B event was identified by the CAISO in 2011, but technical studies found that the overload would only be by 1 percent. The CAISO recommended further review of the potential Category B event in future planning cycles (CAISO 2011a). The CAISO did not identify this Category B event or other events with the potential to result in noncompliance with a mandatory NERC, WECC, or CAISO standards when reviewing the need for the proposed project (CAISO 2011a, CAISO 2014c). Category B events are discussed further in this report in Section 1.2.2 under the heading "Applicability of Transmission Planning Standards," and subheading, "NERC Standard TPL-002-0."

A number of potential Category C events (40 or more) that could impact TL13835 were also identified in CAISO's 2010 and 2011 studies, but the CAISO determined that load shedding could occur if needed and compliance with NERC, WECC, and CAISO standards would be maintained (CAISO 2010, 2011a).

In 2011, a version of the proposed project called the South Orange County Reliability Upgrade Project (SOCRUP) was formally proposed for CAISO review and approval and was classified as a reliability project. The CAISO worked with the applicant to develop alternatives to the SOCRUP project and ultimately approved SOCRUP Alternative 3 in 2011. SOCRUP Alternative 3 is largely the same as the proposed project described in this report.[7] The CAISO determined that SOCRUP Alternative 3 would provide similar reliability benefits to the SOCRUP but would be considerably less expensive. The CAISO estimated an in-service date of June 2015 for the proposed project (CAISO 2011a).

[6] "Mitigation" in this case is a specific terms used by the CAISO. This mitigation is similar to Alternative B1, which is described in Chapter 3 of this screening report.

[7] The PEA submitted to the CPUC in 2012 provides much more detail about the proposed project than documentation published by the CAISO about the SOCRUP and SOCRUP Alternative 3. The main transmission components of the proposed project evaluated in this report are assumed to be the same as those approved by the CAISO in 2011. Additional project components, such as the proposed 12-kV distribution line relocation, were not described in the CAISO documentation reviewed during the preparation of this screening report.

The CAISO determined that SOCRUP Alternative 3 was needed to ensure, by 2020, that 40 or more Category C events that could require load shedding on the applicant's 138-kV facilities in southern Orange County would be mitigated (CAISO 2011a, 2014b, 2014c). Some Special Protection Systems that addressed some of the identified Category C events were already in place in the system at the time of CAISO's evaluation. CAISO described the need for the project based on CAISO guidelines that recommend Special Protection Systems not be used to address more than six contingencies that could cause more than four elements to overload and because the large number of potential Category C events identified exceeds this amount (CAISO 2011a, 2011b).[8] The CAISO also determined that the project is needed because of reliability issues associated with supplying the entire South Orange County electrical system from a single 230-kV substation (Talega Substation).

The CAISO determined that the lack of a second 230-kV source to the South Orange County 138-kV system puts more load at risk than the Category C events identified. To improve the overall reliability of the entire South Orange County electrical system, the CAISO stated that it is important to bring another 230-kV source into the area. Given that it would bring another 230-kV source into the service area for approximately $364.8 million[9] and was estimated to be approximately $90 million less expensive than SOCRUP ($454.8 million), the CAISO concluded that SOCRUP Alternative 3 would be the most effective, feasible solution to meet the reliability needs of the southern Orange County area (CAISO 2011a).

1.2.2 CPUC Review of the Proposed Project and Potential Alternatives Pursuant to CEQA (2012–2014)

To refine the CEQA project objectives and adequately document the alternatives screening process, the CPUC reviewed data provided by the applicant, including power flow and load forecast data, as well as applicable transmission planning standards. The applicant applied to the CPUC for a CPCN to construct the proposed project in May 2012, and the CPUC began a review of the application for completeness, conducted site visits, and began its technical analysis. The CPUC's CEQA public process began in January 2013 with circulation of a Notice of Preparation of an Environmental Impact Report. In response to CPUC requests for further information about the proposed project and alternatives during the course of CEQA review, the applicant provided power flow and load forecast data. The applicant re-submitted revised power flow and related data that describe their electrical system to the CPUC several times between April 2013 and June 2014. The applicant updated the data to correct technical errors and to account for relatively small South Orange County 138-kV system reconfiguration and reconductoring projects that had been completed. For example, SDG&E tapped (connected) the Laguna Niguel–San Mateo 138-kV Line (TL13835) to Talega Substation; looped in the Talega–Trabuco 138-kV Line (TL13833) to Pico Substation; and connected the Talega–San Mateo 138-kV Line (TL13812) to Pico Substation by tapping TL13833, which created the new San Mateo–Pico–Talega 138-kV Line (TL13846). These and other transmission improvements completed by SDG&E through 2014 reduced the risk of some of the overload conditions identified by the CAISO in 2011 that could occur through the 10-year planning horizon (through 2024).

The CPUC's review of the applicant's power flow data and latest load forecast data (SDG&E 2014c) indicated that no Category B (N-1) events that could require load shedding would occur within the 10-year planning horizon. The CPUC verified that Category C events that could require load shedding could occur within the 10-year planning horizon but also that SDG&E would remain in compliance

[8] CAISO Planning Guideline ISO SPS6, which was adopted in June 2011, recommends, as a general guideline, that there should be no more than six local contingencies (single or credible double contingencies) that would trigger the operation of a Special Protection System and that the Special Protection System should not be monitoring more than four system elements or variables (CAISO 2011b, 2014b).

[9] In 2012, the applicant estimated that the proposed project would cost approximately $473.6 million (SDG&E 2012).

with mandatory NERC, WECC, and CAISO standards even if load shedding was required because of these events. Among the Category C events that could occur is a possible overload of the Talega Tap–Laguna Niguel 138-kV Line (TL13835) because of the loss of 138-kV lines between Pico and Capistrano substations (TL13816) and Pico and Trabuco substations (TL13833) (SDG&E 2012, 2014a).[10]

According to the latest load data provided to the CPUC, recorded peak load on the South Orange County 138-kV system has dropped each year since 2007. The existing 138-kV system is capable of handling 400 to 499 megawatts (MW) of power during normal conditions and 500 MW or more during temporary, peak load conditions. The rated capacity of the 138-kV system is approximately 580 MW. In 2013, the recorded peak load was 61 MW (approximately 13 percent) lower than in 2007 (Figure 5). In addition, the load forecast data that supported CAISO's approval of the proposed project in 2011 indicated that South Orange County electrical system loads could reach 523 MW by 2020 (CAISO 2011a). The applicant's May 2014 load forecast indicates that peak loads could reach 474 MW by 2020 (Table 2), which represents a 49 MW reduction in the load forecast (about 9 percent). The applicant's current power flow data do not indicate that system loads may exceed 500 MW until after 2024 (SDG&E 2014c) and loads might not reach 523 MW until 2029 assuming a steady growth rate of approximately 5.7 MW, or about 1 percent, per year (Table 2). The applicant's latest forecast assumes that continued development of the Rancho Mission Viejo residential complex could add more than 10,000 homes in the vicinity of Rancho Mission Viejo Substation during the next 10 to 20 years (San Juan Capistrano Patch 2013, SDG&E 2012, 2014a, 2014c).[11] The applicant does not forecast that any of the 138/12-kV substations within its South Orange County 138-kV system would exceed their operating capacity through 2024 (Table 3).

The CPUC's review of the proposed project, its objectives, and alternatives includes consideration of the NERC, WECC, and CAISO transmission planning standards that the applicant referenced when defining the need for the proposed project, as discussed in the following section. The objectives of the proposed project as defined by the CPUC for CEQA review purposes (see Section 1.3) are based, in part, on the following review of transmission planning standards.

Applicability of Transmission Planning Standards

Components of the applicant's South Orange County transmission system that connect to the regional electrical grid managed by the CAISO must be constructed and maintained in compliance with mandatory NERC, WECC, and CAISO standards.[12] In addition, the applicant designs its transmission systems in accordance with additional standards and guidelines established by NERC, WECC, and CAISO that are not mandatory but are recommended as industry best practices. To date, operation of

[10] According to the applicant's latest load forecast through 2024 for the South Orange County 138-kV system (Table 2), loads are no longer anticipated to increase such that the common mode failure scenarios previously identified would occur within the 10-year planning horizon.

[11] In response to a request for further information from the CPUC, the applicant indicated that from 2001 through 2013, the South Orange County 138-kV system load center migrated further east from Capistrano Substation in the direction of the Rancho Mission Viejo residential area and Rancho Mission Viejo Substation. The applicant's 2014 load forecast projects that the load center will continue to migrate further east from Capistrano Substation through 2024.

[12] As of June 18, 2007, the Federal Energy Regulatory Commission granted NERC the legal authority to enforce Reliability Standards with all users, owners, and operators of the bulk power system in the United States and made compliance with those standards mandatory and enforceable (NERC 2013b). WECC is one of the eight regional electric reliability councils under NERC. Both WECC and CAISO transmission planning standards are based on and in compliance with NERC transmission planning standards (CAISO 2011b, WECC 2003).

the applicant's South Orange County transmission system and planning for future system conditions has not violated NERC, WECC, or CAISO standards.

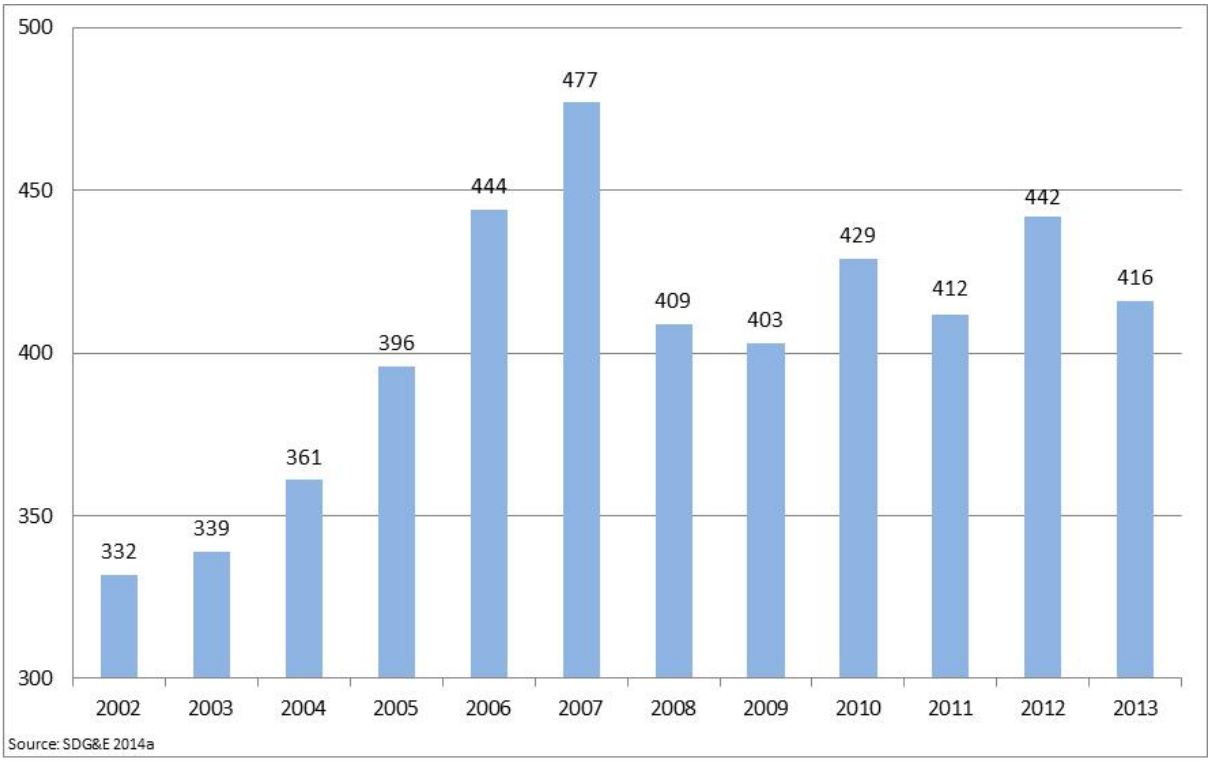

Figure 5 South Orange County 138-kV System Recorded Peak Load (2002–2013) in Megawatts

Table 2 South Orange County 138-kV System Forecast Peak Loads and Peak Loads by Substation for 2014 through 2024 in Megawatts

Substation	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Trabuco	87.5	87.9	88.3	88.8	89.2	89.6	90.0	90.5	90.9	91.3	91.7
Margarita	107.3	107.8	108.4	109.0	109.6	110.2	110.8	111.4	112.0	112.6	113.2
Rancho Mission Viejo	14.7	17.0	20.4	23.8	27.2	30.6	34.0	37.5	40.9	41.1	41.3
Pico	42.2	42.8	43.3	43.8	44.3	44.8	45.4	45.9	46.4	46.9	47.4
San Mateo	35.2	37.0	37.7	38.5	38.9	39.3	39.7	40.0	40.4	40.8	41.2
Laguna Niguel	96.9	96.5	97.0	97.5	98.0	98.4	98.8	99.2	99.6	100.0	100.4
Capistrano	52.0	52.5	53.1	53.6	54.1	54.6	55.2	55.7	56.2	56.7	57.2
Total [1]	435.8	441.5	448.2	455.0	461.3	467.5	473.9	480.2	486.4	489.4	492.4

Source: SDG&E 2014c

Note: [1.] The projections presented in this table are for non-coincident peak loads during a 1-in-10-year heat storm.

Table 3 South Orange County 138/12-kV Substation Peak Loads and Percent Capacity Forecasts for 2024

Substation	Substation Capacity	2024 Peak Load Forecast [1]	2024 Percent Capacity Forecast [1]
Trabuco	120 MW	91.7 MW	76.4%
Margarita	120 MW	113.2 MW	94.3%
Rancho Mission Viejo	60 MW	41.3 MW	68.8%
Pico	60 MW	47.4 MW	79.0%
San Mateo	44 MW	41.2 MW	93.6%
Laguna Niguel	120 MW	100.4 MW	83.7%
Capistrano	60 MW	57.2 MW	95.3%
Totals	584 MW	492.4 MW	84.0%

Source: SDG&E 2014c
Key: MW = megawatts
Note: [1] The projections presented in this table are for non-coincident peak loads during a 1-in-10-year heat storm.

The following NERC and CAISO standards were identified in the applicant's PEA or in responses to requests for further information from the CPUC: NERC standards TPL-002-0, TPL-003-0, and TPL-004-0, proposed revisions to CAISO's transmission planning standards, and common mode failure standards (CAISO 2014a, SDG&E 2012). This section discusses the applicability of these standards to the proposed project.

NERC Standard TPL-002-0

All components of the applicant's transmission system that connect to the larger electrical grid managed by the CAISO are required to perform as specified in NERC standard TPL-002-0 (NERC 2005a) in the event of a Category B (N-1) contingency (unplanned outage of a single generation or transmission element, e.g., the failure of a single transmission line or single transformer). The standard requires that the applicant design its transmission system such that if a Category B event occurs, electrical load is not shed, i.e., an unplanned blackout does not occur due to the applicant disconnecting transmission system components to avoid overloading and possibly damaging the transmission system. Unplanned load shedding under these circumstances would not be in compliance with NERC standard TPL-002-0.

The applicant's latest load forecast data (Table 2) and the CPUC's analysis of power flow data indicate that construction of the proposed project is not required to avoid Category B events that may require load shedding within the 10-year planning horizon. The CAISO's 2010 and 2011 transmission planning reviews resulted in similar findings: while affirming the need for the proposed project, the CAISO did not identify the potential for noncompliance with mandatory transmission planning standards as an issue (CAISO 2010, 2011a, CAISO 2014c). For these reasons, the ability of the proposed project or an alternative to ensure that the applicant's South Orange County 138-kV system remains in compliance with NERC standard TPL-002-0 does not serve as a useful criterion for the screening of alternatives presented in this report.

NERC Standards TPL-003-0 and TPL-004-0

NERC standard TPL-003-0 addresses transmission system performance following the unplanned outage of multiple transmission elements (Category C events), and TPL-004-0 addresses transmission system performance following an extreme outage event, such as the loss of an entire substation (Category D events) (NERC 2005b, 2005c). These types of contingencies are much less common than the loss of a single generation or transmission element (Category B events). Although some transmission planning components of these standards are mandatory (see TPL-003-0b and TPL-004-0a), the applicant is not required by NERC, WECC, or CAISO to design its transmission system to avoid load shedding during the types of outages addressed by NERC standards TPL-003-0 and TPL-004-0 (CAISO 2011a, NERC 2013c). Category C and D events identified by the applicant and during CAISO's review of the proposed project are important considerations (SDG&E 2012, 2014a, CAISO 2011a); however, construction of the proposed project is not necessary to ensure that the applicant's South Orange County 138-kV system remains in compliance with NERC standards TPL-003-0 and TPL-004-0. For this reason, compliance with NERC standards TPL-003-0 and TPL-004-0 does not serve as a useful criterion for the screening of alternatives presented in this report.

Proposed Revisions to CAISO Transmission Planning Standards

The applicant has indicated that the CAISO's recent draft proposal (also referred to as the straw proposal) for revisions to its transmission planning standards could require the applicant to avoid load shedding after Category C, N-1-1 contingencies starting in 2015. Some of the proposed changes would apply specifically to *High Density Urban Load Areas*, which are *Urbanized Areas* as defined by the United States Census Bureau that also have a population greater than one million persons (CAISO 2014a, 2014b).[13] According to this definition, it does not appear that the proposed High Density Urban Load Areas standards would apply to the proposed project area in southern Orange County. The proposed project area is within an Urbanized Area defined by the United States Census Bureau as Mission-Viejo-Lake Forest-San Clemente (No. 57709), which has a population of less than 600,000 people (CEC 2007, United States Census Bureau 2010a).

In addition to defining standards for High Density Urban Load Areas, the proposed changes to CAISO's standard for local area long-term planning include provisions for planning on a case-by-case basis for areas not located in High Density Urban Load Areas, such as the applicant's South Orange County service area (CAISO 2014b). The proposed revisions state that case-by-case assessments should take into consideration risk assessment of outages that would activate Special Protection Systems and consider such factors as shared rights-of-way, shared transmission structures and substations, history of fires, restoration time, coordination among parties required to operate pertinent parts of the transmission system, outage history for resources in the area, and other area-specific data (CAISO 2014a, 2014b).

At this time, and prior to adoption of the proposed revisions to CAISO's transmission planning standards, it is unclear to what extent the proposed revisions may be applicable to the proposed project. For the purposes of the CPUC's CEQA review, the proposed revisions to CAISO's transmission planning standards have not yet been adopted and are not considered applicable to the proposed project or alternatives presented in this report. Pursuant to CEQA Guidelines Section 15125, baseline conditions for CEQA review are typically established at the time of circulation of the Notice of Preparation of an EIR. The Notice of Preparation for the proposed project EIR was circulated in 2013. Should the revisions described in the CAISO's 2014 straw proposal be adopted prior to circulation of the Draft EIR, however, the CPUC may elect to reference the adopted revisions in the EIR.

[13] The United States Census Bureau defines Urbanized Areas as areas with 50,000 or more people (United States Census Bureau 2010b).

Regardless, the CPUC's review of the applicant's power flow and load forecast data indicates that the proposed project and each of the alternatives to be carried forward for further consideration in the EIR would ensure that the South Orange County 138-kV system remains in compliance through the 10-year planning horizon if the CAISO's revisions to the transmission planning standards, as currently proposed, are adopted. For these reasons, the ability of the proposed project or an alternative to ensure that the applicant's South Orange County 138-kV system remains in compliance with the proposed revisions to CAISO's transmission planning standards does not serve as a useful criterion for the screening of alternatives presented in this report.

Planning for Common Mode Failures

In order to further demonstrate a need for the proposed project, the applicant submitted several examples of potential common mode failures in the South Orange County service area to the CPUC for review. The two worst-case common mode failure outages identified by the applicant through the 10-year planning horizon were:

1. Scenario 1: Outage of the Pico–Capistrano 138-kV Line (TL13816) and Pico–Trabuco 138-kV Line (TL13833); and
2. Scenario 2: Outage of the Pico–Talega 138-kV Line (TL13836) and Pico–Talega–San Mateo 138-kV Line (TL13846).

If any of the example common mode failures were to occur, the applicant would be required to shed load to avoid overloading components of their transmission system. The CPUC's review of the applicant's TL13836/TL13846 common mode failure example found that the applicant would be required to shed load in this scenario until reinforcement or remedial action plans are implemented. Shedding load in this instance, however, would likely be allowable and in compliance with NERC, WECC, and CAISO standards for this type of common mode failure. Load shedding in response to events described in the other examples provided by the applicant would also be allowable and in compliance with the standards.

The applicant further indicated that it may not be possible to shed sufficient load quickly enough to protect the South Orange County 138-kV system and maintain compliance with mandatory planning standards for some of the example scenarios provided because of the way their system is currently configured. It is not within the scope of this report to define potential Special Protection Systems or system reconfiguration strategies to address this issue, but each of the alternatives to be carried forward for further consideration in the EIR other than the No Project Alternative would fully mitigate all or the majority of the scenarios identified. The precise number of common mode failure scenarios similar to those identified by the applicant that could still occur after implementation of each alternative remains unclear. However, neither the proposed project nor any of the alternatives would eliminate all possible scenarios that would require load shedding.

For these reasons and based on the latest load forecast data provided by the applicant (Tables 2 and 3), the ability of the proposed project or an alternative to ensure that the applicant's South Orange County 138-kV system remains in compliance with mandatory system performance requirements following a common mode failure does not serve as a useful criterion for comparing any of the alternatives to the proposed project.

1.3 Purpose and Objectives of the Proposed Project

The purpose of the proposed project is to increase reliability of the applicant's South Orange County 138-kV system by reducing the risk of instances that could result in the loss of power to customers through the 10-year planning horizon.

1.3.1 Objectives of the Proposed Project (Developed by the CPUC)

The objectives of the proposed project defined by the CPUC for CEQA review reflect the purpose of the proposed project as described in the PEA and applicant responses to CPUC requests for information (SDG&E 2012). The following three objectives were developed with consideration of the project objectives presented in the PEA (see Section 1.3.2, below) and the outcome of CAISO and CPUC reviews of the proposed project described in Section 1.2. The objectives, as defined by the CPUC, were used as a basis for the development of a reasonable range of alternatives as required by CEQA (see Section 2.2, below). The basic objectives of the proposed project are to:

1. Reduce the risk of instances that could result in the loss of power to customers served by the South Orange County 138-kV system through the 10-year planning horizon;
2. Replace inadequate equipment at Capistrano Substation; and
3. Redistribute power flow of the applicant's South Orange County 138-kV system such that operational flexibility is increased.

Reduce the Risk of Instances that Could Result in the Loss of Power to Customers through the 10-year Planning Horizon

This objective was developed with consideration of the applicant's Objectives I and IV as presented in the PEA (see Section 1.3.2). Loss of power to customers could result from the loss of a transmission line, transformer, power generation facility, or combination of multiple generation or transmission facilities. The loss of one or more generation or transmission facilities could be caused by weather, vehicle accident, or any of a number of natural or human-caused events. The loss of one or more facilities could also be caused by an overload event due to high customer demand. This objective combines elements of the applicant's Objectives I and IV because both objectives describe scenarios that could result in the loss of power to customers.

In drafting this objective, the CPUC first considered the risk of noncompliance with an adopted NERC, WECC, or CAISO transmission planning standard within the 10-year planning horizon. Reviews by both the CAISO and CPUC indicated that the applicant is not at risk for noncompliance with adopted NERC, WECC, or CAISO standards within the 10-year planning horizon (through 2024; see Section 1.2.1). The CPUC then considered other reliability concerns. The reliability issues identified by the CAISO are based on the relatively high number of potential Category C events that would require load shedding and a general concern about the single 230-kV source to the South Orange County 138-kV system (CAISO 2011a, 2014b, 2014c). For the purpose of CEQA review, the CPUC drafted a general objective to reduce instances that could result in the loss of power to customers through the 10-year planning horizon that included elements of the applicant's Objectives I and IV.

Replace Inadequate Equipment at Capistrano Substation

This objective was developed with consideration of the applicant's Objective II as presented in the PEA (see Section 1.3.2). The applicant's Capistrano Substation is approximately 60 years old. To help ensure reliability of electrical service in the San Juan Capistrano area, the applicant proposes to replace aging equipment at the Capistrano Substation and modernize the substation's structural design. The CPUC does not have sufficient data from the applicant to demonstrate which substation equipment is likely to fail within the 10-year planning horizon, and this objective more generally addresses the replacement of substation equipment that can be proven to be inadequate to support the proposed project or one of the project alternatives (if approved for construction).

The replacement of equipment (e.g., transformers) is expected to increase the electrical distribution capacity of Capistrano Substation as well as help ensure substation reliability. It would also allow for the connection of three additional 138-kV transmission lines to the substation.

Redistribute Power Flow of the Applicant's South Orange County 138-kV System Such that Operational Flexibility Is Increased

This objective was developed with consideration of the applicant's Objectives I and III as presented in the PEA (see Section 1.3.2). If a failure were to occur at Talega Substation, power flow could be interrupted to the applicant's South Orange County service area. Currently, Talega Substation is the only substation in South Orange County that is capable of stepping down 230-kV power to 138-kV power, which is required for each of the applicant's 138-kV substations to distribute power to customers in southern Orange County. With the installation of 230/138-kV transformers at Capistrano Substation (i.e., with construction of the proposed San Juan Capistrano Substation) and connection of a new double-circuit 230-kV transmission line, both Capistrano Substation and Talega Substation would be capable of providing power to the entire South Orange County 138-kV system during maintenance or emergency events or to relieve other operational issues with one of the substations. This would increase system reliability and operational flexibility. The connection of two 230-kV source lines to Capistrano Substation and resultant redistribution of power flow within the South Orange County's 138-kV system is illustrated by Figure 3.

1.3.2 Applicant's Stated Objectives

The applicant identified the following five objectives of the proposed project in the PEA:

I. Provide transmission system reliability;
   a. Reduce the risk of an uncontrolled outage of all South Orange County load;
   b. Reduce the risk of a controlled interruption of a portion of the South Orange County load;
   c. Comply with mandatory North American Electric Reliability Corporation, Western Electric Coordinating Council and California Independent System Operator transmission planning and operations standards;

II. Rebuild Capistrano Substation to replace aging equipment and increase capacity;

III. Improve transmission and distribution operating flexibility;

IV. Accommodate customer load growth in the South Orange County area; and

V. Locate proposed facilities within existing transmission corridors, SDG&E ROW, and utility owned property (SDG&E 2012).

Elements of applicant Objectives I through IV were integrated into the objectives of the proposed project defined by the CPUC for CEQA review purposes as described in Section 1.3.1. Applicant Objective V was not included in the CPUC's list of objectives. An objective to locate proposed facilities within existing transmission corridors, applicant ROW, and utility-owned property does not identify a specific need for the proposed project and is not applicable as a criterion for comparing the proposed project to alternatives.

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2 Overview of the Alternatives Screening Process

2.1 Alternatives Screening Methodology

Each of the potential alternatives to the proposed project identified by the CPUC for review was screened using the following three-step process:

Step 1: Clarify the description of the alternative to allow for comparative evaluation.

Step 2: Briefly evaluate the alternative by comparing it with the proposed project and the CEQA requirements for the evaluation of alternatives (Section 2.2, below).

Step 3: Determine the suitability of each alternative for full analysis in the EIR based on the results of Step 2. If the alternative is unsuitable, eliminate it from further consideration.

2.2 CEQA Requirements for the Consideration of Alternatives

An important aspect of EIR preparation is the identification and assessment of alternatives to the proposed project that have the potential to avoid or substantially lessen potentially significant effects. In addition to mandating consideration of the No Project Alternative, the CEQA Guidelines (Section 15126.6(e)) emphasize the selection of a reasonable range of feasible alternatives and adequate assessment, which allows decision makers to use a comparative analysis. CEQA Guidelines (Section 15126.6(a)) state:

> *An EIR shall describe a reasonable range of alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation.*

To comply with CEQA requirements for the evaluation of alternatives, each alternative identified was evaluated according to three criteria:

1. Would the alternative accomplish most of the basic project objectives?
2. Would the alternative be feasible (from a technological, economic, and legal perspective)?
3. Would the alternative avoid or substantially lessen any significant effects of the proposed project (including whether the alternative itself could create significant effects potentially greater than those of the proposed project)?

The CEQA Guidelines require the consideration of alternatives capable of eliminating or reducing significant environmental effects even though they may "impede to some degree the attainment of project objectives or would be more costly" (Section 15126.6(b)).

2.2.1 Consistency with the Objectives of the Proposed Project

A project's statement of objectives describes the underlying purpose of the project and the reasons for undertaking the project. The evaluation of the alternatives includes an assessment of each project alternative according to whether it fulfils the objectives.

2.2.2 Feasibility

According to the CEQA Guidelines (Section 15126.6(f)(1)), among the factors that may be taken into account when addressing the feasibility of alternatives include site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries, and proponent control over alternative sites in determining the range of alternatives to be evaluated in the EIR. For the screening analysis, the feasibility of potential alternatives was assessed using the following considerations:

- **Technological Feasibility.** Is the alternative feasible from a technical perspective, considering available technology? Are there any construction, operation, or maintenance constraints that cannot be overcome?
- **Legal Feasibility**. For example, do legal protections on lands preclude or substantially limit the feasibility of constructing high-voltage transmission lines and substations? Do regulatory restrictions substantially limit the feasibility of high-voltage transmission lines and substations? Is the alternative consistent with regulatory standards for transmission system design, operation, and maintenance?
- **Economic Feasibility.** Is the alternative so costly that its costs would prohibit its implementation?

2.2.3 Potential to Avoid or Lessen Significant Environmental Effects

CEQA requires that alternatives to a proposed project have the potential to avoid or substantially lessen one or more significant effects of the project (CEQA Guidelines Section 15126.6). Prior to development of the EIR, it is not possible to identify and evaluate all of the significant effects of the proposed project and alternatives with certainty, and it may not be possible to quantify each effect. For the purposes of alternatives screening, elements of the proposed project and alternatives that could cause a significant environmental effect are identified on a preliminary basis and discussed, to the extent possible, with regard to general conditions in the proposed project area. Table 4 presents a summary of the potentially significant effects of the proposed project. It does not include the detailed analysis that will be included in the EIR.

Table 4 Summary of Potentially Significant Effects of the Proposed Project

Resource Area	Potentially Significant Effects
Aesthetics (Visual Resources)	San Juan Capistrano Substation would present an appearance that would be very different from the current view of the site (primarily, the former utility structure). A wall would be constructed around most of the site, and the height of the buildings within the site would be greater than the current substation profile, affecting views from Camino Capistrano. The appearance of the proposed substation may conflict with community goals for the appearance and design of new structures.

Table 4 Summary of Potentially Significant Effects of the Proposed Project

Resource Area	Potentially Significant Effects
Air Quality	Temporary violations of thresholds for fugitive dust (particulate matter of 10 micrometers or less and 2.5 micrometers or less) may occur during construction of the proposed substation due to the use of heavy construction equipment, grading, travel on unpaved roads, and materials handling. Nitrogen dioxide emitted by heavy construction equipment may also exceed significance thresholds.
Biological Resources	Temporary and permanent effects on sensitive species habitat and designated reserve areas would likely result from construction and operation of the proposed transmission lines and distribution lines.
	Temporary and permanent effects on federally protected wetlands (e.g., Prima Deshecha Canada or its tributaries) as defined by Section 404 of the Clean Water Act could result from construction and operation activities along proposed Transmission Line Segment 3.
Cultural Resources	The project would result in the demolition of the former utility structure, a potential historic resource.
Hazards and Hazardous Materials (Risk of Wildland Fire)	Increased fire risk could occur on a temporary or permanent basis during construction or operation of the proposed project along Transmission Line Segments 3 and 4, the proposed overhead 12-kV distribution line route, and at Talega Substation, which are within or adjacent to Very High Fire Hazard Severity Zones.
Transportation and Traffic	Potentially significant effects on roadways that operate at substandard levels of service (e.g., Avenida Pico in proximity to Interstate 5 [I-5]) may occur due to construction trips associated with the proposed project and where the proposed 230-kV transmission line would be installed across I-5 and State Route 74 (SR-74).
	Vista Montana Road serves as the main entrance to San Juan Hills High School and the Rancho San Juan residential community. During peak periods, the four-lane roadway becomes highly congested. Installation of the proposed 230-kV transmission line underground within Vista Montana Road would require closure of two of the four lanes for approximately 8 months. This would result in a temporary but potentially significant effect with regard to level of service and emergency access.
Noise	Temporary effects on nearby sensitive receptors could result from construction equipment and activities, including helicopter use that would exceed local noise standards, substantially increase temporary ambient noise levels, and generate substantial groundborne vibrations during construction.
Growth Inducement	CEQA Guidelines Section 15126.2, "Consideration and Discussion of Significant Environmental Impacts," states in part (d) that projects that would remove obstacles to growth (such as a major expansion of a waste water treatment plant) might allow for more construction in service areas. The additional construction may, subsequently, tax existing community service facilities, requiring the construction of other new facilities that could cause significant environmental effects. Similarly, the proposed project would add a substantial amount of electrical capacity to the South Orange County 138-kV system. The amount of capacity added may not be required to accommodate demand forecast by the applicant through 2024 (SDG&E 2014c). The surplus electrical capacity may remove an obstacle for growth beyond forecast levels in the South Orange County service area and may, indirectly, induce growth.

Table 4 Summary of Potentially Significant Effects of the Proposed Project

Resource Area	Potentially Significant Effects
Cumulative Effects	Construction of the proposed project could result in a temporary, cumulatively considerable net increase in particulate matter and nitrogen dioxide emissions, and may result in effects on traffic. Known projects, the construction of which may overlap with construction of the proposed project (and which may contribute to a potentially significant air quality or traffic impact), include the following: • La Pata Avenue Gap Closure and Camino Del Rio Extension; • SR-241 Tesoro Extension (Oso Parkway to North of SR-74); and • SR-241 Extension in Full (Oso Parkway to I-5).

Sources: CALFIRE 2011, Orange County Public Works 2014, Orange County Transportation Authority 2013, SDG&E 2012, 2014c Transportation Corridor Agencies 2013a, 2013b

Key:

LOS F = Level of Service F. There are six LOSs with letter designations ranging from A to F. LOS A represents the best operating conditions from the traveler's perspective (i.e., free flow with little delay), and LOS F represents the worst conditions from the traveler's perspective (i.e., heavy congestion and long delays) (TRB 2010).

3 Alternative Descriptions and Screening Evaluation

This section describes each of the alternatives identified by the CPUC and explains why they were retained for further consideration in the EIR or eliminated. If the results of the screening analysis showed that a potential alternative would be unable to meet most of the project objectives, would be infeasible, or would not avoid or substantially lessen a potentially significant effect of the proposed project, it was eliminated from further consideration. Each alternative determined to meet the CEQA requirements for the evaluation of alternatives (Section 2.2, "CEQA Requirements for the Consideration of Alternatives") was retained for further consideration in the EIR. The following alternatives are evaluated in this report:

- Alternative A: No Project
- Alternative B1: Reconductor Laguna Niguel–Talega 138-kV Line
- Alternative B2: Use of Existing Transmission Lines (Additional Talega–Capistrano 138-kV Line)
- Alternative B3: Phased Construction of Alternatives B1 and B2
- Alternative B4: Rebuild South Orange County 138-kV System
- Alternative C1: SCE 230-kV Loop-in to Capistrano Substation
- Alternative C2: SCE 230-kV Loop-in to Capistrano Substation Routing Alternative
- Alternative D: SCE 230-kV Loop-in to Reduced-Footprint Substation at Landfill
- Alternative E: New 230-kV Talega–Capistrano Line Operated at 138 kV
- Alternative F: 230-kV Rancho Mission Viejo Substation
- Alternative G: New 138-kV San Luis Rey–San Mateo Line and San Luis Rey Substation Expansion
- Alternative H: New 230-kV Line from Escondido to Capistrano
- Alternative I: Other Substation Alternatives

Although not required by mandatory standards to mitigate the risk of load shedding after Category C events, the proposed project and each of the alternatives to be carried forward for further consideration in the EIR would ensure that load shedding is not required for the majority of the potential Category C events identified (Alternatives A through G). Construction of the proposed project, for example, would eliminate the risk of all but two of the Category C events that the applicant identified could require load shedding through 2024 (SDG&E 2012, 2014a).

CAISO's transmission plans published from 2008 through 2011 indicate that Special Protection Systems and 138-kV line reconductoring would likely be effective mitigation for a number of the Category C events identified by the applicant. Some reconductoring projects considered by the CAISO and included in the applicant's PEA (SDG&E 2012) as potential project alternatives are considered as components of some of the alternatives described in this report (see Alternatives B1, B3, and B4). The CAISO's additional reliability concerns regarding the single source of 230-kV power from Talega Substation that currently supplies the South Orange County 138-kV system are also addressed by several of the alternatives. The need for an additional 230-kV source is the basis of one of the project objectives defined by the CPUC (see Section 1.3.1). Alternatives to the proposed project described in this report would meet this objective by interconnecting with SCE 230-kV transmission facilities (Alternatives C1, C2, and D) or upgrading Rancho Mission Viejo Substation and connecting it to a new double-circuit 230-kV line from Talega Substation (Alternative F).

3.1 Alternatives to Transmission Facilities

Pursuant to California Public Utilities Code Section 1002.3, the CPUC must consider cost-effective alternatives to transmission facilities that meet the need for an efficient, reliable, and affordable supply of electricity. Alternatives A, B1, B2, and B3 discussed in this report are considered alternatives to transmission facilities pursuant to California Public Utilities Code Section 1002.3 because they include methods for meeting project objectives that would not require new transmission facilities that would operate at voltages equal to or greater than 200 kV and would incorporate energy conservation and efficiency improvement measures. Alternative A would not include the construction of new or upgraded transmission lines. Alternatives B1, B2, and B3 would reconductor existing 138-kV transmission lines or, to the extent feasible, make use of transmission lines that are currently not in use. It is anticipated that each of these alternatives could be constructed with minimal structure replacement but further data from the applicant are required to make this determination. Existing, unused transmission facilities and rights-of-way (ROWs) would be used under Alternative B2.

Alternatives A, B1, B2, and B3 include cost-effective demand-side alternatives, e.g., targeted energy efficiency, demand reduction measures (demand response and load management), and local generation, that may be implemented within the 10-year planning horizon. Local generation refers to small-scale, customer-level distributed generation resources within an electrical service area, e.g., rooftop solar photovoltaic (PV) generation on single-family homes. Alternatives to transmission facilities may include other types of distributed generation installations (e.g., rooftop solar PV generation on commercial facilities, combined heat and power units, and biomass facilities as well as small wind and other small-scale, often community-based facilities; CEC 2009) and larger-scale renewable and conventional generation facilities (e.g., solar fields and natural gas power plants).

3.2 Alternative A – No Project

Alternative A is identified as the No Project Alternative in this report. CEQA requires that a No Project Alternative be considered in EIRs (CEQA Guidelines Section 15126.6(e)). The No Project Alternative is the circumstance under which the proposed project does not proceed (CEQA Guidelines Section 15126.6(e)(3)(B)). The purpose of describing and analyzing a No Project Alternative is to allow decision-makers to compare the effects of approving the proposed project with the effects of not approving the proposed project.

The components of the No Project Alternative described in this report were defined by the CPUC with input from the applicant. Regardless of whether the proposed project is constructed, it is reasonably foreseeable that the following would occur prior to 2018 (SDG&E 2012, CAISO 2014d):

- Talega Substation's STATCOM would be replaced; and
- Between 2015 and the end of 2017, two new, dynamic synchronous condensers (approximately 700 MVARs at 230 kV)[14] would be installed in locations within the South Orange County service area as approved by the CAISO to provide additional reactive power support in the proposed project area.

The applicant would replace the STATCOM at the Talega Substation because the original STATCOM was a prototype model that is now obsolete. The existing and planned STATCOM units are connected to the applicant's 138-kV transmission system (SDG&E 2012). In addition, the CAISO approved the installation of two, new dynamic synchronous condensers as part of the South Orange County Dynamic Reactive Support and Talega Area Dynamic Reactive Support reliability projects (CAISO 2013b). One dynamic synchronous condenser would be installed at Talega Substation and the other would be installed at or in proximity to the San Onofre Nuclear Generating Station (SONGS) switchyard. The two dynamic synchronous condensers would be connected to the applicant's 230-kV transmission system. Their installation was approved by the CAISO in 2013, primarily because of the retirement of SONGS. According to CAISO technical study results, the retirement of SONGS may cause voltage reduction issues on the 230-kV transmission systems that transmitted power generated at SONGS (CAISO 2013b, 2014d).

No other improvements to the applicant's 138-kV and 230-kV transmission systems in addition to the STATCOM and dynamic synchronous condenser installations are included as part of the No Project Alternative. It is assumed, however, that energy efficiency improvements and energy generation installations that would incrementally reduce load on SDG&E's South Orange County 138-kV system will continue to be implemented throughout the 10-year planning horizon. The following energy efficiency and generation discussion is organized into two sections: (1) Demand-Side Management and Energy Conservation Programs; and (2) Distributed and Renewable Generation. The No Project Alternative described in this report is considered an alternative that meets the CPUC's requirements for consideration of cost-effective alternatives to transmission facilities as described in Section 3.1, "Alternatives to Transmission Facilities."

Demand-Side Management and Energy Conservation Programs

Demand management and energy conservation programs are demand-side response programs designed to shift energy use to off-peak times and/or reduce overall energy use, and can include the installation of high-efficiency appliances (e.g., efficient heating and cooling systems and energy-efficient lighting), the installation of insulation and weatherization, and customer behavior changes (e.g., customers that turn off lights more frequently because of increased customer awareness of their electrical usage).

Greater than 99 percent of the applicant's customers within South Orange County have smart meters, which can record hourly electricity consumption and allow customers to reduce their demand for higher-priced energy during peak periods, and also allow customers to participate in SDG&E's Summer Saver Program. The applicant continues to deploy them to existing customers and installs them on all newly constructed facilities as part of their normal business practice. Both the Summer

[14] A dynamic synchronous condenser, similar to a STATCOM, is type of device used to optimize the power transfer capability of AC transmission systems. Dynamic synchronous condensers are another option for regulating reactive power.

Saver Program and the applicant's commercial-customer Technical Assistance and Technology Incentives Program are designed to reduce peak electrical demand (SDG&E 2012).

To the extent that demand-side management and energy efficiency programs have been adopted by customers, the effects are reflected in the measured peak demand recorded annually for the South Orange County service area. While demand has decreased since 2007 as discussed in Section 1.2.2 and shown in Figure 5, the applicant's data do not suggest that increased program participation has substantially contributed to the reduction. Applicant data from 2010 to 2014 indicate that less than 1 MW is saved annually from customer participation in the Summer Saver and Technical Assistance and Technology Incentives programs. The applicant's data do not suggest that increases in program participation are expected in the coming years. The number of customers participating in the Summer Saver Program, for example, has decreased each year since 2010 (SDG&E 2012). Further, the data do not indicate that increased program participation through the 10-year planning horizon, should it occur, would substantially affect the applicant's current or future load forecasts (SDG&E 2012). A single megawatt of annual reduction in annual demand is minor with respect to the recorded peak demand for South Orange County's 138-kV system, which has exceeded 400 MW each year since 2006 (Figure 5).

Distributed and Renewable Generation

Additional conventional generation systems (e.g., large-scale natural-gas powered electrical generation facilities) installed within the applicant's South Orange County service area that would be considered distributed generation facilities are relevant in the evaluation of project alternatives to the extent that they would reduce forecast demand on components of the South Orange County 138-kV system. The applicant does not anticipate, however, that new, conventional generation systems will be installed within their South Orange County service area within the 10-year planning horizon because of community resistance and a lack of available land (SDG&E 2012). The applicant cites, as an example, the Wellhead Power Margarita, LLC project, a 2008 proposal for a 46 MW natural-gas powered generation "peaker" plant that would have been located in the South Orange County service area and would have only generated electricity during peak demand periods. The plant, proposed to be constructed in proximity to the Ladera Ranch development (a residential community of approximately 8,000 homes), was withdrawn due to local opposition (Orange County Register 2008, SDG&E 2012).

Conventional and renewable generation sources that may be installed outside the applicant's South Orange County service area would not serve to reduce demand on the South Orange County 138-kV system such that the overloads projected by the applicant would not occur. For new generation sources to have the potential to significantly reduce demand on the applicant's transmission system, they must be installed near the load source and connected to the applicant's electrical system at either distribution or transmission voltages.

Rooftop Solar

Small-scale distributed generation, such as rooftop solar panels and fuel cell systems, have the potential to appreciably reduce demand on the applicant's electrical system. The applicant includes projected increases in distributed generation in its load forecasts in that their forecasts are based on the annual forecasts prepared by the California Energy Commission, and the California Energy Commission includes new sources of rooftop solar and other customer-side generation in their forecasts, as well as projected increases in energy conservation and efficiency and increases in distributed generation.

The applicant estimates that the combined annual capacity of small-scale solar generation facilities and fuel cell systems within their South Orange County service area as of May 2014 is 12.6 MW,

which satisfies roughly 3 percent of the annual demand on applicant's approximately 450 MW South Orange County 138-kV system. This estimate includes customers that participate in the applicant's Net Energy Metering program. Net Energy Metering allows a customer-generator (e.g., a family home with rooftop solar installed) to receive financial credit for power generated by their onsite system and fed back into the utility's electrical system (CPUC 2014). Participation in the Net Energy Metering program within South Orange County has increased rapidly in the past few years as shown in Figure 6. The applicant's data indicate that the increased number of customer-generators and total generation capacity[15] associated with the Net Energy Metering program within the South Orange County service area has increased at an accelerated pace in the last 10 years (Figures 7a and 7b).

The latest data provided by the applicant indicate that rooftop solar installations are likely to continue to reduce peak demand on the applicant's transmission system during the 10-year planning horizon (Figures 6, 7a, and 7b).

Consideration of CEQA Requirements for the Evaluation of Alternatives

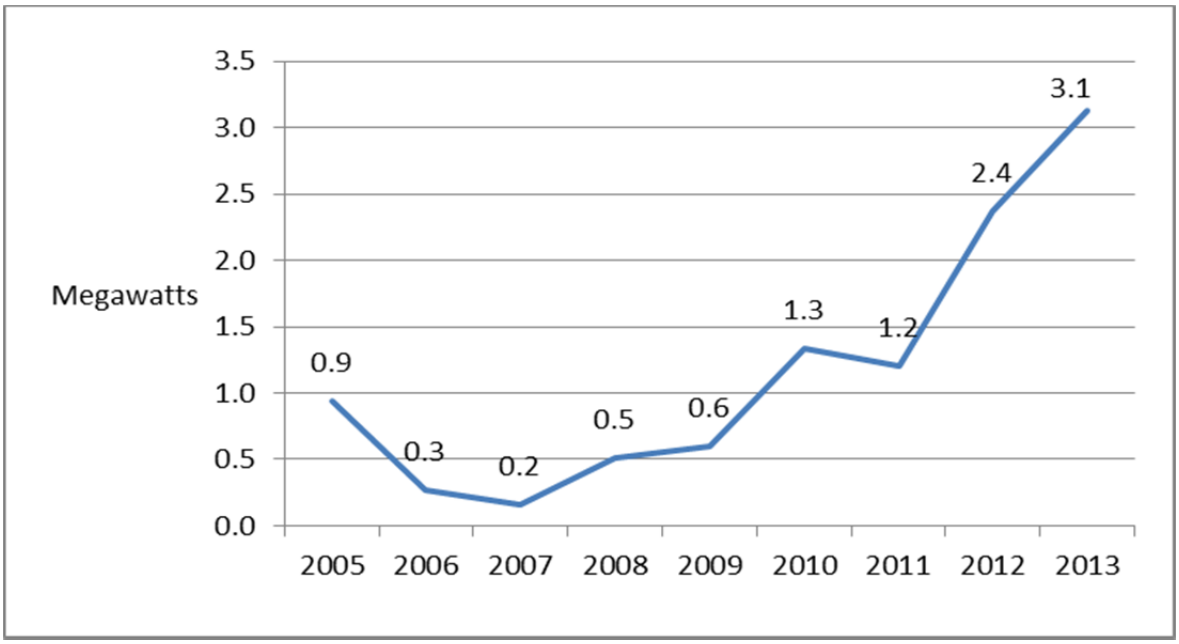
Project Objectives

The CPUC's review of applicant data indicates that, if the rate of new rooftop solar and fuel cell installation continues to increase at or near the pace indicated in Figures 7a and 7b, the No Project Alternative would at least partially meet Objective 1. This alternative would meet Objective 2 because the applicant would be able to replace inadequate substation equipment as needed without increasing the footprint or voltage of Capistrano Substation. This alternative would not meet Objective 3 because power flow within the applicant's South Orange County 138-kV system would not be redistributed as part of the No Project Alternative.

The anticipated STATCOM and dynamic synchronous condenser installations would address voltage issues on the applicant's 138-kV and 230-kV systems, but would not substantially reduce the risk of instances that could result in the loss of power to customers served by the South Orange County 138-kV system through the 10-year planning horizon. The installations may extend the period during which load shedding may be used to address contingency events for 6 months to a year or more, but would not ensure that these scenarios do not occur through the entire 10-year planning horizon.

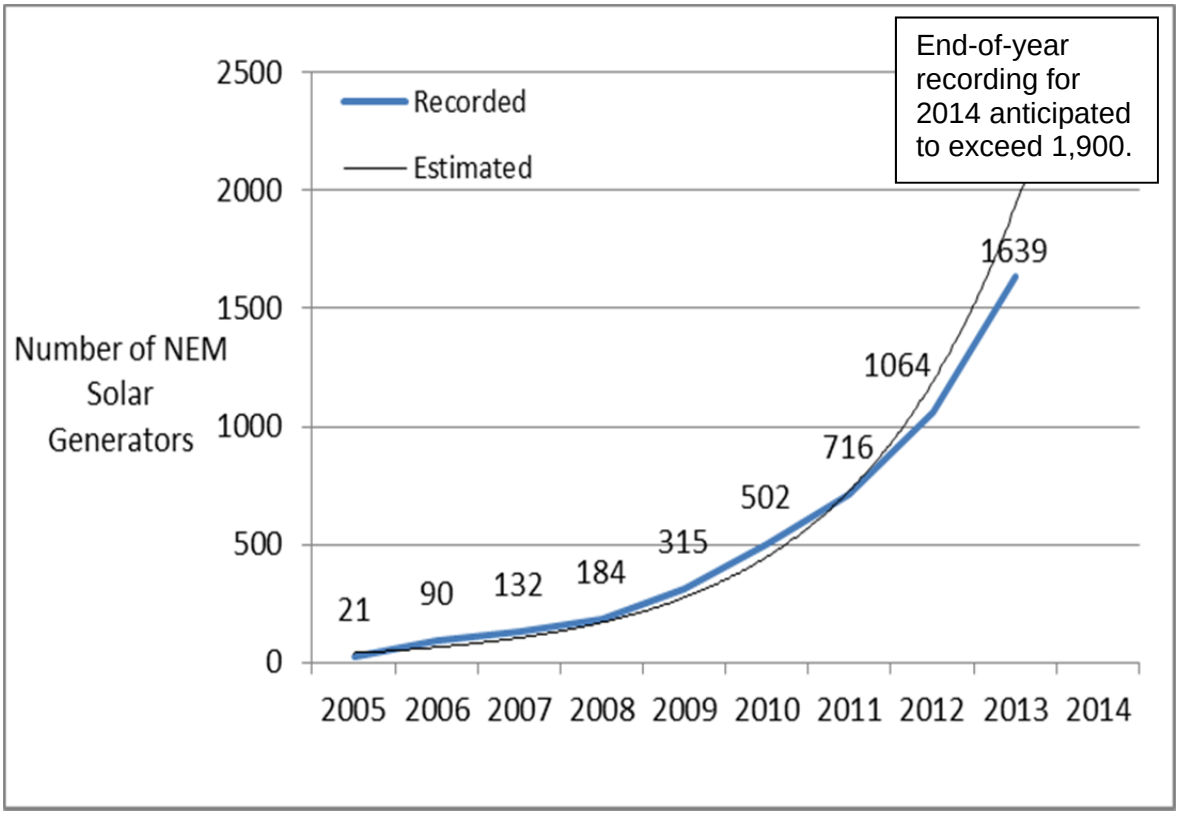
According to data provided by the applicant, anticipated energy efficiency and conservation improvements that may occur during the planning horizon may further extend the period during which load shedding may be used to address contingency events, but not substantially. In addition, ongoing increases in the use of energy-efficient new homes and appliances are anticipated to continue to address some of the growth in electrical demand (USEIA 2014). Also, due to local opposition and the lack of available land, the applicant anticipates that new generation sources within the South Orange County service area would not be constructed within the planning horizon.

[15] The generation capacity data provided by the applicant refer to the nameplate capacity (i.e., intended design capacity) of installed rooftop solar-generation equipment. The applicant is not able to report the specific amount of power provided by Net Energy Metering program participants with rooftop solar installations. Regardless, Net Energy Metering program generation is accounted for in the South Orange County 138-kV system's recorded peak load and, thus, is reflected in the applicant's system-wide load forecasts.



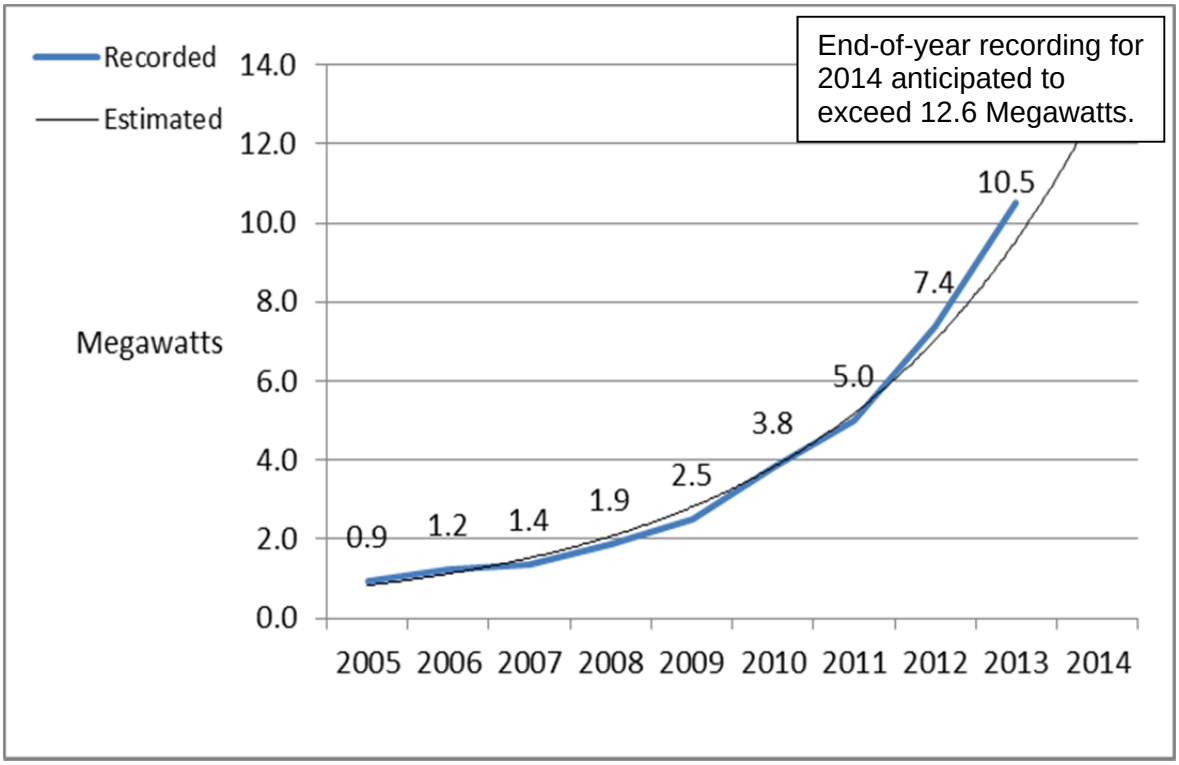
Source: SDG&E 2014d

Figure 6 Nameplate Solar Generation Capacity Added Annually to SDG&E's South Orange County Service Area (2005–2013)



Source: SDG&E 2014d
Note: The number of Net Energy Metering (NEM) solar generators as of May 2014 was 1,990.

Figure 7a Number of Solar Generators in SDG&E's South Orange County Service Area (2005–2013)



Source: SDG&E 2014d
Note: Net Energy Metering solar generation capacity was 12.6 megawatts as of May 2014.

Figure 7b Total Nameplate Solar Generation Capacity in SDG&E's South Orange County Service Area (2005–2013)

Although increased Net Energy Metering program participation and rooftop solar installations (Figures 6, 7a, and 7b) in South Orange County have satisfied some demand on the South Orange County 138-kV system and are expected to continue to address demand, at this time it is unclear whether the amount of future reductions in demand may be sufficient to satisfy Objective 1. Nationwide, the cost of PV solar panels is anticipated to continue to decrease, and the total amount of solar power generation is expected to increase through the 10-year planning horizon. Solar energy generation is projected to increase by 7.5 percent per year through 2040 nationwide almost exclusively as a result of increased PV capacity in both the utility-side and customer-side sectors (USEIA 2014). While installations of rooftop solar panels are expected to reduce demand on electrical systems, they are not projected to have a substantial effect nationwide through 2024 because electricity from rooftop solar and similar distributed generation sources are only expected to account for a relatively small percentage of total electricity use (USEIA 2014).

The CPUC's review of the applicant's power flow data indicates that, under the conditions specified for the No Project Alternative, load shedding could be used to address a number of contingency events through 2024, although not all contingency events could be addressed.[16] Therefore, based on available data, the No Project Alternative would partially meet Objective 1, but it is unclear to what extent, specifically, it would meet Objective 1 through the 10-year planning horizon.

[16] In addition to the STATCOM and dynamic synchronous condenser installations, the CPUC assumed that various, existing capacitor banks at substations within the South Orange County 138-kV system would be turned on such that reactive power support would be further enhanced should the loss of a transmission or generation element occur.

Feasibility
The No Project Alternative is considered feasible from a technological, legal, and economic perspective.

Environmental Advantages
No new transmission facilities would be constructed as part of the No Project Alternative. Each of the potentially significant effects associated with the proposed project would be avoided.

Environmental Disadvantages
No environmental disadvantages associated with the No Project Alternative in comparison to the proposed project are anticipated.

Conclusion
RETAINED. Alternative A would be feasible and reduce potentially significant environmental effects but may not meet most of the basic project objectives. Regardless, the No Project Alternative is retained for further consideration in the EIR because analysis of the No Project alternative is required by CEQA. In addition, the No Project Alternative would not increase capacity of the South Orange County 138-kV system and, hence, would not induce growth.

3.3 Alternative B1 – Reconductor Laguna Niguel–Talega 138-kV Line
Under Alternative B1, which was identified by the CPUC, a segment of the Laguna Niguel–Talega 138-kV Line (TL13835) would be reconductored with conductor of a comparable size but higher capacity, such as Aluminum Conductor Steel Supported (ACSS) or similar. ACSS has a higher operating temperature and greater resistance to overload than other types of comparably-sized conductor, such as Aluminum Conductor Steel Reinforced (ACSR) (Southwire 2014). The use of ACSS or similar high-capacity conductor would allow for high power transfer (e.g., 273 MVA) in comparison to the existing 138-kV line's 136 MVA rating.[17]

Under this alternative, a 138-kV segment (approximately 7.8-miles long; Figure 8) from Capistrano Substation to Talega Substation would be reconductored. Reconductoring would occur along the same transmission line route (Segments 1b to 4) as the proposed project (Figure 3). In addition, an approximately 2.5-mile-long segment of transmission line (TL13835) from Laguna Niguel Substation would be tied into Capistrano Substation (but would not require reconductoring) at a location adjacent to the substation to create a new Laguna Niguel–Capistrano 138-kV Line under this alternative. Some structures may need to be replaced during reconductoring. Equipment at Capistrano Substation found to be inadequate would also be replaced.

This alternative includes the assumption that the CAISO-approved installation of reactive power support equipment and anticipated increase in rooftop solar installations within South Orange County as described under Alternative A would take place. Alternative B1 would meet the CPUC's requirements for consideration of cost-effective alternatives to transmission facilities as described in Section 3.1.

[17] Transmission line TL13835's existing ACSR conductor has a diameter of 336 kcmil. A circular mil (cmil) is a standard unit of measure used for electrical systems that refers to the area of the cross section of conductor. One cmil is equal to the area of a circle with a 1-mil diameter, and 1 kcmil is equal to 1,000 cmils. Large conductor sizes rated for use on electrical transmission lines are generally 0.6-inches to 2-inches in diameter. ACSR 336-kcmil conductor is approximately 0.7-inches in diameter (Grigsby 2001).

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Figure 8

138-kV Reconductoring and Use of Existing Transmission Lines

Alternatives B1, B2 and B3*

South Orange County Reliability Enhancement Project

The applicant proposed a reconductoring project similar to Alternative B1 to the CAISO in 2010 and 2011 to address a forecast overload of TL13835 due to a potential Category B (N-1) event caused by the loss of the Talega–Pico 138-kV Line (TL13836). In 2011, the CAISO recommended the reconductoring project be evaluated in the future because the overload identified would be only by 1 percent. The CAISO also noted that TL13835 might be upgraded as part of the version of the proposed project presented to the CAISO at that time (CAISO 2010, 2011a).

Consideration of CEQA Requirements for the Evaluation of Alternatives

Project Objectives

This alternative would meet project Objectives 1 and 2 as defined in Section 1.3.1, but would not redistribute power flow of the applicant's South Orange County 138-kV system (Objective 3). The CPUC's analysis of the applicant's power flow and latest load forecast data indicate that Alternative B1 would ensure each of the potential Category C (N-1-1) contingencies identified by the applicant and CAISO (Section 1.2.1) would be avoided through the 10-year planning horizon (Objective 1). [18] Equipment at Capistrano Substation found to be inadequate would be replaced (Objective 2).

The ability of this alternative to meet Objective 1 through the 10-year planning horizon is enhanced by the CAISO-approved installation of reactive power support equipment and the anticipated increase in rooftop solar installations within South Orange County described under Alternative A. With respect to Objective 1, it should also be noted that the precise number of potential overload scenarios that this alternative would address in comparison to the proposed project remains unclear. Regardless, neither this alternative nor the proposed project would address all of the potential overload scenarios identified by the applicant (see also Section 1.2.2 under the subheading, "Planning for Common Mode Failures").

Feasibility

This alternative is potentially feasible from a technological, legal, and economic perspective.

Environmental Advantages

Under this alternative, no new 230-kV line would be installed, nor would the San Juan Capistrano substation be constructed. The use of high-capacity conductor would likely reduce the number of support structures that would be required to be replaced for 138-kV line reconductoring. It is assumed that conductor (138 kV) would not need to be replaced in the existing underground conduit along Vista Montana Road because the existing underground conductor has sufficient capacity (273 MVA or greater) to connect to a new higher-capacity overhead line. If this is not the case, potentially significant effects on traffic along Vista Montana Road would still be reduced because new conductor could be pulled into the existing underground conduit, which would not require trenching. Potentially significant effects on all other resource areas identified in Table 4 would also be reduced, in large part because the size of the project area and total area of construction disturbance would be reduced. Impacts to aesthetic and cultural resources at the Capistrano Substation site would not occur under this alternative.

[18] The latest power flow data provided by the applicant were based on outdated load forecast data. For example, the load forecast assumptions in the power flow data estimated that by 2017, load on the South Orange County 138-kV system could reach approximately 511.5 MW as measured at Talega Substation. The applicant's latest load forecast indicates that loads would only reach approximately 455.0 MW in 2017 (Table 2). Evaluation of potential contingency events using the higher load forecast indicates there may be a contingency under which Alternative B1 may not be sufficient to avoid a potential transmission line overload without the installation of ACSS or comparable high-capacity conductor rated for higher throughput, e.g., approximately 300 MVA instead of 270 MVA. Evaluation of potential contingency events using the more recent load forecast (SDG&E 2014c) indicates there would be no such contingency event for Alternative B2.

Environmental Disadvantages

No environmental disadvantages associated with this alternative in comparison to the proposed project are anticipated.

Conclusion

RETAINED. Alternative B1 is potentially feasible, would meet most of the basic project objectives, and would reduce each of the potentially significant effects of the proposed project identified in Table 4. Therefore, this alternative is retained for further consideration in the EIR. In addition, this alternative would increase capacity of the South Orange Couth 138-kV System substantially less than the proposed project because a new 230-kV source would not be constructed. It is not anticipated that Alternative B1 would induce growth.

3.4 Alternative B2 – Use of Existing Transmission Lines (Additional Talega–Capistrano 138-kV Line)

Under this alternative, which was identified by the CPUC, an existing 138-kV transmission line currently operated as a distribution line (12-kV circuit 315) and an unused transmission line would be connected and energized at 138 kV. The existing 138-kV line extends approximately 3 miles from Capistrano Substation southeast to the San Juan Hills High School area. The other transmission line, which is assumed to be an unused 66-kV or 69-kV line, extends from the San Juan Hills High School approximately 4.8 miles south to Talega Substation. Sections of the transmission line were identified as unused by the applicant during the CPUC's October 16, 2012 site visit. At that time, the applicant indicated that they planned to remove the line at a future date but not as part of the proposed project.

For this alternative, the existing 66-kV/69-kV line's conductor would be replaced with higher-capacity but comparably sized conductor (e.g., ACSS) if needed. Replacement of the existing wood structures may also be required. Reconductoring, if required, would occur along the same transmission line route (Segments 1b to 4) as the proposed project (Figure 3). The new Talega–Capistrano 138-kV Line would have a capacity of approximately 270 MVA depending on whether reconductoring is required and the type of conductor installed. In addition, equipment at Capistrano Substation found to be inadequate as described in Section 1.3.1 would be replaced.

Under this alternative, the operation of 12-kV distribution circuit 315 at 138-kV would necessitate the additional installation of a new, distribution line route, which would be identical to the distribution component of the proposed project. This alternative also assumes that the CAISO-approved installation of reactive power support equipment and anticipated increase in rooftop solar installations within South Orange County as described under Alternative A would take place. Alternative B2 would meet the CPUC's requirements for consideration of cost-effective alternatives to transmission facilities as described in Section 3.1.

Consideration of CEQA Requirements for the Evaluation of Alternatives

Project Objectives

As for Alternative B1, Alternative B2 would meet project Objectives 1 and 2 as defined in Section 1.3.1 but would not redistribute power flow of the applicant's South Orange County 138-kV system (Objective 3). The ability of this alternative to meet Objective 1 through the 10-year planning horizon is enhanced by the CAISO-approved installation of reactive power support equipment and anticipated increase in rooftop solar installations within South Orange County described under Alternative A.

Assuming that the existing 66-kV/69-kV line is reconductored and the new 138-kV line described under Alternative B2 would have a capacity of approximately 270 MVA, results from the CPUC's preliminary analysis of SDG&E's power flow data indicate that this alternative would avoid the two

worst-case common mode failure outages identified by the applicant through the 10-year planning horizon. The two scenarios evaluated were:

1. Scenario 1: Outage of the Pico–Capistrano 138-kV Line (TL13816) and Pico–Trabuco 138-kV Line (TL13833); and
2. Scenario 2: Outage of the Pico–Talega 138-kV Line (TL13836) and Pico–Talega–San Mateo 138-kV Line (TL13846).

The analysis found that if either of these scenarios were to occur, the heaviest load on a component of the applicant's South Orange County 138-kV system would be on the new 138-kV line that would be installed as part of this alternative. The load would be, at most, 90 percent of the new 138-kV line's estimated 270 MVA capacity if either of these scenarios were to occur prior to 2028. The analysis also found that this alternative would ensure that none of the Category C (N-1-1) events identified would occur through the 10-year planning horizon. The results of this analysis reinforce the conclusion that Alternative B2 would meet Objective 1.[19]

Feasibility
This alternative is potentially feasible from a technological, legal, and economic perspective.

Environmental Advantages
Each of the advantages described for Alternative B1 would also apply to this alternative.

Environmental Disadvantages
For this alternative, distribution circuit 315 (12-kV) would be relocated similar to the proposed project; this would not be required under Alternative B1. Trenching and pole replacement would be required for the relocation of distribution circuit 315 as described in Section 1.1.2, resulting in impacts (e.g., on air quality, biological resources, and other resource areas) that could be greater than those that would occur under Alternative B1, because the total area of disturbance would be larger. In comparison to the proposed project, however, no environmental disadvantages associated with this alternative are anticipated.

Conclusion
RETAINED. Alternative B2 is potentially feasible, would meet most of the basic project objectives, and would reduce each of the potentially significant effects of the proposed project identified in Table 4. Therefore, this alternative is retained for further consideration in the EIR. In addition, this alternative would increase capacity of the South Orange Couth 138-kV System substantially less than the proposed project because a new 230-kV source would not be constructed. It is not anticipated that Alternative B2 would induce growth.

3.5 Alternative B3 – Phased Construction of Alternatives B1 and B2
Under this alternative, which was identified by the CPUC, the construction of either Alternative B1 or B2, or the construction of both alternatives would occur. The construction of both alternatives would only occur if necessary to address potential overload events that may be forecast by future transmission planning studies.

If, under this alternative, the components described under Alternative B2 were to be constructed first, the existing 138-kV line (TL13835) could continue operation while these initial components were

[19] The applicant power flow data evaluated by the CPUC were for 2017–2027, assumed that the proposed project was not constructed, and assumed a growth rate of approximately 5.7 MW of electrical demand per year on the South Orange County 138-kV system.

constructed. There would be minimal, if any, impact on the South Orange County 138-kV system during construction, which would likely result in fewer service disruptions than would otherwise occur. If the components described under Alternative B1 are constructed first (reconductoring of TL13835), the existing 138-kV transmission line (currently operated at 12 kV) and unused 66-kV/69-kV transmission line could potentially be operated at 138 kV during reconductoring of TL13835 to ensure continuous electrical service is maintained, which could result in fewer disruptions in service.

It is unclear at this time whether the 2.5-mile-long segment of TL13835 from Laguna Niguel Substation would be required to be tied into Capistrano Substation as described under Alternative B1 if this alternative is constructed. This alternative includes the assumption that the CAISO-approved installation of reactive power support equipment and anticipated increase in rooftop solar installations within South Orange County as described under Alternative A would take place. Alternative B3 would meet the CPUC's requirements for consideration of cost-effective alternatives to transmission facilities as described in Section 3.1.

Consideration of CEQA Requirements for the Evaluation of Alternatives

Project Objectives

This alternative would meet project Objectives 1 and 2 as defined in Section 1.3.1, but would not redistribute power flow of the applicant's South Orange County 138-kV system (Objective 3). Equipment at Capistrano Substation found to be inadequate would be replaced (Objective 2), and the construction of either the components described under Alternative B1 or those described under Alternative B2 would be sufficient to meet Objective 1. The CPUC's review of the applicant's power flow data indicates that each of the various Category C (N-1-1) contingencies identified by the applicant and CAISO (Section 1.2.1) would be avoided through the 10-year planning horizon under this alternative. The combined construction of the components of Alternatives B1 and B2 would extend the period during which Category C contingencies would not occur further than if only one of the two alternatives were constructed.

The ability of this alternative to meet Objective 1 through the 10-year planning horizon is enhanced by the CAISO-approved installation of reactive power support equipment and anticipated increase in rooftop solar installations within South Orange County described under Alternative A.

Feasibility

This alternative is potentially feasible from a technological, legal, and economic perspective.

Environmental Advantages

Each of the advantages described for Alternative B1 would also apply to this alternative. No new 230-kV line would be installed, and the San Juan Capistrano Substation would not be constructed. The use of high-capacity conductor that is of a comparable size to the existing conductor would likely reduce the number of support structures that may need to be replaced for 138-kV line reconductoring. It is assumed that conductor would not need to be replaced in the existing underground conduit (138 kV) along Vista Montana Road because the existing underground conductor has sufficient capacity (273 MVA or greater) to connect to a new higher-capacity overhead line. If this is not the case, potentially significant effects on traffic along Vista Montana Road would still be reduced because new conductor could be pulled into the existing underground conduit, which would not require trenching. Potentially significant effects on other resource areas identified in Table 4 would also be reduced.

Environmental Disadvantages

The environmental disadvantages of Alternative B2 would also apply to this alternative if Alternative B2 is selected for construction and distribution circuit 315 (12-kV) is relocated as described for the proposed project. Trenching and pole replacement would be required for the relocation of distribution

circuit 315 as described in Section 1.1.2. In comparison to the proposed project, however, no environmental disadvantages associated with this alternative are anticipated.

Conclusion

RETAINED. Alternative B3 is potentially feasible, would meet most of the basic project objectives, and would reduce each of the potentially significant effects of the proposed project identified in Table 4. Therefore, this alternative is retained for further consideration in the EIR. In addition, this alternative would increase capacity of the South Orange Couth 138-kV System substantially less than the proposed project because a new 230-kV source would not be constructed. It is not anticipated that Alternative B3 would induce growth.

3.6 Alternative B4 – Rebuild South Orange County 138-kV System

This alternative was identified by the applicant in the PEA and further refined by the applicant in response to the CPUC's request for further description of the improvements that SDG&E anticipates would be required for the South Orange County 138-kV system should the proposed project not be approved. Under this alternative, all of the existing 138-kV lines that extend between the applicant's Trabuco, Capistrano, Laguna Niguel, and Talega substations would be reconductored (approximately 34 miles; Figure 9) except the Capistrano–Laguna Niguel 138-kV Line (TL13837) and a short section (TL13846C) that extends through the Talega Corridor area to connect the Talega–Pico–San Mateo 138-kV Line (TL13846) to Talega Substation. This would include reconductoring, the installation of new structures, and the installation of new underground conduit along five 138-kV lines (TL13816, TL13833, TL13835, TL13836, and TL13846) and the 7.8 miles of reconductoring described under Alternative B1.

In addition, new 138-kV facilities at Capistrano Substation would be constructed as described for the proposed project, and would include the installation of three 138/12-kV transformers and space for a fourth 138/12-kV transformer at the lower yard of the Capistrano Substation site (see Section 1.1.2). This substation expansion would likely result in demolition of the former utility structure that fronts the substation property on Camino Capistrano; however, no 230-kV substation would be constructed at the site, and the profile of the rebuilt substation would be lower in height than for the proposed project. Two 230/138-kV transformers that the applicant indicated are outdated would be replaced at Talega Substation. The applicant also indicated that this alternative would include the reactive power support elements described under the No Project Alternative. It is assumed that the other No Project Alternative elements would be included under Alternative B4 as well.

Consideration of CEQA Requirements for the Evaluation of Alternatives

Project Objectives

This alternative would meet project Objectives 1 and 2 as defined in Section 1.3.1, but would not redistribute power flow of the applicant's South Orange County 138-kV system (Objective 3). The applicant's power flow data indicate that Alternative B4 would ensure that each of the potential Category C (N-1-1) contingencies identified by the applicant and CAISO (Section 1.2.1) would be avoided through the 10-year planning horizon (Objective 1). Equipment at Capistrano Substation found to be inadequate would be replaced (Objective 2). The ability of this alternative to satisfy Objective 1 through the 10-year planning horizon would be enhanced by the CAISO-approved installation of reactive power support equipment and anticipated increase in rooftop solar installations within South Orange County described under Alternative A.

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Figure 9

Rebuild South Orange County 138-kV System

Alternative B4

South Orange County Reliability Enhancement Project

Feasibility
This alternative is potentially feasible from a technological, legal, and economic perspective.

Environmental Advantages
It is not anticipated that trenching would be required along Vista Montana Road for the installation of new duct banks for Alternative B4; therefore, potentially significant effects on traffic along Vista Montana Road at the entrance to San Juan Hills High School and the Rancho San Juan residential development would be avoided.

Environmental Disadvantages
With the exception of impacts to traffic, each of the potentially significant effects of the proposed project identified in Table 4 would also apply to this alternative. Capistrano Substation would still be expanded into the lower yard, which would result in a potentially significant effect on cultural and visual resources. In addition, substantial construction would occur along the proposed 230-kV route to reconductor, install new structures, and install new underground conduit along the segments of five 138-kV lines (TL13816, TL13833, TL13835, TL13836, and TL13846). Additional 138-kV line segments to Laguna Niguel and Trabuco substations would also be reconductored, and new structures and new underground conduit would be installed (SDG&E 2014b). Because the project construction area and total area of disturbance would be larger than for the proposed project, impacts to some resource areas, including air quality and biological resources, could be greater than for the proposed project.

Conclusion
RETAINED. Alternative B4 is potentially feasible, would meet most of the basic project objectives, and would reduce a potentially significant effect on traffic. Therefore, this alternative is retained for further consideration in the EIR. In addition, this alternative would increase capacity of the South Orange Couth 138-kV System substantially less than the proposed project because a new 230-kV source would not be constructed, and hence, it would be less likely to induce growth.

3.7 Alternative C1 – SCE 230-kV Loop-in to Capistrano Substation
A version of this alternative was initially identified by the applicant in the PEA. As compared to the PEA alternative, Alternative C1 includes sufficient design details to ensure that analysis pursuant to CEQA may be conducted. Under this alternative, San Juan Capistrano Substation would be constructed as described for the proposed project. A new double-circuit 230-kV transmission line (3 to 4 miles long) would be constructed from the proposed San Juan Capistrano Substation to a location in proximity to Prima Deschecha Landfill and the San Juan Hills High School area (Figure 10). At this location, the new 230-kV line would loop in (connect) to SCE's existing Serrano–SONGS 230-kV line. The new 230-kV line and loop in connection would be constructed within the same ROW as the double-circuit 230-kV line proposed for the project. A small amount of new ROW may be required depending on where the loop-in connection is constructed. Distribution circuit 315 (12 kV) would be relocated as described for the proposed project.

Consideration of CEQA Requirements for the Evaluation of Alternatives
Project Objectives
This alternative would meet each of the project objectives as defined in Section 1.3.1.

Feasibility
This alternative is potentially feasible from a technological, legal, and economic perspective.

Alternative C1
(SCE 230-kV Loop-in to Capistrano Substation)

Alternative C2
(SCE 230-kV Loop-in to Capistrano Substation Routing Alternative)

Alternative D
(New 230-kV Substation at Landfill)

LEGEND

- Proposed 230-kV substation upgrade
- Existing 230-kV substation
- Existing 138-kV substation
- Replace inadequate equipment at substation
- Loop-in to existing transmission line
- Existing 230-kV lines (SCE)
- Existing Talega-Capistrano (SDG&E) 138-kV line
- Relocate 12-kV distribution line as proposed
- New double-circuit 230-kV line
- New double-circuit 230-kV line in new right-of-way
- Energize existing 138-kV line that is currently operated at 12 kV (SDG&E)
- Reconductor unused 66-kV line
- New 138-kV line in new right-of-way

CAISO	California Independent System Operator
SDG&E	San Diego Gas & Electric Company
SCE	Southern California Edison Company
MVAR	Megavolt Ampere Reactive power
kV	kilovolt (= 1000 volts)

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Figure 10 **SDG&E 230-kV Interconnect with SCE Alternatives C1, C2, and D**

South Orange County Reliability Enhancement Project

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Environmental Advantages

The new double-circuit 230-kV line would be 3.8 to 4.8 miles shorter than the proposed double-circuit 230-kV line. In comparison to the proposed project, construction would not occur along approximately 4 miles of ROW extending south of Prima Deschecha Landfill to Talega Substation. Less land disturbance would be required during construction than for the proposed project, which would reduce potentially significant effects (including potentially significant cumulative effects) on air quality and biological resources, and effects related to construction noise, traffic, and increased risk of wildfire.

Environmental Disadvantages

No environmental disadvantages to this alternative in comparison to the proposed project are anticipated.

Conclusion

RETAINED. Alternative C1 is potentially feasible, would meet the basic project objectives, and would reduce potentially significant effects of the proposed project. Therefore, this alternative is retained for further consideration in the EIR.

3.8 Alternative C2 – SCE 230-kV Loop-in to Capistrano Substation Routing Alternative

A version of this alternative was initially identified by the applicant in the PEA. As compared to the PEA alternative, Alternative C2 includes design details sufficient to ensure that analysis pursuant to CEQA may be conducted, and includes details based on comments received during the EIR scoping meeting held in the City of San Juan Capistrano. Many of the same components described under Alternative C1 would be constructed, but instead of connecting to SCE's Serrano–SONGS 230-kV line at a location in proximity to Prima Deschecha Landfill and south of the San Juan Hills High School area, the connection would be made north of the San Juan Hills High School area (Figure 10). The new double-circuit 230-kV line would be constructed along the same ROW southeast from Capistrano Substation to San Juan Creek Road. At San Juan Creek Road, new 230-kV line would be constructed in new underground conduit and within new ROW along San Juan Creek Road for approximately 1 mile northeast to a location near La Pata Avenue where it would connect to SCE's existing 230-kV line. It is assumed that distribution circuit 315 (12 kV) would be relocated as described for the proposed project.

Consideration of CEQA Requirements for the Evaluation of Alternatives

Project Objectives

This alternative would meet each of the project objectives as defined in Section 1.3.1.

Feasibility

This alternative is potentially feasible from a technological, legal, and economic perspective.

Environmental Advantages

The new double-circuit 230-kV line in this alternative would be 4.5 to 5 miles shorter than the proposed project's double-circuit 230-kV line that would be constructed under the proposed project and 0.5 to 1 mile shorter than the 230-kV lines described under Alternative C1. Construction within the SDG&E ROW from approximately 5 miles south of the San Juan High School area south to Talega Substation as described for the proposed project would not occur under this alternative. Less land disturbance would be required during construction than for the proposed project, which would reduce potentially significant effects (including potentially significant cumulative effects) on air quality and biological resources, and effects related to construction noise and increased risk of

wildfire. Potentially significant effects on traffic along Vista Montana Road at the entrance to San Juan Hills High School and the Rancho San Juan residential development would be avoided.

Environmental Disadvantages

Under Alternative C2, approximately 1 mile of new underground conduit would be installed in new ROW along San Juan Creek Road. By comparison, the proposed project would require approximately 0.4 miles of new underground conduit along the proposed 230-kV line route, which would be installed primarily in existing ROW. At this time, biological, cultural, and other resource survey data have not been collected for the route along San Juan Creek Road described for this alternative. It is assumed that potentially significant effects on biological resources, including jurisdictional wetland areas, could occur because San Juan Creek parallels San Juan Creek Road. At the closest point, the creek is located within a few hundred feet of the road. No other environmental disadvantages to this alternative in comparison to the proposed project are anticipated.

Conclusion

RETAINED. Alternative C2 is potentially feasible, would meet the basic project objectives, and would reduce potentially significant effects of the proposed project. Therefore, this alternative is retained for further consideration in the EIR/SEIR.

3.9 Alternative D – SCE 230-kV Loop In to Reduced-Footprint Substation at Landfill

A version of this alternative was initially identified by the applicant in the PEA. As compared to the alternative presented in the PEA, Alternative D includes design details sufficient to ensure that analysis pursuant to CEQA may be conducted. Under this alternative, a new 230/138/12-kV substation would be constructed at Prima Deschecha Landfill in proximity to the transmission corridor that crosses the landfill (Figure 10). Both SDG&E and SCE transmission lines are located within this corridor. Power would be provided to the new substation from SCE's Serrano–SONGS 230-kV line. A new, double-circuit 230-kV line segment (less than 0.25-miles long) would be constructed, possibly within new ROW that would loop the new substation into SCE's 230-kV line.

Under this alternative, a new, single-circuit 138-kV line segment (approximately 0.75-miles long) would be installed that would use the existing 66-kV/69-kV transmission line route described in Alternative B2. This line segment would extend from the new substation west to the applicant's transmission ROW and then extend north along the 66-kV/69-kV line route to the San Juan Hills High School area where it would connect to the applicant's existing, underground 138-kV line.

Distribution circuit 315 (12 kV) would be relocated as described for the proposed project, which would allow the existing 138-kV line that extends from the San Juan Hills High School area to Capistrano Substation to be energized at 138 kV instead of 12 kV. The new 138-kV segment would be used to create a continuous, new 138-kV line between the new substation and Capistrano Substation.

One 230/138-kV transformer would be installed at the new substation with space for a spare if the applicant provides data that indicate a spare could be needed. One 138/12-kV transformer would also be installed. Space for additional 138/12-kV transformers and/or additional distribution-level transformers would also be included in the substation design if the applicant provides data that indicate the space could be needed. The substation would be gas insulated and require 3 to 10 acres of land. In addition, equipment at Capistrano Substation found to be inadequate would be replaced.

Variation Dismissed from Further Consideration

In the PEA, the applicant considered constructing San Juan Capistrano Substation at Prima Deschecha Landfill, but instead of connecting to one of SCE's existing 230-kV lines, the applicant would construct a new, double-circuit 230-kV line (approximately 4.25-miles long) from the landfill to Talega Substation. San Juan Capistrano Substation would be a larger, open-air-insulated substation (10 acres) instead of a gas-insulated substation (6.4 acres). Reconductoring (138 kV) would occur near Capistrano Substation and between Capistrano Substation and the landfill. The applicant would still expand Capistrano Substation under this variation but would not install the proposed 230-kV facilities. The applicant dismissed this alternative because substation construction would occur in two areas instead of one and because a potentially significant impact would not be avoided or substantially reduced (SDG&E 2012). This variation was considered with respect to Alternative D in this screening report but was dismissed because it would result in substantially greater land disturbance than Alternative D. It would not be environmentally superior with respect to Alternative D and, therefore, is not considered further in this report.

Consideration of CEQA Requirements for the Evaluation of Alternatives

Project Objectives

This alternative would meet each of the project objectives as defined in Section 1.3.1. The CPUC's review of the applicant's power flow data indicates that Alternative D would ensure that each of the potential Category C (N-1-1) contingencies identified by the applicant and CAISO (Section 1.2.1) would be avoided through the 10-year planning horizon (Objective 1). Equipment at Capistrano Substation found to be inadequate would be replaced (Objective 2), and power flow within the applicant's South Orange County 138-kV system would be redistributed (Objective 3).

Feasibility

This alternative is potentially feasible from a technological, legal, and economic perspective.

Environmental Advantages

The new double-circuit 230-kV line would be approximately 4.8 miles shorter than the proposed project's double-circuit 230-kV line. Construction would not occur along the ROW extending from Prima Deschecha Landfill to Talega Substation (approximately 4 miles) or along the 3-mile corridor between Capistrano Substation and the San Juan Hills High School area, as it would for the proposed project. The new 230/138/12-kV substation would likely be smaller than the proposed 230/138/12-kV substation, because fewer transformers would be required.

The former utility structure at the Capistrano Substation site would not be demolished, which would reduce potentially significant effects on cultural resources, and Capistrano Substation would not be expanded, which would reduce potentially significant effects on visual resources. Less land disturbance would be required during construction, which would reduce potentially significant effects (including potentially significant cumulative effects) on air quality and biological resources, and effects related to construction noise and increased risk of wildfire. Potentially significant effects on traffic along Vista Montana Road at the entrance to San Juan Hills High School and the Rancho San Juan residential development would be avoided.

Environmental Disadvantages

Three to 10 acres of new substation ROW would be required adjacent to the existing transmission line corridor for construction of the new substation. In addition, approximately 0.25 miles of new transmission line ROW would be required. Hence, Alternative D could require up to 10.25 acres of new ROW. By comparison, the applicant estimates that the proposed project would require 10.13 acres of new ROW. Some, likely minor, impacts could result from the additional ROW. No other

environmental disadvantages to this alternative in comparison to the proposed project are anticipated under this alternative.

Conclusion

RETAINED. Alternative D is potentially feasible, would meet the basic project objectives, and would reduce potentially significant effects of the proposed project. Therefore, this alternative is retained for further consideration in the EIR.

3.10 Alternative E – New 230-kV Talega–Capistrano Line Operated at 138 kV

Under this alternative, which was identified by the CPUC, the proposed double-circuit 230-kV line would be constructed between Talega Substation and the San Juan Hills High School and Rancho San Juan residential development area (Figure 11). The two new circuits would be operated at 138 kV rather than 230 kV. The new double-circuit transmission line would connect to two existing transmission line segments between Capistrano Substation and the San Juan Hills High School and Rancho San Juan residential development area.

One of the existing 138-kV lines is the Laguna Niguel–San Mateo–Talega 138-kV Line (TL13835) and the second 138-kV line is currently operated at 12 kV (distribution circuit 315). Distribution circuit 315 would be relocated as proposed, and the existing 138-kV circuit would be energized at 138 kV. If reconductoring is required between Capistrano Substation and the San Juan Hills High School and Rancho San Juan residential development area to upgrade sections of circuit 315, higher-capacity conductor (e.g., ACSS) similar in size to the existing conductor would be installed. The new Talega–Capistrano 138-kV Lines that would be created under this alternative could have a capacity of approximately 270 MVA depending on whether reconductoring is required and the type of conductor installed.

If it is not feasible to make use of circuit 315 under this alternative, only one 230-kV circuit (operated at 138 kV) would be installed between Talega Substation and the San Juan Hills High School and Rancho San Juan residential development area on the new double-circuit poles. Circuit 315 would not be relocated and the Laguna Niguel–San Mateo–Talega 138-kV Line (TL13835) section between Capistrano Substation and the San Juan Hills High School and Rancho San Juan residential development area would be reconductored with higher-capacity conductor (see also Alternative B1).

Equipment at Capistrano Substation would be replaced to the extent that the applicant can provide data that indicate such replacement would be required to accommodate this alternative or would otherwise be required because the equipment is inadequate. If future load forecast and power flow studies indicate that the existing 138/12-kV Capistrano Substation must be expanded to a larger 230/138/12-kV substation as described for the proposed project, 4.8 miles of the proposed double-circuit 230-kV line (7.8-miles long) would already be in place to support this expansion.

Route Variation Dismissed from Further Consideration

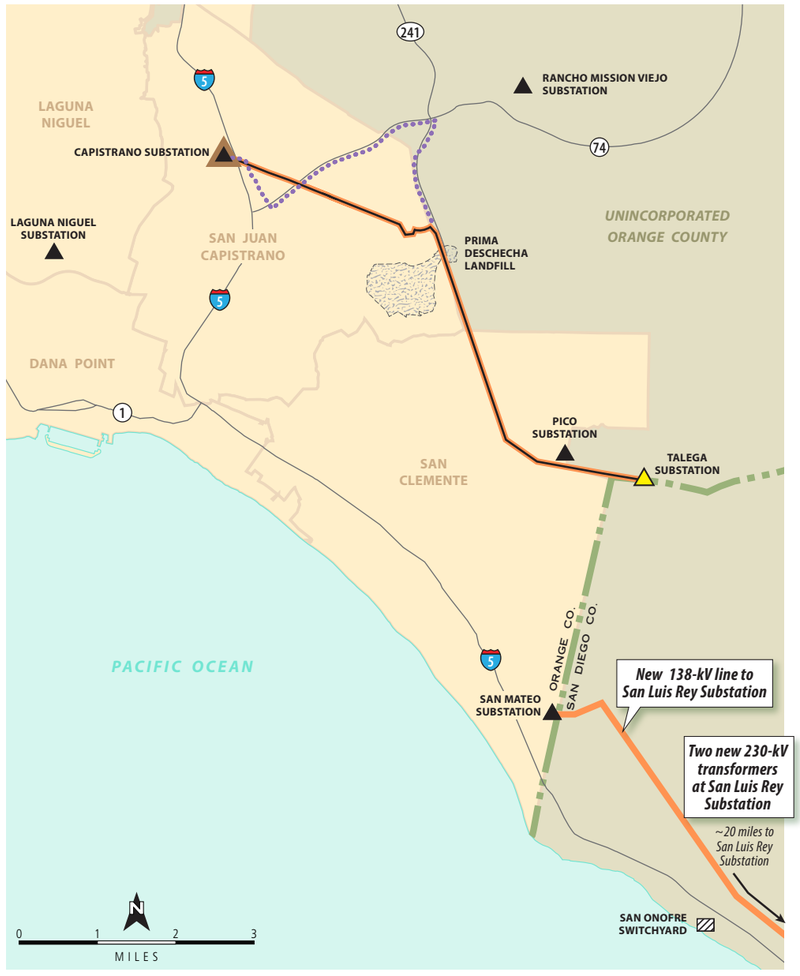
In the PEA, the applicant considered routing one of the proposed 230-kV lines along Vista Montana Road by replacing an unused 138-kV conduit package with 230-kV conduit. The second 230-kV line would be installed in new underground conduit north along La Pata Avenue to San Juan Creek Road. From there, the second 230-kV line would be installed as described for the routing alternative identified under Alternative C2. The applicant dismissed this alternative because it would result in approximately 2 miles of additional land disturbance (SDG&E 2012). This variation was considered with respect to Alternative E in this screening report but was dismissed because it would result in substantially greater land disturbance than Alternative E. It would not be environmentally superior with respect to Alternative E and, therefore, is not considered further in this report.

Alternative E

(New 230-kV Talega–Capistrano Line Segments Operated at 138 kV)

Alternative F

(230-kV Rancho Mission Viejo Substation)



Alternative G

(New 138-kV San Luis Rey–San Mateo Line and San Luis Rey Substation Expansion)

LEGEND

- Proposed 230-kV substation upgrade
- Replace inadequate equipment at substation
- Rebuild and expand substation without increase to 230 kV
- Existing 230-kV substation
- Existing 138-kV substation
- Existing 138-kV line
- New double-circuit 230-kV line
- New or reconductored 138-kV line in existing right-of-way
- Relocate 12-kV distribution line as proposed

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Figure 11 **New 138-kV Transmission Line and Rancho Mission Viejo Alternatives (Alternatives E, F, and G)**

South Orange County Reliability Enhancement Project

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Consideration of CEQA Requirements for the Evaluation of Alternatives

Project Objectives

This alternative would meet project Objectives 1 and 2, but would not redistribute power flow of the applicant's South Orange County 138-kV system (Objective 3). The CPUC's review of the applicant's power flow data indicate that Alternative E would ensure that each of the potential Category C (N-1-1) contingencies identified by the applicant and CAISO (Section 1.2.1) would be avoided through the 10-year planning horizon (Objective 1). Equipment at Capistrano Substation found to be inadequate would be replaced (Objective 2).

Feasibility

This alternative is potentially feasible from a technological, legal, and economic perspective.

Environmental Advantages

Under this alternative, Capistrano Substation would not be expanded, which would reduce potentially significant effects on visual resources, and the former utility structure at the Capistrano Substation site would not be demolished, which would reduce potentially significant effects on cultural resources. The 230-kV transmission line would be approximately 3 miles shorter than as described for the proposed project. Less land disturbance would be required during construction, which would reduce potentially significant effects (including potentially significant cumulative effects) on air quality and biological resources, and effects related to construction noise and increased risk of wildfire. It is assumed that conductor would not need to be replaced in the existing underground conduit (138 kV) along Vista Montana Road because the existing underground conductor has sufficient capacity (273 MVA or greater) to connect to a new higher-capacity overhead line (operated at 138 kV). If this is not the case, potentially significant effects on traffic along Vista Montana Road would still be reduced because new conductor could be pulled into the existing underground conduit, which would not require trenching

Environmental Disadvantages

No environmental disadvantages associated with this alternative are anticipated.

Conclusion

RETAINED. Alternative E is potentially feasible, would meet the basic project objectives, and would reduce potentially significant effects of the proposed project. Therefore, this alternative is retained for further consideration in the EIR.

3.11 Alternative F – 230-kV Rancho Mission Viejo Substation

This alternative was identified by the CPUC based on comments received during the EIR scoping meeting held in the City of San Juan Capistrano. In addition, details regarding the Eastern Talega 230-kV Transmission Line Route alternative as described in the applicant's PEA are incorporated into this alternative.

Under this alternative the applicant's 138/12-kV Rancho Mission Viejo Substation would be expanded to a 230/138/12-kV substation with comparable specifications to those of the proposed project's new San Juan Capistrano Substation. Capistrano Substation would not be expanded, but equipment at Capistrano Substation found to be inadequate would be replaced.

To bring a new 230-kV source into the South Orange County service area, a new, double-circuit 230-kV Talega–Rancho Mission Viejo line would be constructed along the Eastern Talega 230-kV Transmission Line Route described in the PEA. This route follows the existing Talega–Rancho Mission Viejo 138-kV Line (TL13831). Although two new 230-kV circuits would be installed, one of the circuits would be energized at 138 kV and operated as TL13831. The existing TL13831 structures

and conductor would be removed, and the existing ROW (100-feet wide) would be increased by approximately 20 feet.

Some 138-kV reconductoring or 138-kV line construction is assumed to be required to make use of the additional power that would be available from an upgraded, 230/138/12-kV Rancho Mission Viejo Substation. Additional 138-kV work that may be required will be evaluated in the EIR based on input from the applicant.

Route Variation to Capistrano Substation Dismissed from Further Consideration

In the PEA, the applicant considered an Eastern Talega to San Juan Capistrano 230-kV Transmission Line Route Alternative that would construct a new double-circuit 230-kV line from Talega Substation as described for Alternative F in this screening report. Instead of connecting the new 230-kV line to an expanded 230-kV Rancho Mission Viejo Substation, however, it would bypass Rancho Mission Viejo Substation and continue to Margarita Substation and then Trabuco Substation on route to Capistrano Substation under this route variation. Capistrano Substation would be expanded into San Juan Capistrano Substation as proposed. The route variation between Talega and Capistrano substations would be approximately 16-miles long and require a combination of new overhead and underground construction.

The applicant dismissed this alternative because it would require the acquisition of a substantial amount of new ROW and result in more than 8 miles of additional land disturbance than the proposed project (SDG&E 2012). The 16-mile route variation to Capistrano Substation was considered with respect to Alternative F in this screening report but was dismissed because of the amount of additional land disturbance and new ROW that would be required. It would not be environmentally superior with respect to Alternative F and, therefore, is not considered further in this report.

Consideration of CEQA Requirements for the Evaluation of Alternatives

Project Objectives

Initial screening indicates that this alternative would meet each of the project objectives as defined in Section 1.3.1.

Feasibility

This alternative is potentially feasible from a technological, legal, and economic perspective.

Environmental Advantages

A new, double-circuit 230-kV line that follows the route of TL13831 would be approximately 6.5 miles long (approximately 1 mile shorter than the 230-kV route for the proposed project). The former utility structure at the Capistrano Substation site would not be demolished, which would reduce potentially significant effects on aesthetic and cultural resources. In addition, impacts on traffic that may occur at the entrance to San Juan Hills High School and the Rancho San Juan residential development at Vista Montana Road would be avoided.

Environmental Disadvantages

It is assumed that the existing ROW that would accommodate the new, double-circuit 230-kV line under this alternative would be required to be increased in width along the approximately 6.5-mile extent of the route between Talega and Rancho Mission Viejo substations. Survey data addressing resources including biological and cultural resources have not yet been collected along this route. Potentially significant effects on biological resources could occur because aerial imagery indicates that the route traverses several miles of forested and undeveloped land. Other potentially significant effects are anticipated to be similar to or greater than those of the proposed project (see Table 4), with the exception of effects to aesthetic and cultural resources and, possibly, impacts related to traffic.

Conclusion

RETAINED. Alternative F is potentially feasible, would meet the basic project objectives, and would reduce potentially significant effects of the proposed project on aesthetic and cultural resources as well as traffic. Therefore, this alternative is retained for further consideration in the EIR.

3.12 Alternative G – New 138-kV San Luis Rey–San Mateo Line and San Luis Rey Substation Expansion

This alternative was identified by the applicant in the PEA. Under this alternative, a new, approximately 18-mile-long 138-kV transmission line would be constructed within existing and new ROW from San Luis Rey Substation to San Mateo Substation (Figure 11). Two new 230/138-kV transformers would be installed at San Luis Rey Substation, the substation would be expanded, and three 230-kV line segments would be modified. Capistrano Substation's 138-kV and 12-kV facilities would be rebuilt as described for the proposed project, and a number of 138-kV transmission lines would be reconductored. In addition, a segment of the Laguna Niguel–Talega 138-kV Line (TL13835) from Capistrano Substation to Talega Substation would be modified to support a second 138-kV line, which would require a similar amount of construction as the double-circuit 230-kV transmission line that would be constructed as part of the proposed project.

Consideration of CEQA Requirements for the Evaluation of Alternatives

Project Objectives

This alternative would meet project Objectives 1 and 2 as defined in Section 1.3.1. This alternative would also partially meet Objective 3 because a new 138-kV line from San Luis Rey Substation would connect the applicant's South Orange County 138-kV system to the 230-kV network that supplies San Luis Rey Substation (SDG&E 2012).

Feasibility

The applicant presented Alternative G to the CAISO, and the CAISO reviewed this alternative along with the SOCRUP project and other alternatives from 2008 to 2011 (see Section 1.2.1). The CAISO rejected this alternative because it would be substantially more expensive than the SOCRUP project and would take longer to construct because of technical challenges associated with designing and constructing it. The CAISO did not consider it in the adopted CAISO transmission plans published from 2008 to 2010 or the 2011 transmission plan that approved the need for the proposed project (CAISO 2008, 2009, 2010, 2011a, SDG&E 2012), it is assumed, for the purposes of this alternatives screening report, that Alternative G is potentially feasible.

Environmental Advantages

It is assumed that conductor would not need to be replaced in the existing, unused underground conduit (138 kV) along Vista Montana Road because the existing underground conductor has sufficient capacity to connect to a new 138-kV overhead line. If this is not the case, potentially significant effects on traffic along Vista Montana Road would still be reduced because new 138-kV conductor could be pulled into the existing conduit, which would reduce the amount of trenching that would be required.

Environmental Disadvantages

Each of the potentially significant effects of the proposed project identified in Table 4 would also apply to this alternative. Capistrano Substation would still be expanded into the lower yard, which would result in potentially significant effects on cultural and visual resources. In addition, substantial construction would occur along the proposed 230-kV route to reconductor 138-kV lines and install new double-circuit 138-kV structures. Substantial work in addition to what would be required for the proposed project would also occur at San Luis Rey Substation and along the additional 18-mile-long

138-kV transmission line that would be required for this alternative. The additional land disturbance during construction would increase potentially significant effects (including potentially significant cumulative effects) on air quality, from increased risk of wildfire, and from construction noise. At this time, biological and other resource survey data have not been collected along the 18-mile-long 138-kV transmission line route from San Luis Rey Substation, but it is assumed that impacts on biological resources could occur, and if so, would be greater than those that may occur as part of the proposed project because the total area of construction disturbance for this alternative would be larger.

Conclusion

RETAINED. Alternative G is potentially feasible, would meet the basic project objectives, and would reduce a potentially significant effect of the proposed project on transportation and traffic. Therefore, this alternative is retained for further consideration in the EIR. In addition, this alternative would increase capacity of the South Orange Couth 138-kV System less than the proposed project because a new 230-kV source would not be constructed, and hence, it would be less likely to induce growth.

3.13 Alternative H – New 230-kV Line from Escondido to Capistrano

This alternative was identified by the applicant in the PEA. Under this alternative, a second 230-kV circuit would be installed on the Escondido–Talega 230-kV line, which is approximately 45 miles long. Double-circuit structures are already in place along this line but only one circuit is currently installed. A new 230-kV bay position would be installed within Escondido Substation to accommodate the additional circuit. The new 230-kV line from Escondido Substation would bypass Talega Substation and connect directly to the proposed San Juan Capistrano Substation. Construction would occur as proposed along the ROW between Talega Substation and the Capistrano Substation site.

Consideration of CEQA Requirements for the Evaluation of Alternatives

Project Objectives

This alternative would meet each of the project objectives as defined in Section 1.3.1.

Feasibility

This alternative is potentially feasible from a technological, legal, and economic perspective. The applicant presented this alternative to the CAISO, and the CAISO reviewed it along with the SOCRUP project and other alternatives from 2008 to 2011 (see Section 1.2.1). The CAISO rejected this alternative because it would be more expensive (SDG&E 2012), but it is assumed, for the purposes of this alternatives screening report, that Alternative H is potentially feasible.

Environmental Advantages

No environmental advantages are associated with this alternative in comparison to the proposed project.

Environmental Disadvantages

This alternative would require that new 230-kV conductor be installed along approximately 45 miles of existing ROW between Talega Substation and Escondido Substation. All other components of this alternative would be the same as those for the proposed project. Impacts on air quality and other resource areas would be greater for this alternative than the proposed project.

Conclusion

ELIMINATED. Alternative H is potentially feasible and would meet the basic project objectives but would not reduce a potentially significant effect of the proposed project. Therefore, this alternative will not be carried forward for further consideration in the EIR.

3.14 Alternative I – Other Substation Alternatives

The applicant identified the following alternatives in the PEA specific to substation design or siting.

Expand Capistrano Substation without Constructing New 230-kV Line

Under this alternative, the applicant would expand Capistrano Substation as proposed but would not install the proposed 230-kV facilities. A new 230-kV line from Talega Substation to Capistrano Substation would not be constructed. The applicant dismissed this alternative because it would not meet most of the basic project objectives (SDG&E 2012).

Air-Insulated San Juan Capistrano Substation

Under this alternative, the applicant would construct San Juan Capistrano Substation without installing the proposed gas-insulated facilities. Instead, the substation would be all open-air insulated. An open-air insulated substation would require approximately 10 acres of land, which could not be constructed within the footprint of the existing Capistrano Substation property (approximately 6.4 acres). The applicant dismissed this alternative because approximately 45 single-family homes located on the north and east sides of the site would need to be acquired and demolished to allow for substation construction and installation of the required transmission and distribution lines (SDG&E 2012).

Alternative Substation Site East of Capistrano Substation

The applicant considered constructing a new substation within a geographic area centered approximately 1 mile east of Capistrano Substation. The applicant identified this general area as the load center of the South Orange County 138-kV system. The area east of Capistrano Substation and across I-5 is built out primarily by residential developments but also contains a number of recreational facilities (e.g., golf facilities, equestrian facilities, parks, and dedicated open space). Undeveloped properties within the area are hilly with slopes greater than 25 percent. For these reasons, the applicant dismissed this alternative because it would not be feasible to identify contiguous, available property appropriate for a new 230/138-kV substation. Furthermore, a substantial amount of new ROW would be required for the associated transmission and distribution lines and access roads (SDG&E 2012).

Reconfigure and Expand Talega Substation

The applicant considered installing 230-kV and 138-kV bus ties and relocating transmission lines and banks at Talega Substation to reduce the effects of certain types of potential outages. Some of the equipment within Talega Substation would be moved outside of the substation's current footprint. Approximately 2 acres of property adjacent to the substation would be acquired. A new gas-insulated 230-kV substation would be installed where the equipment to be moved is currently located. Essentially, a separate, isolated 230-kV substation would be constructed within the existing Talega Substation. The applicant dismissed this alternative because it would not meet most of the basic project objectives (SDG&E 2012).

Consideration of CEQA Requirements for the Evaluation of Alternatives

Project Objectives

The Air-Insulated San Juan Capistrano Substation alternative and Alternative Substation Site East of Capistrano Substation would both meet each of the project objectives as defined in Section 1.3.1.

The Expand Capistrano Substation without Constructing New 230-kV Line alternative would replace inadequate equipment at Capistrano Substation (Objective 2) but would not redistribute power flow of the applicant's South Orange County 138-kV system (Objective 3). It may partially meet Objective 1 because, as stated under Alternative A (No Project), load shedding could be used to address a number

of the contingency events identified through 2024. It is assumed that each component of the No Project Alternative would be constructed regardless of whether the Expand Capistrano Substation without Constructing New 230-kV Line alternative is constructed.

The Reconfigure and Expand Talega Substation alternative would not meet Objectives 2 or 3, but it may meet Objective 1 for the same reason that the Expand Capistrano Substation without Constructing New 230-kV Line alternative may meet Objective 1.

Feasibility

Each of the substation alternatives considered under Alternative I are potentially feasible from a technological, legal, and economic perspective except Alternative Substation Site East of Capistrano Substation. It may not be feasible to construct a new substation within the geographic area centered approximately 1 mile east of Capistrano Substation without acquiring and demolishing residential properties and recreational facilities to create the space needed to construct a new 230/138-kV substation and new transmission corridors and distribution lines.

Environmental Advantages

The substation design and siting alternatives described under Alternative I that would not require the construction of a new 230-kV line would reduce a number of the potentially significant effects of the proposed project identified in Table 4 (i.e., the Expand Capistrano Substation without Constructing New 230-kV Line alternative and Reconfigure and Expand Talega Substation alternative). Unlike the Expand Capistrano Substation without Constructing New 230-kV Line alternative, however, the Reconfigure and Expand Talega Substation alternative would avoid or reduce each of the potentially significant effects of the proposed project, including those that may occur due to construction at the Capistrano Substation site.

The Alternative Substation Site East of Capistrano Substation may reduce a potentially significant effect on cultural resources because demolition of the former utility structure (a potential historic resource) would not occur. This alternative may also reduce a potentially significant effect on visual resources because construction at the Capistrano Substation site may not be required. No environmental advantages are associated with the Air-Insulated San Juan Capistrano Substation alternative in comparison to the proposed project.

Environmental Disadvantages

The Air-Insulated San Juan Capistrano Substation alternative would result in increased impacts on air quality because of the 45 homes that would be acquired and demolished and additional land disturbance. The Alternative Substation Site East of Capistrano Substation would result in increased impacts on air quality because of the new transmission corridors that would be developed to connect to the new substation and likelihood that existing residences and community facilities would need to be demolished or relocated. It is likely that impacts on traffic and other resources areas would also be increased, but additional survey data would be required to make this determination.

No environmental disadvantages are associated with the Expand Capistrano Substation without Constructing New 230-kV Line alternative or Reconfigure and Expand Talega Substation alternative in comparison to the proposed project.

Conclusion

ELIMINATED. None of the additional substation design and siting alternatives considered under Alternative I would meet each of the three CEQA criteria for alternatives (Section 2.2, “CEQA Requirements for the Consideration of Alternatives”). Some of the alternatives considered under Alternative I would be feasible but would not meet most of the basic project objectives. Others would

meet most of the basic project objectives and be feasible but would not reduce a potentially significant effect of the proposed project. Therefore, none of the alternatives defined under Alternative I will be carried forward for further consideration in the EIR.

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4 Summary of Alternatives Carried Forward for Analysis in the EIR

Each alternative identified by the applicant and CPUC is listed in Table 5 along with a summary of alternative screening results. Each alternative evaluated in this report will be carried forward for analysis in the EIR except Alternatives H and I.

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Table 5 Summary of Alternatives Included in the Alternative Screening Report

Alternative	Carried Forward to EIR	Identified By	Objectives Met	Potentially Feasible	Potentially Significant Environmental Effects Likely Reduced [a]							
					Aesthetics	Air	Biological	Cultural	Hazards (Wildfire)	Noise	Traffic	Growth Inducing
A. No Project	Yes	CPUC	1 (partially) and 3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
B1. Reconductor Laguna Niguel–Talega 138-kV Line	Yes	CPUC	1 and 2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
B2. Use of Existing Transmission Lines	Yes	CPUC	1 and 2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
B3. Phased Construction of Alternatives B1 and B2	Yes	CPUC	1 and 2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
B4. Rebuild South Orange County 138-kV System	Yes	SDG&E	1 and 2	Yes	–	–	–	–	–	–	Yes	Yes
C1. SCE 230-kV Loop In to Capistrano Substation	Yes	SDG&E [b]	1, 2, and 3	Yes	–	Yes	Yes	–	Yes	Yes	Yes	–
C2. SCE 230-kV Loop In to Capistrano Substation Alternative Route	Yes	CPUC	1, 2, and 3	Yes	–	Yes	Yes	–	Yes	Yes	Yes	–
D. SCE 230-kV Loop In to Reduced-Footprint Substation at Landfill	Yes	SDG&E [b]	1, 2, and 3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	–
E. New 230-kV Line Operated at 138 kV	Yes	CPUC	1 and 2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F. 230-kV Rancho Mission Viejo Substation	Yes	CPUC	1, 2, and 3	Yes	Yes	–	–	Yes	–	–	Yes	–
G. New 138-kV San Luis Rey–San Mateo Line and San Luis Rey Substation Expansion	Yes	SDG&E	1, 2, and 3	Yes	–	–	–	–	–	–	Yes	Yes
H. New 230-kV Line from Escondido to Capistrano	No	SDG&E	1, 2, and 3	Yes	–	–	–	–	–	–	–	–
I. Other Substation Alternatives	No	SDG&E	– [c]	– [c]	– [c]							

Source: SDG&E 2012, 2014a, 2014b, 2014c, 2014d

Key: CPUC = California Public Utilities Commission, SDG&E = San Diego Gas and Electric Company

Notes:

[a] Potentially significant environmental effects of the proposed project that would likely be reduced under the alternative ("environmental advantages").

[b] Alternative originated by SDG&E but presented with modifications or design details added by the CPUC.

[c] Refer to the analysis presented in the screening report.

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