Chapter 3 Project Description

3.1 Introduction

The Applicant's Proposed Project (Project) before the California Public Utilities Commission (CPUC) is made up of two components: a high voltage transmission line and an advanced pumped storage facility, as described below. It is the Applicant's intent to construct both facilities, if feasible. However, as it is likely that contractual arrangements, ownership and construction will be individualized for each component, it is likely that the transmission facilities and pumped storage facilities will be constructed as phased sub-projects of the overall Applicant's Proposed Project. For the purpose of this PEA document, the project is broken into these two components, namely, the transmission component (TE-VS Interconnect) and the advanced pumped storage component (LEAPS), which together make up the full Proposed Project.

The transmission component of the Project (phase I), known as the Talega-Escondido/Valley-Serrano 500 kV Interconnect (TE/VS Interconnect) is proposed by The Nevada Hydro Company, Inc. (TNHC or the Applicant) as an approximately 32 mile, 500 kV high voltage transmission line with its appurtenant facilities. The line, running through northern San Diego and western Riverside Counties, will provide the only 500 kV link between San Diego Gas & Electric Company's (SDG&E) existing 230 kV system and Southern California Edison Company's (SCE) existing 500 kV electric transmission system. The general location of the project appears in Figure 3.1.1-1 Talega-Escondido/Valley-Serrano 500 kV Interconnect Project. Figure 3.1.1-2 LEAPS Project Conceptual Single Line Diagram provides a single line diagram view.

The other component of the Project (phase II), proposed jointly by the Applicant and the Elsinore Valley Municipal Water District (EVMWD), is a 500 MW advanced pumped storage facility located near Lake Elsinore in Riverside County, California (LEAPS). The plan and profile view of LEAPS is presented in Figure 3.1.1-3 LEAPS Pumped Storage Component. The LEAPS powerhouse would connect into the grid over the TE/VS Interconnect. LEAPS will be capable of providing 500 MW of electricity for up to twelve hours and of refilling at a pumping capacity of 600 MW. Storage capacity of the plant's proposed upper reservoir is 6,000 megawatt hours (MWh). The efficiency is projected to be 83.3 percent, making the pumped storage facility one of the most efficient pumped storage plants in the world

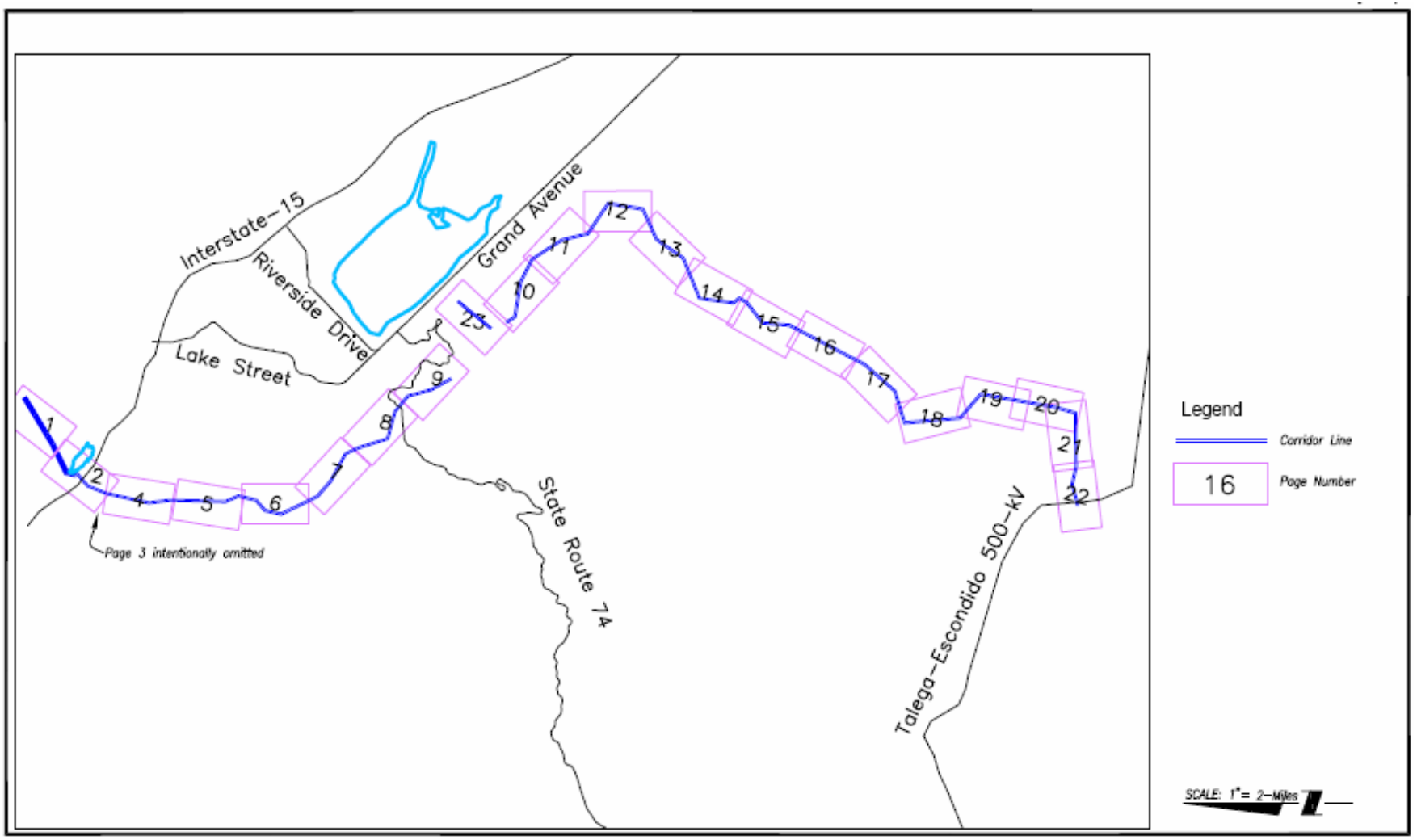

Figure 3.1.1-1 (Index) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

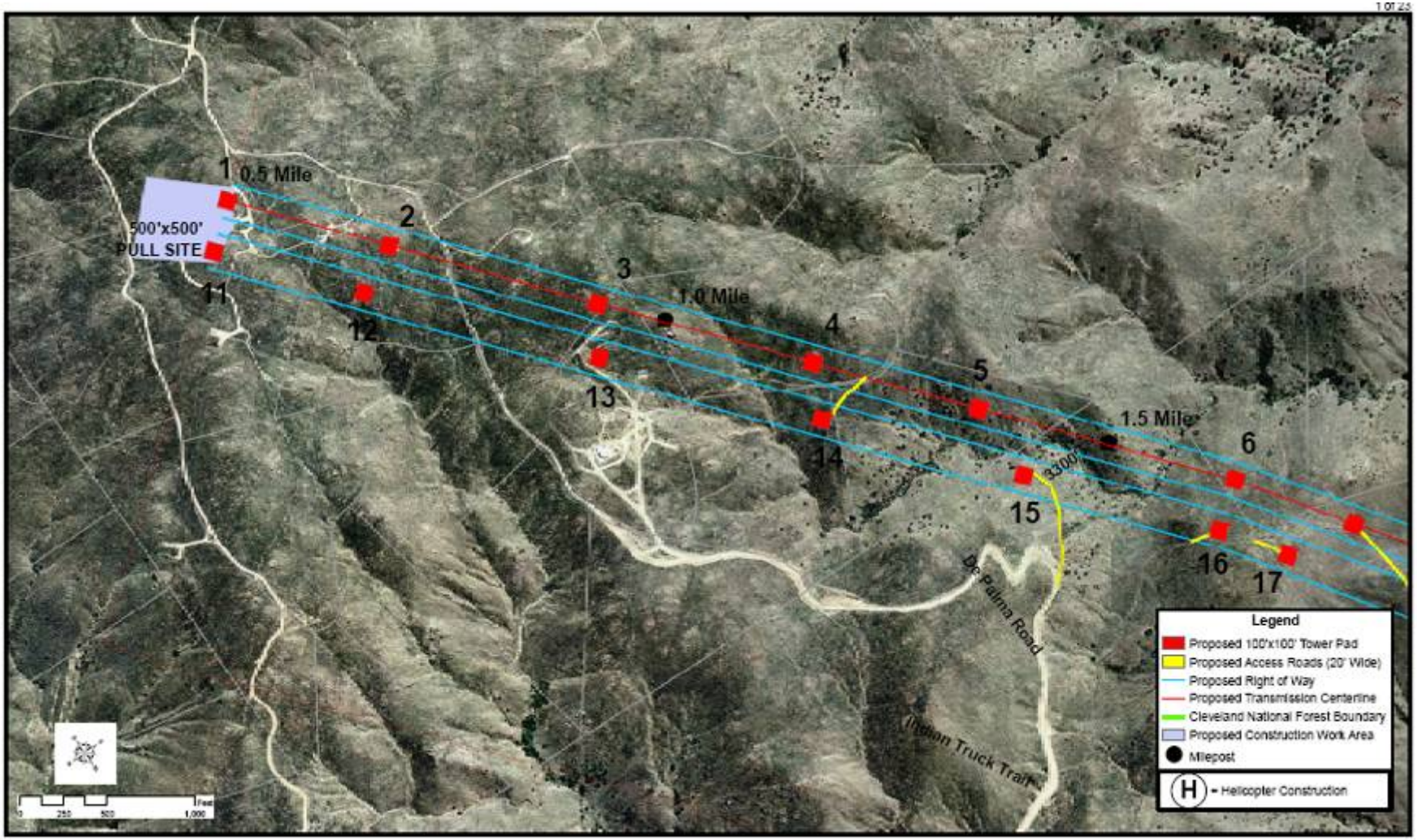

Figure 3.1.1-1 (1 of 23) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

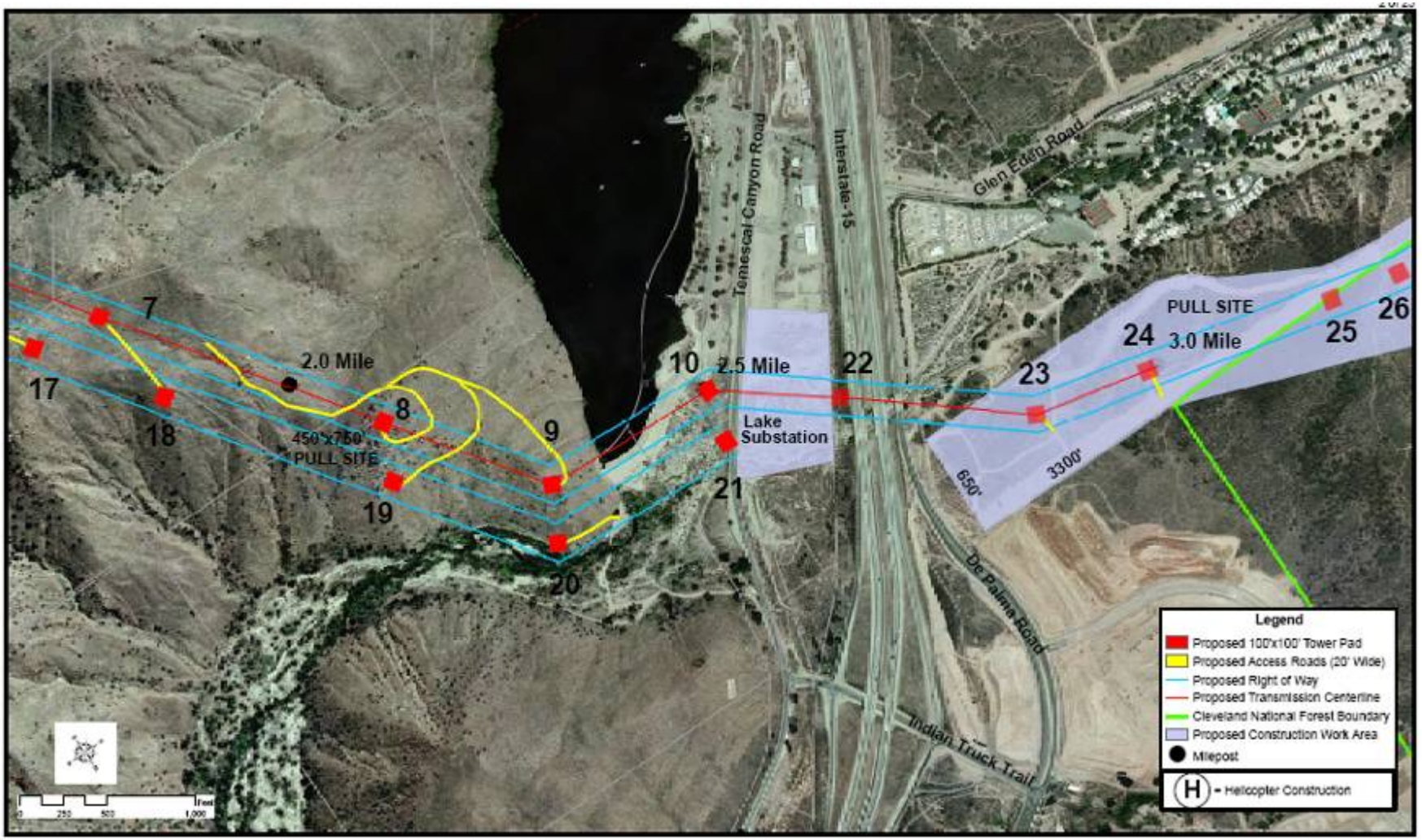

Figure 3.1.1-1 (2 of 23) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

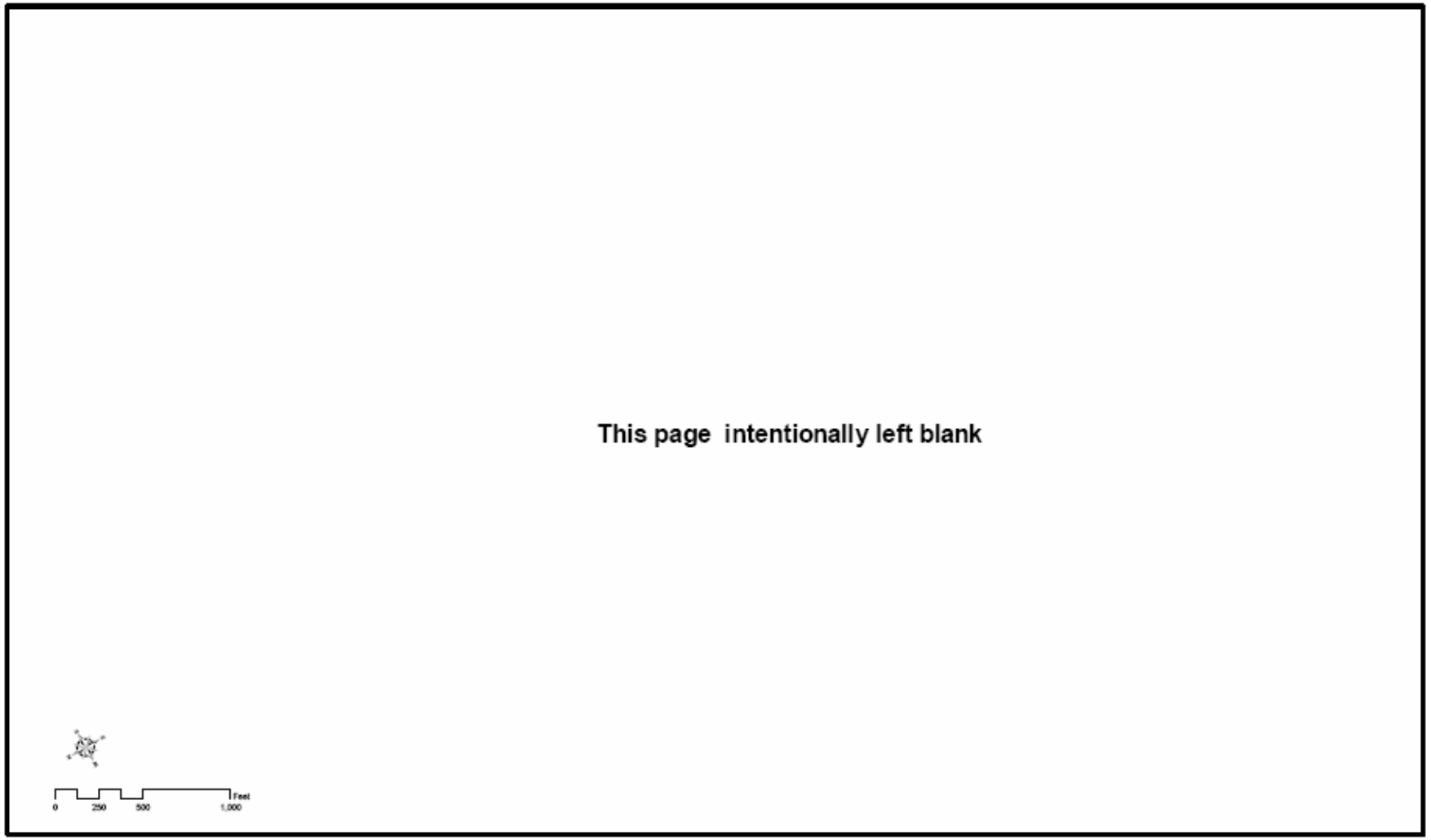

Figure 3.1.1-1 (3 of 23) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

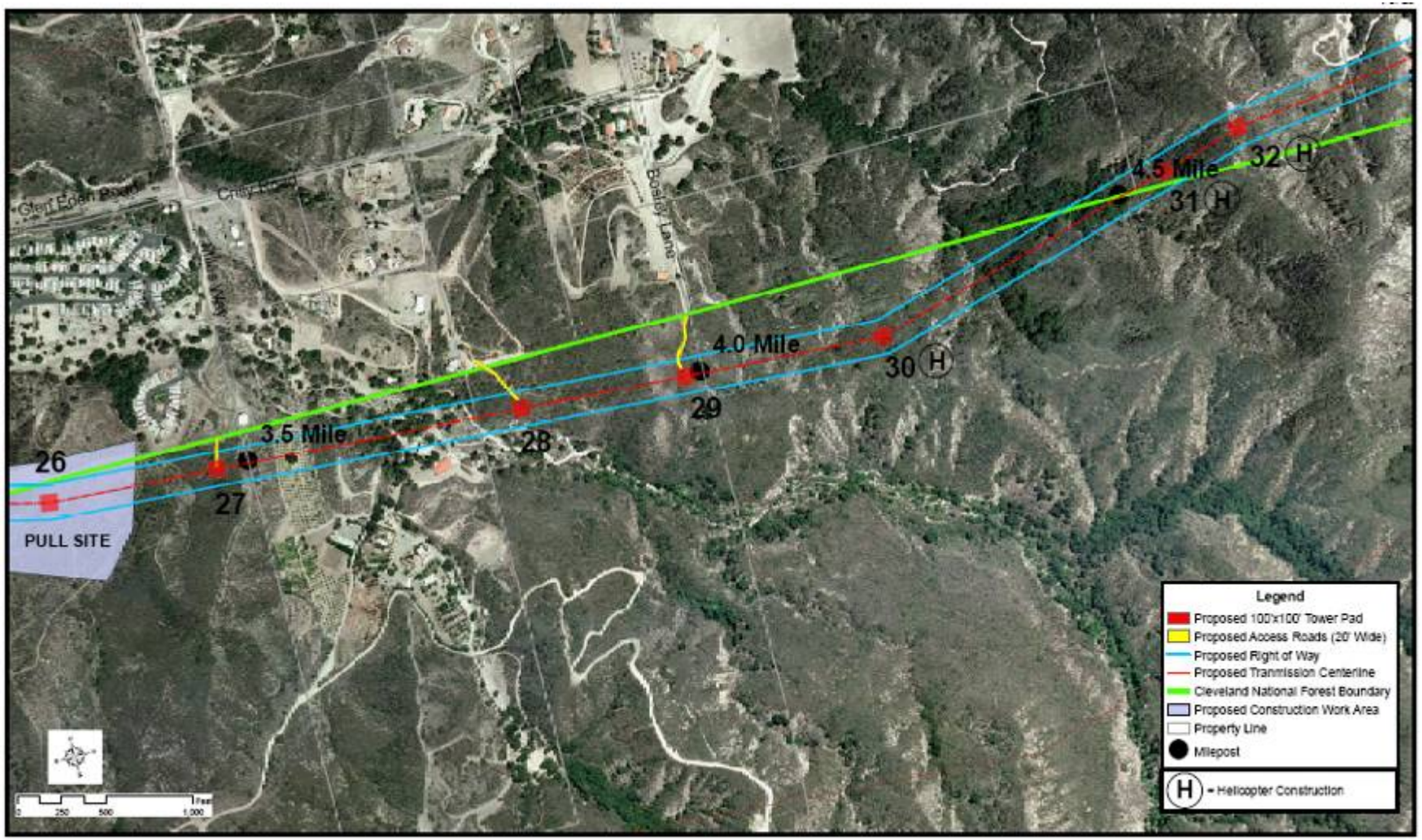

Figure 3.1.1-1 (4 of 23) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

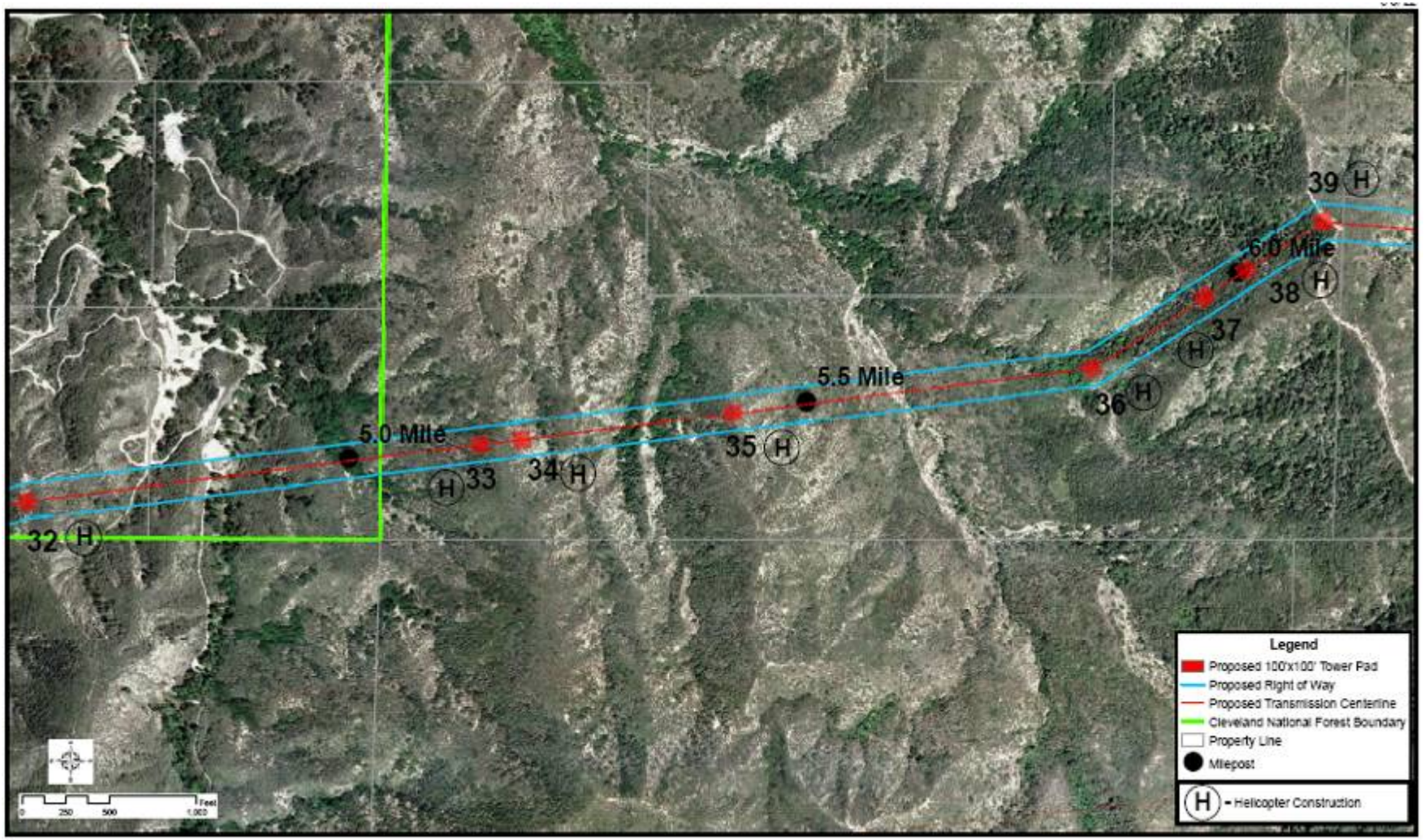

Figure 3.1.1-1 (5 of 23) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

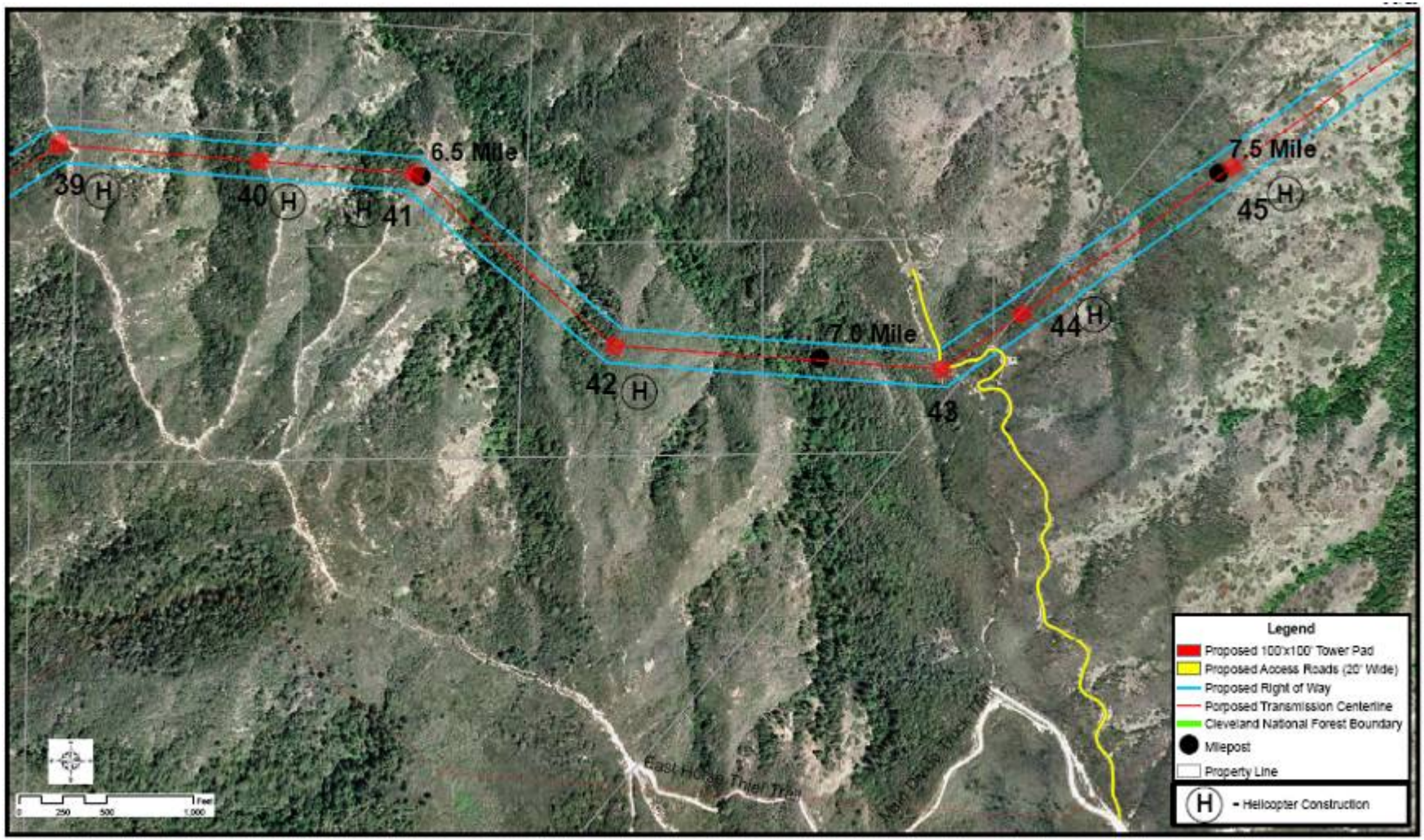

Figure 3.1.1-1 (6 of 23) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

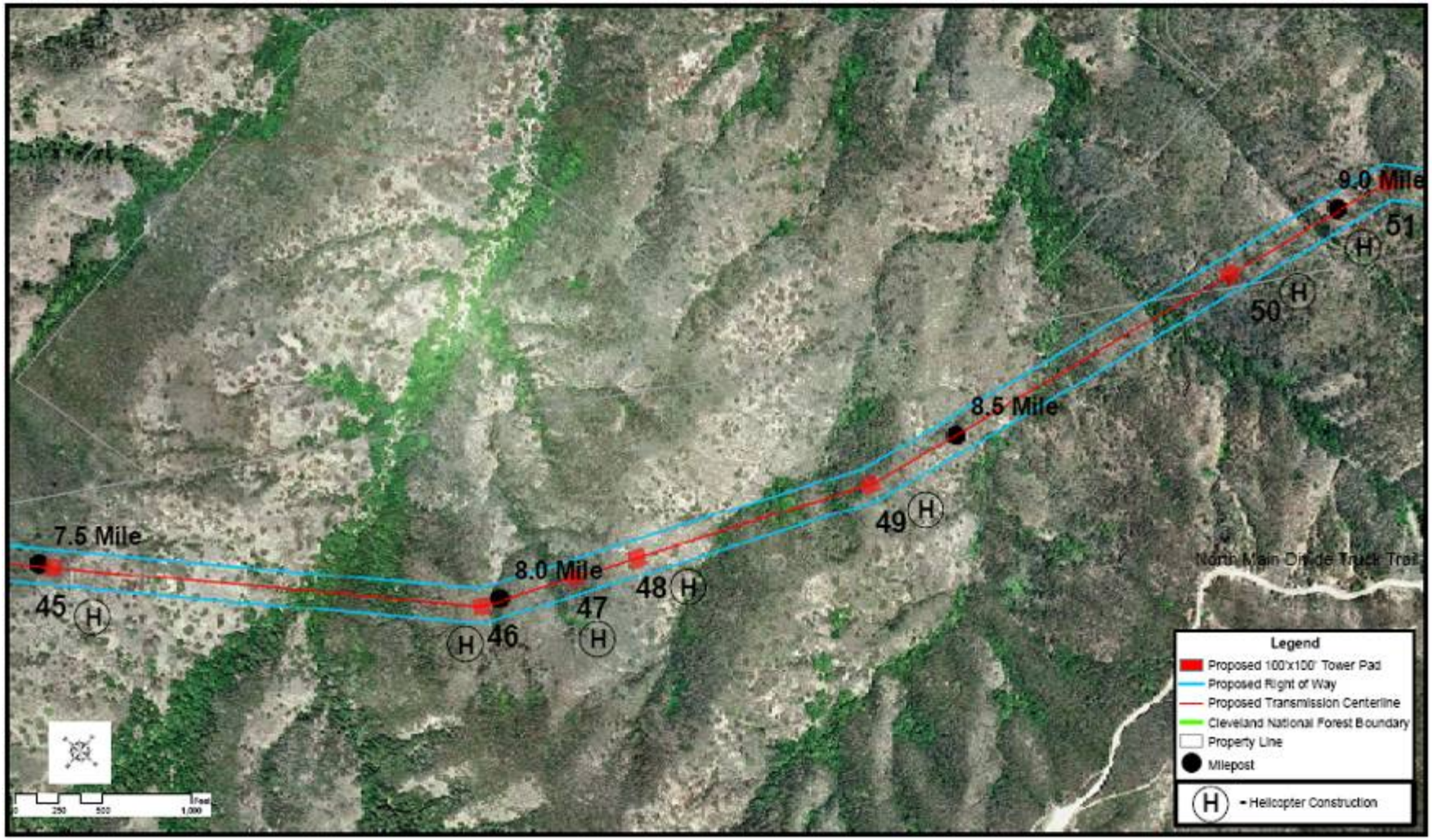

Figure 3.1.1-1 (7 of 23) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

Figure 3.1.1-1 (8 of 23) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

Figure 3.1.1-1 (9 of 23) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

Figure 3.1.1-1 (10 of 23) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

Figure 3.1.1-1 (11 of 23) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

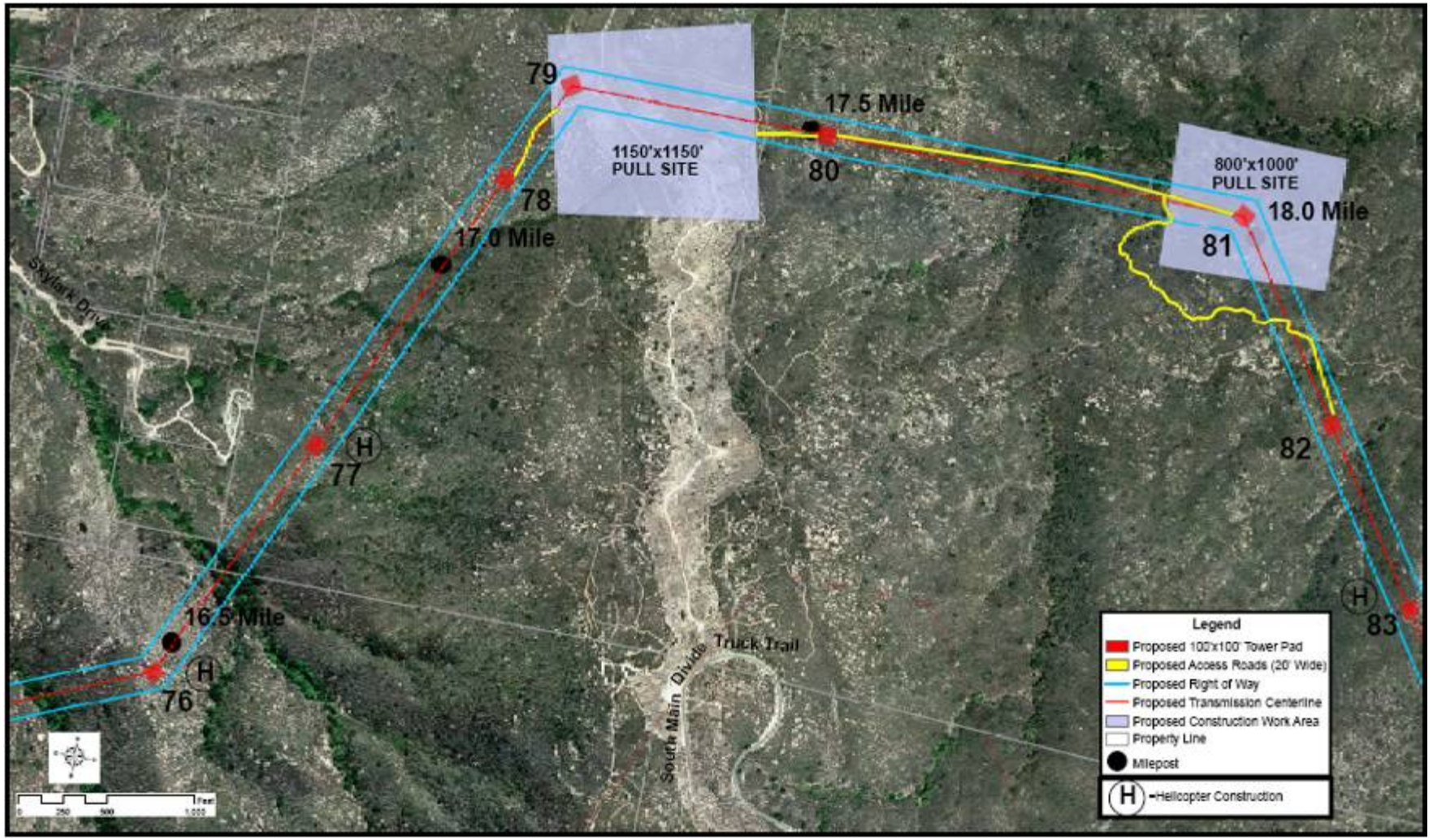

Figure 3.1.1-1 (12 of 23) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

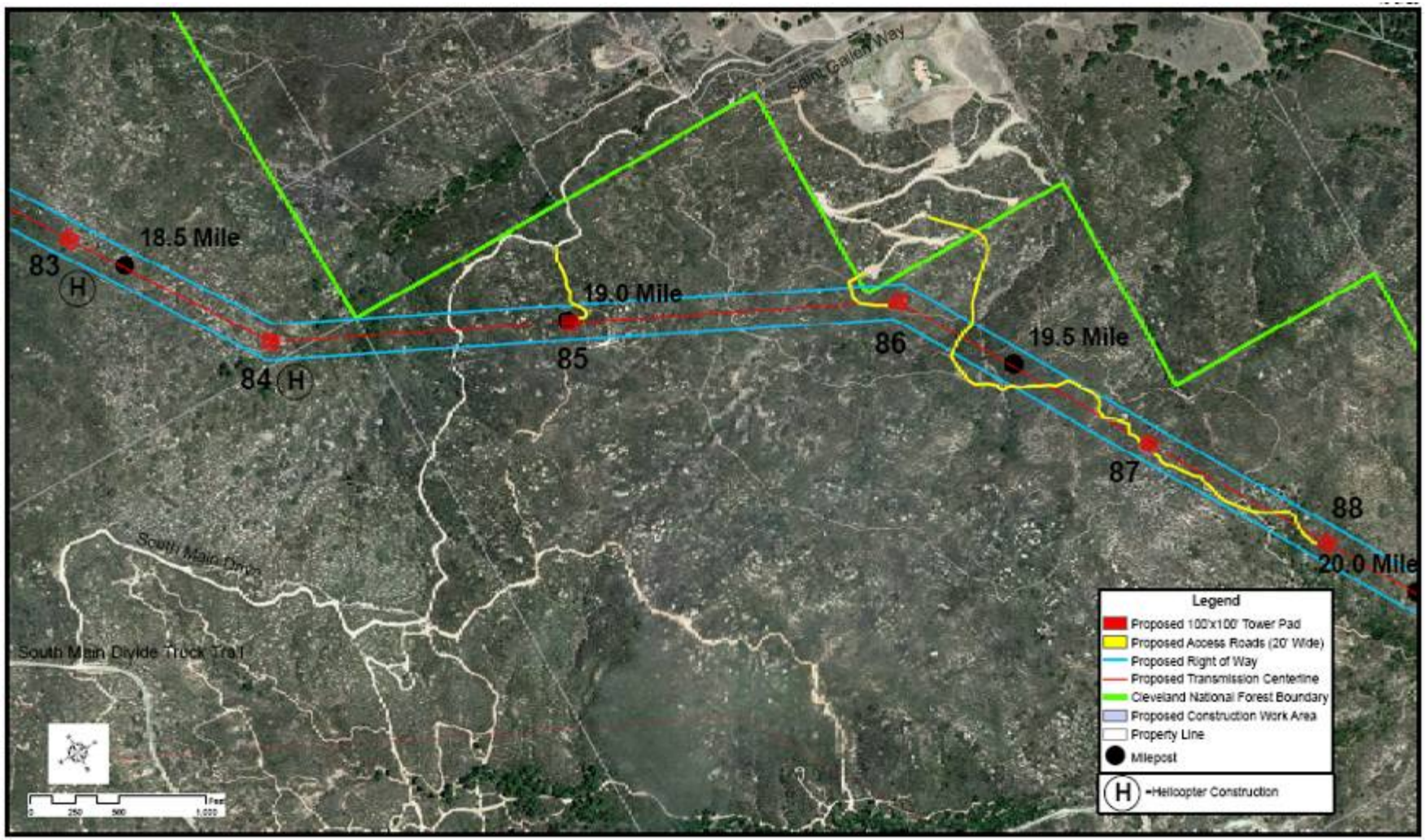

Figure 3.1.1-1 (13 of 23) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

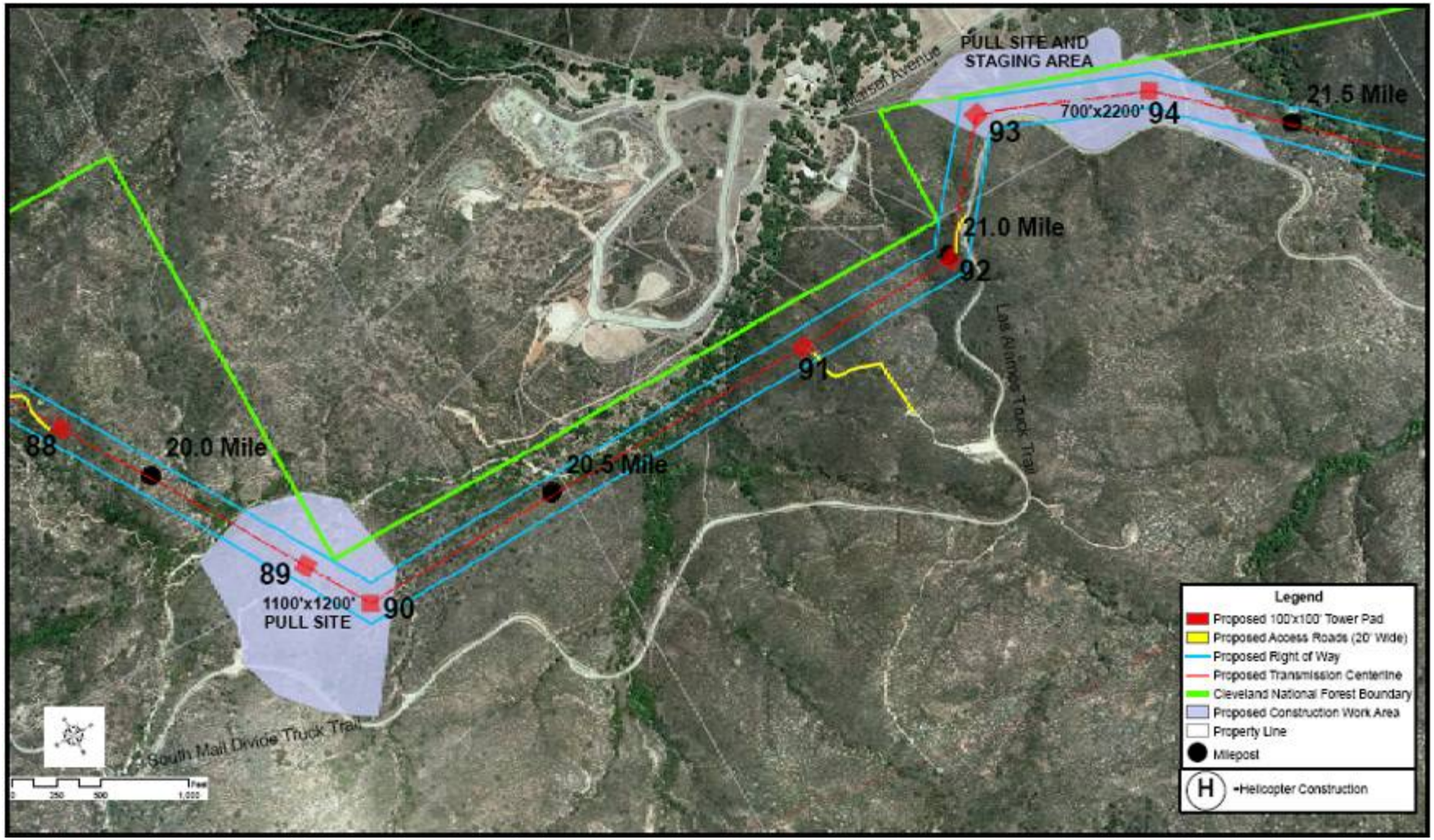

Figure 3.1.1-1 (14 of 23) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

Figure 3.1.1-1 (15 of 23) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

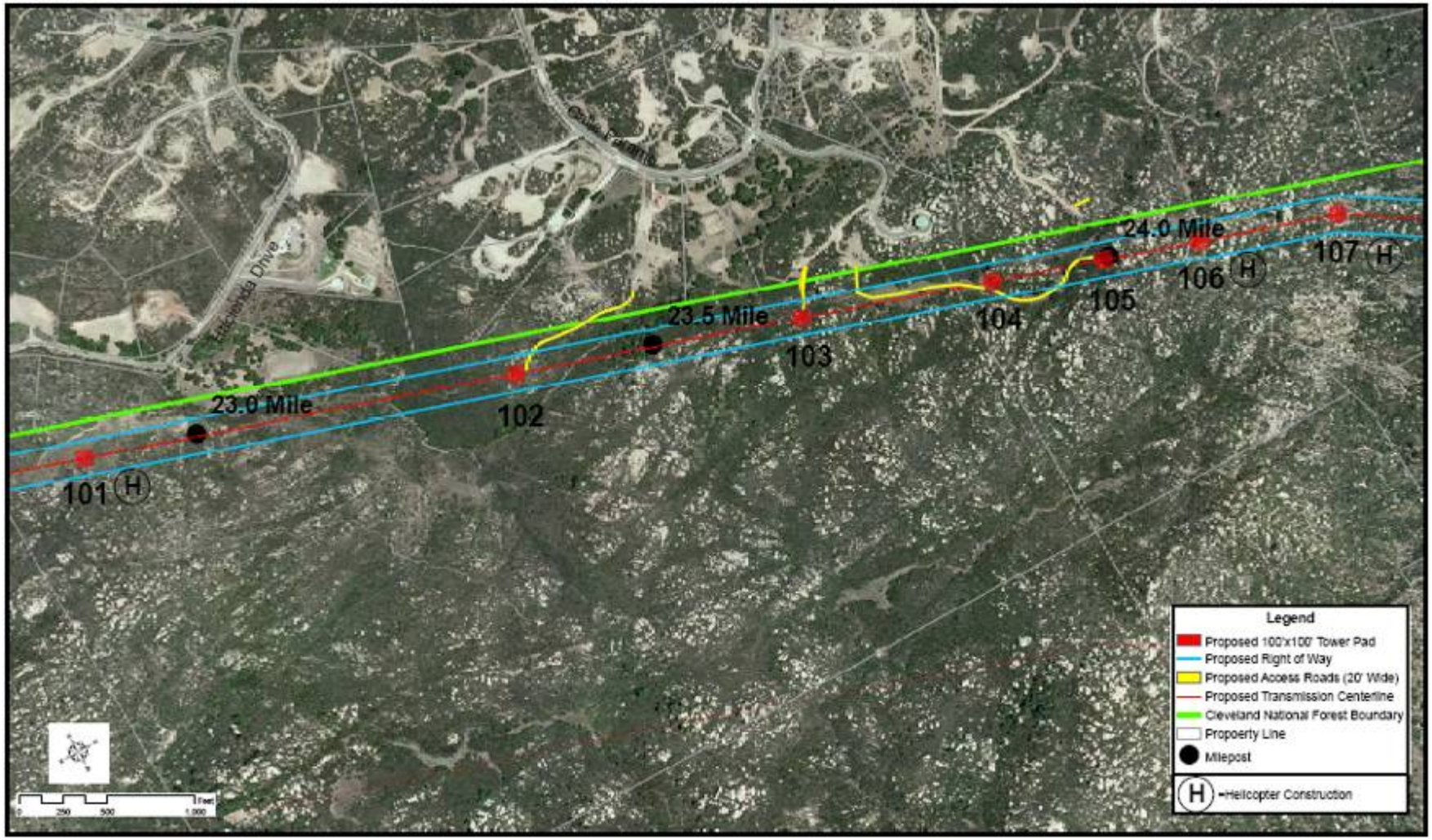

Figure 3.1.1-1 (16 of 23) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

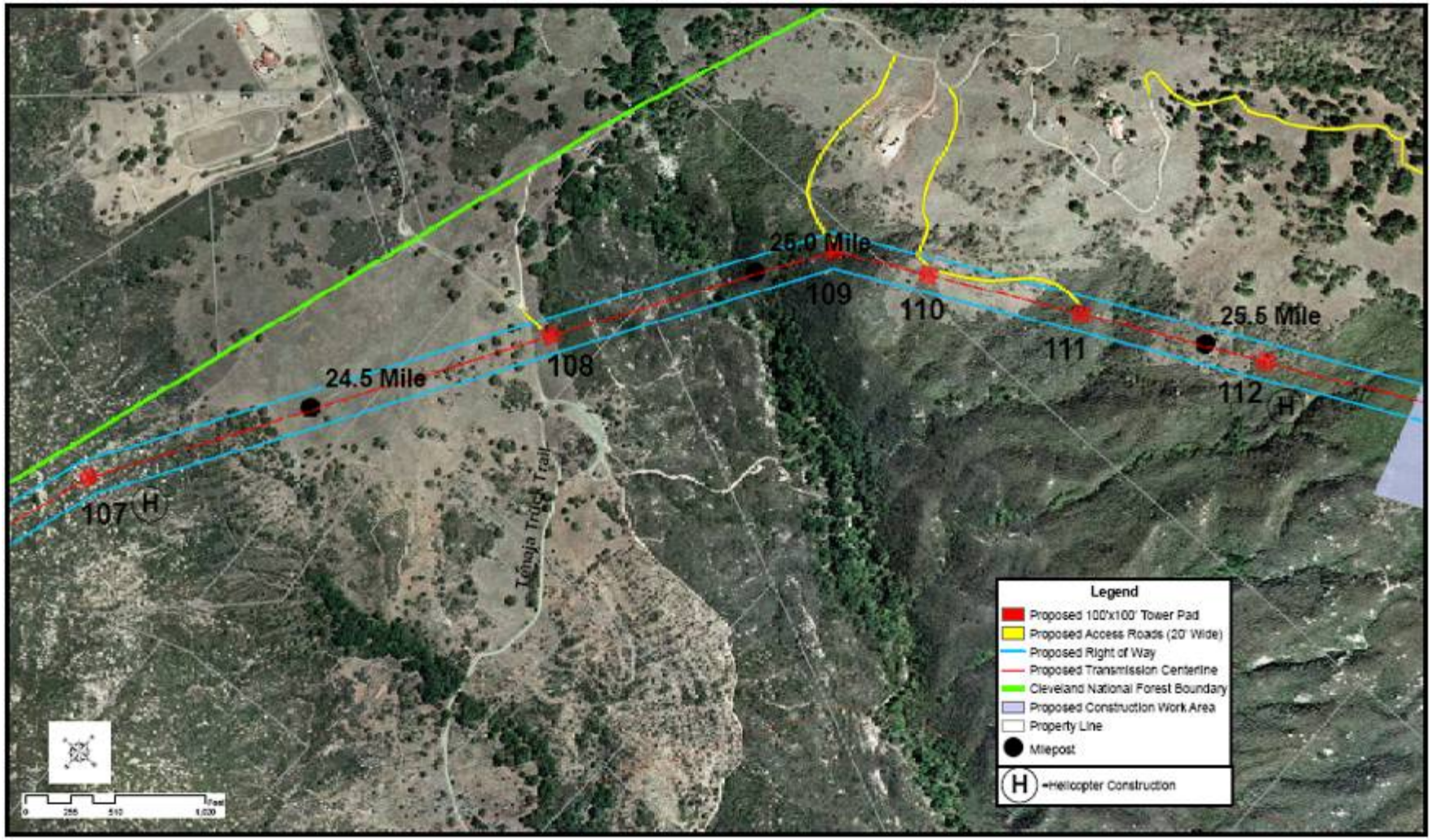

Figure 3.1.1-1 (17 of 23) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

Figure 3.1.1-1 (18 of 23) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

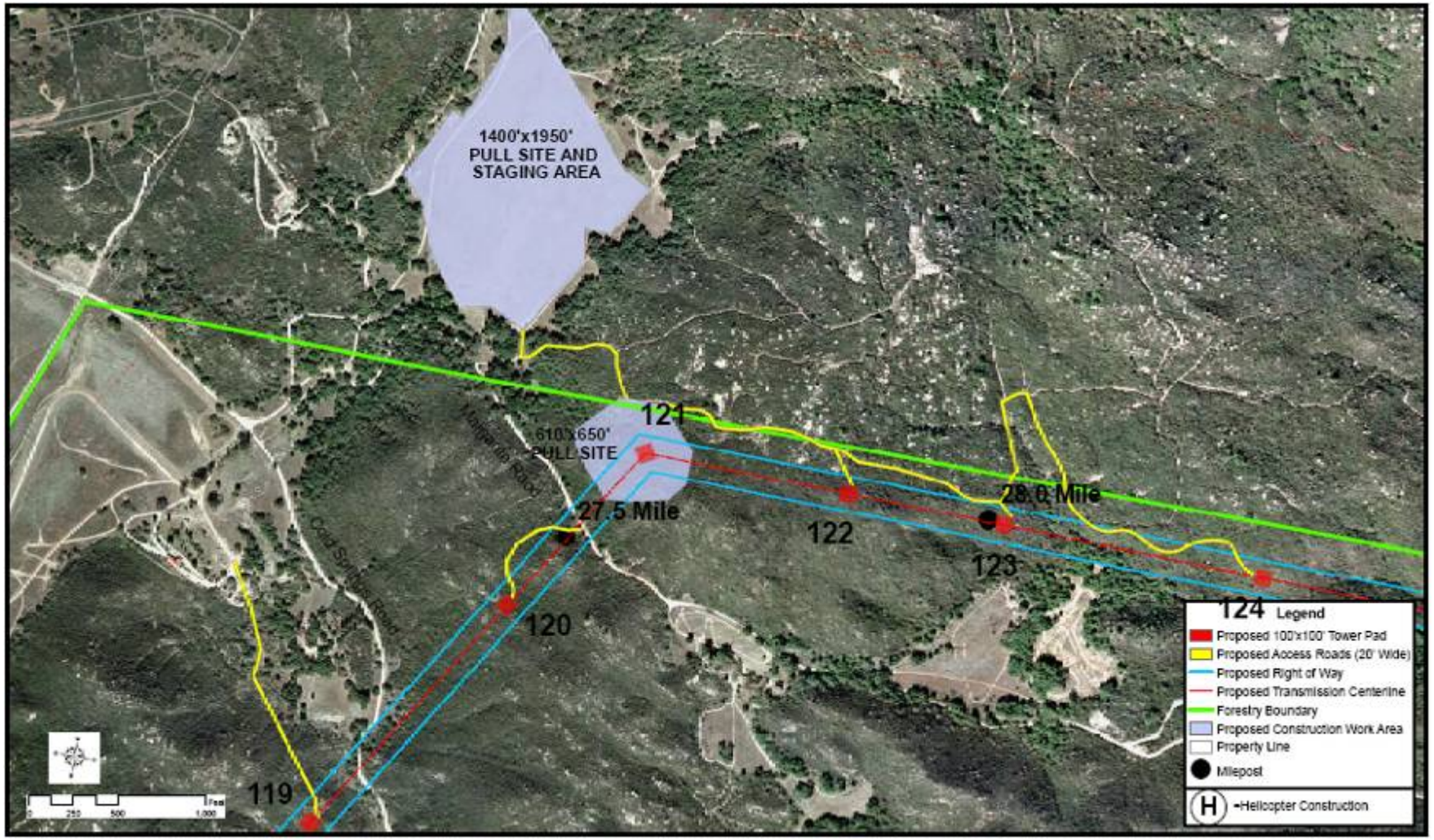

Figure 3.1.1-1 (19 of 23) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

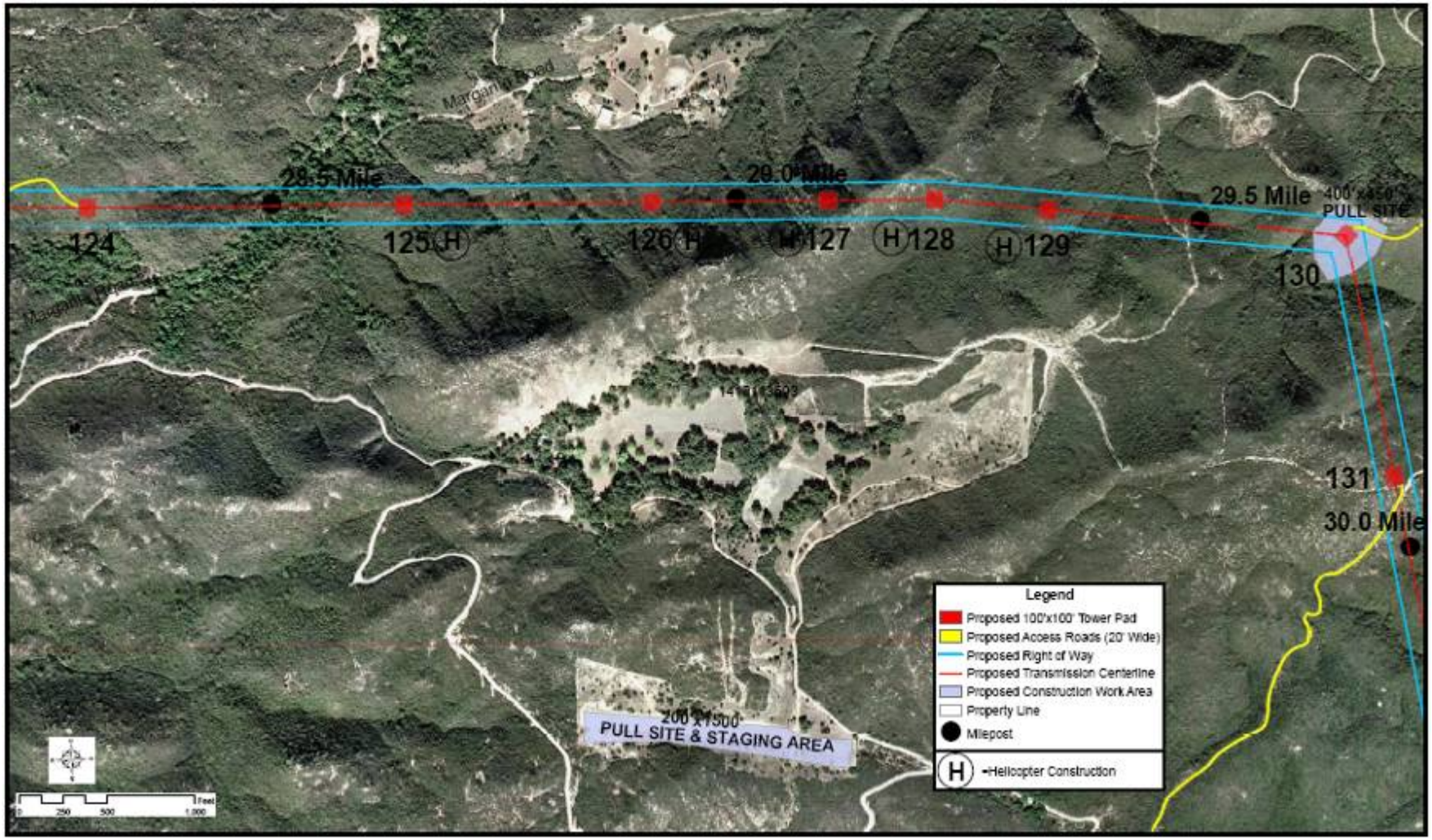

Figure 3.1.1-1 (20 of 23) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

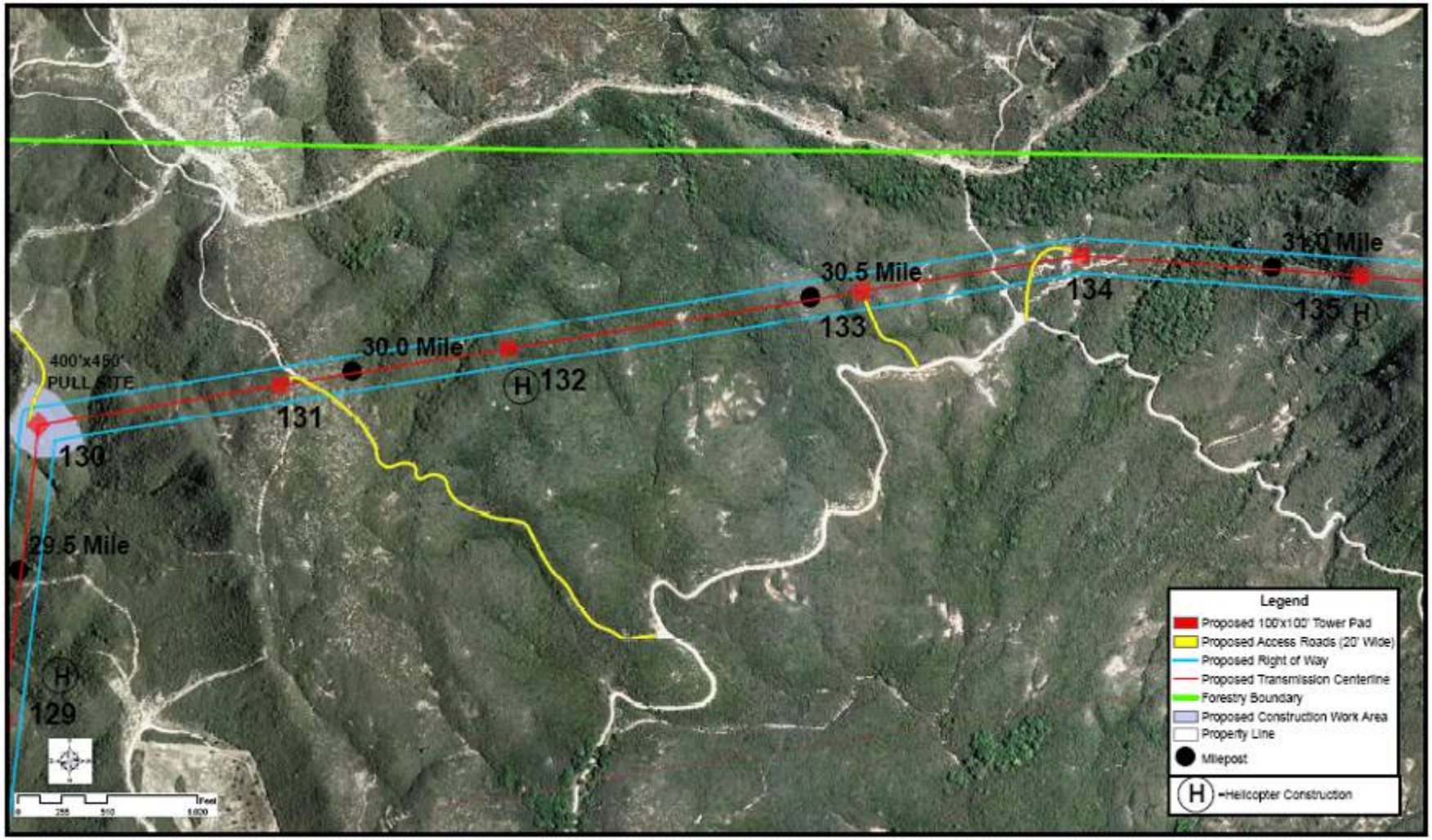

Figure 3.1.1-1 (21 of 23) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

Figure 3.1.1-1 (22 of 23) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

Figure 3.1.1-1 (23 of 23) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

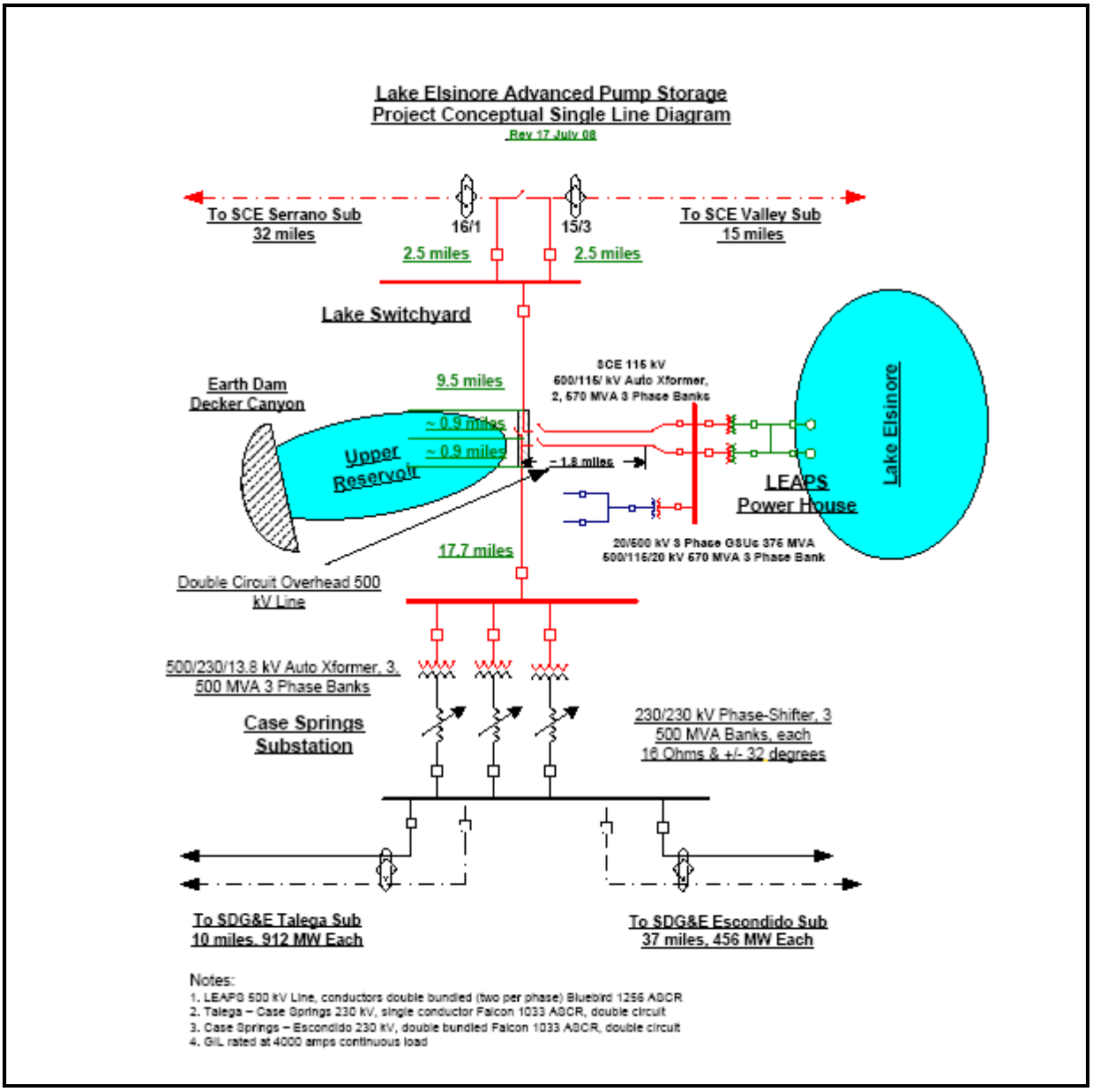

Figure 3.1.1-2 Project Conceptual Single Line Diagram
Source: The Nevada Hydro Company

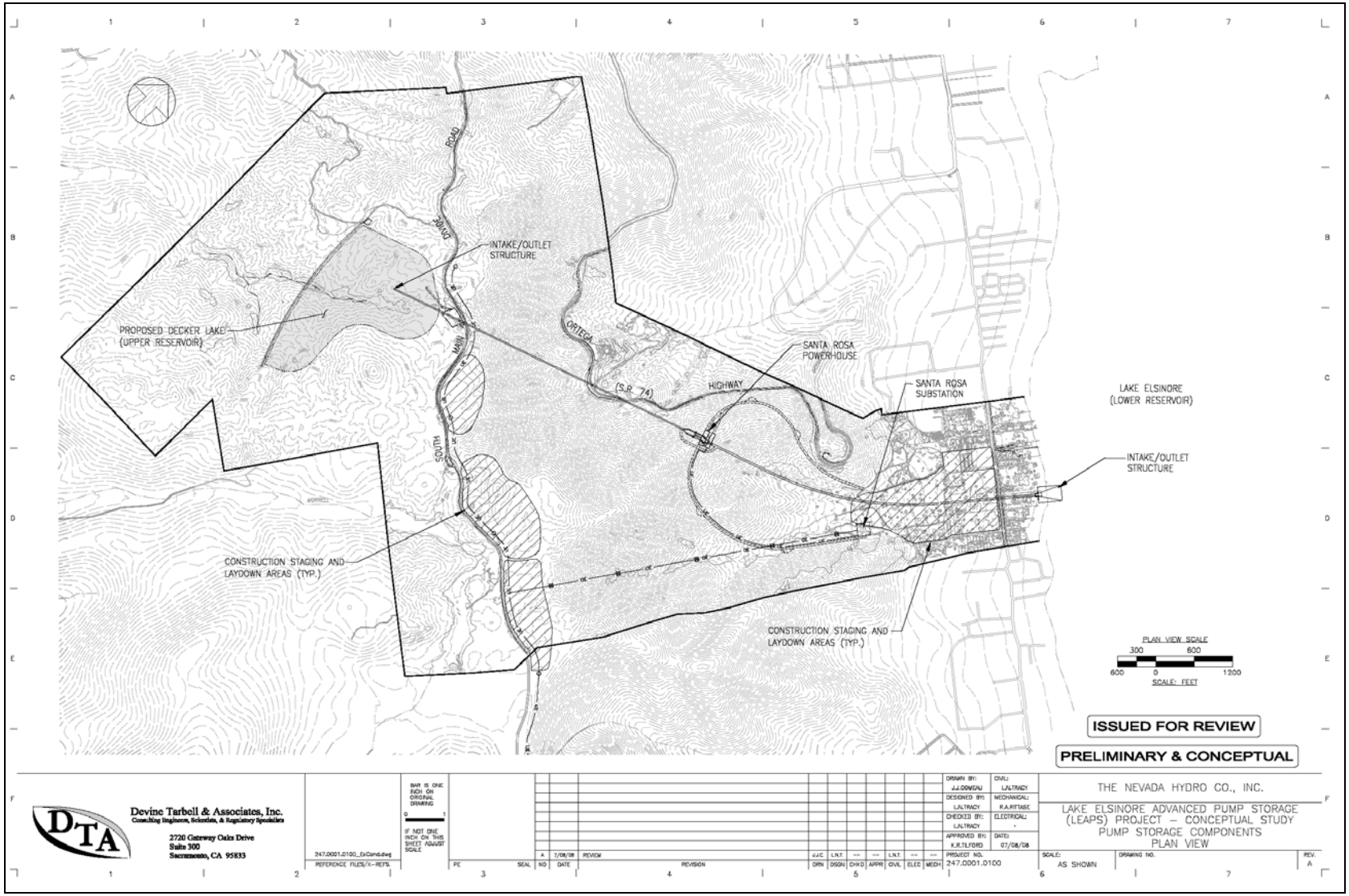

Figure 3.1.1-3 LEAPS Pumped Storage Component
Source: The Nevada Hydro Company

The Project's transmission route has been carefully selected by the Applicant and by the United States Forest Service (Forest Service) and the Federal Energy Regulatory Commission (FERC) to minimize the impact on individual property owners, on public lands, and on the environment. LEAPS complements existing generation by storing energy during low demand periods and releasing the stored energy during peak load periods. As such, LEAPS is beneficial to generation sources such as wind, geothermal and other renewable and non-renewable energy sources that produce power during low value off-peak periods. LEAPS has the advantage of being an air quality-friendly source of energy and an immediate source of both real and reactive power for grid management dispatchers on an instantaneous or near-instantaneous basis in the event of a system disturbance.

The Project has already undergone extensive environmental review by the FERC. The complete FERC record, comprising over 1,600 documents, may be found in FERC docket PN–11858. FERC recently approved rate-based treatment for the TE/VS Interconnect project in docket ER06-278-005, and the project has been designated as a critical state resource by the California Energy Commission in its 2007 Strategic Transmission Investment Plan.[1]

3.1.1 Background - Permit and Licensing

In addition to the application for a certificate of public convenience and necessity (CPCN) from the Commission, the Applicant (and in some cases working in conjunction with the EVMWD) is concurrently processing related applications for the following discretionary permits:

1. A FERC hydropower license for LEAPS and its associated transmission and such other ancillary facilities as may be identified by FERC.

2. Two special use permits (SUPs) from the US Forest Service (Forest Service), including separate SUP applications for the TE/VS Interconnect and LEAPS.

3. Two Section 401 water quality certifications from the State Water Resources Control Board (SWRCB), including separate applications for the TE/VS Interconnect and LEAPS.

4. Two Section 404 permit applications from the United States Army Corps of Engineers (ACOE), including separate applications for the TE/VS Interconnect and LEAPS. TNHC will obtain other discretionary and ministerial permits and approvals as may be required for the project's approval, implementation, operation, and maintenance.

In early 2007, FERC and the Forest Service published a "Final Environmental Impact Statement for Hydropower License – Lake Elsinore Advanced Pumped Storage Project, FERC PN-11858, FERC/EIS-0191F (FEIS) which examines both TE/VS Interconnect project and LEAPS.

3.1.1.1 Licensing for Transmission

The TE/VS Interconnect is identified herein as a stand alone transmission line authorization request to the Commission. Although identified as a "stand-alone" project, the proposed line has

1/ California Energy Commission, Strategic Transmission Investment Plan, October 2007, CEC-700-2007-018CTF.

been examined extensively by FERC in the FEIS. The FEIS examines both the TE/VS Interconnect and LEAPS facilities as related, connected, and cumulative actions. Although FERC is empowered to license the "complete unit of development," the Applicant's concurrent processing of two separate applications (for LEAPS from FERC and for TE/VS Interconnect from the Commission) is based, in part, on the Applicant's inability to foretell the precise nature of the federal entitlements and the possible statutory and/or regulatory limitations, if any, that may govern FERC's ability to fully license all aspects of the proposed Project.

Although we are presenting the combined influences of both the transmission and generation projects in our PEA document, because the CPUC does not have the jurisdiction to authorize the pumped storage facility, TNHC does not seek a certificate of public convenience and necessity (CPCN) from the Commission for that facility. Instead, TNHC requests a CPCN only for the TE/VS Interconnect.

As much of the permitting history for the projects stems from the Federal hydropower licensing of the pumped storage facility by FERC, that process is described in the following section.

3.1.1.2 Licensing for Pumped Storage

The LEAPS facility is the subject of a separate application by the Applicant and the Elsinore Valley Municipal Water District (EVMWD) (FERC PN-11858) to the FERC for a federal hydropower project license under the provisions of the Federal Power Act of 1920 (FPA), as amended and as codified in Chapter 12 of Title 16 of the United States Code (U.S.C.) Parts 791(a)-825(r), and FERC's rules and regulations (18 CFR 4.38).

Running concurrently with the application for the FERC issued hydropower license is the Forest Service' separate federal SUP process (16 U.S.C. 797[b] and 823[b]; 63 FR 65950-65969). That process was initiated, in part, for the purpose of obtaining separate Forest Service authorization for any additional transmission lines, larger wire sizes, modified tower configurations, increased electrical capacity, and other ancillary facilities required to accommodate both the power flows associated with the pumped storage project and the increased power flows associated with the system interconnection and system upgrades, above and beyond those flows associated with or authorized under the federal hydropower license. The Forest Service is acting pursuant to the provisions of Multiple Use-Sustained Yield Act and National Forest Management Act of 1976 (16 U.S.C. 472[a], 521[b], 1600, 1601-1614) and applicable Forest Service manuals, handbooks, and procedures.

The Energy Policy Act of 2005 (Public Law 109-58) (EPAct 2005) "encourages deployment of transmission technologies and other measures to increase the capacity and efficiency of existing transmission facilities and improve the operation of the facilities." Under Section 1223(11), "pumped storage" is classified as an "advanced transmission technology," defined as a technology that increases the capacity, efficiency, or reliability of an existing or new transmission facility. On November 17, 2006, FERC explicitly identified the LEAPS project as an "advanced transmission technology," in part, defining LEAPS as a transmission facility.[2]

2/ ER06–278.

This Project is unlike many projects presented for the Commission's consideration, in that it has already undergone extensive environmental review by the FERC and the Forest Service. The documentation comprising FERC's environmental review record was subjected to public, agency, and third-party peer review. The over 1,600 documents comprising the federal environmental review record for the proposed project may be accessed online at the FERC e-library, and include the following:

- "Initial Stage Consultation Document – Lake Elsinore Advanced Pumped Storage Project, Federal Energy Regulatory Commission, Project Number 11858"[3];

- "Final Application for Major Unconstructed Project – Lake Elsinore Advanced Pumped Storage Project, FERC Project No. 11858"[4];

- "Final Application for License of Major Unconstructed Project - Response to FERC Deficiency Letter for the Lake Elsinore Advanced Pumped Storage Project, Federal Energy Regulatory Commission, Project Number 11858"[5];

- "Draft Environmental Impact Statement for Hydropower License – Lake Elsinore Advanced Pumped Storage Project, FERC Project No. 11858, FERC/EIS-0191D"[6]; and

- "Final Environmental Impact Statement for Hydropower License – Lake Elsinore Advanced Pumped Storage Project, FERC Project No. 11858, FERC/EIS-0191F."[7]

Finally, note that EVMWD and TNHC are co-applicants in the FERC proceeding, and should be considered as a single entity for purposes of permitting associated with the Project. Under the provisions of an agreement between them, the two entities are working together toward the issuance of a FERC hydropower license. Thus, permits may have been applied for and other actions taken by either party. If and when FERC acts, under the provisions of that agreement, EVMWD is obligated to transfer all of its interests in the LEAPS project to TNHC. This includes its interests in both the LEAPS facility and in the TE/VS Interconnect. In the event FERC fails to act, or denies issuance of the hydropower license, the parties have agreed to take appropriate actions to consolidate any rights and obligations in the name of a single party. See Section 3.1.2.1 (Development Agreement) for more information on this agreement.

3.1.1.3 CEQA

3/ Elsinore Valley Municipal Water District and The Nevada Hydro Company, Inc., Initial Stage Consultation Document – Lake Elsinore Advanced Pumped Storage Project, Federal Energy Regulatory Commission, Project Number 11858, April 2001.

4/ Elsinore Valley Municipal Water District and The Nevada Hydro Company, Inc., Final Application for Major Unconstructed Project – Lake Elsinore Advanced Pumped Storage Project, FERC Project No. 11858, February 2004.

5/ Elsinore Valley Municipal Water District and The Nevada Hydro Company, Inc., Final Application for License of Major Unconstructed Project - Response to FERC Deficiency Letter for the Lake Elsinore Advanced Pumped Storage Project, Federal Energy Regulatory Commission, Project Number 11858, November 2004; Elsinore Valley Municipal Water District and The Nevada Hydro Company, Inc., Final Application for License of Major Unconstructed Project - Response to FERC Deficiency Letter for the Lake Elsinore Advanced Pumped Storage Project, Federal Energy Regulatory Commission, Project Number 11858, February 2005.

6/ Federal Energy Regulatory Commission, Draft Environmental Impact Statement for Hydropower License – Lake Elsinore Advanced Pumped Storage Project, FERC Project No. 11858, FERC/EIS-0191D, February 2006.

7/ Federal Energy Regulatory Commission, Final Environmental Impact Statement for Hydropower License – Lake Elsinore Advanced Pumped Storage Project, FERC Project No. 11858, FERC/EIS-0191F, January 2007.

The project proponents had requested that the SWRCB act as the lead agency, and that Agency refused to assume this role. In their April 9, 2008 letter, the Commission has identified the California State Water Resources Control Board (SWRCB) as a Responsible Agency under CEQA.

3.1.1.4 Discretionary Permits, Approvals, and Consultation Requirements

Those federal, State, and local permits and approvals that are or that may be associated with and/or required for the effectuation of these projects are listed in Table 3.3.3-1, Discretionary Permits, Approvals, and Consultation.[8] Some level of consultation has or will occur with each of the identified agencies. Although not explicitly identified, mitigation, fee, or other similar agreements may be required with certain agencies. The sequence in which the agencies are presented does nor infer any prioritization with regards to those agencies.

If LEAPS is licensed by FERC and/or by the Forest Service, the FPA, the EPAct 2005, and/or other federal provisions (including the Commerce and Supremacy Clauses of the United States Constitution) may preempt the need or obligation for the Applicant to obtain, prepare, process, and receive some or all of the entitlements, permits, and approvals identified herein or otherwise required from State and local agencies. For example, the FPA preempts State law that would otherwise apply to the federal hydropower project, except where the FPA explicitly reserves State authority over a specific issue. Those exemptions include Section 401(a)(1) of the CWA which specifies that FERC may not issue a license for a hydropower project unless the state water quality certifying agency has issued a water quality certification or has waived certification. Section 401(d) of the CWA (33 U.S.C. 1341[d]) provides that State certification shall become a condition of any federal license that is issued.

As applicable, under the provisions of the projects' 401 water quality certification, the proposed projects shall conform to those standards identified in the following permits:

- State Water Resource Control Board's (SWRCB) "National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activities, Order 99-08-DWQ, NPDES No. CAS000001"[9] (General Construction Permit);

- California Regional Water Quality Control Board, Santa Ana Region's (SARWQCB) "Waste Discharge Requirements for the Riverside County Flood Control and Water Conservation District, the County of Riverside, and the Incorporated Cities of Riverside County within the Santa Ana Region Areawide Urban Runoff, Order No. R8-2002-0011, NPDES No. CAS 618033"[10] (Riverside County NPDES Permit);

8/ Federal entitlements may be authorized under the provisions of NEPA and based on the information contained in the "Final Environmental Impact Statement for Hydropower License – Lake Elsinore Advanced Pumped Storage Project, FERC Project No. 11858, FERC/EIS-0191D" (FERC/USFS, January 2007).

9/State Water Resource Control Board, National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activities, Order 99-08-DWQ, NPDES No. CAS000001, August 19, 1999.

10/California Regional Water Quality Control Board, Santa Ana Region, Waste Discharge Requirements for the Riverside County Flood Control and Water Conservation District, the County of Riverside, and the Incorporated Cities of Riverside County within the Santa Ana Region Areawide Urban Runoff, Order No. R8-2002-0011, NPDES No. CAS 618033, October 25, 2002.

- California Regional Water Quality Control Board, San Diego Region's (SDRWQCB) "Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Storm Sewer System Draining the Watersheds of the County of San Diego, the Incorporated Cities of San Diego County, the San Diego Unified Port District, and the San Diego County Regional Airport Authority, Tentative Order No. R9-2006-0011, NPDES Permit No. CAS0108758"[11] (San Diego County NPDES Permit); and

- SDRWQCB's "General Waste Discharge Requirements for Discharges of Hydrostatic Test Water and Potable Water to Surface Waters and Storm Drains or other Conveyance Systems, San Diego Region, Order No. R9-2002-0020, NPDES No. CAG679001."[12]

Pursuant to Section 27 of the FPA (16 U.S.C. 821), "nothing contained herein shall be construed as affecting or intending to affect or in any way to interfere with the laws of the respective States relating to the control, appropriation, use, or distribution of water used in irrigation or for municipal or other uses, or any vested right acquired therein."

In California, the SWRCB is responsible for the issuance of water quality certification (Section 13160, CWC) and for the administration of surface water rights (Sections 1000-5976, CWC). A water rights permit is not required for the use of purchased water, groundwater, or reclaimed water. Waters used by the EVMWD and by other agencies to stabilize water levels in Lake Elsinore are from water purchases, groundwater wells, and the authorized discharge of reclaimed waters. As such, there exist no outstanding water rights issues associated with the proposed projects.

Table 3.3.3-1 Discretionary Permits, Approvals, and Consultation
Source: The Nevada Hydro Company, Inc.

Discretionary Permits, Approvals, and Consultation (Federal, State, & Local Agencies and Tribal Governances)	
Federal Agencies	
Federal Energy Regulatory Commission Hydro West Branch 2 888 First Street, NE Washington, DC 20426	Federal hydropower license
Secretary of Energy United States Department of Energy 1000 Independence Ave., SW Washington, DC 20585	Consultation
United States Forest Service Cleveland National Forest Trabuco Ranger District 1147 E. Sixth Street Corona, California 92879	Forest Plan amendment SUP authorization Easements or other real property conveyances Forest plan amendment or interpretation Timber settlement sale
Bureau of Land Management Palm Springs South Coast Field Office 690 W. Garnet Avenue (P.O. Box 581260) North Palm Springs, California 92258-1260	Easements or other real property conveyances

11/California Regional Water Quality Control Board, San Diego Region, Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Storm Sewer System Draining the Watersheds of the County of San Diego, the Incorporated Cities of San Diego County, the San Diego Unified Port District, and the San Diego County Regional Airport Authority, Tentative Order No. R9-2006-0011, NPDES Permit No. CAS0108758, August 30, 2006.

12/California Regional Water Quality Control Board, San Diego Region, General Waste Discharge Requirements for Discharges of Hydrostatic Test Water and Potable Water to Surface Waters and Storm Drains or other Conveyance Systems, San Diego Region, Order No. R9-2002-0020, NPDES No. CAG679001, August 14, 2002.

Discretionary Permits, Approvals, and Consultation (Federal, State, & Local Agencies and Tribal Governances)	
U.S. Environmental Protection Agency, Region 9 75 Hawthorne Street San Francisco, California 94105	Conformity determination Prevention of significant deterioration permit
United States Department of the Interior United States Fish and Wildlife Service Carlsbad Field Office 6010 Hidden Valley Road Carlsbad, California 92011	Section 7 consultation Take authorization
National Marine Fisheries Service Southwest Region - Habitat Conservation Division 501 West Ocean Boulevard, Suite 4200 Long Beach, California 90802	Section 7 consultation Take authorization
United States Department of the Interior Office of the Secretary of the Interior 1849 "C" Street N.W. Washington, DC 20240	Notification of impending loss of archaeological resources
United States Department of the Interior San Francisco Region 600 Harrison Street, Suite 515 San Francisco, California 94107-1376	Notification of impending loss of archaeological resources
United States Army Corps of Engineers Los Angeles District 911 Wilshire Boulevard P. O. Box 2711 Los Angeles, California 90053-2325	Section 404 individual or nationwide permit Section 10 permit
United States Department of the Navy Office of the Secretary of the Navy 1000 – Navy Pentagon Washington, D.C. 20350-1000	License for non-federal use of real property
United States Department of the Navy Southwest Division 1220 Pacific Highway San Diego, California 92132	License for non-federal use of real property
United States Marine Corps Camp Joseph H. Pendleton Natural Resources Department Box 555010 Camp Pendleton, California 92055-5010	License for non-federal use of real property Base Commander General consultation
Federal Aviation Administration Western-Pacific Region - Air Traffic Division 1500 Aviation Boulevard Hawthorne, California 90250	Notice of proposed construction or alteration (Form 746001)
National Park Service Pacific West Region 600 Harrison Street, Suite 600 San Francisco, California 94107	Section 106 consultation
Advisory Council on Historic Preservation 1100 Pennsylvania Avenue, MW, Suite 803 Old Post Office Building Washington, DC 20004	Section 106 consultation
United States Bureau of Indian Affairs Pacific Regional Office 2800 Cottage Way Sacramento, California 95825	Section 106 consultation
State Agencies	
California Public Utilities Commission 505 Van Ness Avenue San Francisco, California 94102	Certificate of public convenience and necessity Permit to construct

Discretionary Permits, Approvals, and Consultation (Federal, State, & Local Agencies and Tribal Governances)	
California Independent System Operator P.O. Box 639014 Folsom, California 95763-9014	Acceptance of operational control
California Department of Water Resources Southern District 770 Fairmont Avenue Glendale, California 91203	Certificate of approval of plans and specifications
California Department of Water Resources Division of Safety of Dams 2200 "X" Street, Suite 200 Sacramento, California 95818-2502) P. O. Box 942836 Sacramento, California 94236-0001	Certificate of approval of plans and specifications
California Department of Fish and Game South Coast, Region 5 4949 Viewridge Avenue San Diego, California 92123	Streambed alteration agreement
California Department of Fish and Game Eastern Sierra and Inland Desert Region, Region 6 3602 Inland Empire Boulevard, Suite C-220 Ontario, California 91764	Streambed alteration agreement
California Fish and Game Commission 1416 9th Street, Room 1320 Sacramento, California 95814	Application for fishway
State Water Resources Control Board Division of Water Rights 1001 "I" Street P.O. Box 2000 Sacramento, California 94814	Statement of water diversion and use Permit to appropriate water Section 401 water quality certification
California Regional Water Quality Control Board Santa Ana Region (8) 3737 Main Street, Suite 500 Riverside, California 92501	Section 401 water quality certification NPDES and associated storm water permits Storm water pollution prevention plan
California Regional Water Quality Control Board San Diego Region (9) 9174 Sky Park Court, Suite 100 San Diego, California 92123-4340	Section 401 water quality certification NPDES and associated storm water permits Storm water pollution prevention plan
California Department of Transportation, District 8 464 W. Fourth Street, 6th Floor San Bernardino, California 92401-1400	Highway crossing permit Right-of-way easements Encroachment permit
South Coast Air Quality Management District 21865 E. Copley Drive Diamond Bar, CA 91765	Permit to construct Permit to operate
San Diego County Air Pollution Control District 9150 Chesapeake Drive San Diego, CA 92123-1096	Permit to construct Permit to operate
California Department of Industrial Relations Division of Occupational Safety and Health 1515 Clay Street, Suite 1901 Oakland, California 94612	Construction activities permit Tower cranes permit Helicopter operations permit Tunneling permit
California State Lands Commission 100 Howe Avenue, Suite 100 South Sacramento, California 95825-8202	Lease or permit for use of non-tidal navigable waters
Local Agency Formation Commission 3850 Vine St, Suite 110 Riverside, California, 92507-4277	Change of organization
California Coastal Commission San Diego Coast District Office 7575 Metropolitan Drive, Suite 103 San Diego, California 92108-4402	Consultation

Discretionary Permits, Approvals, and Consultation (Federal, State, & Local Agencies and Tribal Governances)	
Local Agencies	
County of Riverside Planning Department 4080 Lemon Street P.O. Box 1409 Riverside, California 92502-1409	MSHCP permit General plan amendment and zone change Tentative map, easement, or lot line adjustment Dedication and acceptance Conditional use permit NPDES and associated storm water permits Stormwater pollution prevention plan
County of Riverside Flood Control and Water Conservation District 1995 Market Street Riverside, California, 92501	Development review Flood hazard report and conditions Cooperative agreement Encroachment permit Site plan review
Riverside County Health Department Environmental Health Services 4065 County Circle Drive, Room 123 Riverside, California 92503	Drilling permit (water well)
County of San Diego Planning and Land Use Department 5201 Ruffin Road, Suite B San Diego, California 92123	Tentative map, easement, or lot line adjustment NPDES and associated storm water permits Stormwater pollution prevention plan Building permits
County of San Diego Department of Environmental Health Land and Water Quality Division P.O. Box 129261 San Diego, California 91221-9261	Drilling permit (water well)
City of Lake Elsinore Community Development Department 130 S. Main Street Lake Elsinore, California 92530	Tentative map, easement, or lot line adjustment Prezoning and annexation General Plan amendment and zone change Shoreline buffer zone Dedication and acceptance Design review
Metropolitan Water District of Southern California 700 North Alameda Street Los Angeles, California 90012-2944 P.O. Box 54153 Los Angeles, California 90054-0153	Real property conveyance or encroachment permit Water purchase agreement
Western Riverside County Regional Conservation Agency 4080 Lemon Street, Twelfth floor Riverside, California 92501	Real property conveyance or encroachment permit Joint project review
Lake Elsinore Unified School District 545 Chaney Street Lake Elsinore, California 92530	School or facilities agreement
Tribal Governances	
Agua Caliente Band of Cahuilla Indians 600 E. Tahquitz Canyon Palm Springs, California 92262	Section 106 consultation
Juaneno Band of Mission Indians Acjachemen Nation 31411-A La Matanza Street San Juan Capistrano, California 92675	Section 106 consultation
La Jolla Band of Mission Indians 22000 Highway 76 Pauma Valley, California 92061	Section 106 consultation
Pala Band of Mission Indians 35008 Pala Temecula Road, PMB 50 Pala, California 92059	Section 106 consultation

Discretionary Permits, Approvals, and Consultation (Federal, State, & Local Agencies and Tribal Governances)	
Pauma/Yuima Band of Mission Indians P.O. Box 369 Pauma Valley, California 92061	Section 106 consultation
Pechanga Band of Mission Indians P.O. Box 1477 Temecula, California 92593	Section 106 consultation
Rincon Band of Mission Indians P.O. Box 68 Valley Center, California 92082	Section 106 consultation
Gabrieleno/Tongva Tribal Council of San Gabriel P.O. Box 693 San Gabriel, California 91776	Section 106 consultation
Juaneno Band of Mission Indians 31742 Via Belardes San Juan Capistrano, California 92675	Section 106 consultation
Juaneno Band of Mission Indians 27001 La Paz Road, Suite 330 Mission Viejo, California 92691	Section 106 consultation
San Luis Rey Band of Mission Indians 1042 Highland Drive Vista, California 92083	Section 106 consultation

3.1.2 Existing Project Development Agreements

The following agreements are now in place and may affect the Project, have potential bearing on the Project's design, and/or influence the Project's operations.

3.1.2.1 Development Agreement

The EVMWD and TNHC have entered into a development agreement whereby the EVMWD has conveyed to TNHC the "exclusive right to develop, build, and operate the project." The "Development Agreement by and between Elsinore Valley Municipal Water District and The Hydro Company, Incorporated," dated May 15, 1997, in combination with any subsequent agreements that may be executed between the parties, define the roles, responsibilities, and obligations of both parties with respect to the LEAPS project. As stipulated in the Development Agreement: "[The Nevada Hydro Company] will pay the District for performance of water management services, which performance shall include, without limitation, maintaining the water level sufficient for operation of the project, at Lake Elsinore from revenues resulting from power generation operations of the project." [13]

Referencing the SARWQCB's "Lake Elsinore and Canyon Lake Nutrient Total Maximum Daily Loads": "The average amount of supplemental water needed to maintain Lake Elsinore at 1240 to 1247 feet (considered the appropriate operation range) is 8,800 AFY. Under worst-case drought conditions, up to 13,800 AFY of supplemental water may be needed to maintain the lake elevation above 1240 feet. Of these amounts, 5,000 AFY is assumed to come from the groundwater via three island wells, while the balance would come from recycled wastewater

13/California Regional Water Quality Control Board, San Diego Region, General Waste Discharge Requirements for Discharges of Hydrostatic Test Water and Potable Water to Surface Waters and Storm Drains or other Conveyance Systems, San Diego Region, Order No. R9-2002-0020, NPDES No. CAG679001, August 14, 2002.

from either EMWD or EVMWD."[14] TNHC's obligations, if any, under the Development Agreement for any fee payment for water management services are, therefore, limited to those identified by the SARWQCB with regards to elevation 1240 feet AMSL.

3.1.2.2 Power Agencies of California

In 1994, the EVMWD executed a letter agreement with the Cities of Anaheim, Azusa, Banning, Colton, and Riverside (Cities) which may or could remain applicable to the LEAPS project. Under the terms of that agreement and subject to the provisions therein, the Cities agreed to surrender the Cities' then existing preliminary permit under now-expired FERC PN-11261, to support the issuance of any permit, license, or authorization relative to the development of the "Lake Elsinore Pumped Storage Project," retained the right to intervene (either jointly or individually) in any proceedings involving the issuance of a permit, license, or other authorization necessary or relevant to the development of that project in exchange for the EVMWD's agreement to:

1. "Sell to the Cities, collectively or individually, up to a total of 75 megawatts (MW) of capacity and provide associated peaking energy of at least 6 megawatt-hours of MW each week from the project under terms and at price to be negotiated and set forth" in a "30 year power sales agreement" (PSA).

2. "Design the project in such a way so that it is capable of providing, subject to prudent utility practices and the terms of EVMWD's regulatory authorization, such capacity and associated peaking energy."

In the event that the EVMWD and the Cities are unable to agree upon the terms of such PSA, the EVMWD agreed to give the Cities a one time right-of-first refusal to purchase up to 75 MW of capacity from the "LEAPS facility" under the same terms and conditions agreed to for the sale from that project to a third party.

As specified in the Development Agreement: "District represents and warrants that it has obtained from each of the Cities an effective waiver of the provisions of Section VII of the letter agreement with Cities which waive shall be acceptable to Company in form and content. Company hereby undertakes to honor District's obligations, if any, under Section V of the letter agreement with Cities." [15]

3.1.2.3 City of Lake Elsinore

On March 1, 2003, the EVMWD and the City of Lake Elsinore executed a "Lake Elsinore Comprehensive Water Management Agreement." The stated purpose of that agreement was to: (1) clarify and restate the rights and obligations of the EVMWD and the City with respect to the use of San Jacinto River flows for domestic, municipal, and industrial uses in the EVMWD's

14/California Regional Water Quality Control Board, San Diego Region, General Waste Discharge Requirements for Discharges of Hydrostatic Test Water and Potable Water to Surface Waters and Storm Drains or other Conveyance Systems, San Diego Region, Order No. R9-2002-0020, NPDES No. CAG679001, August 14, 2002.

15/California Regional Water Quality Control Board, San Diego Region, General Waste Discharge Requirements for Discharges of Hydrostatic Test Water and Potable Water to Surface Waters and Storm Drains or other Conveyance Systems, San Diego Region, Order No. R9-2002-0020, NPDES No. CAG679001, August 14, 2002.

service area and for recreational use of Lake Elsinore, and fish and wildlife enhancement; and (2) provide the term and framework by which the EVMWD and the City will work together to provide supplemental water supplies, when available and within the resources of the community, to maintain the elevation of Lake Elsinore, to the extent feasible, at a minimum level of 1240 feet AMSL.

That agreement included the following provisions with regards to the project: "The District has explored and continues to explore the possible approval and implementation of the Lake Elsinore Advanced Pumped Storage facility. This project envisions drawing water from Lake Elsinore as part of the project. The City agrees to cooperate with the District in analyzing and to discuss plans regarding the use of water stored in the lake to implement the LEAPS facility. In no event shall the LEAPS facility result in the permanent diversion or increased evaporation of water already in the lake without providing for the introduction of suitable replacement water at the District's or the project proponent's sole cost. Moreover, the LEAPS facility, if implemented, shall not interfere with the recreational use of Lake Elsinore, adversely impact fish and wildlife enhancement in and around Lake Elsinore, or in any way frustrate the ability of the parties, or either of them, to accomplish the objectives and purpose of this agreement."

3.2 Project Location

With the exception of remote system upgrades, described in the interconnection facilities studies performed by SCE and SDG&E[16] and also described herein, the project's general location is depicted in Figure 3.1.2-1 Regional Vicinity Map and includes those portions of Riverside, San Diego, San Bernadino, and Orange Counties in which the proposed transmission alignment and other project-related facilities are located. The area illustrated also encompasses SCE's existing Valley-Serrano 500 kV transmission line and SDG&E's existing 230 kV Talega-Escondido transmission line, since those systems would be interconnected as a result of the construction and operation of the project. As shown, the project area generally extends from north and west of the City of Lake Elsinore (Riverside County) southward to north and east of the City of Oceanside (San Diego County) westward toward the San Onofre Nuclear Generating Station (SONGS) (San Diego County), and eastward to City of Escondido (San Diego County).

The TE/VS Interconnect transmission component of the Project is shown on Figure 3.1.1-1, Talega-Escondido/Valley-Serrano 500 kV Interconnect Project. The TE/VS Interconnect lines would be located in portions of the San Jacinto River Basin north of Lake Elsinore and would travel southwardly along the eastern side of the Santa Ana Mountains connecting to existing transmission lines near Camp Pendleton Marine Corp Base. Primary land uses for this area are related to recreation, residential, conservation, and U.S. Department of Defense property.

The Talega-Escondido upgrade sections (TE line) of the project consist of 51 miles of reconductoring of the existing line, located primarily in northern San Diego and Southern Orange Counties. The TE line intercepts the south terminus of the TE/VS Interconnect line and extends westward to the SDG&E Talega Substation on the southern side of Camp Pendleton and eastward to the Escondido Substation. This ROW was previously permitted by SDG&E and

16/Southern California Edison Company, Nevada Hydro Company, Inc. and Elsinore Valley Municipal Water District Lake Elsinore Advanced Pumped Storage Project, Southern California Edison Company Facilities Study, November 30, 2006; San Diego Gas & Electric Company, Lake Elsinore Advanced Pumped Storage Project, Interconnection Facilities Study, Draft Report, December 15, 2006.

provides for reconductoring as proposed in this PEA & LGIA. In addition, under EPA 2005, 3M ACCR conductor is proposed, see Attachment 2.

LEAPS would be located immediately west of Lake Elsinore and extending up to the crest of the Santa Ana mountains near South Main Divide Road as shown on Figure 3.1.1-3, LEAPS Pumped Storage Component.

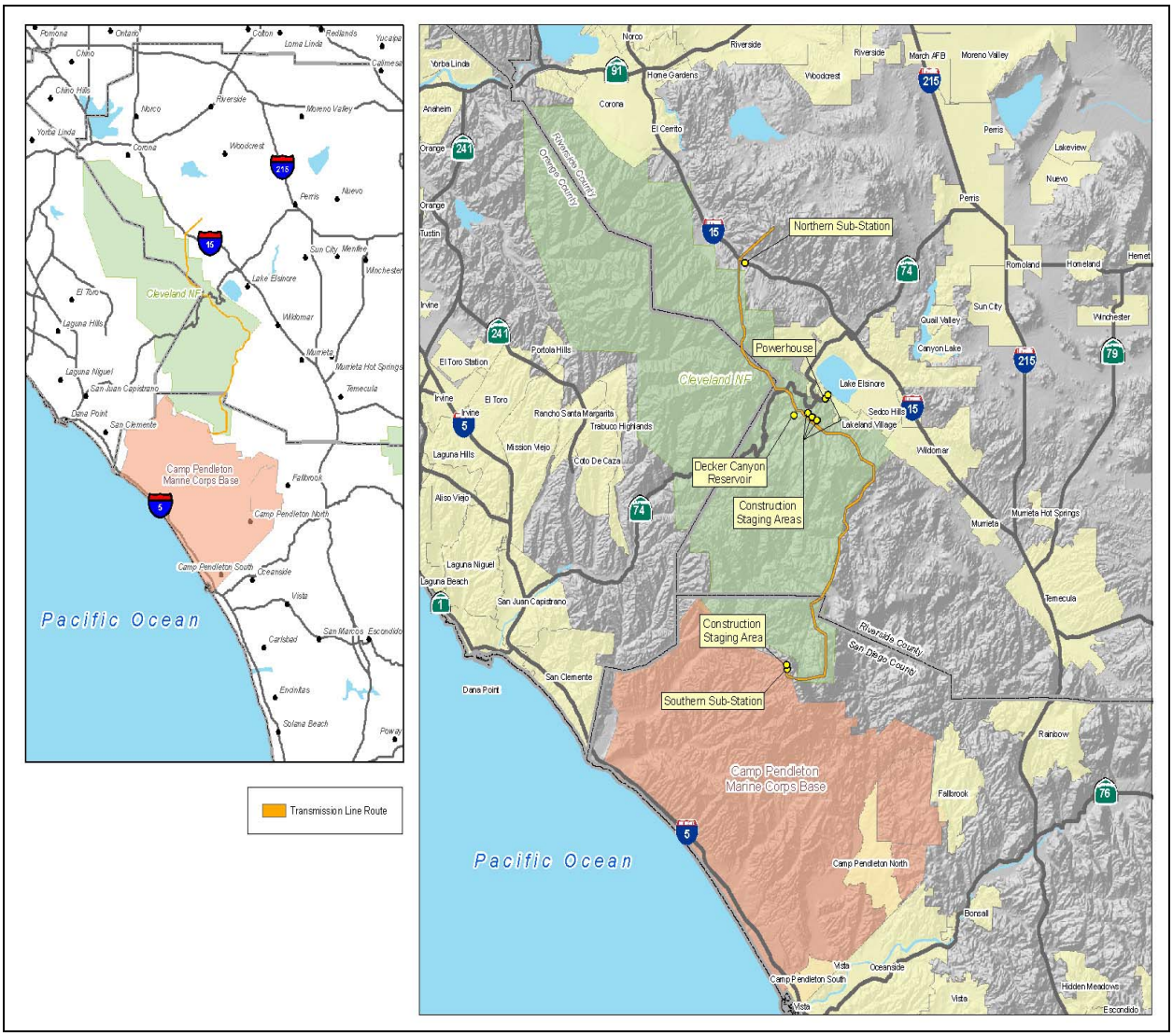

Figure 3.1.2-1 Regional Vicinity Map
Source: The Nevada Hydro Company

3.2.1 Geographical Location

Portions of the projects are or may be located on public and privately owned lands located in unincorporated portions of southwestern Riverside County, northeast Orange County, and northwestern San Diego County and within the corporate boundaries of the City of Lake Elsinore. Public lands upon which the Proposed Project facilities are proposed include or may include properties under the ownership or control of the following governmental entities.

- City of Lake Elsinore, including lands located within the ordinary high-water mark (OHWM) of the inland water body known as Lake Elsinore (Lake Elsinore);

- Counties of Orange, Riverside, and San Diego;

- Western Riverside County Regional Conservation Agency (RCHCA), Metropolitan Water District of Southern California (MWD), and California Department of Fish and Game (CDFG), including lands located within the Lake Mathews-Estelle Mountain Reserve;

- California Department of Transportation (Caltrans), including lands within the rights-of-way for the Interstate 15 (Corona) Freeway and State Route 74 (Ortega Highway);

- National Forest System (NFS) lands located within the Congressional boundaries of the Cleveland National Forest (CNF) – Trabuco Ranger District (TRD);

- United States Marine Corp Base Camp Base Joseph H. Pendleton (Camp Pendleton);

- United States Department of the Interior – Bureau of Land Management (BLM), including lands located within the Lake Mathews-Estelle Mountain Reserve.

SDG&E's Talega-Escondido 230 kV transmission line is located in northern San Diego and Southern Riverside County. The transmission line terminates south of the County of Orange at its western terminus at the existing Talega Substation and extends into Riverside County west of Camp Pendleton to Escondido.

Project elements associated with LEAPS are located in southwestern Riverside County, near Lake Elsinore. Lake Elsinore lies approximately 60 miles southeast of Los Angeles and about 22 miles southwest of the City of Riverside. Lake Elsinore is located within the corporate boundaries of the City of Lake Elsinore (City) and is a natural low point of the San Jacinto River and its drainage basin. Over 90 percent of that watershed drains first into Railroad Canyon Reservoir (Canyon Lake) and then flows into Lake Elsinore.

3.2.2 General Description of Land Uses Within the Proposed Project

A detailed description of land use is provided in Chapter 4, but a general discussion of land use is provided in this section to assist review.[17]

3.2.2.1 Land Use Associated with the Transmission Alignments

Most of the TE/VS Interconnect transmission alignment is located within the CNF boundary. This alignment crosses primarily CNF lands, with private land crossings at the northern and southern portions of the route. Most of this area is undeveloped land characterized by forests, chaparral, and coastal sage habitats, sometimes in the vicinity of single-family homes or other land uses, such as a private airstrip and the Forest Service Wildomar OHV area.

17/The description provided to the Commission in this section is excerpted from § 3.3.7 of the FEIS.

The central section of the facility would be placed underground where it traverses the ridgeline in a popular hang-gliding launch area located west of Lakeland Village, Lake Elsinore, and the city of Lake Elsinore. From this central area, the proposed alignment would cross primarily undeveloped areas.

Development within 0.5 mile of the proposed transmission alignment (starting from the central point and moving north or south) includes the following:

- Proposed northern overhead transmission alignment—El Cariso fire station, single-family homes in the growing residential area of El Cariso Village, the Glen Eden Policy Area, Glen Eden Sun Club community, Sycamore Creek community, Interstate 15, and nearby commercial properties.

- Proposed southern overhead transmission alignment—single-family homes in Lakeland Village, single-family homes in the growing residential area of El Cariso Village, single-family homes in the La Cresta area, Forest Service Tenaja guard station, scattered ranch houses, and a private landing strip.

The land use associated with the TE line are more varied. These include public land, agricultural use, residential and commercial uses. Specific land use has been evaluated and summarized by SDG&E in other licensing efforts. Additional detailed land use information can be provided.

3.2.2.2 Land Use Associated with LEAPS

Facilities for LEAPS include the upper reservoir site, headrace tunnel, underground powerhouse, tailrace tunnel and associated construction area staging and tunnel access sites. The pumped storage land uses are shown on Sheet 24 of Figure 3.1.1-1, Talega-Escondido/Valley-Serrano 500 kV Interconnect project. Generally, the features upstream and including the powerhouse are located within the Cleveland National Forest. The tailrace tunnel, Lake Elsinore inlet/outlet and associated tunnel access roads and construction area are located on located on private land.

This area of the Cleveland National Forest is bordered almost entirely by urban development. CNF lands provide a scenic backdrop valued by its urban communities and motorists traveling between Los Angeles and San Diego along Interstate 15, and from Riverside to Orange County along Ortega Highway (SR-74). The area includes both east-facing and west-facing slopes of the Santa Ana and Elsinore Mountains. Communities on the east-facing slope in the area include El Cariso, located southwest of Lake Elsinore and west of Ortega Highway, and Lakeland Village, located south of Lake Elsinore and east of Ortega Highway. On the west-facing slopes, small residential communities include Rancho Capistrano, located on a private in-holding in the Cleveland National Forest.

The proposed upper reservoir site is located in the Cleveland National Forest. The area around the proposed upper reservoir is used primarily for recreation associated with hiking. The upper reservoir site is located near hang gliding launch sites along South Main Divide Road, which also serves as the sole access road to the homes at Rancho Capistrano (approximately 4 miles southeast of Ortega Highway) and for recreational access to the Wildomar OHV area

(approximately 9 miles southeast of Ortega Highway). Slightly farther east is Elsinore Peak, where the Forest Service has issued a special use permit for operation of telecommunications facilities, currently comprising six towers and five buildings. West of the proposed and alternate upper reservoir sites, nearby land uses include the Forest Service El Cariso fire station, an adjacent visitor information facility, and a campground. Figure 3.2.2-1 Land Use Near Upper Reservoir Site indicates the types and locations of nearby land uses. Several land use classifications are also shown in Figure 3.1.1-1, Talega-Escondido/Valley-Serrano 500 kV Interconnect project.

The proposed LEAPS powerhouse site is located approximately 1000 feet deep beneath the mountains west of the developed area along the south shore of Lake Elsinore, south of Grand Avenue. The area along Grand Avenue is characterized by a mix of single-family residences, small commercial establishments, multi-family residential development, and vacant property. New single-family residential developments are filling in some of the vacant properties.

The proposed 30 acre Santa Rosa construction laydown area is located on undeveloped private property adjacent to the unincorporated community of Lakeland Village. The construction laydown area proposed for this site nearly abuts Grand Avenue to the east, but is outside the Cleveland National Forest boundary. With the exception of numerous dirt trails that crisscross the property, the laydown site is vacant. Sheet 23 of Figure 3.1.1-1 Talega-Escondido/Valley-Serrano 500 kV Interconnect project indicates the types and locations of nearby land uses. These include multi-family residential properties such as the Santa Rosa Mountain Villa apartments fronting along Santa Rosa Drive, the Butterfield Elementary Visual and Performing Arts Magnet School on Grand Avenue, and single-family homes along Union Avenue, Magnolia Street, and other nearby streets. Single-family homes along Grand Avenue in this vicinity have direct access to Lake Elsinore. Developed private residential property comprises the land use east of Grand Avenue in the vicinity of the proposed lower tailrace tunnel inlet/outlet on the shore of Lake Elsinore.

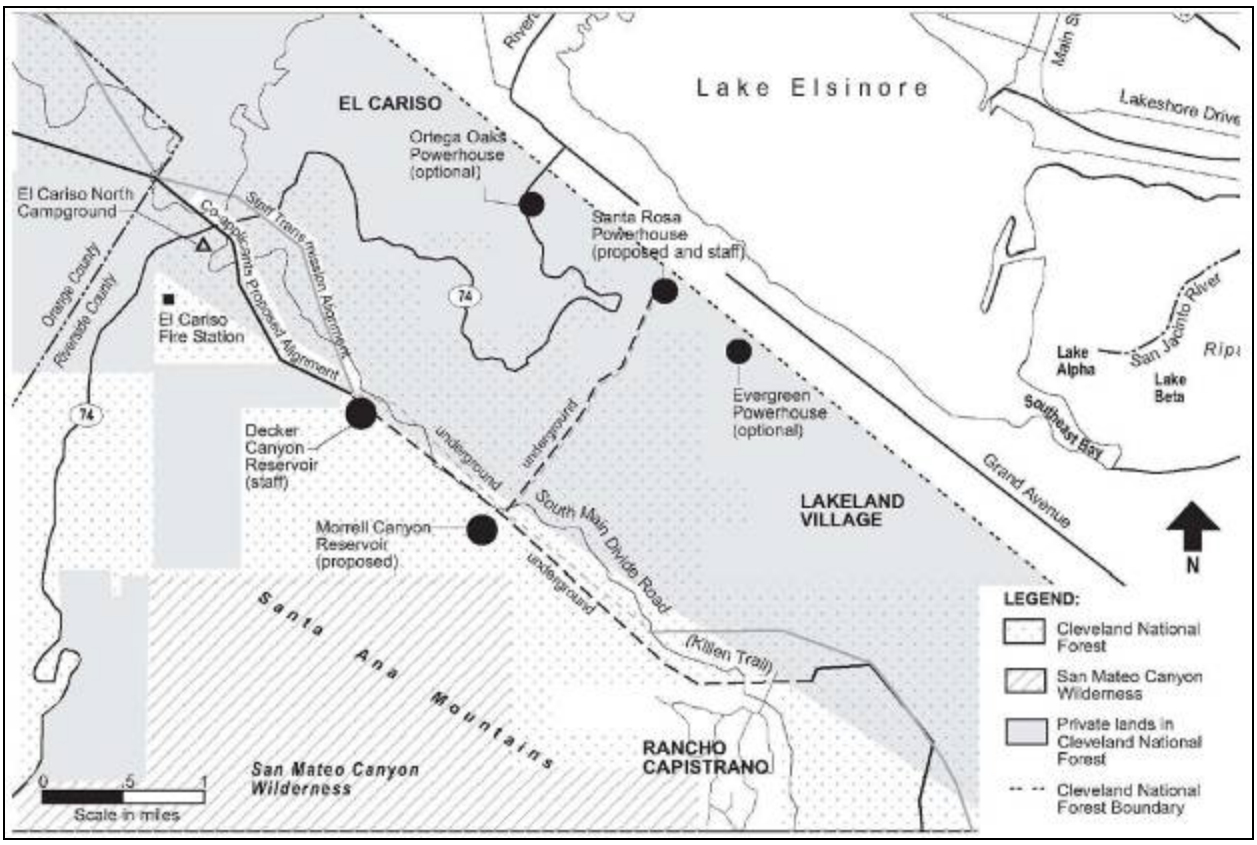

Figure 3.2.2-1 Land Use Near Upper Reservoir Site
Source: FERC

3.3 Existing System

The Project sits between the SCE and SDG&E service areas and connects the two systems for the first time at a 500 kV level. These two existing systems are described in the following sections.

From a national perspective, the project resides in the Southwestern United States transmission system. Figure 3.3-1 Southwestern U.S. Transmission System Schematic depicts graphically the relevant portion of the national system with the addition of the Proposed Project. Figure 3.3-2 Southern California System Schematic, graphically depicts the southern California system with the addition of the Proposed Project.

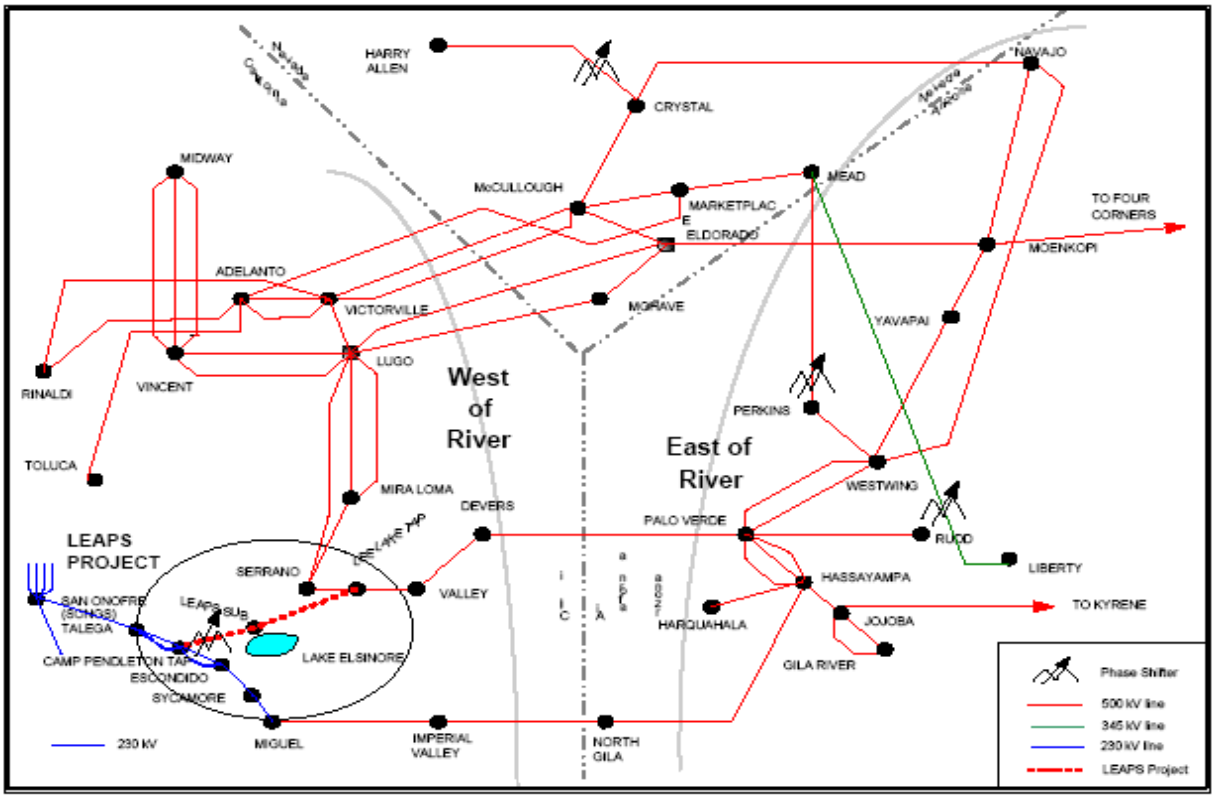

Figure 3.3-1 Southwestern U.S. Transmission System Schematic
Source: The Nevada Hydro Company

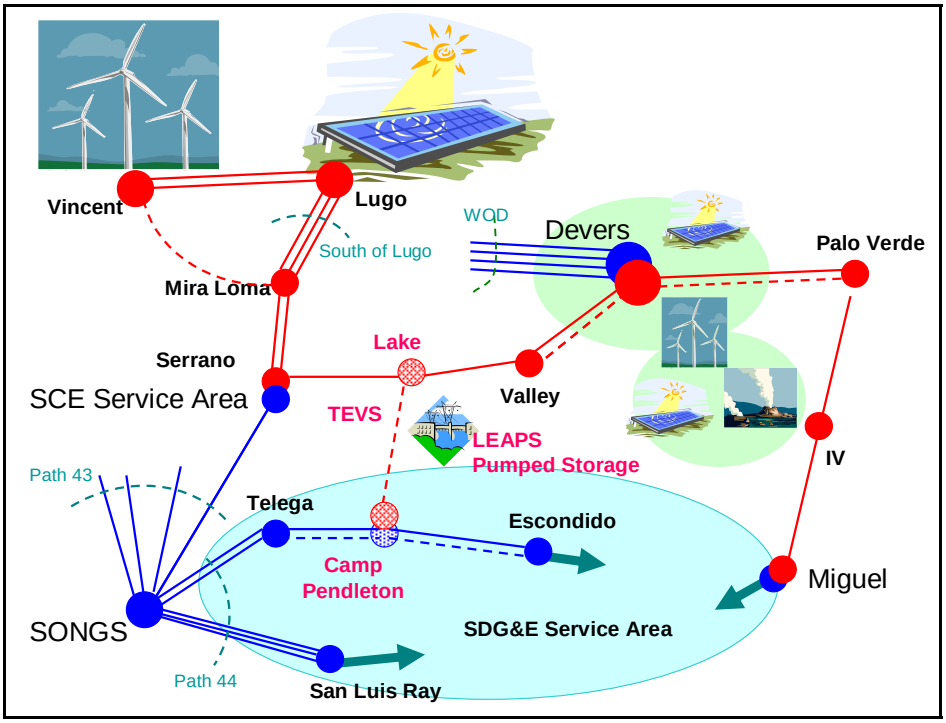

Figure 3.3-2 Southern California System Schematic
Source: The Nevada Hydro Company

SCE System

SCE is the largest electric utility in California, providing service over 50,000 square-mile area within central, coastal and southern California. SCE owns all of its electrical transmission facilities and equipment, but since the deregulation of California's electricity market, the company owns little generation, except for its hydroelectric plants, totaling about 1,200 MW, and its 75% share of the 2,150 MW San Onofre Nuclear Generating Station. Most of the generation in southern California is now owned by other companies.

SCE's power grid is linked on the north to Pacific Gas & Electric's (PG&E) system by the Path 26 wires that generally follow Interstate 5 over Tejon Pass. The interconnection takes place at the Buttonwillow Substation. PG&E's and WAPA's Path 15 and Path 66, respectively, from Buttonwillow north eventually connect to BPA's grid in the Pacific Northwest. There are several other interconnections with local and out-of-state utilities, such as Path 46.

The SCE transmission network consists of mainly 500 kV and 230 kV transmission lines with multiple long corridors connecting remote generation or other utilities. The system consists of roughly 1,183 miles of 500 kV, 3,574 miles of 230 kV and 1,846 miles of 115 kV high voltage lines with the 115 kV system providing both main grid or distribution services. The SCE transmission system connects the southern California load center with major generation sources located in Arizona, Northern California and the Pacific Northwest. A map showing SCE's service territory appears as Figure 3.3-3 SCE Service Territory.

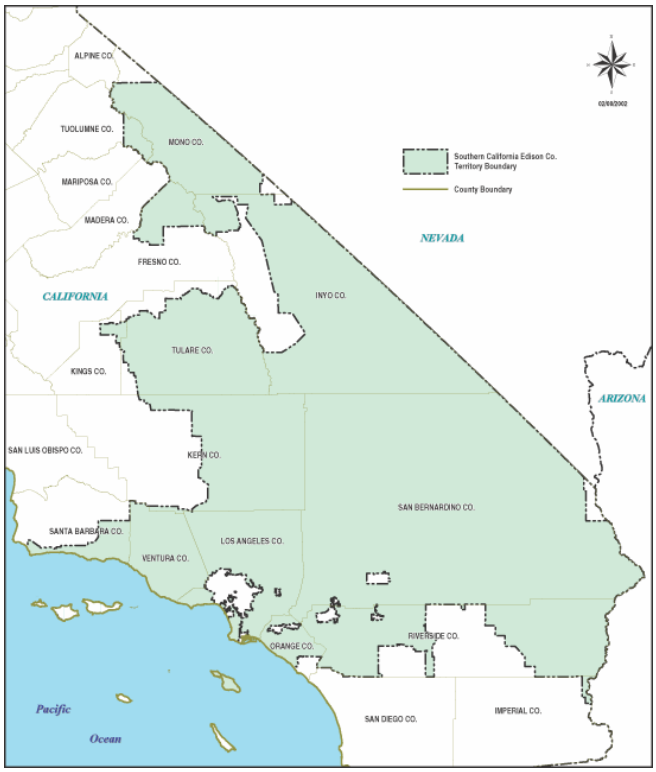

Figure 3.3-3 SCE Service Territory
Source SCE

3.3.1 SDG&E System

SDG&E provides energy service to 3.4 million consumers through 1.4 million electric meters and 830,000 natural gas meters in San Diego and southern Orange counties. The utility's area spans 4,100 square miles.

SDG&E's service area geographically covers all of San Diego County and some of southern Orange County. SDG&E's customer demand is served by the combination of internal resources and imported capacity delivered into the local reliability area by imports through SDG&E's existing Miguel Substation from the east and south, as well as through the San Onofre (SONGS) switchyard to the north. The SDG&E electric transmission system is interconnected through five 230 kV transmission lines (Path 44/South of SONGS) with SCE, with Arizona through the 500 kV SWPL transmission line, with the IID control area through one 230 kV transmission line, and with CFE in Mexico through two 230 kV transmission lines.

Existing local (on system) generating resources include the Palomar Energy Facility (connected into SDG&E's 230 kV grid), the Encina Power Plant (connected into SDG&E's grid at 138 kV and 230 kV); the South Bay Power Plant (connected at 69 kV and 138 kV), a number of combustion turbine facilities connected at 69 kV and a 50 MW wind generation facility connected to the 69 kV grid.

A map showing SDG&E's service territory appears as Figure 3.3.1-1, SDG&E Service Territory.

Figure 3.3.1-1 SD&E Service Territory
Source SDG&E

SDG&E system has only 2 import paths, at SONGS and at Miguel Substation. The import is limited when one of the import paths is lost.

3.3.2 Changes Due to Project Implementation

The proposed transmission lines would have a nominal rating of 1,500 MW and will increase import capability into the San Diego area by at least 1,100 MW, raising the total import capacity into the San Diego area to approximately 4,000 MW. In addition, the proposed projects will provide 500 MW of black-start generation capacity, 600 MW of off-peak load for grid baseload generation stability, 8,000 MWh of emergency generation, and all forms of ancillary services (AS), including regulation services, spinning and non-spinning reserve, voltage support, and black-start generation capacity.[18] In addition, the line will provide a path for renewable resources throughout California into the San Diego area and will provide a critical connection for San Diego into the rest of the California Grid.

3.3.2.1 Changes to the SCE System

The TE/VS Interconnect is adjacent to SCE's major Serrano and Valley Substations. It will affect the flow on the South of Lugo and the Palo Verde – Devers – Valley paths, and the West of Devers lines from Devers all the way to Mira Loma and Rancho Vista. The TE/VS Interconnect southern terminal is close to the San Onofre nuclear generation station.

The TE/VS Interconnect is parallel to Path 43 (North of SONGS) and will effect its flow as well. Without considering the phase-shifter controlling the power flow direction, the power flow will most likely move from North-to-South (from Lake to Case Springs). Under this condition:

- The TE/VS Interconnect will increase the power flow on South of Lugo, and on Palo Verde – Devers – Valley – Lake paths. The significance of this negative impact will be greatly reduced with the planned construction of Vincent – Mira Loma 500kV line (part of the TRTP) to relieve transmission constrains on South of Lugo Path. In addition the construction of DPV2 (including the Devers – Valley #2 line) will relieve the flow stress on the Palo Verde – Devers – Valley – Lake path.

- As part of the TE/VS Interconnect, the construction of the Lake 500 kV Switchyard will relieve transformer loading (due to significant load growth in the area) by 2010/2011, and current operating issues relating to the split bus operation of the Valley 115 kV bus and load balancing between the spilt 115 kV buses. See SCE Alberhill 115 kV reinforcement project, Chapter 6, Alternative 5.

- The TE/VS Interconnect and LEAPS will provide significant voltage support to the SONGS operation. Currently SONGS operates under complex operating nomograms to maintain voltage support to SONGS under NRC requirements.

- The TE/VS Interconnect and LEAPS will provide local and viable back-start capability to SONGS operation and to the grid. Currently, the closest black-start capable units in the area are at least 300 miles away (Big Creek units in northern California, and Hoover Dam units in Nevada), and they are not viable operationally.

18/Ancillary services are needed to maintain reliability within the CAISO-controlled grid. Ancillary services include coordination and scheduling services (load following, energy imbalance service, control of transmission congestion), automatic generation control (load frequency control and the economic dispatch of plants), and support of system integrity and security (reactive power, spinning and operating reserves).

3.3.2.2 Changes to SDG&E Transmission System

To interconnect the TE/VS Interconnect, a new Case Springs 500/230 kV Substation will be built looping in the existing Talega – Escondido 230 kV lines. The Talega – Case Springs line will be upgraded to handle up to 912 MVA each circuit and an additional circuit from the Case Springs – Escondido line will be upgraded to 456 MVA each circuit and built using the existing tower structure. Those upgrades and ROW were previously permitted by SDG&E and provide for reconductoring as proposed in this PEA & LGIA. In addition, 3M ACCR conductors are proposed, see Attachment 2.

SDG&E system has only two import paths, at SONGS and at Miguel Substation. The import is limited when one of the import paths is lost.

Impacts to the existing SDG&E Transmission system will likely include the following:

- The TE/VS Interconnect will change the flow distribution of the Path 44 lines, more flows will be on the three SONGS – San Luis RE lines as shown on Figure 3.3-2 Southern California System Schematic. The increased flow on these lines will be the limiting factor for the TE/VS Interconnect transfer capability.

- The TE/VS Interconnect adds a third import path to the SDG&E system, thus reducing the flow stress on the existing two paths.

- With proper upgrade to SDG&E's internal transmission system (including the 230 kV and the 69 kV system and as further described herein), the TE/VS Interconnect will significantly increase SDG&E operational flexibility (maintenance and emergency handling) and reliability.

- The TE/VS Interconnect will increase SDG&E import capability and reduce LCR.

- The TE/VS Interconnect provide critical route to access renewable energy from Tehachapi wind generation, Desert region solar power, and Imperial Valley geothermal generations.

- The TE/VS Interconnect phase shifter can be operated to maximize reliability by inducing counter flows. (Similar to WECC loop-flow control mechanism).

- The TE/VS Interconnect will increase voltage support to the SDG&E transmission system under normal and contingency conditions.

- With increased voltage support, the TE/VS Interconnect may also increase the SCIT import capability. Currently the SCIT OTC is limited by the voltage instability in the area south of SONGS when both of the SONGS units (G-2) were lost.

- Currently SDG&E has no viable black-start capable generation nearby. LEAPS and the TE/VS Interconnect will provide viable black-start capability.

3.4 Project Objectives

Project Objectives are presented in detail in Chapter 2.

3.5 The Proposed Project

3.5.1 Whole of the Proposed Project

This section describes the configuration of the proposed Project as an overview to familiarize the reader with the project components. The specific detailed description of the project is presented in Section 3.6 Project Components.

The Project is an innovative, private sector solution designed to address a number of grid–related issues including:

- Helping to solve the reliability needs of San Diego in a cost effective manner
- Improving access to and transmission of renewable resources
- Helping to effectively manage intermittent renewable resources
- Helping to improve grid efficiency
- Effectuating distribution level improvements in southern Riverside County

In order to perform these functions, the Project consists of two related components. First, the TE/VS Interconnect will connect the San Diego basin with the rest of the California Grid at 500 kV for the first time. It will do so by connecting SCE's Valley-Serrano 500 kV line with SDG&E's Talega-Escondido 230 kV transmission line over a newly constructed approximately 32 mile overhead line through the Cleveland National Forest.

A second portion of the Project is the LEAPS 500 MW advanced pumped storage facility that will be located at roughly midway along the TE/VS Interconnect adjacent to Lake Elsinore in southern Riverside County. Together, and in response to such factors and real-time congestion and intermittent energy projection (renewables), the project can be used to take care of real-time ancillary services needs. The superior dynamic capabilities of the pumped storage facility makes it uniquely capable of solving short-term reliability concerns and energy-balance issues. The facility can provide ancillary services, including regulation and frequency response, regulation up, regulation down, operating reserves including spinning and non-spinning reserves and operating reserves, and supplemental reserves, up to its maximum pumping capacity, generating capacity, or both. In addition, the pumped storage facility can provide black start as well as reactive support to help the CAISO maintain voltages, particularly for post-contingency and black-start capabilities. None of these services are currently available in this quantity in the region.

3.5.1.1 Components of the TE/VS Interconnect

The TE/VS Interconnect components are shown on Figure 3.1.1-2, Project Conceptual Single Line Diagram, and include:

- The new 500 kV transmission line from the new Lake 500 kV Switchyard to the new Case Springs 500/230 kV Substation, entering service in February 2011 (depending upon timing of Commission approval).

- A portion of the transmission facility will be underground, and may include 500 kV gas insulated line (GIL), oil filled line, or dielectric line, in the area above Lake Elsinore.

- The Case Springs Substation is located on the northern border of Camp Pendelton, and will include three 500/230 kV, 500/620 MVA (normal and emergency rating) transformers. Three 230 kV phase shifting transformers, each rated 500 MVA normal and 620 MVA emergency, will be placed in series with the three 500/230 kV transformers. The station will also provide space and an integration point for one additional 500 kV line.

- The Santa Rosa Substation is located roughly midway between the Lake and Case Springs Substations, and will provide reliability enhancements to the local distribution system and later connect the pumped storage facility to the grid.

- The Lake Switchyard will be located adjacent to Lee (Corona) Lake and will include a breaker and one-half configuration with four bays for the Valley-Serrano 500 kV Loops. Two more bays for an optional SCE distribution substation, can feed two 560 MVA 500/115 kV transformers. See SCE Alberhill 115 kV reinforcement project, Chapter 6, Alternative 5.

- The existing Talega–Case Springs 230 kV line will be upgraded to provide a normal and emergency rating of 912 MVA in each of two circuits. After relocating an existing 69 kV line from the tower positions presently used on the portion of the line between Escondido and Case Springs, a second 230 kV circuit will be added to the towers between Escondido and Case Springs. This line will be rated at 456 MVA for each circuit, using the same conductor as the existing line in that line section. It is proposed that 3M ACCR conductors be used, see Attachment 2.

3.5.1.2 Components of LEAPS

LEAPS will be the first new large pumped storage facility to be constructed in the United States in nearly 20 years. The main components of this development are shown on Figure 3.1.1-3, LEAPS Pumped Storage Component. Beginning the description from the higher elevations to the west, the pumped storage facility will include a new reservoir to be constructed in Decker Canyon near the ridgeline of the Elsinore Mountains immediately west of South Main Divide Road. This reservoir will be filled and drained through a short approach tunnel to a vertical shaft that penetrates into the mountain approximately 1,700 feet to a lower tunnel known as the headrace tunnel. The headrace tunnel will proceed generally east to the location of an underground powerhouse housing two turbine-generators capable of producing 500 MW of electricity during generation and requiring 600 MW of electricity during pumping. The powerhouse exit tunnel, known as the tailrace tunnel, will then proceed from the powerhouse eastward to the Lake Elsinore shoreline, where an inlet/outlet structure will be constructed at the lake's edge.

In the offpeak pumping cycle, the water will be withdrawn by gravity from Lake Elsinore through the tailrace tunnel to the powerhouse, where it will be pumped through the headrace tunnel, up the shaft, and into Decker Lake. In the generation cycle, the flow will reverse through the turbines to produce electricity during peak demand periods. The storage reservoir will hold up to an equivalent of 8,000 MWh of production. The cycle efficiency of the facility (generation energy to pumping energy) will be 83.3% at the primary level, making it one of the most efficient facilities in the world. The fast response characteristics of the operation in both generation and pumping mode will be considerable, as well as the reactive power capability of the Project Electricity will be supplied through the TE/VS Interconnect system and fed to and from the Santa Rosa Substation to the turbine-generator.

3.5.2 Fit into Regional System

The proposed project will:

- Increase reliability in the San Diego area
- Provide a path for renewable resources throughout California into the San Diego area
- Provide a critical connection for San Diego into the rest of the California Grid

The transmission lines would have a nominal rating of 1,500 MW and will increase import capability into the San Diego area by at least 1,100 MW, raising the total import capacity into the San Diego area to approximately 4,000 MW. The pumped storage facility will provide a variety of critical benefits to the system, including 500 MW of generation capacity, 600 MW of off-peak load for grid baseload generation stability, 8,000 MWh of emergency generation, and all forms of ancillary services (AS), including regulation services, spinning and non-spinning reserve, voltage support, and black-start generation capacity.

3.5.3 Future phases

There are no reasonable foreseeable future phases or consequences of the proposed project.

3.5.4 Capacity Increase

As stated above, the TE/VS Interconnect would have a nominal rating of 1,500 MW and will increase import capability into the San Diego area by at least 1,100 MW, raising the total import capacity into the San Diego area to approximately 4,000 MW.

3.5.5 GIS Database

The data is provided electronically for the Commission's use.

3.6 Proposed Project Components

The Project would include facilities described in the following sections:

3.6.1 Talega-Escondido/Valley-Serrano 500 kV Interconnect Facility

The TE/VS Interconnect is a 1,500 megawatt (MW) rated 500 kV, three phase, alternating current transmission line interconnecting SCE's Valley-Serrano 500 kV line via a new Lake Switchyard and SDG&E's existing and upgraded Talega-Escondido 230 kV transmission line via a new Case Springs Substation. As proposed, operational control of the TE/VS Interconnect project would be turned over to the CAISO, pursuant to a "transmission control agreement" and a "participating transmission owner tariff." A conceptual single line diagram appears in Figure 3.1.1-2, LEAPS Project Conceptual Single Line Diagram.

3.6.1.1 Transmission Lines

New 500 kV transmission lines will extend for about 32 miles, generally running north to south through the Cleveland National Forest and linking SCE's existing 500 kV Valley-Serrano transmission line (via a new substation) to SDG&E's existing and upgraded 230 kV Talega-Escondido transmission line (via a new substation). The upgraded 230 kV transmission line will extend for about 51 miles, generally running east to west between SDG&E's existing Talega Substation (33000 Avenida Pico, San Clemente, San Diego County) and SDG&E's existing Escondido Substation (2037 Mission Avenue, Escondido, San Diego County). The proposed transmission lines will be designed, constructed, and operated in accordance with the following standards and criteria:

- NERC/WECC's reliability criteria.[19]
- CAISO's reliability criteria[20] and applicable planning standards.[21]
- CPUC's "Construction and Operation of Power and Communication Lines" (General Order [GO] 52), "Rules for Overhead Line Construction" (GO-95), "Rules for Construction of Underground Electric Supply and Communications Systems" (GO-128), and "Rules for Planning and Construction of Electric Generation, Line, and Substation Facilities in California" (GO-131-D), current avian protection plan guidelines[22] and suggested practices.[23]
- SCE and SDG&E design standards, as applicable, and other applicable State and local codes.

3.6.1.2 Poles/Towers

The complete technical package describing tower locations and types is included as Attachment 1, Tower Placement, Data Information Tables & Location Information. This attachment includes Plan and Profile Drawings and Sheets, as well as unique structure numbers and locations.

Additional specific pole dimensions are also located in Attachment 1. Normally, the upper bodies have similar dimension with specific legs selected to fit the specific tower site. Tower

19/Western Electricity Coordinating Council, Minimum Operating Reliability Criteria, April 6, 2005.

20/The CAISO's reliability criteria, applicable to all existing and proposed facilities interconnecting to the CAISO-controlled grid, constitutes the policies, standards, principles, and guides of the CAISO designed to assure the adequacy and security of the electric transmission system. These criteria are similar to WSCC's criteria for transmission system contingency performance and the NERC's planning standards. The CAISO's reliability criteria, however, contains additional requirements not found in WSCC's criteria and/or the NERC's standards.

21/California Independent System Operator, Planning Standards, February 7, 2002.

22/Edison Electric Institute Avian Power Line Interaction Committee and United States Fish and Wildlife Service, Avian Protection Plan Guidelines, April 2005.

23/Edison Electric Institute Avian Power Line Interaction Committee and the California Energy Commission, Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006, PEIR Final Project Report, CEC-500-2006-022, 2006.

loading controls the actual member sizes and weight of the towers, ground clearance is maintained for each specific span, maximum operating temperature and the high side train as depicted on Plan and Profile sheets. Specific line design is summarized in tabular format in this Attachment.

Upgrades to the SDG&E-Escondido 230 kV Line will be in accordance with SDG&E's design standards. Preliminary design investigations indicate that the structures were originally designed for double bundled double circuit configurations. A joint design review team consisting of SDG&E Engineers, TNHC's Line Design Contractor and TNHC Engineers will review the existing structures for the new load conditions.

Transmission towers will consist of tangent (suspended) type structures, where the conductors approach and depart the structures in a straight line, and heavier structures, including both angle structures that suspend the conductors and allow limited changes in line direction and dead-end structures which allow for more substantial changes in line direction. Every mile, or approximately five structures will be a communications catwalk mid-span on the towers. This will be used as needed to provide line of sight communications, repeaters, tower lighting, and provide UHF/VHF/GHz/WiFi antennae or dish. Typical tower structures are presented in Section 3.6.3.

3.6.1.3 Conductor/Cable

3.6.1.3.1 Above-Ground Installation

The TE/VS Interconnect 500 kV line is a single circuit transmission line utilizing galvanized lattice structures, monopole steel structures and non-specular surface. The design specifications are detailed below. The path rating of the TE/VS Interconnect line is expected to be 1,500 MW. The conductor size is planned at 2,156 Kcmil (thousands of circular mils) aluminum conductor steel reinforced (ACSR) spaced 18-inches apart. The connection will have a planned ampacity rating of at least 1,623 amps. All 500 kV air-insulated circuits will be twin-bundled 2156 "Bluebird" ACSR, or equivalent. The overhead shield wires, employed to protect the electrical conductors from lighting strikes, would be aluminium-coated steel-stranded wire with a fiber-optic core for communication purposes. Some of the fibers in the fiber-optic core would be used for control and monitoring of protective relaying and communication equipment between facilities. The remaining static wire will be insulated at 4.16 kV for any required tower lighting. In addition, the power will be used approximately every mile for communications equipment, and fiber repeaters as required. The specifications for transmission equipment includes:

- BIL: 1.2 x 50 microsecond wave: 1550 kV BIL.
- Wet switching surge withstand: 1175 kV.
- Ten-second wet 60 Hz withstand: 775 kV.
- One-minute dry 60 Hz withstand: 860 kV.
- Minimum creep distance 360 inches.
- Corona and Radio Influence Voltage (RIV).

- Corona: When the total installation is viewed in complete darkness, there shall be no visible corona at 350 kV, after the voltage has been brought down to 400 kV rms.
- RIV: The substations or transmission lines RIV shall not exceed 500 micro volts at 1000 kH when tested at 350 kV.
- SCE lattice design towers will be used for basic construction, EHT for tangent, ELA for line angles and ELT for dead-end structures. Where required, Forest Service requirements will prevail.
- Polymer suspension insulators will be used in all cases.
- Conductors are bundled (two per phase) Bluebird 1256 ASCR.
- Safety Factor is 3:1 for insulators and hardware; 2:1 for foundations.
- Final unloaded conductor tension is 22% of ultimate; max working tension is 33.3% of ultimate. Static wire is 33.3% of ultimate.
- Minimum design clearance from conductor to ground is 14' vertical, 11'3" horizontal, 33' phase to phase horizontal and 37' vertical.
- One static wire will be OPGW.
- Minimum clearance to surface for road crossing is 40' normal and 35' for overload.
- No guyed structures are required.

The Forest Service has provided a list of conditions for the project as part of the licensing process. These conditions are referred to as 4(e) conditions, and are presented as Attachment 2. As specified by the Forest Service, on NFS lands:

1. Transmission lines shall be non-specular (non-reflective) and neutral in coloration.
2. Support towers shall be custom-colored to harmonize with the natural vegetation and sky.
3. Towers beyond 3/4 mile of sensitive viewpoints shall visually recede into the natural appearing landscape.
4. Support towers within the foreground (approximately 3/4 mile of sensitive viewpoints) shall typically be of monopole design.
5. Vegetation and ground clearing at the foot of each tower and between towers will be limited to the clearing necessary to comply with electrical safety requirements.

In terms of seismic design requirements, all substation and transmission line apparatus shall remain functional and operational during and subsequent to a seismic event having a ground motion which is represented by the performance level defined as follows. The seismic design of shall be in accordance with recommendations contained in IEEE Std. 693 1997. The In-service configuration shall be qualified to the High Seismic Performance Level. The minimum ground motion shall be 1.0 lateral acceleration and 1.5 vertical acceleration applied at the footing of the apparatus.

3.6.1.3.2 Below-Ground Installation

The FERC has required that a roughly 1.7-mile segment of the proposed transmission line be placed underground rather than on an overhead structures. The remaining line segments will be overhead lines (OHL). While the Applicant is proposing a GIL system, other underground technologies and design options that may be available include fluid-filled polypropylene paper laminate (PPL), cross-linked polyethylene (XLPE), high-pressure fluid-filled (HPFF), and extruded-dielectric transmission cables. The underground circuits will be rated at 4,000 amps (A) continuous and 63 kiloamps/ls (kA) short circuit. Figure 3.6.1-2, North Transition Plan (Typical) presents a schematic illustration of a transition station between the GIL and the overhead line (OHL) similar to what will be constructed at the northern and southern terminus of the GIL vault. Figure 3.6.1-3 presents typical elevation views of the transition structures.

This 1.7 mile underground section will be located underground in an area adjacent to the upper reservoir between structures T63 and T64. The underground tunnel has a cross section of about a 10 x 11 feet and is constructed to allow space for movement of a gas cart need for maintenance of the GIL line sections. In addition, forced air handling equipment is needed for cooling. Cable troughs for auxiliary power and alarm circuits, (gas pressure and smoke detection) are required.

The GIL construction involves two concentric pipe sections: the inner small diameter conductor and the outer large diameter gas housing pipe. The conductor is energized at line to ground voltage with the outer housing at ground potential. Each section is isolated from adjacent sections so that a gas leak effects only that section and each section is fitted with a gas pressure detection sensor for line trip prior to a line to ground fault. Technical information on the GIL system is presented in Table 3.6.1-1 Technical Data for the Proposed 500 kV GIL.

Table 3.6.1-1 Technical Data for the Proposed 500 kV GIL

Technical Data for Proposed 500 kV GIL		
Resistance per unit length:	R' = 9.42 mOhm/km	R' = 15.07 mOhm/mile
Reactance per unit length:	X' = 67.5 mOhm/km	X' = 108.0 mOhm/mile
Inductance per unit length:	L' = 0.215 mH/km	L' = 0.346 mH/mile
Capacitance per unit length:	C' = 54.45 nF/km	C' = 87.61 nF/mile
Surge impedance:	Zw = 63.1 Ohm	

Source: The Nevada Hydro Company

The distance between the Lake Substation and the Northern GIL transition is about 9.5 miles and the distance between the Northern GIL transition and the Santa Rosa Substation is about 1.8 SM. The new GIS will be located within the Congressional boundaries of the CNF.

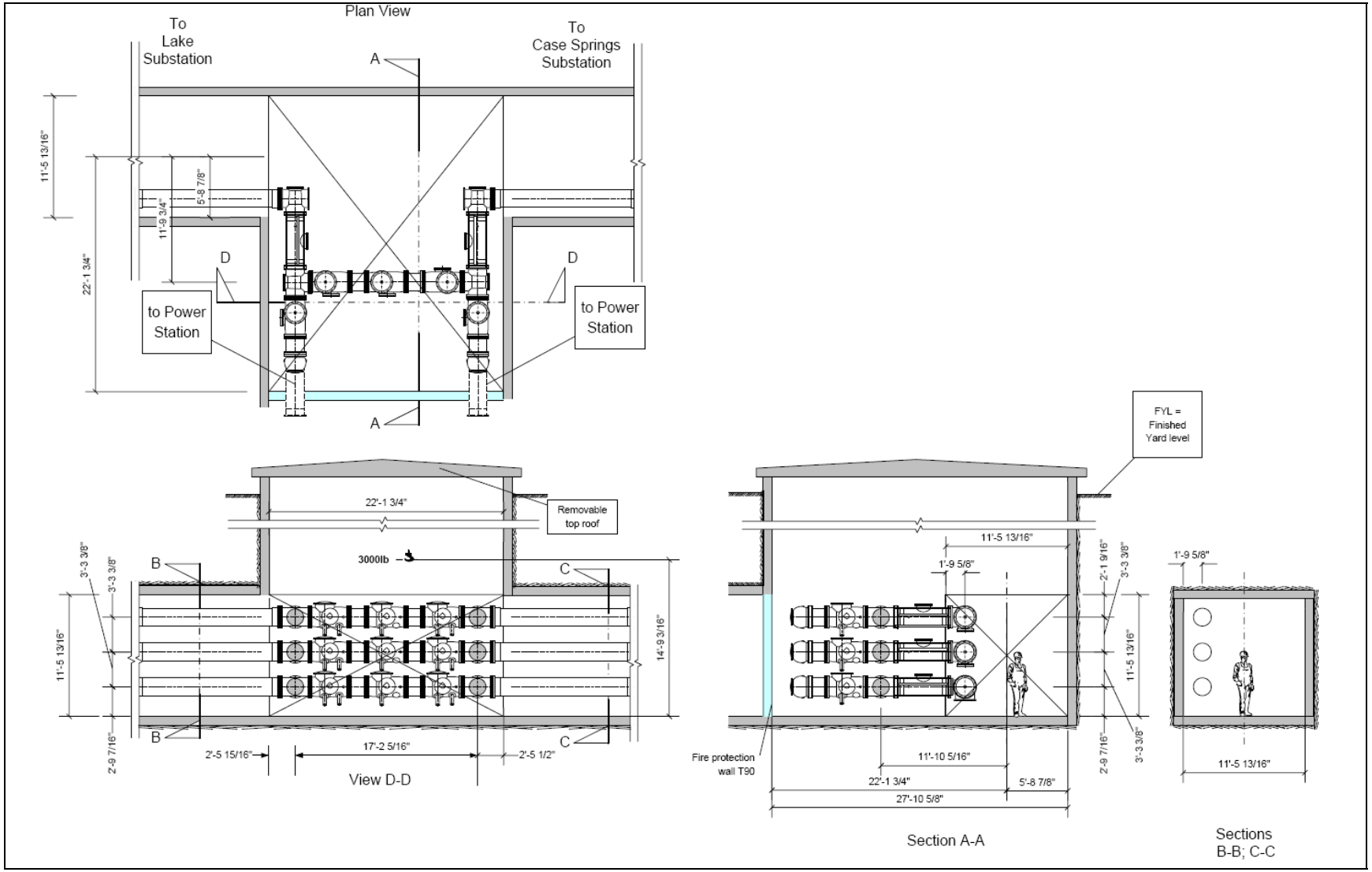

Figure 3.6.1-1 Gil Vault Elevations

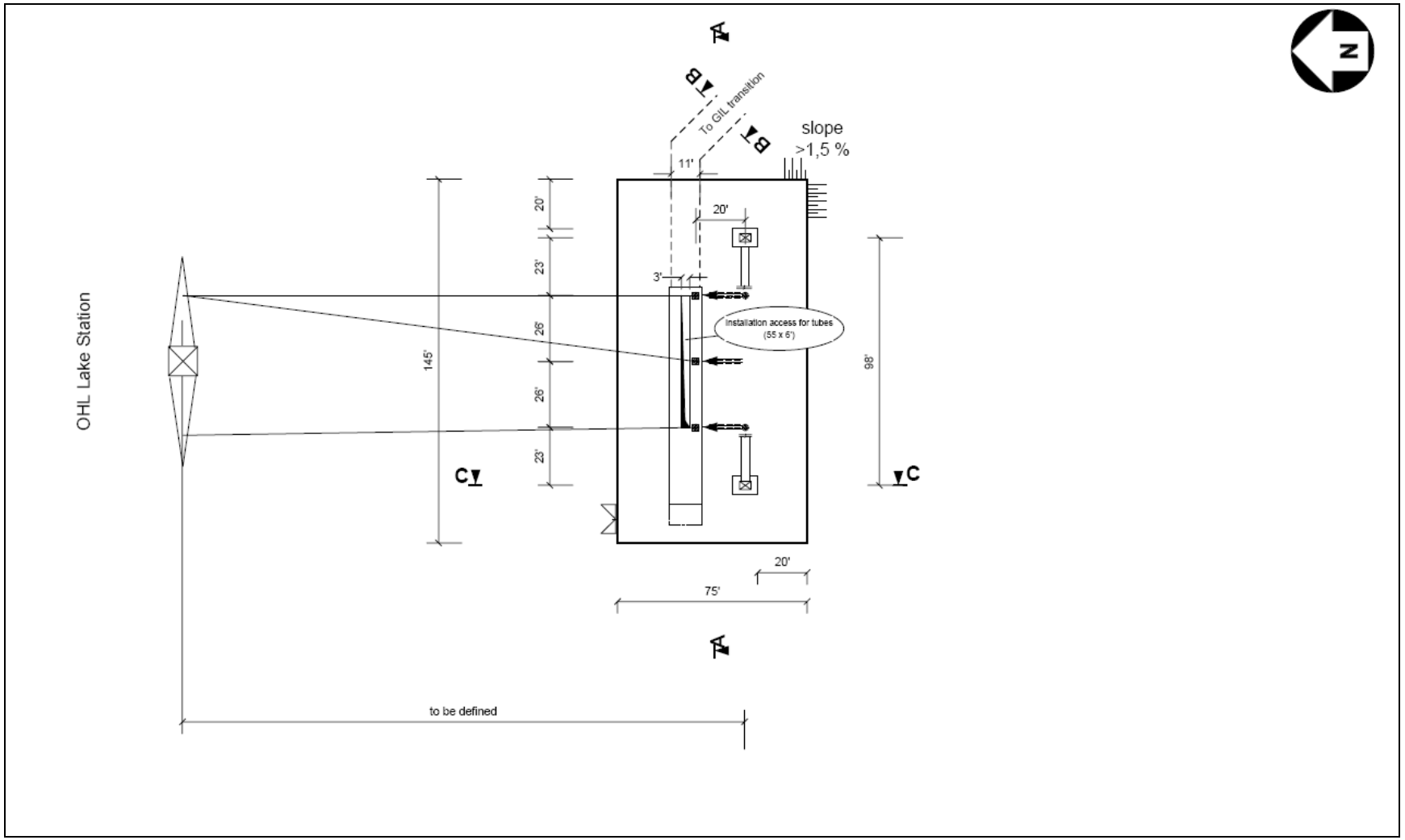

Figure 3.6.1-2 North Transition Plan (Typical)

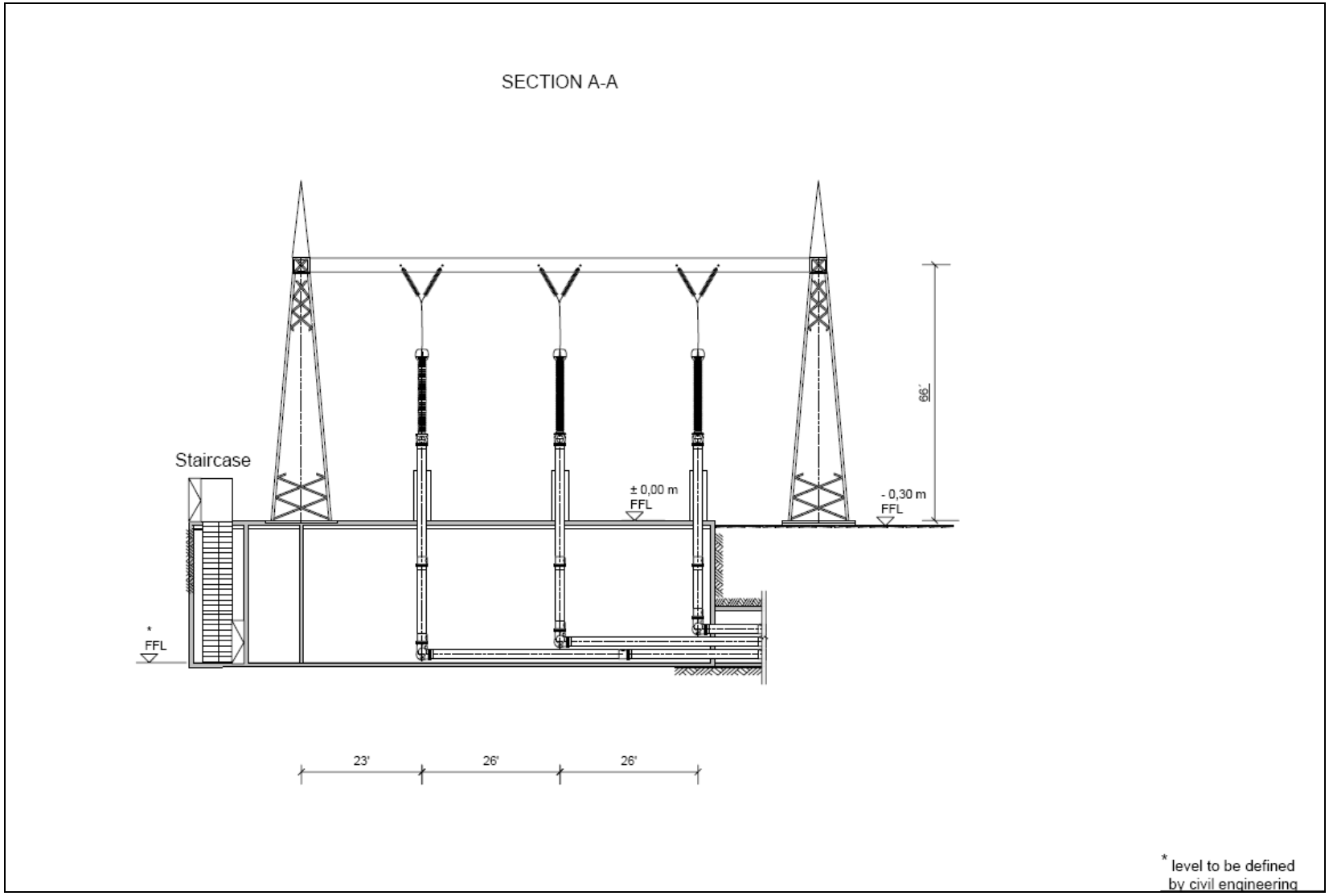

Figure 3.6.1-3 (1 of 3) North Transition Elevations (Typ)

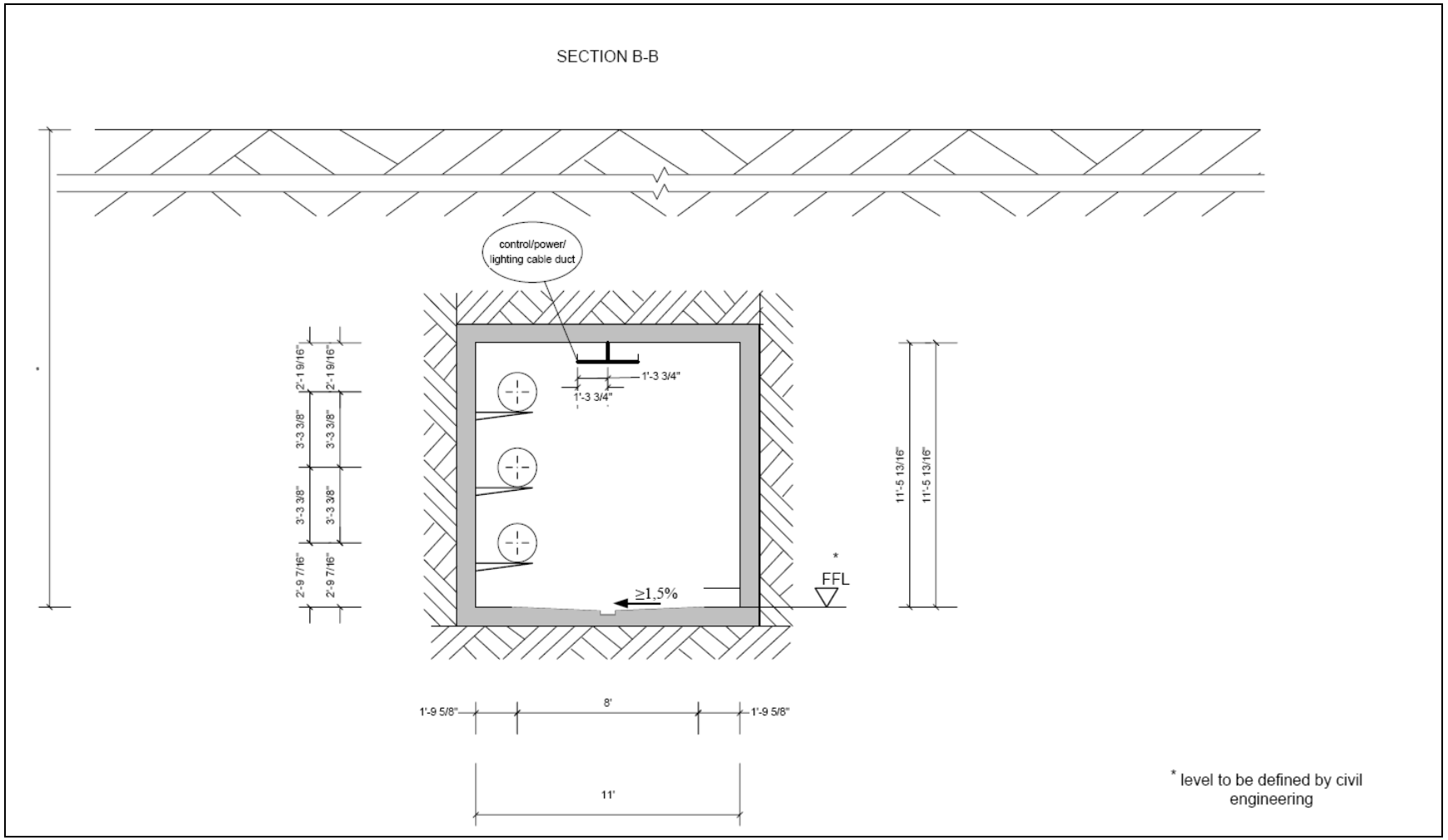

Figure 3.6.1-3 (2 of 3) North Transition Elevations (Typ)

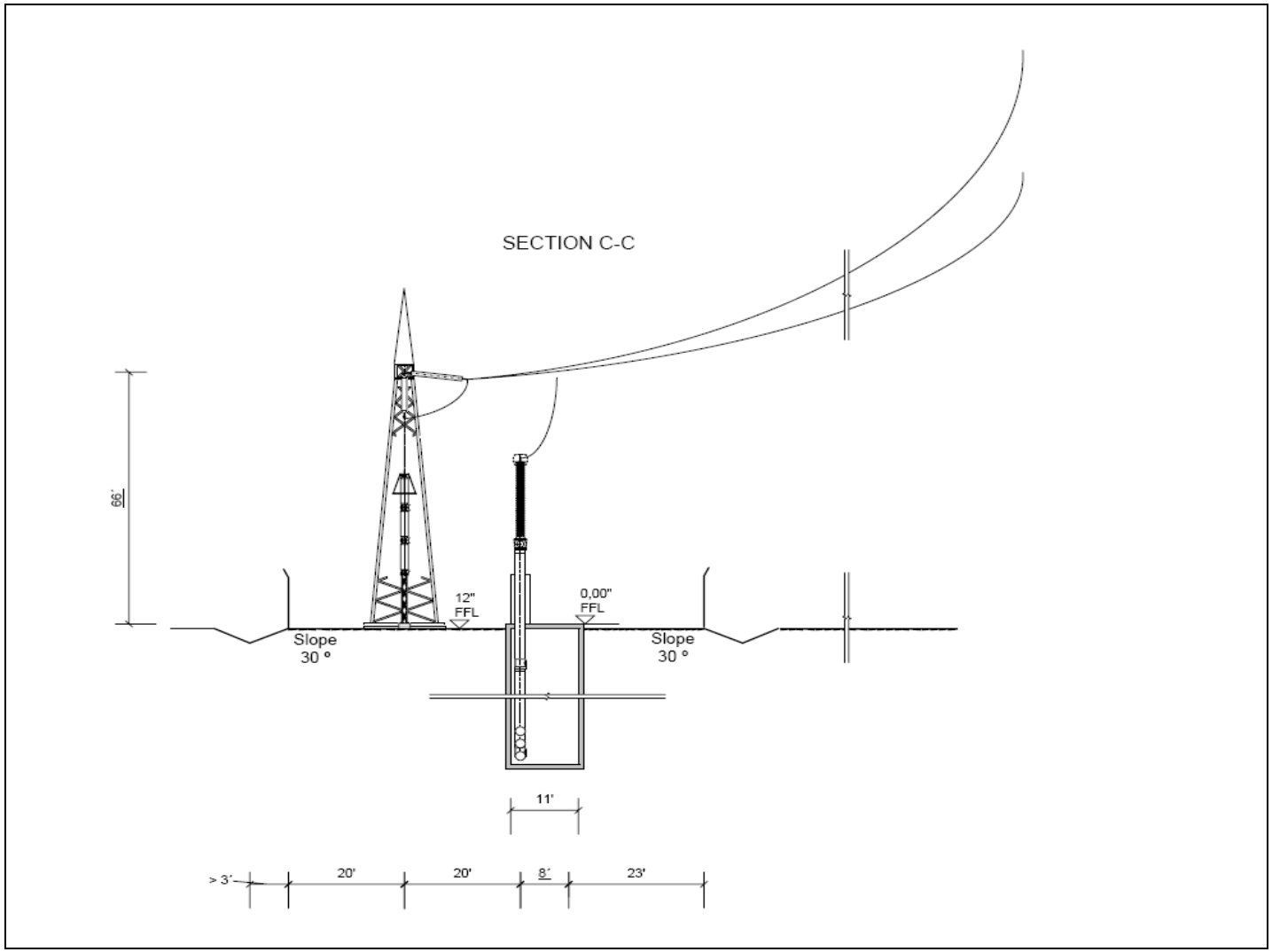

Figure 3.6.1-3 (3 of 3) North Transition Elevations (Typ)

3.6.1.4 Substations

New substations, identified as the Case Springs Substation and the Lake Switchyard, will be constructed where the new transmission line will interconnect SDG&E's existing 230 kV transmission system on the south and with SCE's existing 500 kV transmission system on the north. In addition, the Santa Rosa substation will also be constructed. Each of the proposed substations is described below.

3.6.1.4.1 Lake Switchyard

As illustrated in Figure 3.6.1-5 Lake Switchyard Site, the proposed northern connection to SCE's existing Valley-Serrano 500 kV transmission line and new 500 kV switchyard will be located east of I-15 at Temescal Canyon Road, in an unincorporated portion of Riverside County referred to as Alberhill.

The new switchyard will be located on the north-east side of the Interstate 15 (I-15) Freeway near SCE's existing 500 kV Valley-Serrano line. The property is presently privately owned and would need to be acquired. This new switchyard will occupy about 14 acres on two pads, which will define the fence line. The switchyard outline itself is approximately 300 ft wide by 900 ft long. The new switchyard will consist of seven new breaker-and-a-half configurations. The loop in/out will be approximately half-way between SCE's existing Serrano Substation (East Carver Lane, Orange, Orange County) and Valley Substation (Menifee Road and Highway 74, Romoland, Riverside County). A conceptual site plan of the new Northern (Lake) 500 kV Switchyard is presented in Figure 3.6.1-6 Lake 500kV Switchyard – Conceptual Plan Layout. Conceptual elevation drawings for that switchyard are presented in Figure 3.6.1-7 Lake 500 kV Switchyard – Conceptual Elevation Drawings. The switchyard is electrically depicted in Figure 3.6.1-8 Lake 500 kV Switchyard – Single Line Diagram.

The Switchyard will be split into the following three parts:

1. 500 kV connection to the Valley-Serrano line;
2. 500 kV connection to the TE/VS Interconnect system's new OHL.
3. Spare taps for a potential SCE 115 kV Alberhill reinforcement project. (See Chapters 5 and 6 for a discussion of this project.)

The extension of the Valley-Serrano line involves two single circuits starting between existing structures 16/1 and 15/3 on the existing right-of-way and the new northern "A" frame dead end in the Lake Switchyard. The distance from the switchyard to the existing right-of-way is approximately two miles, for an estimated total of four miles of new transmission line. SCE requires that the line extension be constructed on two separate single-circuit structures with about 150 foot separation on the same right-of-way. The 500 kV switchyard system will be built to SCE standards.

To be able to keep jurisdictions clear, a line of demarcation will be made between the SCE and the Applicant's portions of the switchyard using walls gates and fences, where appropriate. As proposed, the building will be reinforced concrete block. The seismic requirements for the

equipment and building will be to IEEE 693 high-seismic level. Air conditioning and auxiliary service requirements will be defined by the gas-insulated switchgear (GIS) equipment itself. Each section of the switchyard (SCE and Applicant) will have its own dedicated control room.

The GIS building will be one structure with an internal wall which will serve as the line of demarcation between the parties.

The proposed GIS configuration consists of seven bays of 1½ CB 500 kV switchgear (Siemens 8DQ1). Bays 1 through 4 are for the connection to the Valley-Serrano line and LEAPS. The 500 kV GIS connection to the TE/VS Interconnect 500 kV OHL is done using the lst breaker and a half scheme. All equipment will be rated at 550 kV, 4000A, and 63kA. The new switchyard will require a connection to SCE's existing SCE 13.8 kV lines for station power.

As described in the LGIA now under negotiation between the parties, the switchyard will include the following:

- New light-wave and channel equipment, SCADA and applicable Participating TO voice and data requirements.

- Approximately six miles of new ADSS fiber optic cable to extend the existing fiber optic cable from the Elsinore or Skylark Substations to the Santa Rosa Substation. The combined (existing + new) fiber optic cable provides the required alternate route between Lake Switchyard and the Santa Rosa Substation.

- One RTU at to monitor the typical bulk power elements such as MW, MVAR, and phase amps at each line and also kV at lines and busses and all circuit breaker status/control, protection relays status and alarms. The RTU will transmit information to the Participating TO's Grid Control Center via the existing Mira Loma Regional Control Center System.

The Mechanical-Electrical Equipment Room ("MEER") will consist of a new 30 ft. by 20 ft. MEER building to house Batteries and battery charger, Light and power selector switch, Light and power panel, A.C. distribution panel, and D.C. distribution pane. Relay protection devices will include:

- Two GE C60 breaker management relays
- One SEL-311L line current differential (digital F.O. channel)
- One GE L90 line current differential (digital F. O. channel)
- One GE D60 directional comparison pilot relaying (digital F.O./MW channel)
- One RFL 9745 tele-protection channel DTT (digital F.O. channel)
- One RFL 9745 tele-protection channel DTT (M/W channel)
- One 32/64 digital fault recorder
- One Ethernet service drop
- One SEL-2030 relay

Other Station Elements to be installed include:

- Dual communication channels on separate routes to support the Line Protection Relays. One of the communication channels will be provided by installing OPGW.
- Perimeter fence with barbed wire and a double door 20 ft. gate around the switchyard.
- Grounding grid to cover the switchyard area and additional 10 ft. outside the perimeter fence.
- A 25 ft. wide paved driveway around the switchyards and the transformer banks with a branch of driveway to provide access to the relay room.
- Required control cable trenches from the relay room to the switchyards.
- Microwave antenna for VHF, UHF & WiFi communications.
- 750 kW Emergency diesel generator and day tank, (CARB Certified).

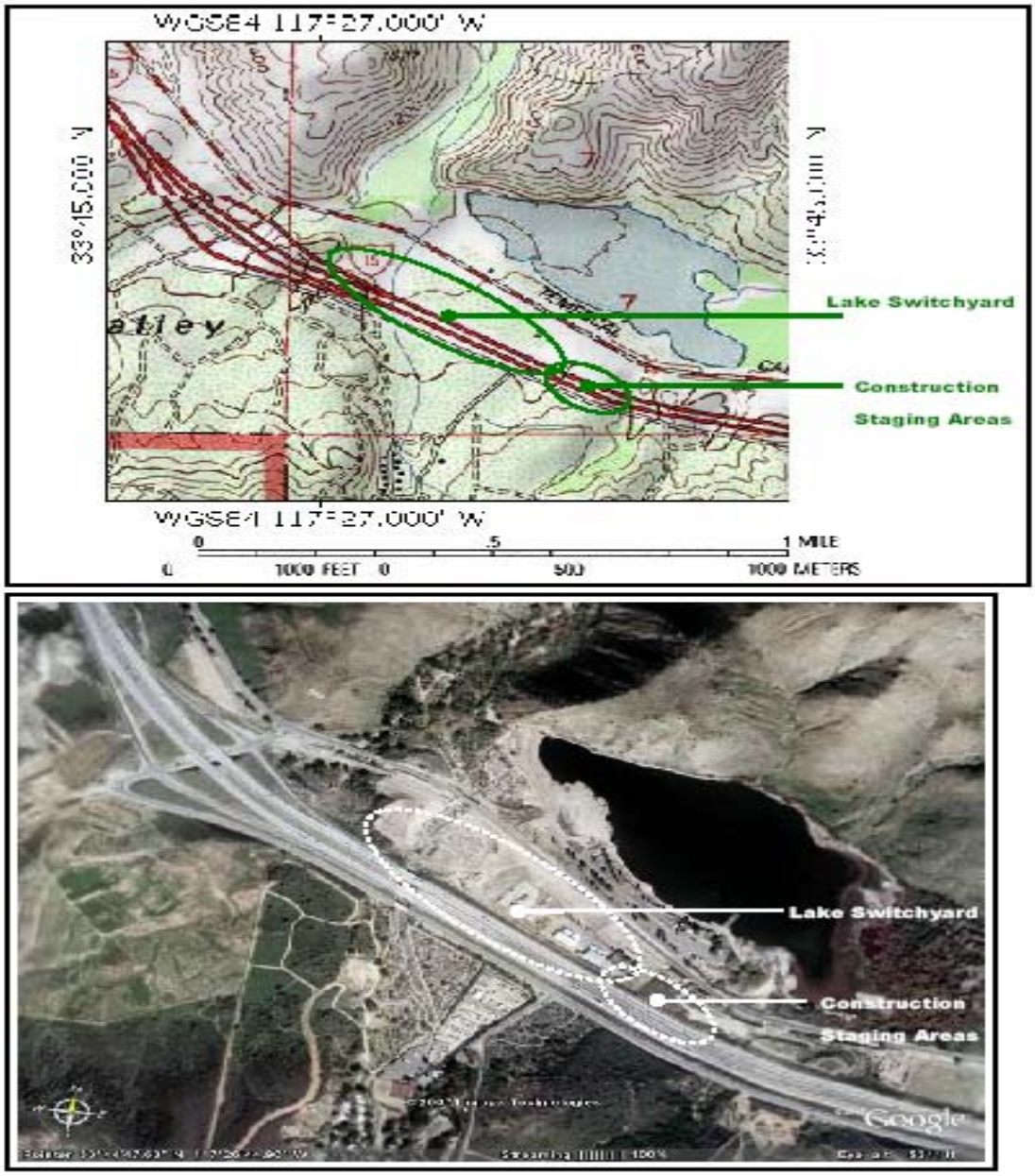

Figure 3.6.1-5 (1 of 2) Lake Switchyard Site
Source: Siemens Power Transmission & Distribution

Figure 3.6.1-5 (2 of 2) Lake Switchyard Site
Source: Siemens Power Transmission & Distribution

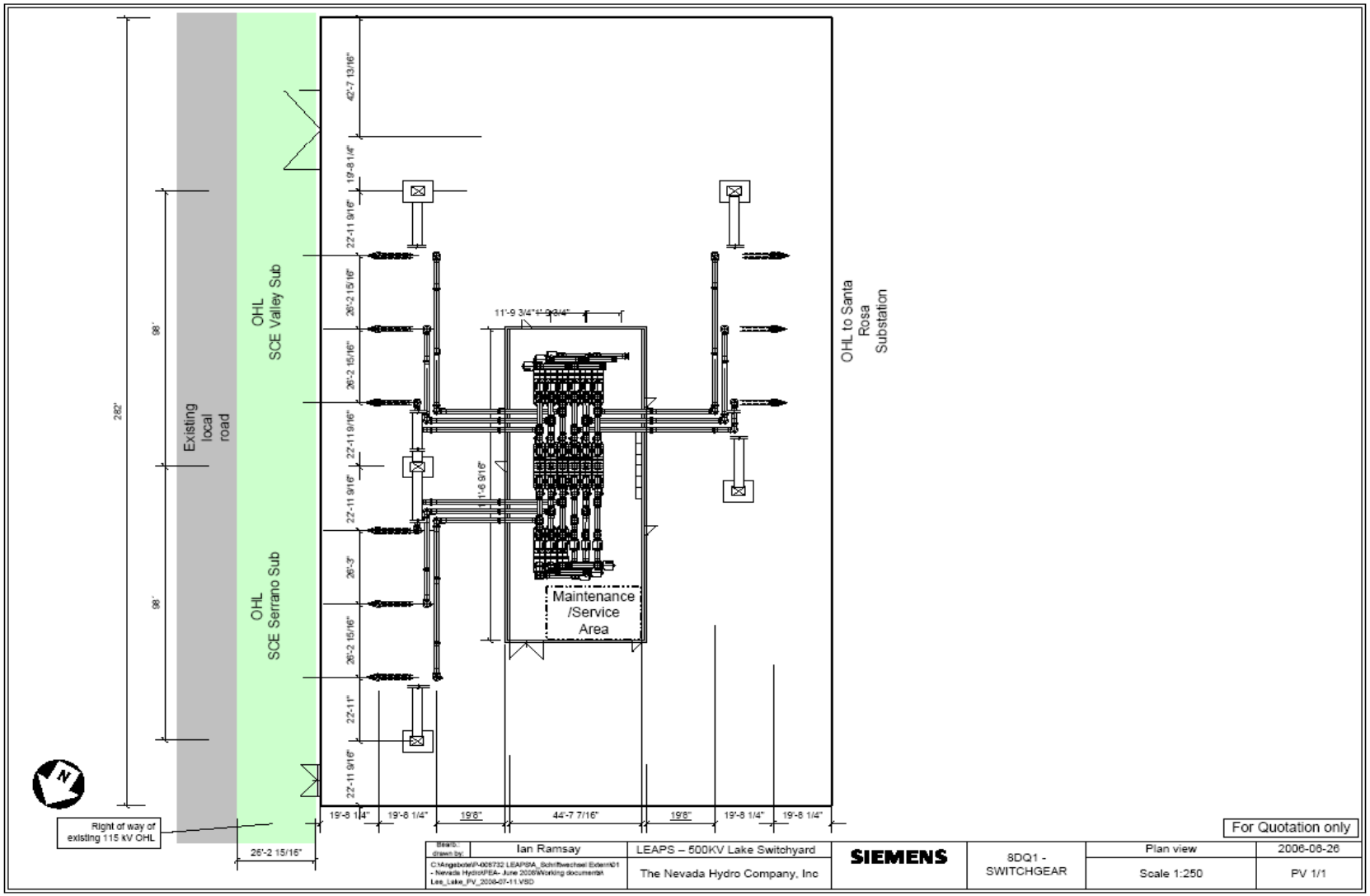

Figure 3.6.1-6 Lake 500kV Switchyard – Conceptual Plan Layout
Source: Siemens Power Transmission & Distribution

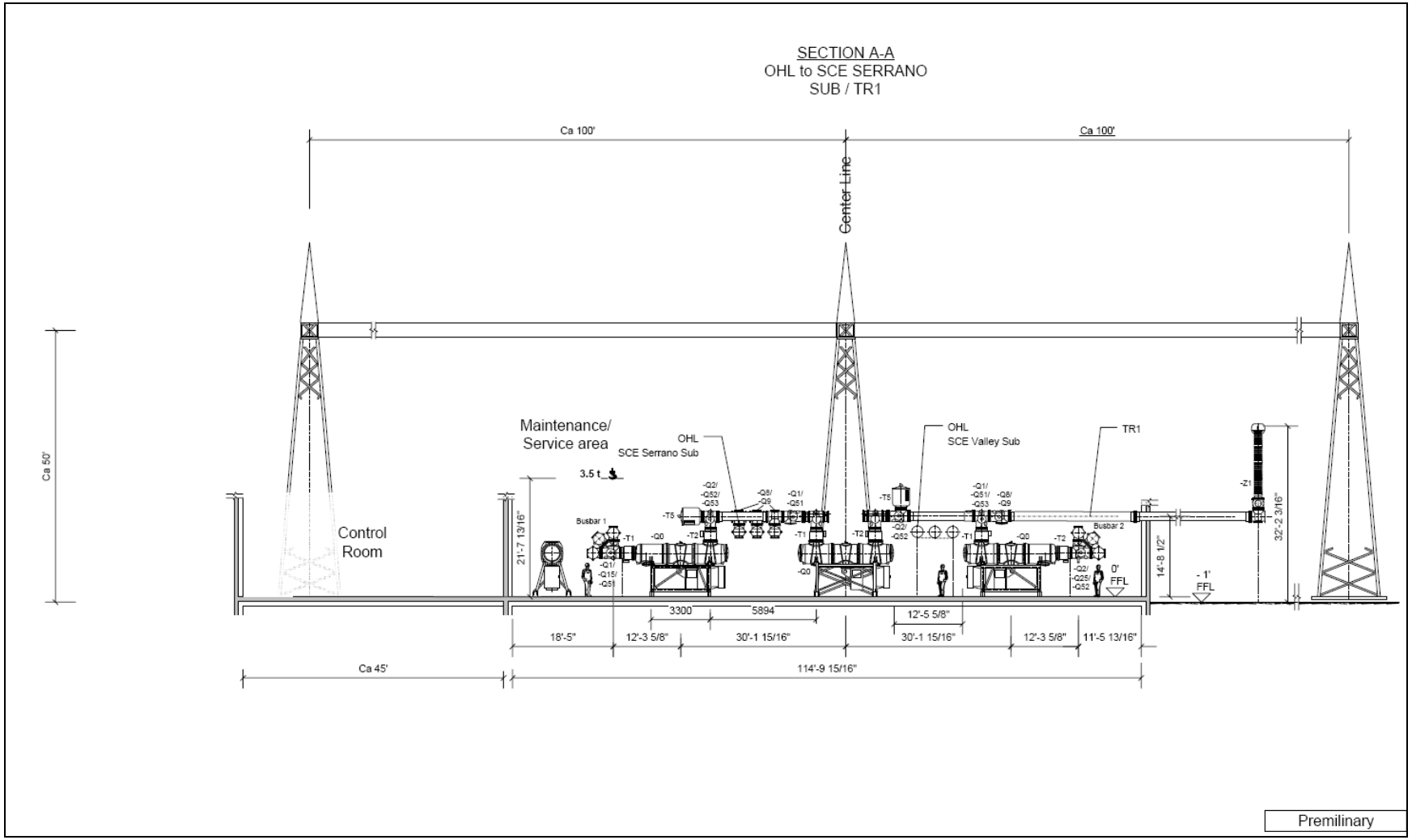

Figure 3.6.1-7 (1 of 3) Lake 500 kV Switchyard – Conceptual Elevation Drawings
Source: Siemens Power Transmission & Distribution

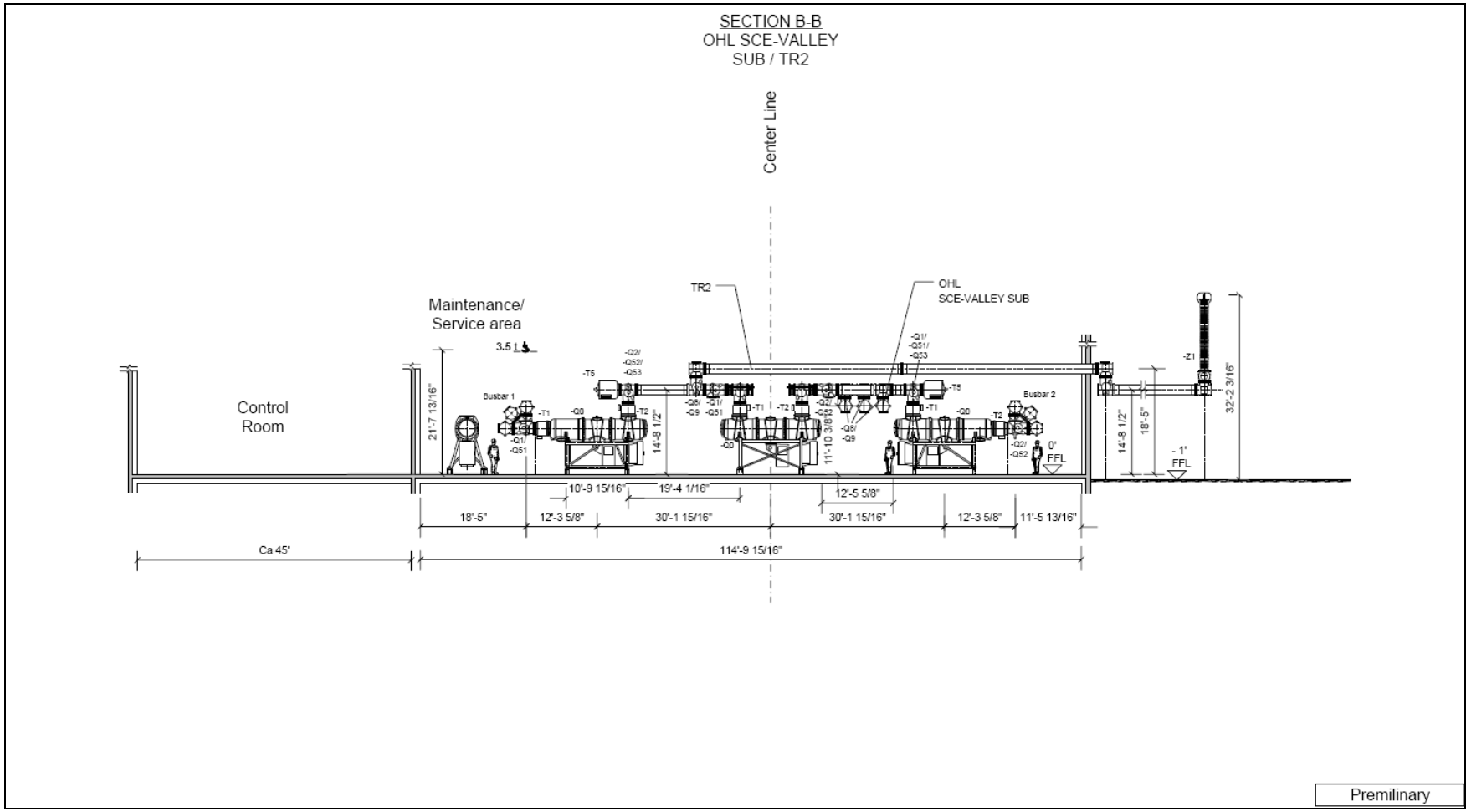

Figure 3.6.1-7 (2 of 3) Lake 500 kV Switchyard – Conceptual Elevation Drawings
Source: Siemens Power Transmission & Distribution

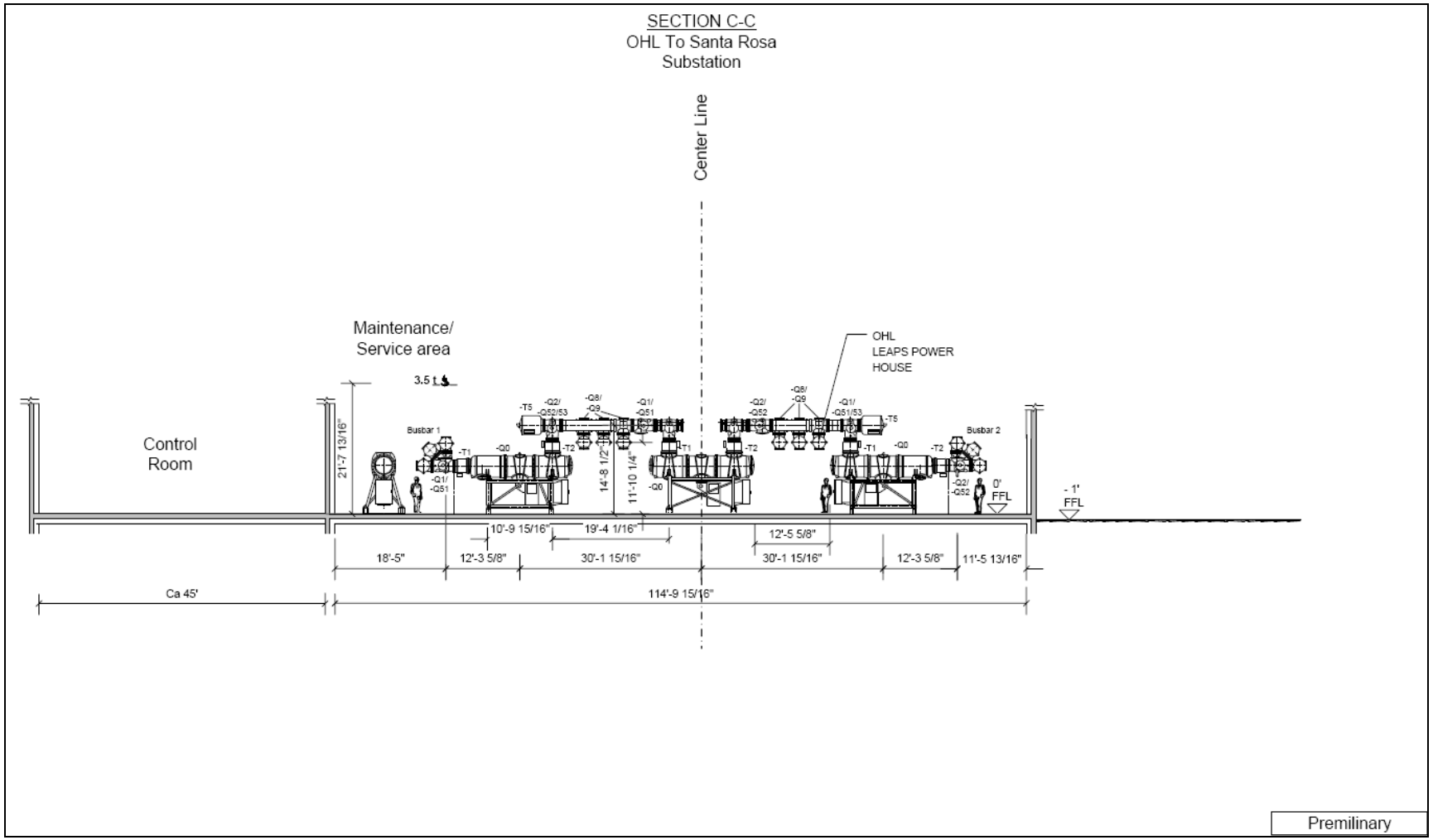

Figure 3.6.1-7 (3 of 3) Lake 500 kV Switchyard – Conceptual Elevation Drawings
Source: Siemens Power Transmission & Distribution

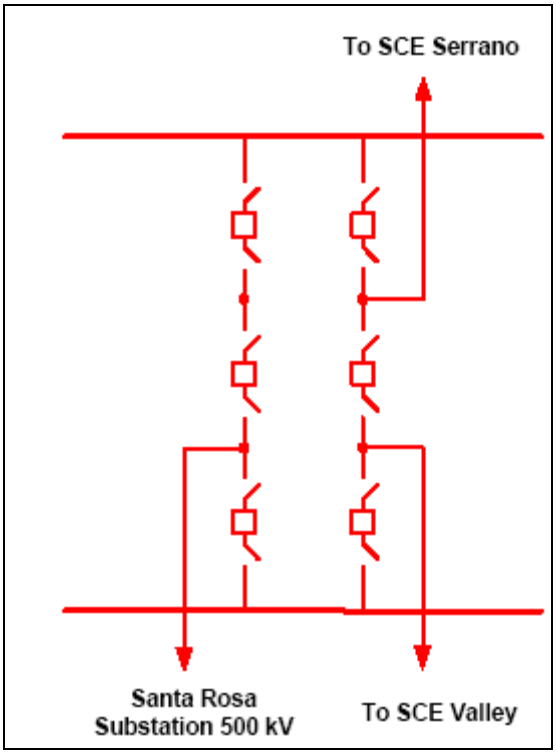

Figure 3.6.1-8 Lake 500 kV Switchyard – Single Line Diagram
Source: SCE

3.6.1.4.2 Santa Rosa Substation

The proposed Santa Rosa Substation is located within an unincorporated area (Lakeland Village) of Riverside County.

As illustrated in Figure 3.6.1-9 Santa Rosa Substation Site, the new Santa Rosa Substation will be constructed above ground and may later be integrated into the design of the LEAPS powerhouse. The substation will serve two local 115 kV circuits reinforcing SCE's Skylark and Elsinore Substations. The approximate load is 100 MW per circuit, for a total of 200 MW of new load served. The load served is the Lake Elsinore area both incorporated and unincorporated Riverside County. The 115 kV circuits also supply starting and facilities power required by the LEAPS project.

A conceptual site plan of the Santa Rosa Substation is presented in Figure 3.6.1-10 Santa Rosa Substation Site – Conceptual Site Plan. Conceptual elevation drawings for that substation are presented in Figure 3.6.1-11 Santa Rosa Substation Site – Conceptual Elevation Drawings. The substation is electrically depicted in Figure 3.6.1-12 Santa Rosa Substation Single Line Diagram.

While serving to reinforce local load, the Santa Rosa Substation may later provide for a connection from the pumped storage facility's powerhouse to the grid and will provide lower-voltage power from the powerhouse to the high-voltage transmission system. The point of connection between the pumped storage facility and the high voltage grid, will be the secondary side of the two 500/20 kV transformers rated at 375 MVA. As an alternate, the generator step up transformers may be located underground adjacent to the LEAPS powerhouse.

The proposed Santa Rosa Substation will enclose a breaker and a half, 500 kV configuration. The primary components of the substation include circuit breakers and disconnect switches, switchyard buses and structures, and microwave/telecommunication facilities.

Figure 3.6.1-9 Santa Rosa Substation Site
Source: Siemens Power Transmission and Distribution

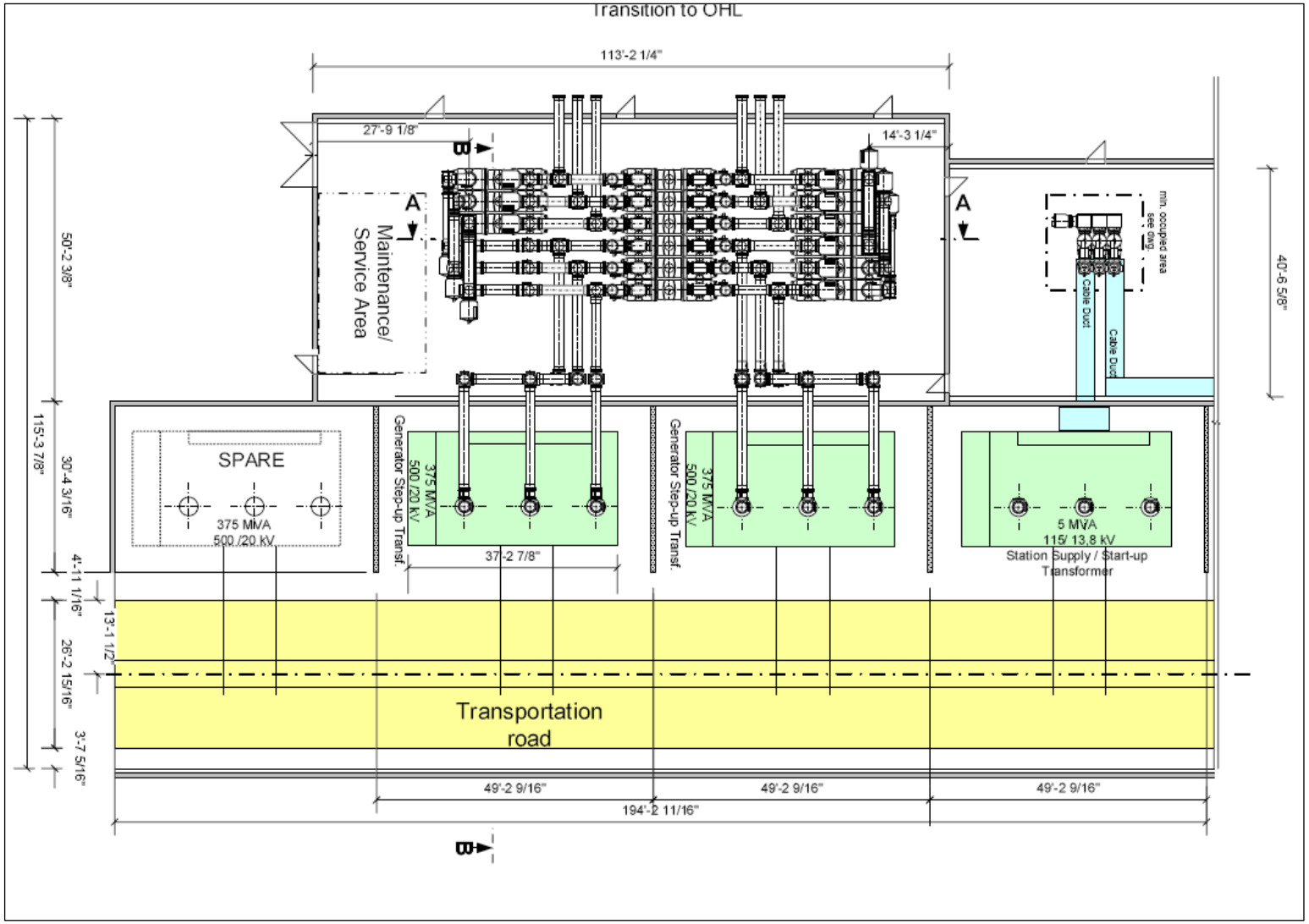

Figure 3.6.1-10 Santa Rosa Substation Site – Conceptual Site Plan
Source: Siemens Power Transmission & Distribution

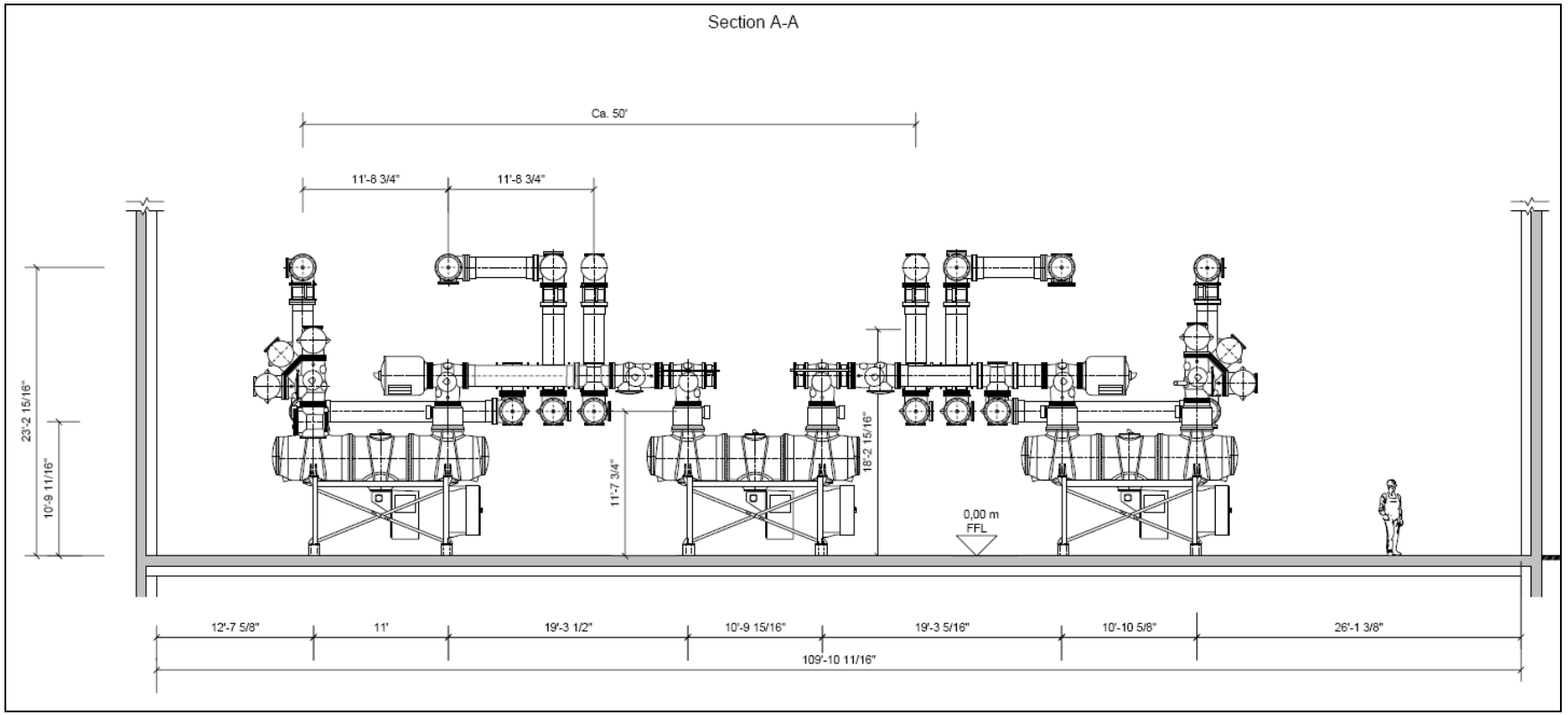

Figure 3.6.1-11 (1 of 3) Santa Rosa Substation Site – Conceptual Elevation Drawings
Source: Siemens Power Transmission & Distribution

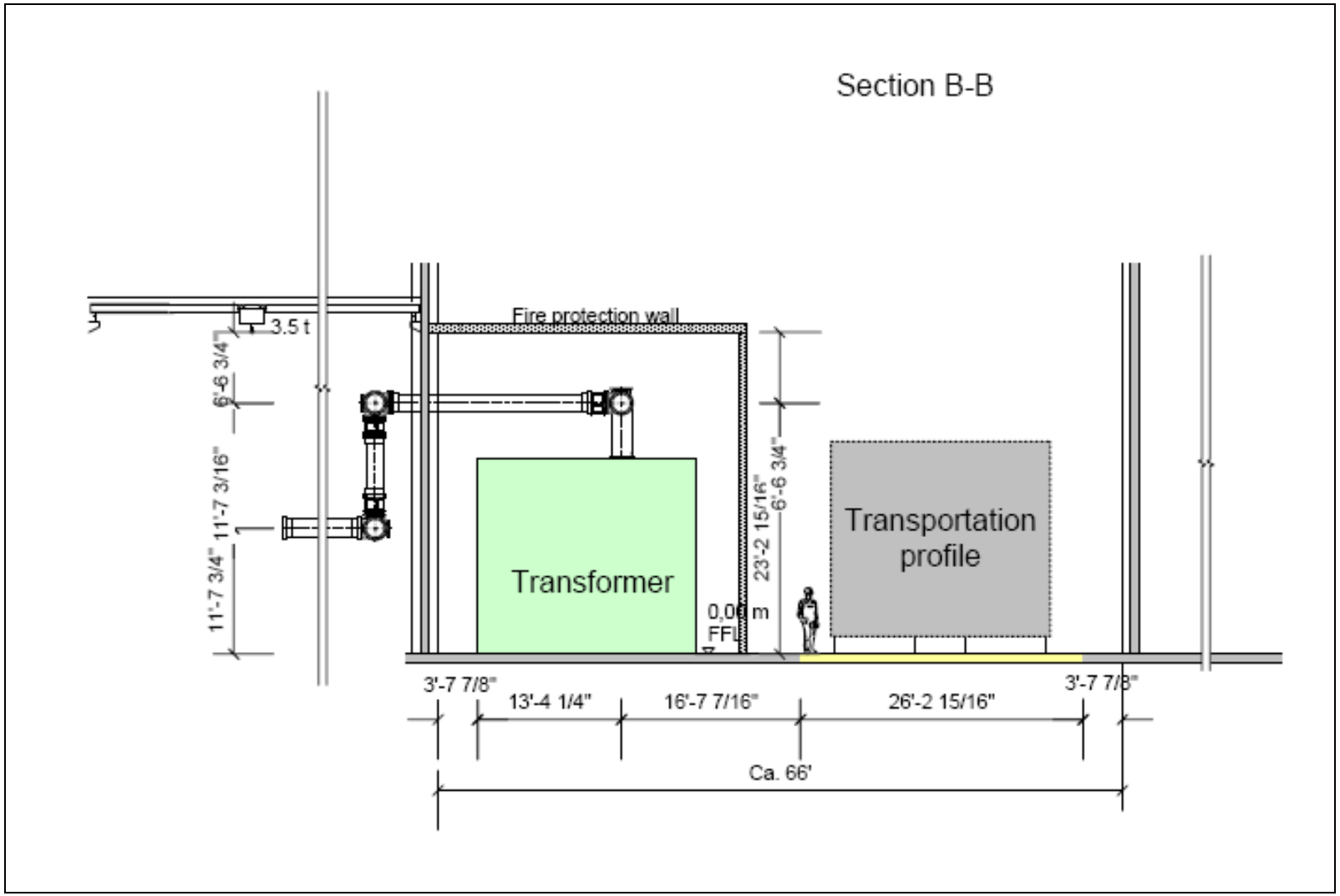

Figure 3.6.1-11 (2 of 3) Santa Rosa Substation Site – Conceptual Elevation Drawings
Source: Siemens Power Transmission & Distribution

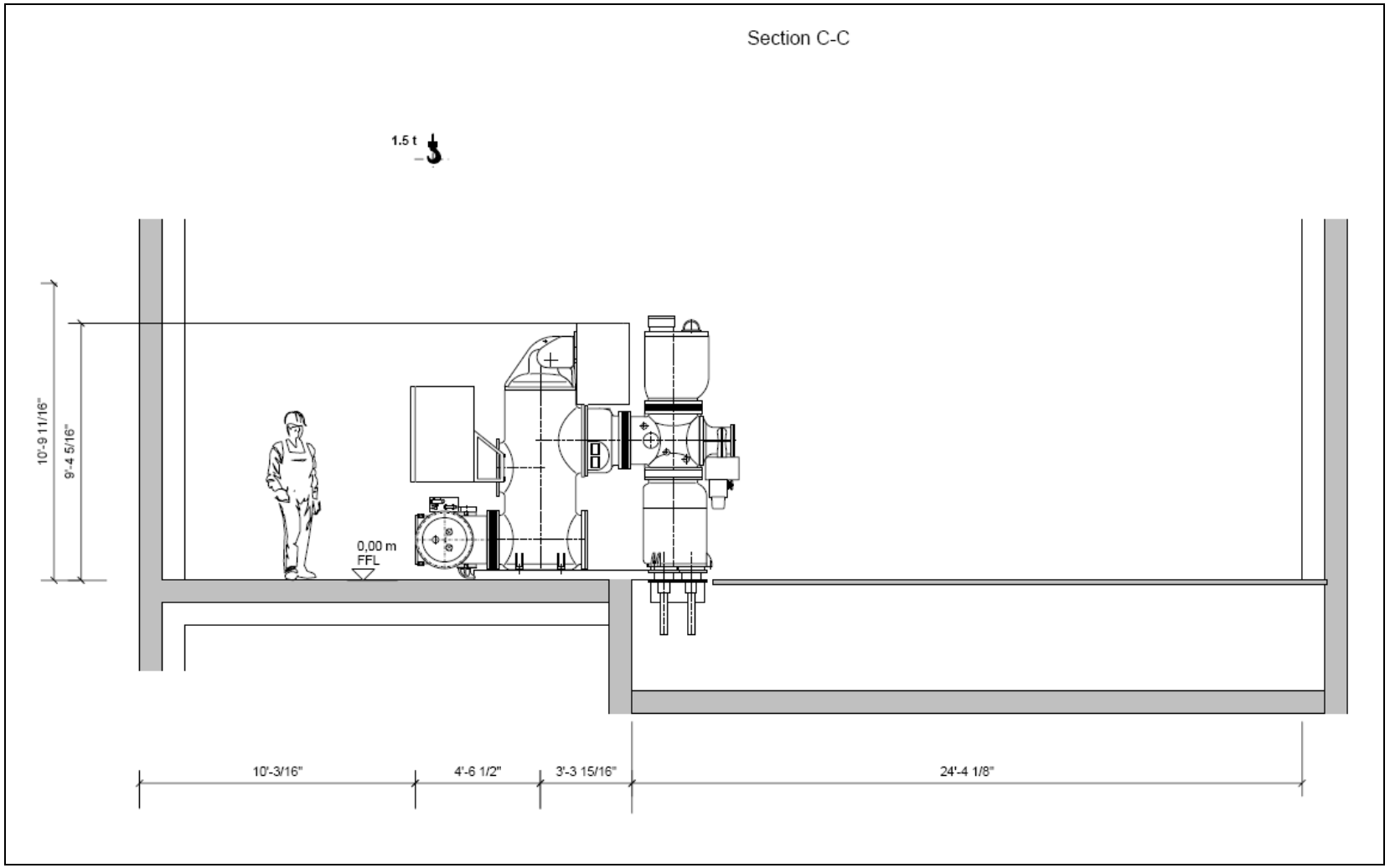

Figure 3.6.1-11 (3 of 3) Santa Rosa Substation Site – Conceptual Elevation Drawings
Source: Siemens Power Transmission & Distribution

Rated voltage	550 kV
Rated frequency	60 Hz
Rated lightning impulse withstand voltage	1550 kV
Rated power frequency withstand voltage (1 min)	740 kV
Rated current busbar	4000 A
Rated current feeder	4000 A
Rated short - time withstand current	63 kA / 1s
Rated short - circuit breaking current	63 kA
Indoor ambient temperature	-5°C / +40°C
Outdoor ambient temperature	-5°C / +49°C

Figure 3.6.1-12 (1 of 2) Santa Rosa Substation Single Line Diagram
Source: Siemens Power Transmission & Distribution

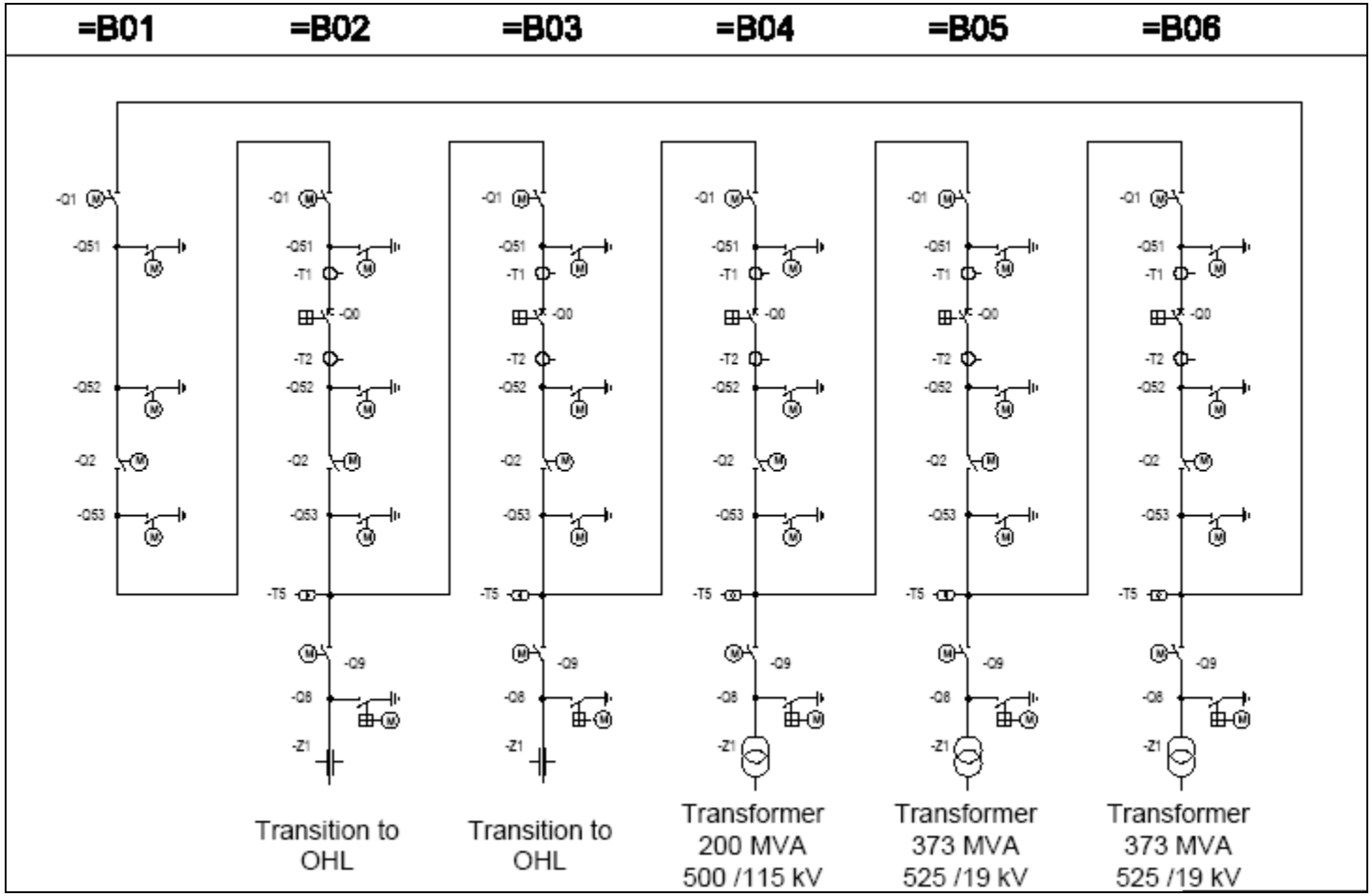

Figure 3.6.1-12 (2 of 2) Santa Rosa Substation Single Line Diagram
Source: Siemens Power Transmission & Distribution

3.6.1.4.3 Case Springs Substation

The proposed Case Springs 500 kV to 230 kV gas-insulated substation (GIS), located near existing Tower No. 163 (Z322651), serves as the southern interconnection of the TE/VS Interconnect to the SDG&E system. As illustrated in the site is approximately 33 acres. The Case Springs Substation (500 kV, 230 kV, 69 kV upgrades/voltage support, and 13.8 kV station power) will be located near the SDG&E's existing 230 kV transmission lines on publicly owned lands near the northern border of Camp Pendleton and the southern border of the TRD. SDG&E's existing 230 kV transmission lines extend between the existing Talega and Escondido Substations. The loop-in consists of Tower 163 removal, installation of two 230 kV anchor bolted dead-end steel poles, and hardware and conductor.

The SDG&E 230 kV GIS will include:

1. Breaker and a half bus design.
2. The initial 4-bay arrangement of the GIS will accommodate four transmission line positions, three bank positions, and one spare position; the ultimate arrangement will allow space for a future fifth bay if needed.
3. 12-230 kV circuit breakers and the associated disconnect switches, ground switches, potential transformers, and gas-insulated bus.
4. Two station service transformers.
5. Three metering units.
6. Required line synchronizing potential transformers.
7. All structures & foundations, busses and equipment within switchyard fence.
8. A dedicated block wall control house, substation below grade conduits and cables, protection systems, supervisory control/telecommunications equipment, batteries and low voltage circuits (all the required protection, metering, telemetering, SCADA and communication equipment and systems).
9. Ground grid.
10. Lighting.
11. Transmission line air-to-gas transitions into the GIS.
12. Air-to-gas transitions for the phase shifting transformer leads and one 750 kW emergency diesel engine /generator set including transfer switch and day tanks, (CARB Certified).

The new Case Springs 500 / 230 kV Substation will include flow control. Three phase-shifting transformers, sized for nominal operation at +16 to -32 degrees with a southern flow of 1,500 MW, are planned. A phase-shifting transformer angular range analysis has been conducted and is included in Figure 3.6.1-4 Power Flow Testing of System Conditions and Associated Angular Phase Shifts.

Some existing and new transmission towers will require special anti-collision lighting. Camp Pendleton will specify infrared lighting that will prevent night vision distortions.

LEAPS Project Phase Shifting Transformer Angular Range Analysis
Power Flow Testing of System Conditions and Associated Angular Phase Shifts

Siemens PTI
July 10, 2007

Case No.	SDGE Net Ties (MW)	SCE Net Ties (MW)	Path 44 Flow (MW)	LEAPS Gen (MW)	LEAPS Phase Shifters Flow (MW)	LEAPS Phase Shifters Angle (Degrees)	Case Description
1	-3016	-6941	163	500	1.000	-20,63	2015 Heavy Summer CAISO Jan. 26,2007 Testimony Case - Green Path +Leaps
2	-3051	-7003	939	500	1.340	-6,16	Same as Case 1 with Imp. Val.-Miguel 500 kV Line Out
3	-3017	-7460	117	0	1.001	-24,57	Same as Case 1 with LEAPS Generation Off
4	-3051	-7530	930	0	1.336	-24,57	Same as Case 3 with Imp. Val.-Miguel 500 kV Line Out
5	-3016	-6941	716	500	243	0,00	Same as Case 1 with LEAPS Phase Shifters at 0 Degrees
6	-3016	-6941	890	500	7	6,70	Same as Case 1 with LEAPS Phase Shifters at 0 MW Flow
7	-3016	-6941	972	0	9	5,98	Same as Case 3 with SCE Gen up 320 MW, LEAPS Phase Shifters at 0 MW Flow
8	-2556	-6941	-84	500	999	-24,71	Same as Case 1 with Otay Mesa ON Max (All SDGE Generation on at Max)
9	-2457	-7453	-139	0	994	-27,12	Same as Case 8 with LEAPS Generation Off
10	-4004	-6621	750	500	1.000	-16,44	Same as Case 3 with Encina Off, SCE Gen up 320 MW, 660 MW Added in Palo Verde Area
11	-4004	-6621	1491	500	7	12,70	Same as Case 10 with LEAPS Gen On, Phase Shifters at 0 MW Flow
12	-4004	-6621	1161	500	447	0,00	Same as Case 10 with LEAPS Gen On, Phase Shifters at 0 Degrees
13	-4002	-6401	935	500	1.002	-14,71	Same as Case 10 with Solar A Off, 230 at Mtn Vista, 670 in Palo Vere Area
14	-4005	-7151	742	0	1.000	-18,68	Same as Case 10 with LEAPS Generation Off
15	-4053	-6402	1811	500	1.440	-16,27	Same as Case 10 with Loss of Imp. Val.-Miguel 500 kV Line
16	-4056	-6925	1810	0	1.427	-18,61	Same as Case 10 with LEAPS Gen Off, Loss of Imp. Val.-Miguel 500 kV Line
17	-4044	-8166	-68	500	1.391	-16,27	Same as Case 10 with Loss of Two SONGS Units
18	-1291	-2997	767	-600	-615	11,05	2010-11 Light Winter CSRTP Case, LEAPS pumping 600, supplied from SDGE
19	-1929	-2370	1197	-600	-613	15,48	Same as Case 18 with Palomar and Encina Off, SCE Gen up 620 MW
20	-1932	-2947	1144	-600	-615	15,43	Same as Case 18 with Palomar and Encina Off, 620 MW Gen in Palo Verde Area
21	-3017	-6941	165	500	1.000	-24,39	Same as Case 1 with one Case Springs Phase Shifter out of service
22	-3017	-6941	-4	500	1.228	-34,94	Same as Case 21 and remaining two phase shifters at 124% of nominal rating
23	-3051	-6980	907	500	1.376	-20,63	Same as Case 2 with phase angles held same as in Case 1 (no auto change)

Notes - SDGE and SCE Net Tie Flows - Negative Value is import
Path 44 Flow south (SCE to SDGE) is Positive Value
LEAPS Phase Shifter Flow from LEAPS toward Case Springs 230 kV Bus is a Positive Value
LEAPS Phase Shifter Angle is measured at the side near the 500/230 kV Transformers, flow values are measured on Case Springs 230 kV side

Figure 3.6.1-4 Power Flow Testing of System Conditions and Associated Angular Phase Shifts
Source: Siemens Power Transmission & Distribution

A conceptual site plan of the new Case Springs Substation is presented in Figure 3.6.1-13, Case Springs Substation Site an in Figure 3.6.1-14, Case Springs Conceptual Site Plan. The Case Springs Substation is electrically depicted in Figure 3.6.1-15, Case Springs Single Line Diagram.

The load served by the Case Springs 500/230 kV Substation is largely the SDG&E service territory and San Diego County. This new substation and associated transmission upgrades will provide a total, bi-directional import capacity of 1,500 MW to San Diego. In addition, it will be able to provide 1,100 MW under contingency (G-1/N-1) conditions, and can be dispatched in real-time by the CAISO.

The point of connection, (POC) between SDGE and The TE/VS Interconnect 500 kV transmission project is the 230 kV GIS and the 230 kV phase shifting transformers.

The Applicant will self perform all facilities and upgrades under the LGIA Section 5.1.3, to maintain schedule as approved by FERC in their May 9, 2008 ruling in Docket ER08-654-000.

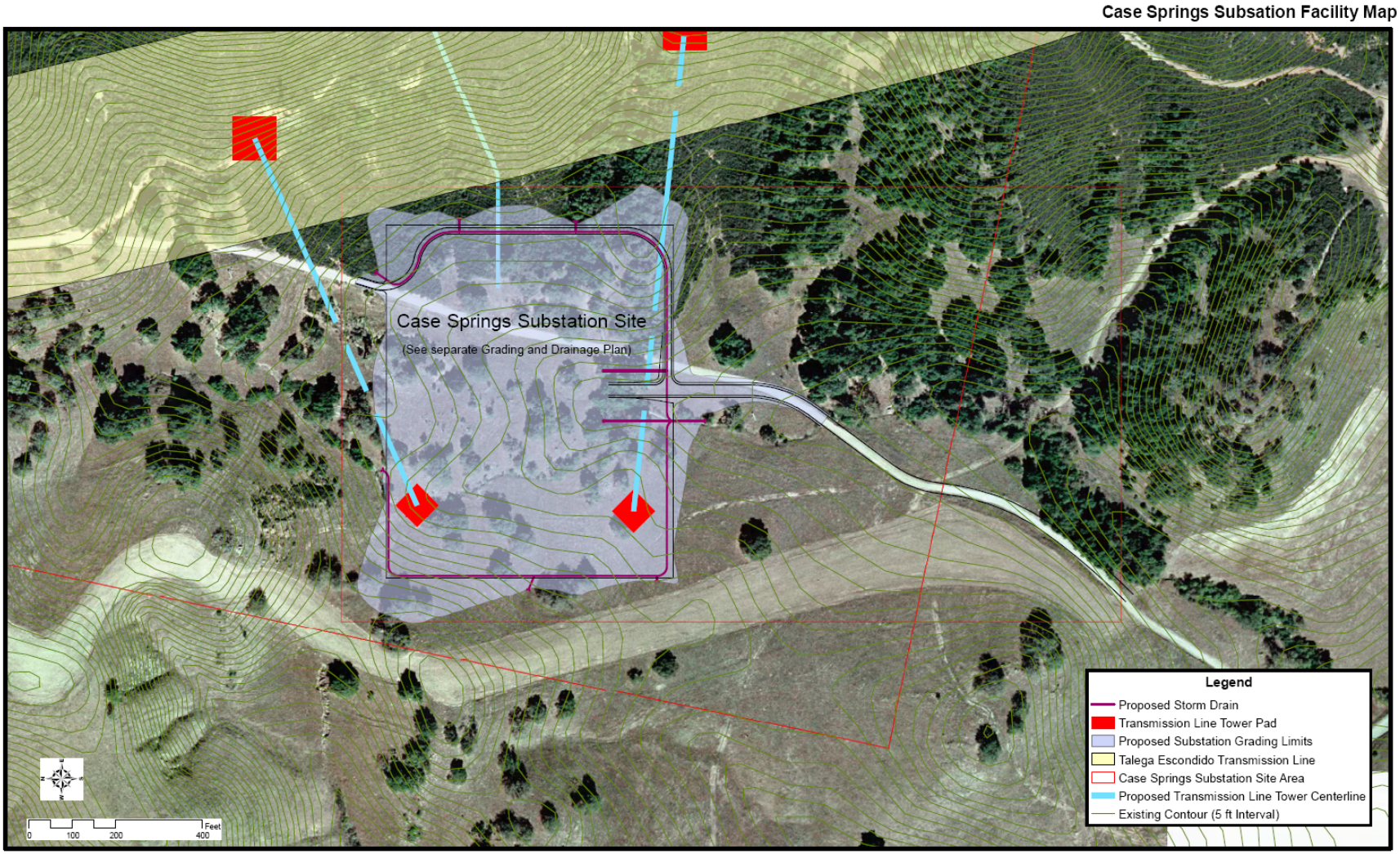

Figure 3.6.1-13 Case Springs Substation Site
Source: Siemens Power Transmission and Distribution

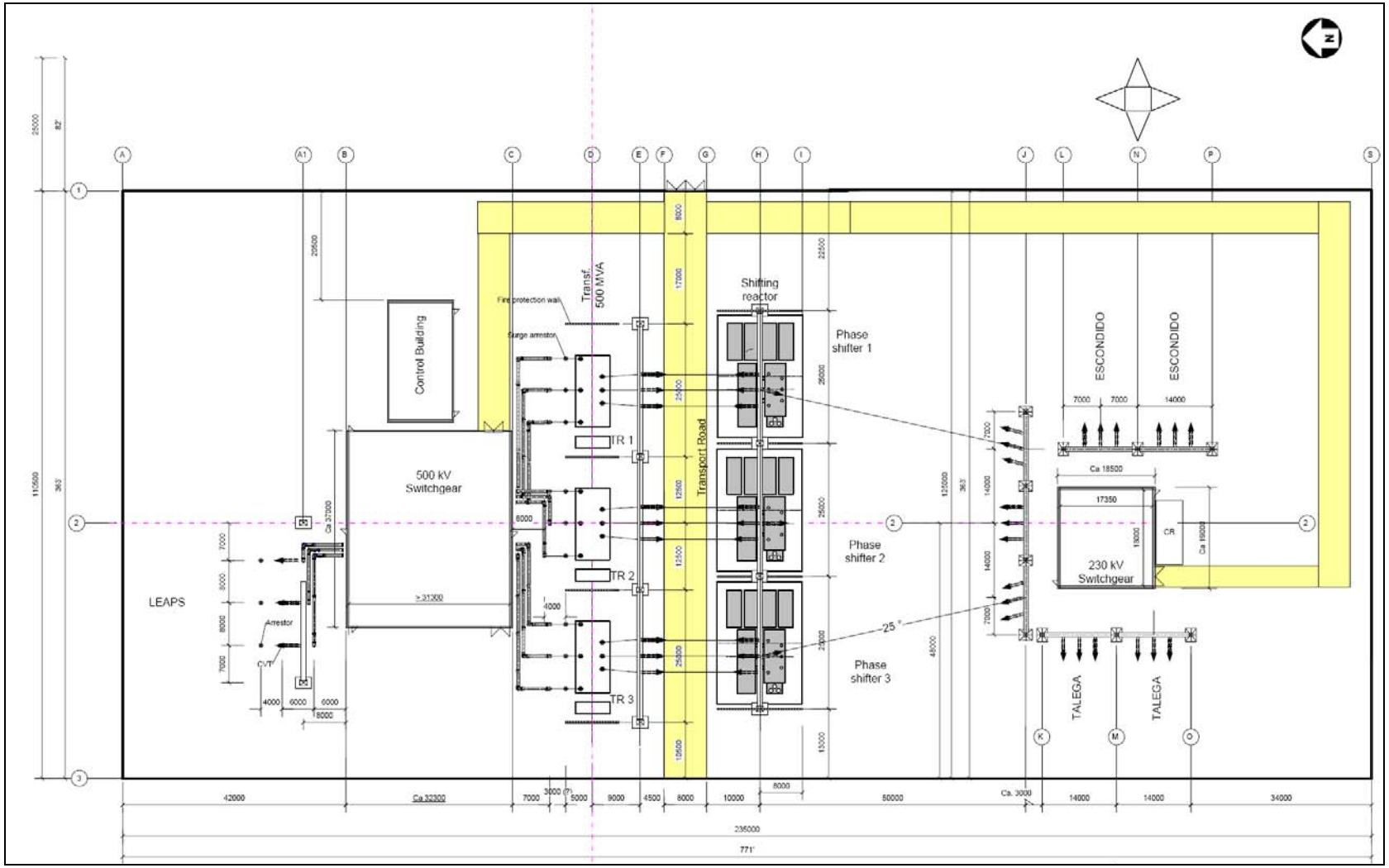

Figure 3.6.1-14 Case Springs Substation – Conceptual Site Plan
Source: Siemens Power Transmission & Distribution

Rated voltage	245 kV
Rated frequency	60 Hz
Rated lightning impulse withstand voltage	1050 kV
Rated power frequency withstand voltage	460 kV
Rated current busbar	1250 A
Rated current feeder	1250 A
Rated short - time withstand current	31,5 kA / 1s
Rated short - circuit breaking current	31,5 kA
Indoor ambient temperature	-5°C…+40°C
Outdoor ambient temperature	-5°C…+49°C

Figure 3.6.1-15 (1 of 2) Case Springs Substation – Single Line Diagram
Source: Siemens Power Transmission & Distribution

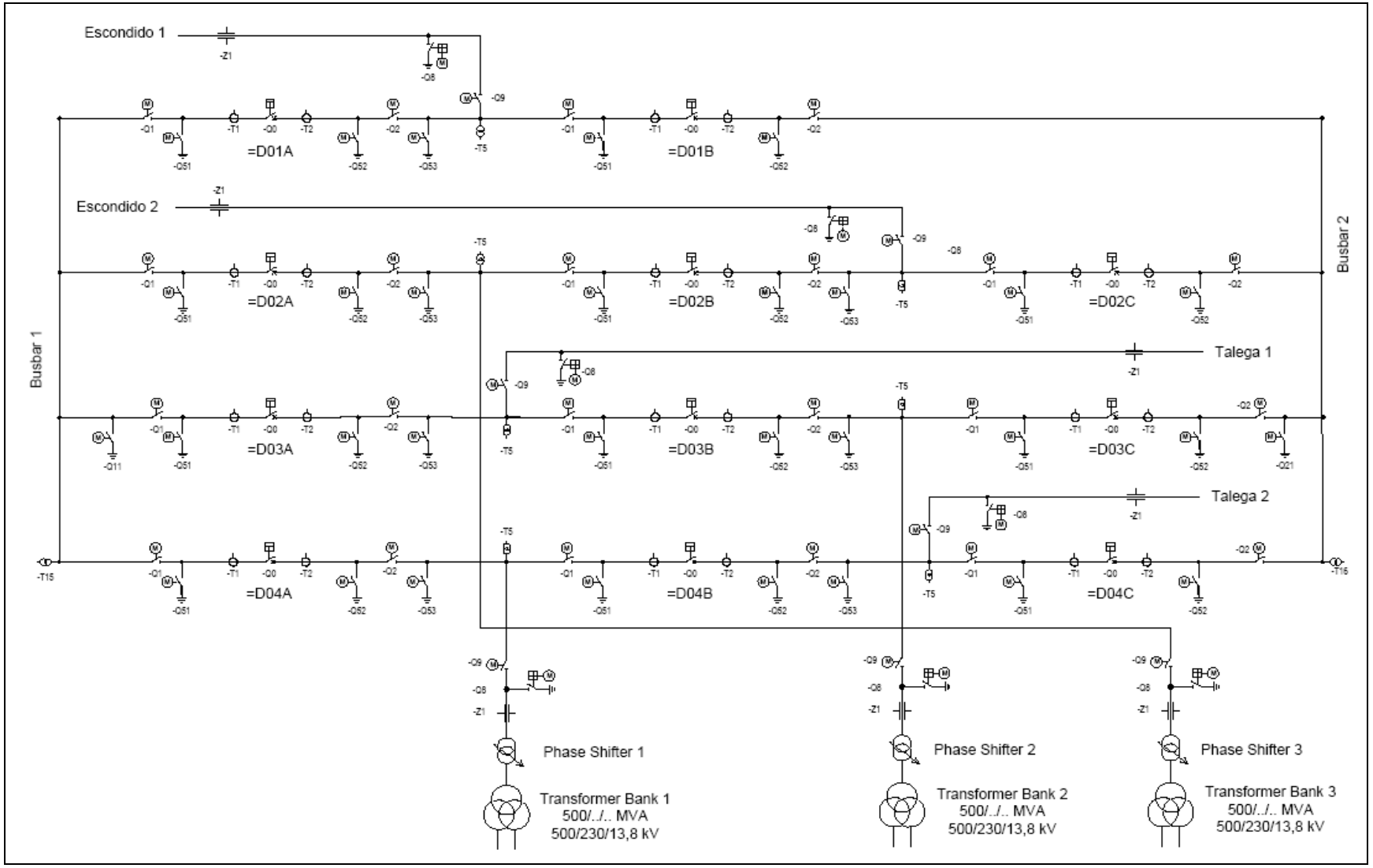

Figure 3.6.1-15 (2 of 2) Case Springs Substation – Single Line Diagram
Source: Siemens Power Transmission & Distribution

3.6.1.5 Telecommunications

Overhead shield wires will be used to protect the electrical conductors from lighting strikes. These wires would be aluminium-coated steel-stranded wire with a fiber-optic core for communication purposes. Some of the fibers in the fiber-optic core would be used for control and monitoring of protective relaying and communication equipment between facilities. The remaining static wire will be insulated at 4.16 kV for any required tower lighting. In addition, the power will be used approximately every mile for communications equipment, and fiber repeaters as required.

Fiber will be utilized throughout the project for communications. One static wire on all transmission towers has a fiber core. Fiber is also used extensively underground, and in all project works.

Microwave will be utilized throughout the project for control and telemetry. This is line of site communications, and will require microwave towers at all substations, powerhouse and at major project locations.

Telephone will be utilized throughout the project locations for communications and security.

Finally, radio will be utilized through the project for radio line of sight communications, telemetry, security, communications and internet. UHF, VHF, Cell, GHz and Wifi frequencies are commonly used both dish & antenna. Communications towers will be required adjacent to all major project facilities. It is anticipated that Case Springs Substation, Santa Rosa Substation, Lake Switchyard, and the LEAPS Powerhouse will require 100 ft. to 300 ft. towers for line-of-sight communications. The towers will be equipped with mid-span antenna platforms and anti-collision lights.

3.6.2 LEAPS

LEAPS will have an installed generating capacity of 500 MW and pumping capacity of 600 MW, provided by two single-stage reversible Francis-type pump turbine units operating under an average net head of approximately 1,600 feet. The facility will firm up and store renewable energy, primarily wind energy,[24] and will be one of the most efficient storage facilities in the world, rated at approximately 83.3% net at the 500 kV primary levels.

The facility currently consists of two 250 MW Voith Siemens Hydro Power Generation synchronous generators, 600 MW of pump load, step-up transformers, and appurtenant facilities. This federal hydroelectric project is being licensed by FERC[25] (FERC PN-11858-002) under the

24/Pumped storage can minimize the system impact of integrating large volumes of intermittent wind resources into the power grid by absorbing electricity generation during high-wind periods that would otherwise cause operational problems for system operators. Pumped storage can be used in tandem with wind resources to shift delivery of wind energy from off-peak to on-peak period during the day and smooth out production spikes (Source: California Energy Commission, Integrated Energy Policy Report, CEC-100-2-5-007CMF, November 2005, p. 146).

25/FERC's authority to license hydropower projects is found in Part 1 of the FPA. Section 4(e) of the FPA (16 U.S.C. 797[e]) empowers FERC to issue licenses for projects that: (1) are located on navigable waters; (2) located on non-navigable waters over which Congress has Commerce Clause jurisdiction, were constructed after 1935, and affect the interests of interstate or foreign commerce; (3) located on public lands or reservations of the United States (excluding national parks); and/or (4) using surplus water or water power from a federal dam.

provision of the FPA and is being permitted by the United States Forest Service under the provisions of the National Forest Management Act (NFMA). Section 15(e) of the FPA (16 U.S.C. 808[e]) specifies that any license issued by FERC shall be for a term that FERC determines to be in the public interest but not less than 30 years nor more than 50 years from the date of issuance. A 50-year federal hydropower license, with the potential for subsequent relicensing for an extended term beyond 50 years, has been assumed herein.

The LEAPS facility will conform to and comply with FERC's "Engineering Guidelines for the Evaluation of Hydroelectric Projects."[26] As stipulated in Part 12 (Safety of Water Power Projects and Project Works) therein, the licensee must use sound and prudent engineering practices in any action relating to the design, construction, operation, maintenance, use, repair, or modification of a water power project or project works (Section 12.5). Requirements include the preparation of an "emergency action plan" (EAP) developed in consultation and cooperation with appropriate federal, State, and local agencies responsible for public health and safety and designed to provide early warning to upstream and downstream inhabitants, property owners, operators of water-related facilities, recreational users, and other persons in the vicinity who might be affected by a project emergency (Section 12.20). The EAP shall conform to FERC guidelines (Section 12.22) and must be filed no later than 60 days before the initial filing of the LEAPS reservoir begins (Section 12.23).

Because the proposed upper reservoir's impoundment would be classified as a "high hazard dam" or "high hazard potential structure,"[27] the EAP will be developed in accordance with FERC[28] and Federal Emergency Management Agency[29] (FEMA) regulations, guideline, and manuals. Final dam design and specification shall be subject to the findings of the design-level seismic investigation conforming to FERC,[30] FEMA,[31] and applicable California Department of Water Resources - Division of Safety of Dams[32] (DSOD) standards.

As required, the Applicant's "standard technical information document" (STID) will include a surveillance and monitoring plan (SMP) providing the details of how the owner will monitor and evaluate the performance of the dam and project structures. The SMP will include the

Jurisdiction applies regardless of project size. Section 10(a)(1) of the FPA (16 U.S.C. 803[a][1]) establishes the comprehensive development standard which each project must meet to be licensed (Source: Federal Energy Regulatory Commission, Report on Hydroelectric Licensing Policies, Procedures, and Regulations – Comprehensive Review and Recommendations Pursuant to Section 603 of the Energy Act of 2000, May 2001, pp. 9-11).

26/Federal Energy Regulatory Commission, Engineering Guidelines for the Evaluation of Hydroelectric Projects, April 1991, updated July 1, 2005.

27/Federal Emergency Management Agency, Federal Guidelines for Dam Safety – Hazard Potential Classification System for Dams, April 2004.

28/Federal Energy Regulatory Commission, Guidelines for Preparation of Emergency Action Plans, November 1979, revised September 1988.

29/Federal Emergency Management Agency, Federal Guidelines for Dam Safety, April 2004; Federal Emergency Management Agency, Federal Guidelines for Dam Safety – Emergency Action Planning for Dam Owners, April 2004; Federal Emergency Management Agency, Federal Guidelines for Dam Safety – Selecting and Accommodating Inflow Design Floods for Dams, April 2004.

30/Op. Cit., Engineering Guidelines for the Evaluation of Hydropower Projects, April 1991, updated July 1, 2005; Federal Energy Regulatory Commission, Guidelines for Public Safety at Hydropower Projects, March 1992.

31/Federal Emergency Management Agency, Federal Guidelines for Dam Safety – Earthquake Analysis and Design of Dams, May 2005.

32/Parts 1 and 2 of Division 3 (Dams and Reservoirs) of the CWC; Chapter 1 of Division 2, Title 23 (Waters) of the CCR; and Current Practices of the Department in Supervision of Dams and Reservoirs. Sections 6000-6004.5 of the CWC identify dams and reservoirs that are in State jurisdiction. Dams and reservoirs owned by the United States are not subject to State jurisdiction, except as otherwise provided by federal law.

requirement to periodically submit a surveillance and monitoring report (SMR) presenting, evaluating, interpreting, and providing findings on the overall performance of the dam.[33]

Signage, conforming to FERC standards, will be placed at the hydropower facilities.[34] Excluding the afterbay, the project's facilities will be landscaped to provide screening along abutting street frontages. Final landscape plans for those facilities located on NFS lands will be developed in coordination with the Forest Service.

Presented below is a brief discussion of the key facilities that collectively comprise the LEAPS, including non-energy-related facilities that are associated with the proposed project.

3.6.2.1 Decker Lake Upper Reservoir

Proposed is the creation of a new approximately 110-acre open reservoir, located in the south fork of Decker Canyon (Sections 21 and 22, T6S, R5W, SBBM USGS 7.5-Minute Alberhill Quadrangle),[35] at the headwaters of San Juan Creek. The proposed upper reservoir (forebay) is located within the TRD, at elevations 2440 to 2850-feet AMSL, on land under Forest Service jurisdiction. The proposed reservoir site is located adjacent to and south of Killen Truck Trail/South Main Divide Truck Trail (Forest Route 6S07) (South Main Divide Truck Trail), an all-weather, County-maintained two-lane road[36] extending eastward from SR-74 (Ortega Highway).

The proposed upper reservoir is not intended for the storage of potable water and no water treatment activities, other than as may be associated with vector control, are proposed therein. No public access to the reservoir site and no recreational contact with the water within that reservoir would be authorized. Access to and waters stored within the upper reservoir will, however, be made available for firefighting purposes.

The new upper reservoir capacity will be approximately 5,750 AF (approximately 5,500 AF live storage and approximately 250 AF dead storage). A 20 foot wide crushed stone, gravel, or asphalt-paved roadway will be provided around the embankment to allow access for maintenance and inspection. Access will be restricted by signage and an approximately 8 foot high chain-link fence located on the outer side of the crest roadway. Surface water channels will be constructed within the perimeter access corridor. The sides and bottom of the upper reservoir will be provided with an impermeable dual liner (i.e., clay and double geomembrane) system to minimize water loss and seepage. The liner system will allow for steepened reservoir side slopes by protecting the side slopes from rapid drawdown damage (e.g., sloughing, erosion, and landsliding) and will protect the reservoir floor from erosion and scour.

33/An outline of the Applicant's SMP is presented in "Supplement No. 1 to Geotechnical Feasibility Report – Preliminary Guidelines for a Monitoring and Surveillance Program, Lake Elsinore Advanced Pumped Storage Project, Riverside County, California" (GENTERRA Consultants, Inc., October 16, 2003), included in the FLA.

34/Federal Energy Regulatory Commission, Safety Signage at Hydropower Projects, October 2001.

35/Latitude: 33.37N; Longitude: 117.2532W.

36/South Main Divide Truck Trail (Killen Trail) links State Route 74 (SR-74 or Ortega Highway) to the residential area of Rancho Capistrano (Morrell Potero) and to the eastern portion of the TRD. At its eastern terminus, South Main Divide Truck Trail becomes Forest Route 7S04 which extends southward to Tenaja Road, near the southeastern border of the TRD.

In addition to the use of low-permeability soil for the impermeable layer of the floor and sideslopes, the upper reservoir will incorporate a double-liner system. The liner system will include a high-density polyethylene (HDPE) liner, drainage layer under the primary geomembrane to collect and convey leakage, secondary HDPE geomembrane under the drainage layer to separate leakage from native groundwater, secondary seepage collection system under the secondary geomembrane to relieve water pressures from under the liner system, and grading preparation as needed to protect the liner system from sharp bedrock protrusions.

Redundant controls will be provided to protect against over-pumping. Three independent systems will be installed to monitor and control the water level in the upper reservoir and to ensure that all units operating in the pumping mode will be tripped before the water level exceeds the final design capacity. These monitoring devices will be coordinated and interlocked in operation to preclude the possibility that failure of a device or a combination of devices and/or any human operating error will allow safe operating levels from being exceeded. For this reason, and since the upper reservoir has no contributory drainage area, no reasonable possibility of exceeding maximum water level will exist.

An intake/outlet structure located in the upper reservoir will interconnect the new upper reservoir with the powerhouse through a single 25 foot diameter nominal conveyance channel and tunnel, with a gated inlet structure. Radial gates, slide gates, or an emergency bulkhead will be installed to shut off water flow from the upper reservoir in the event of an emergency or for inspection and repair.

The proposed upper reservoir will be designed for and will accommodate access by firefighting helicopters and other firefighting personnel. Helicopters will be able to utilize reservoir waters to fill suspended "bambi buckets" or other devices for fire suppression. A wind sock or similar device will be installed in a clearly visible location adjacent to the reservoir to assist pilots by indicating wind conditions during fire fighting events. In addition, the reservoir's waters can be pumped from the upper reservoir by mobile water pumping equipment for other fire-response purposes.

3.6.2.2 Decker Lake Dam

The proposed upper reservoir design includes: (1) an approximately 300 foot high main embankment dam[37] located on the southwest side of the reservoir; (2) maximum and minimum pond elevation of approximately 2790 feet and 2660 feet AMSL, respectively; (3) a crest elevation of 2800 feet AMSL; and (4) an inlet at elevation of approximately 2600 feet AMSL feet for the intake structure. The conceptual drawing for the proposed upper reservoir is included in Figure 3.1.1-3 Pumped Storage Project Components.

37/Dams are defined according to 33 CFR 222.6(h) as all artificial barriers, together with appurtenant works, which impound or divert water and which: (1) are 25 feet or more in height; or (2) have an impounding capacity of 50 acre-feet or more. Federal regulations define dams for the purpose of ensuring public safety (Source: United States Environmental Protection Agency, National Management Measures to Control Nonpoint Source Pollution from Hydromodifications, July 2006, p. I-2).

The required fill volume of the dam is about 3.0 million cubic yards (CY). Grading operations will be conducted in compliance with applicable National Pollutant Discharge Elimination System (NPDES) permit requirements.[38]

While most of the excavation will come from within the area of the reservoir itself, alternative dam designs are presented in section 6.2. Additional excavation materials may come from the powerhouse, shafts, and penstock tunnels. Excavated and/or imported materials will be used to construct the dam and other earth structures required for the impoundment. Materials may be trucked to and from the upper reservoir site along SR-74, via Main Divide Truck Trail.

Embankment material would consist of silty sand and rock materials generated from excavated granitic bedrock and weathered granite. Depending upon the conditions of the bedrock foundation, the dam may be keyed into the foundation rock and the rock foundation may be grouted. All slope inclinations of the dam's slopes will be approximately 3:1 (horizontal to vertical) but may be constructed flatter to accommodate ground motion criteria currently being evaluated. A freeboard of 10 feet was used to estimate the height of the dam. The crest of the dam will have a relatively narrow width (approximately 30 feet). The dam would include a concrete-lined emergency spillway and a low-level outlet.

3.6.2.3 Project Tunnels/Shaft

Water will be transferred between the upper reservoir and the powerhouse through a single approximately 25 foot diameter, primarily concrete-lined tunnel. The inlet elevation at the proposed upper reservoir will be about 2600 feet AMSL.

A tunnel-boring machine (TBM) or conventional hard-rock mining operation will be used to excavate the headrace tunnels. It is anticipated that the high-head conductor will be excavated into competent granitic bedrock. In general, the pipeline alignments will seek to follow the most direct route between the upper reservoir and the powerhouse, taking into consideration the area's topography and subsurface geotechnical features.

A vertical tunnel will descend from a location northeast of the upper reservoir. The vertical tunnel will connect to a lower sub-horizontal tunnel that would have a gradient of approximately five percent downward toward the powerhouse. The horizontal tunnel will be unlined or concrete-lined where there is adequate rock cover over the tunnel and steel lined where there is inadequate rock cover. The horizontal tunnel would then split into a steel-lined manifold immediately upstream of the powerhouse, directing the water flows to the turbines in the powerhouse.

A double-seated spherical valve will be provided at the inlet for each pump-turbine spiral case. The valves will be used to isolate the pump-turbine from the penstock for inspection and maintenance and to close in an emergency. Draft tube bulkhead gates will be provided to be used in conjunction with the penstock valves for dewatering the pump-turbine water passages.

38/California Regional Water Quality Control Board, San Diego Region, Order No. R9-2007-0001, NPDES No. CAS0108758, Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds of the County of San Diego, the Incorporated Cities of San Diego County, the San Diego Unified Port District, and the San Diego County Regional Airport Authority, January 24, 2007, Section D.2.c(1)(a)(vi).

3.6.2.4 LEAPS Powerhouse

As illustrated in Figure 3.1.1-3 LEAPS Pumped Storage Component, the proposed Santa Rosa Powerhouse site (Section 14, T6S, R5W, SBBM, Lake Elsinore 7.5-Minute USGS Topographic Quadrangle) is approximately located west of the terminus of Santa Rosa Drive, between Ponce Drive and Grape Street, within unincorporated Lakeland Village area of Riverside County. The site is located to the south of SR-74 and west of Grand Avenue.

The proposed powerhouse will be located about 340 feet underground at 1,050 AMSL, about 5,000 feet from Lake Elsinore. The powerhouse will contain two reversible Francis-type pump-turbine/motor generators, nominally rated at 300 MW each when pumping, and an additional two empty turbine bays.

A modern system of flow measurements through the pump-turbine will be provided. Each pump-turbine will have adjustable wicket gates controlled by an electronic governor through oil-operated servomotors. Consistent with all Francis-type pump-turbines, the units will operate at relatively constant flow rate while pumping. The pump-turbine runner and wicket gate, as well as other components that may also be susceptible to cavitation, will be of solid stainless steel construction or stainless-steel clad, to prevent cavitation damage. The pump-turbine distributor will be set approximately 195 feet below minimum tail-water level to minimize cavitation damage.

A service bay will be provided at one end of the powerhouse. Two sub-horizontal gently inclined access tunnels will access the headrace tunnel, service bay, transformer gallery, and pumping/generating units from the northeast. The purpose of the tunnels is to provide tunnel and powerhouse cavern access during construction, ventilation, and emergency egress during and after construction. The tunnels will be approximately 30 feet in diameter and will be concrete lined. A service building will be constructed near one of the tunnel portals to provide for the equipment storage and accommodate offices and other uses.

Powerhouse equipment will include an over-head bridge crane supported on high-level beams along the length of the powerhouse. The crane will be sized to handle the heaviest lift during equipment installation and maintenance. The powerhouse cavern housing the pumping/generating units and optional underground transformer gallery approximately 375 feet long, 220 feet wide, and 150 feet high.

The main powerhouse cavity will contain local operating and control equipment for each unit. The powerhouse roof will be supported by rock bolts or rock anchors with wire mesh and shotcrete for support as needed. The powerhouse will be wide enough to accommodate spherical turbine valves to control flow into the units. The valves will be placed immediately upstream of the spiral case so that they can be handled by the main powerhouse crane.

Galleries for electrical and mechanical services will be provided on the upstream and downstream sides of the powerhouse, respectively. Discharge from the units in the generating mode will pass through the draft tubes into the tailrace tunnel. This tunnel will be D-shaped and concrete-lined. The transformer gallery may be located within the powerhouse. The individual

transformers will be enclosed by concrete firewalls. These walls, together with the necessary concrete sections and cable trench, are the only structural work required to contain the transformers. The transformers will be connected to the motor-generators by means of isolated-phase bus through a separate tunnel to each unit.

The power plant's mechanical systems will be designed to maintain suitable and safe conditions for operators and maintenance personnel. Ventilation air in and out of the two powerhouse access tunnels will be provided. The major heat-producing units, such as transformers and generators, will be cooled by oil-water and air-water heat-exchange systems. A system of ducting, bulkhead controls, and circulating fans will be installed to ensure equitable distribution of air throughout the facility and prevent the accumulation of carbon monoxide (CO) and other gases. Fire doors, incorporating air locks, will be provided at key locations. Fire prevention systems in the underground plant will be conventional deluge-type for the major items of equipment. Tied to these systems will be a system of isolating dampers and bulkheads connected to the ventilation system for control of smoke and fumes. In accordance with fire and building code standards, a high-pressure fire system will supply water to fire hose stations located throughout the facility. Unit dewatering will employ high-capacity pumps in pressurized pump pits.

Power generated in the underground powerhouse will be transformed to 500 kV and transmitted to the surface by way of gas-insulated lines (GIL). Two 2,000 kW emergency diesel generators will run an air compressor and essential cooling pumps for the powerhouse complex.[39]

Although computer and programmable logic control (PLC) systems improve plant operation by providing greater flexibility in control, alarming, and sequence of events recording, the essential emergency shutdown controls shall remain hardwired. This will guarantee that a safe and orderly shutdown of the plant can be accomplished in an emergency situation during which the computer and PLC systems have failed.[40]

3.6.2.5 Lake Elsinore Intake/Outlet Structure

Between the powerhouse and lower reservoir, the inlet/outfall structure and its associated conduit (tailrace) will be located within an unincorporated County area. At the lakeshore, the inlet/outlet and other associated improvements extending into Lake Elsinore (e.g., intake headwall structure, reinforced dredged channel, and boat dock) will be constructed within the corporate boundaries of the City.

The intake/outlet (tailrace) structure for the lower reservoir will be located near the southwest shoreline of Lake Elsinore. The structure will extend from the portal of the tailrace tunnel to a headwall structure fitted with trashracks at the shoreline. The structure will be designed to provide a maximum discharge velocity of 1.8 feet per second (fps) at the trashracks during generation and a maximum intake velocity of 1.4 fps at the trashracks during pumping. Stoplogs will be provided at the portal so that the tailrace tunnel can be isolated from Lake Elsinore.

39/The standby generators will be tested monthly for 30 minutes, representing approximately six hours per use of use. Maintenance activities will add approximately twelve hours per year of additional use. Except in the case of an emergency, this would result in an expected annual useage of about 18 hours per generator.

40/Federal Energy Regulatory Commission, Over Pumping Protection Systems Recommended Design Criteria, November 2006, p. 12.

The lower reservoir outlet plan and profile is illustrated in Figure 3.1.1-3, LEAPS Pumped Storage Component. As shown, a rip-rap lined, reinforced dredged channel will be installed to reduce velocities, provide a natural silt trap, and shape a velocity profile into the intake screens, structure, and gates. Following construction, the cofferdam will be removed. A paved maintenance road would provide shoreline access and a boat dock installed to allow for lake access during facility maintenance. The area will be equipped with security cables, warning signs, warning buoys, security cameras, and navigational warning lights.

The tailrace structure for the upper reservoir will consist of a gated inlet structure where the water flows into a horizontal or sloping conduit. Radial gates, slide gates, or an emergency bulkhead will be installed to shut off water flow from the upper reservoir in the event of an emergency and for inspection and repair of the high-head conduit. The intake/outlet structures will be equipped with trashracks to prevent large debris from entering the conduit system. The structure will be located at sufficient depth below minimum operating level to prevent air entrainment. The intake/outlet structure will be reinforced concrete with automated trashracks and stoplogs and will incorporate fish excluders. Fish excluders can be changed seasonally but not automated.

3.6.2.6 Lake Elsinore as the Lower Reservoir

Lake Elsinore will serve as the afterbay for LEAPS. Lake Elsinore is a relatively shallow lake with a large surface area. The lake, a naturally occurring sink for the San Jacinto River watershed, has been significantly modified for water control.[41] At the current lake outlet sill elevation of 1255 feet AMSL, the lake has an average depth of 24.7 feet and the hypolimnetic water volume and surface area are 54,504 AF and 3,606 acres, respectively.[42] Waters within the lake are owned by the EVMWD and the real property within the OHWM is owned by and located within the corporate boundaries of the City. Public access to the lakeshore is limited to locations along the lakeshore where property is publicly owned.

Water from Lake Elsinore will be used for the initial filling of the upper reservoir, for the replenishment of evaporative losses from that reservoir, and for any supply waters that may be required within either the Santa Ana River or San Juan Creek watersheds for the mitigation of any project-related water-diminishment or habitat restoration impacts.[43]

During the facility's operation, waters will be cycled between the existing lower reservoir and the new upper reservoir through a closed loop system.

As indicated in Table 3-4 (LEAPS Weekly Cycle – Hydraulic Maximum Drawdown and Active Storage Balance), under normal operations, approximately 3,000 AF of water will cycle between the two waterbodies, producing an approximately 20-inch maximum horizontal rise or fall of

41/Lichvar, Robert, Gustina, Gregory, Ericsson, Michael, Planning Level Delineation and Geospatial Characterization of Aquatic Resources for San Jacinto and Portions of Santa Margarita Watershed, Riverside County, California, United States Army Corps of Engineers, March 2003, p. 28.

42/Lake Elsinore and San Jacinto Watershed Authority (Montgomery Watson Harza), Final Program Environmental Impact Report – Lake Elsinore Stabilization and Enhancement Project, SCH No. 2001071042, September 2005, p. 5-19.

43/All such waters shall be provided under the terms of the existing Development Agreement and any subsequent agreements between the District and TNHC.

surface water elevations in Lake Elsinore during a weekly cycle (at lake elevation of 1240 feet AMSL). The maximum daily hydraulic drawdown for Lake Elsinore is projected to be about 0.98 feet per week and the maximum weekly hydraulic drawdown of Lake Elsinore is projected to be about 1.72 feet per week. The maximum projected drawdown of 1.72 feet per week represents 5,340.3 AF (maximum hydraulic storage). Since much of the shoreline slopes between 4 and 8 percent, the resulting shoreline fluctuation through each cycle will be between approximately 12 and 38 feet. A greater shoreline withdrawal could occur in areas with extremely shallow slope or if drawdown during the facility's operation were to exceed these projections.

It is assumed that the starting elevation of water in Lake Elsinore is 1240 feet AMSL. At an elevation of 1240 feet AMSL, Lake Elsinore contains 38,518 AF of water. At this elevation, the lake will have its maximum level change based on a given water transfer. At elevation 1247 feet AMSL, the capacity of Lake Elsinore is 61,201 AF. The rate of change at this elevation is 37 percent less for the same water transfer.

3.6.2.7 Other Features as Pumped Storage Components

3.6.2.7.1 Water Supply

Water to keep Lake Elsinore at or above the prescribed level of 1240 feet MSL will potentially come from a variety of sources as may be required under one or more water supply agreements that will be negotiated with regional water supply agencies. These may include the Eastern Municipal Water District (EMWD), the Elsinore Valley Municipal Water District (EVMWD) and others. The primary source of this water is likely to be recycled water from these Districts. These districts will be responsible for approval requirements for discharge into the lake. If used, recycled water will likely require additional treatment to remove phosphorous before being added to the lake.

In addition, because of the isolated nature of a number of facility sites, the Applicant may elect to drill and operate one or more groundwater wells in order to provide construction and operational water. In compliance with California Department of Water Resource requirements[44] and California Well Standards, [45] the water supply well will be contracted to parties possessing C-57 water well contractor's licenses, using a reverse circulation hydraulic rotary drilling rig. Once operational, water quality samples would be collected for full Title 22 analysis, as specified by the California Administrative Code. Additional wells may be required for dewatering excavation during construction and/or stabilizing hillsides or earth embankments. All water from construction dewatering will be monitored and treated, as appropriate, in compliance with all site storm water or construction general discharge permits prior to discharge in compliance with applicable regulations.

3.6.2.7.2 Water Treatment Facilities

44/California Department of Water Resources, California Laws for Water Wells, Monitoring Wells, Cathodic Protection Wells, Geothermal Heal Exchange Wells, March 2003.

45/Lichvar, Robert, Gustina, Gregory, Ericsson, Michael, Planning Level Delineation and Geospatial Characterization of Aquatic Resources for San Jacinto and Portions of Santa Margarita Watershed, Riverside County, California, United States Army Corps of Engineers, March 2003, p. 28.

Phosphorous can be removed from recycled water by the addition of a chemical to form an insoluble precipitate, with the subsequent removal of the precipitate by physical separation processes, such as sedimentation or filtration. The chemicals commonly used are metal salts or lime. The primary metal salts used are aluminum-based salts (most commonly aluminum sulfate or alum) and iron-based salts (ferric chloride, ferric sulfate, ferrous chloride, and ferrous sulfate). If required to treat additional sources of imported water, including water from the Eastern Municipal Water District (EMWD), an approximately 10-acre alum-treatment facility would be constructed in the vicinity of the San Jacinto River channel. If constructed, alum treatment of approximately 175 AF per day of EVMWD and/or EMWD reclaimed water, up to a maximum of 16,000 AFY, would be provided to meet total phosphorus (TP) concentration of 0.5 mg/L in effluent.

3.6.2.7.3 Recreation Facilities

The following facilities are associated with LEAPS only and do not constitute elements of the TE/VS Interconnect, as the Applicant has presented a recreational plan to FERC as part of the Applicant's hydropower licensing project.[46] Components of that plan are outlined below.

Day-Use Area. As indicated in the Forest Service' 4(e) conditions (Condition No. 27), the Forest Service has requested that the Applicant develop a compensating recreational plan for NFS lands that could include the construction of a day-use recreational facility as part of the LEAPS project.[47] Neither the location nor the nature of that use or compensating facilities have been determined by the Forest Service, the facility will likely be located in the area generally illustrated in Figure 3.1.1-3, LEAPS Pumped Storage Component, in one of the areas identified for construction staging. As specified, within one year of the license's issuance, the licensee will file with FERC a "recreation facility development plan" for a recreation facility or alternative use approved by the Forest Service.

For the purpose of CEQA compliance, it is assumed that the Applicant will design and develop, for conveyance to the Forest Service, a minimum 10-acre day-use facility. Assumed uses include a Type 1 helitanker helispot,[48] fire equipment and personnel staging area, firefighter memorial, interpretive center or kiosk, scenic overlook, picnic area, comfort facilities, and/or hang glider launching site (including a windsock and anemometer). Recreational facilities operated by the Applicant on NFS lands, if any, shall be in compliance with FSM 2340.

Neighborhood Park. As stipulated in PM&E Measure 19, the Applicant will develop and implement a recreation plan that provides for transferring of land off NFS lands to a local entity

46/FERC's mandate for providing recreational resources at hydropower projects is defined, in part, in FERC Order 313 (30 FR 16197), which states: "The Commission believes that irrespective of the requirements of their licenses, licensees whose projects comprise land and water resources with outdoor recreational potential have a responsibility for the development of those resources in accordance with area needs, to the extent that such development is not inconsistent with the primary purpose of the project. All licensees will therefore be encouraged to submit for Commission approval and incorporation into their licenses an appropriate recreational plan."

47/As specified in Forest Service Handbook (FSH) 2709.15, the Forest Service shall "[c]ooperate with the applicant or licensee in the development of project recreation plans when recreation facilities are necessary. The licensee is responsible for construction, operation, maintenance, and replacement of project recreation facilities. Where it is in the Government's interest, the Forest Service may perform the operation and maintenance of facilities on National Forest System land with funds provided by the licensee in accordance with a collection agreement" (Section 23.4).

48/In conformance with the recommendations presented "Interagency Helicopter Operations Guide, NFES 1885" (Interagency Aviation Management Council, March 2006) or such other standards as may be identified by the Forest Service.

and promotes the development of recreational facilities at the powerhouse access tunnel location and operation and maintenance (O&M) funding sufficient to operate the facilities.

Unless otherwise precluded under the federal hydropower license[49] and unless an alternative action is either required by the permitting agencies or undertaken by the Applicant (e.g., payment of in-lieu fees[50]), as presently envisioned, the Applicant will improve and dedicate to the County of Riverside or to the City of Lake Elsinore, subject to the jurisdiction authority of the receiving agency, a minimum 5-acre neighborhood park. The proposed location of the park has not been identified. As presently envisioned, park plans would include a multi-purpose field, a tot lot, comfort facilities, on-site parking, and include a botanical garden or landscape plan incorporating indigenous, drought-tolerate plants. No high-intensity sports lighting is proposed.

Alternatively, the Applicant is currently in discussions with the City of Lake Elsinore to develop new and/or improve existing water-based recreational facilities in and around Lake Elsinore. In addition, the "Final Fisheries Management Plan for Lake Elsinore, Riverside County, California" identifies specific "fisheries enhancement measures" that could be undertaken in-lieu of dedication and improvement of the proposed neighborhood park/botanical garden. The Applicant, therefore, reserves the right, subject to further discussions with applicable stakeholders, to modify the LEAPS proposed recreational plans undertake other actions, at a comparable financial cost to the Applicant, with regards to alternative recreational facilities, uses, and/or amenities within and adjacent to Lake Elsinore.

Within three years of commencement of operations, if required, park improvements or such alternative actions as may be acceptable to FERC will be implemented by the Applicant. If, at the time of FERC's licensing, neither the County of Riverside nor the City of Lake Elsinore agree to accept the proposed park or park improvements, inclusive of an agency commitment for on-going maintenance obligations, the Applicant reserves the right to rescind its offer for real property dedication and/or improvement and pay in-lieu park (Quimby Act) fees in accordance with the applicable agency's park ordinance.

With regards to any of the recreational facilities that may be associated with LEAPS, the Applicant will retain an easement or other access or other rights for the operation and maintenance of the hydropower project and/or any of the facilities associated therewith. No new

49/As indicated in FERC: "Given that a project is primarily a water-based facility, it may not be hard to conclude that construction of a boat ramp, a fishing pier, or a hiking trail along the reservoir perimeter could be an appropriate environmental measure that serves a project purpose, if the need for that facility is established. These facilities would enable the public to better use the project lands and waters. It may be more difficult to justify recreation that is more remote from the project site (as in a campground located 20 miles away from any project works). Similarly, it may be hard to draw a public interest connection between a project and a recreation feature that does not appear to be tied to the nature of the project. For example, a community near a project might consider itself to be in need of a public auditorium. It would be difficult to justify inclusion of such a requirement in a license, unless the parties could demonstrate, not just why the proposed measure is generally worthwhile, but, more specifically, how it is linked to the effects and purposes of the project" (71 FR 56523, September 17, 2006).

50/Throughout the licensing process, the Applicant has included new neighborhood park facilities, as an adaptive reuse of a portion of the proposed powerhouse construction site, as a key component of the project's recreational element. Despite extensive consultation, neither the County of Riverside nor the City of Lake Elsinore have expressed support for acceptance of a new neighborhood park without the concurrent commitment for long-term maintenance. Similarly, the only comments received from other stakeholders relative to the Applicant's neighborhood park proposal were presented in opposition to that proposal. Although the park proposal has been retained herein, absent agency and/or neighborhood support for such a facility and absent a federal nexus, unless otherwise imposed by FERC under the federal hydropower license, the Applicant reserves the option of eliminating the construction of a neighborhood park and the dedication of that facility to the County and/or to the City. To the extent that Quimby Act fees are required by the permitting agency, the Applicant reserves the right to pay applicable fees in-lieu of any real property dedication and improvement.

or modified recreational facilities or improvements are included as part of the TE/VS Interconnect project.

3.6.2.7.4 Other Facilities

As indicated in the EVMWD's "Distribution System Master Plan," beyond the 0.1-million gallon (mg) capacity of the existing Skymeadows Reservoir, an additional 0.5 mg of additional potable water storage is recommended for the area of Rancho Capistrano (Morrell Potero), identified as Pressure Zone 3300 (Skymeadows), in order to adequately address the operational, fire, and emergency storage needs of that area.[51] At the base of the Elsinore Mountains, in proximity to Grand Avenue, other identified system improvements include: (1) a new 12-inch suction pipeline extending southward from Grand Avenue to the Adelpha Pump Station; and (2) replace the existing 0.2-mg Adelpha Reservoir with a new 0.6-mg reservoir.[52]

The new 12-inch pipeline and expanded capacity of the Adelpha Reservoir and the Skymeadows Reservoir are not related to or required for the development of the Project. Those facilities are identified in the EVMWD's "Program Environmental Impact Report – Water Distribution System Master Plan (DSMP) and Wastewater Master Plan". Because extensive underground excavation will be required for the construction of the pumped storage facility, there is a substantial cost savings to the EVMWD and others if specified DSMP improvements could be coordinated and conducted concurrently with the development of the pumped storage facility. This cost-savings is predicated upon the EVMWD's completion of all requisite engineering studies within a sufficient time period to allow for incorporation into the design of the proposed hydropower project and the acquisition of any real property interests as may be required for the pumped storage facility's implementation, as an accommodation to the EVMWD, to the extent authorized by FERC. Certain DSMP-identified improvements may be undertaken at the same time that the pumped storage facility is being constructed.

3.6.2.7.5 Agency Imposed Facilities

Part I of the FPA directs FERC, when issuing a license for a hydroelectric project, to require the licensee to undertake appropriate measures on behalf of both developmental and non-developmental public interest uses of the waterway, including fish, wildlife, and recreation. In addition to such other requirements as may be established in or imposed by FERC's licensing articles, the Forest Service' Section 4(e) and environmental protection plan (EPP) conditions, and the Applicant's environmental protection, mitigation, and enhancement (PM&E) measures, the Applicant will undertake the following activities:

Shoreline buffer zone. While acknowledging that the operation of the pumped storage facility will result in vertical variations in the elevation of water levels in Lake Elsinore, thus producing horizontal variations to the liquid edge of the shoreline, as non-licensee owned lands, the

51/Montgomery Watson Harza, Final Report: Distribution System Master Plan, Elsinore Valley Municipal Water District, May 2002, Table 7-4, p. 7-6; Figure 7-5.

52/Ibid., Figure 7-7.

EVMWD lacks jurisdictional authority to establish a shoreline buffer zone or other land use provisions encompassing the lands which might be so effected. [53]

Working in cooperation with the City of Lake Elsinore and the County of Riverside, unless suitable provisions already exist (e.g., limitations on development within the 100-year floodplain), the Applicant will request that the appropriate land-use entity establish a shoreline buffer zone around Lake Elsinore, between elevations 1240 and 1255 feet AMSL, in order to promote public recreational development and use and so as not to impede the safe and efficient operation of LEAPS. As proposed, the shoreline buffer zone would extend above the normal maximum surface elevation of the pumped storage facility reservoir (1240 to 1255 feet AMSL) to allow public access to pumped storage facility lands and waters and to protect the scenic, public recreational, cultural, and other environmental values of the reservoir's shoreline.

It is the Applicant's intent that the shoreline buffer zone be included within the LEAPS boundaries. It is not, however, the Applicant's intent to unreasonably restrict or adversely affect the rights, if any, of individual property owners to reasonably use their lands for productive purposes or to predicate a taking of private lands.

As part of the LEAPS recreational component or as an alternative thereto, the Applicant, in coordination with the City, may seek to acquire lands or easements within the shoreline buffer zone for preservation, recreation, and/or access purposes.

Striped bass and white bass hybrids stocking program. As described in the "Fisheries Management Plan for Lake Elsinore, Riverside County, California," as part of the LEAPS project, the Applicant will conduct an annual or biannual fish stocking program, equivalent to 6,000 yearling nursery-raised fish,[54] in compensation for any resulting fish entrainment, to further multi-agency efforts to reduce the population of threadfin shad and carp, and to enhance and help maintain the lake's sports fishery.

The Applicant or other parties may elect to undertake additional related actions as may be reasonable and appropriate for the approval, construction, operation, and maintenance of the proposed projects, including such measures as may be imposed as permit conditions by any governmental agency with jurisdiction over and authority to condition the proposed projects.

3.6.3 System Upgrades

Separately addressed below are upgrades and other modifications to SCE's and SDG&E's existing transmission facilities that have been identified as needed to accommodate power flows from the Project in each utility's respective interconnection facilities studies (IFS). The

53/As indicated by FERC: "The Federal Energy Regulatory Commission is responsible for issuing licenses for the construction, operation, and maintenance of non-federal hydropower projects. Licensees are responsible for operating and maintaining these projects in accordance with license requirements and project purposes. Consistent with these license responsibilities, a licensee may, with Commission approval, authorize specific uses and occupancies of the project reservoir shoreline that are not related to hydroelectric power production or other project purposes (non-project uses). . .Licensees have a responsibility to ensure that shoreline development activities that occur within project boundaries are consistent with project license requirements, purposes, and operations" (Source: Federal Energy Regulatory Commission, Guidance for Shoreline Management Planning at Hydropower Projects, April 2001, pp. i-ii).

54/Lake Elsinore and San Jacinto Watershed Authority (EIP Associates), Final Fisheries Management Plan for Lake Elsinore, Riverside County, California, August 2005, Appendix E, p. E-12.

Applicant understands that these upgrades will be needed in the event either the TE/VS Interconnect only or the combined TE/VS Interconnect and LEAPS are built.

The Applicant notes that SCE and SDG&E, and the CAISO, have responsibility to identify upgrades to the utilities' respective existing systems that may be needed to accommodate the Project. TNHC reports here the upgrades that the utilities have identified to date.

It is the Applicant's understanding that some of the upgrades identified below will require certain improvements to SCE's and SDG&E's existing substations and other facilities. Because these modifications would occur in areas that are already graded and surfaced, only minimal additional disturbance to those areas would be anticipated as a result of any project-related improvements.

These utility-identified upgrades and improvements to existing SCE and SDG&E facilities are described below. The list of improvements may, however, be subsequently modified in accordance with the provisions of the large-generator interconnection agreements (LGIAs) that will be executed between the Applicant and SCE and between the Applicant and SDG&E.

3.6.3.1 SCE Upgrades

The new Lake Switchyard Plan will include the following elements:

One 500 kV GIS Switchrack with seven breaker–and–a half positions with enough available space to allow the future installation of two additional positions.

The station should allow enough space for future installation of two 500 kV Capacitor Banks.

Protection Relays associated with the 500 kV system will be installed at each of the two remaining line positions as follows:

- Two G.E. C60 breaker management relays
- One SEL-311L line current differential (digital F.O. channel)
- One G.E. L90 line current differential (digital F.O. channel)
- One G.E. D 60 directional comparison pilot relaying (digital F.O./MW channel)
- One RFL 9745 tele-protection channel DTT (digital F.O. channel)
- One RFL 9745 tele-protection channel DTT (M/W channel)

Other station elements will include:

1. One 32/64 digital fault recorder.
2. One Ethernet service drop.
3. One SEL-2030 connected to all three SEL-311L relays.
4. Telecommunications tower and microwave dish antenna.
5. Perimeter fence with double barbed wire and a double door 20 ft. gate around the substation
6. Grounding grid to cover the substation area and additional 10 ft. outside the perimeter fence
7. Grading and site preparation for the substation area and additional 10 ft. outside the perimeter fence.

8. A 25 foot wide paved driveway around the 500 kV switchyard to provide access to the relay room.
9. All required control cable trenches from the relay room to the 500 kV switchyard.

Upgrade the Serrano Substation as follows:

1. Upgrade the Serrano-Valley 500 kV line protection as needed to change the line to a new Lake-Serrano 500 kV transmission line.
2. Replace the existing LFCB relay with a new SEL-311L line current differential relay and modify the existing D60 and L90 relays to change the existing transfer trip schemes from Valley Substation to Lake Switchyard.
3. Reconfigure the existing digital channel from Valley Substation to Lake Switchyard and modify the existing SEL 2030 telecommunications processor with Ethernet to provide connection to the new SEL relay.

Upgrade the Valley Substation as follows:

1. Upgrade the Serrano-Valley 500 kV line protection as needed to change the line to the new Lake-Valley 500 kV transmission line.
2. Replace the existing LFCB relay with a new SEL-311L line current differential relay and modify the existing D60 and L90 relays to change the existing transfer trip schemes from Serrano Substation to the Lake Switchyard.
3. Reconfigure the existing digital channel from Serrano Substation to Lake Switchyard and modify the existing SEL 2030 telecommunications processor with Ethernet to provide connection to the new SEL relay.

Upgrade the Etiwanda Generating Station as follows:

1. Replace the 2000A wave trap on the Vista 220 kV line position with 3000A rated wave trap, with N-2 contingency rating of 3210A to support the maximum N-2 line loading of 3071A.

2. Replace twenty-four 63 kA 220 kV circuit breakers with new 80 kA rated circuit breakers and upgrade the Etiwanda 220 kV switchyard to 80 kA rating. The scope of work for the switchyard upgrade has not been completed at this time. A scope of work and cost estimate has been prepared for the upgrade of a similar facility. At this time it is expected that the type of upgrades for this location would be very similar to those already scoped and estimated for the similar facility.

Based on this assumption, it is expected that, in addition to the work herein, the following additional upgrades would be required:

- Replace twenty-eight 220 kV disconnect switches
- Replace twenty-four 220 kV surge arresters
- Replace all line and bank vertical risers with tubular conductors;
- Replace all 4/0 CU connectors to the ground grid with new 350 kCMIL ACSR

- Install new sections of 350 kCMIL ACSR ground grid and connect to the existing 4/0 CU grid

Telecommunication upgrades will include:

1. Dual communication channels on separate routes to support the line protection relays on the new Lake-Serrano and Lake-Valley 500 kV transmission lines.

2. New microwave path from Lake Switchyard to the existing Santiago Peak Communication Site. At the following substations, the following changes will also be required:

    a. At the Lake Switchyard, install new light wave, microwave (including dish antennas), channel equipment for 500 kV line protection communications tower, fiber optic cable, and DC system, plus new voice and data network infrastructure (operations phones, modem lines, LAN connections to relays, etc.)

    b. At the Serrano Substation, install new light wave and channel equipment for 500 kV line protection, plus incremental addition of voice and data network infrastructure (rack phones, modem lines, LAN connections to relays, etc.).

    c. At the Valley Substation, install new light wave and channel equipment for 500 kV line protection, plus incremental addition of voice and data network infrastructure (rack phones, modem lines, LAN connections to relays, etc.).

    d. At the Santiago Peak Communications Site, install new microwave and dish antennas to link the Lake Switchyard to Serrano and Valley Substations for 500 kV line protection.

    e. At the Mira Loma Substation, install new light wave equipment to link the Lake Substation to Serrano Substation for 500 kV line protection.

    f. Install dual communication channels and OPGW on separate routes to support the line protection relays on the new Lake 500 kV Line.

3.6.3.2 SDG&E Upgrades

The SDG&E-FIS short-circuit analysis indicated that the addition of LEAPS, without phase shifting transformers, causes ten existing breakers to become over-dutied during fault conditions. LEAPS, with phase shifting transformers, caused six existing breakers to become over-dutied during fault conditions. The mitigation for the over-dutied breakers will be their replacement with a higher-rated breaker. The thermal analysis indicated there are two SDG&E facility overloads caused solely by the addition of LEAPS that require mitigation: (1) the Case Springs-Talega 230 kV line segment, and (2) the Case Springs-Escondido 230 kV line segment.

The following plan of service mitigates all project-related SDG&E facility overloads:

1. Add proposed Case Springs-Talega No. 2 230 kV line with about 14 SM of 2-1033 ACSR.

2. Reconductor proposed Case Springs-Talega No. 1 230 kV line with about 14 SM of 2-1033 ACSR.

3. Add proposed Pendelton-Escondido No. 2 230 kV line with about 37 SM of 1-1033 ACSR.

*TNHC is proposing 3M ACCR conductors, see Attachment 2.

The following delivery network upgrades are needed to mitigate these overloads:

1. Bundle the existing line of the Talega-Case Springs 230 kV #1 line to provide 912 MVA capacity.

2. Addition of a second Talega-Case Springs-Escondido 230 kV line with about 37 SM of 1-1033 ACSR conductor, including the addition of the 230 kV bay positions at the Talega and Escondido 230 kV Substations. The 230 kV portion of this line is to have a capacity of 912 MVA and the Case Springs-Escondido. The 230 kV #2 line's capacity will be 456 MVA).

3. Looping the second Escondido-Talega tie-line into the Case Springs 230 kV switch rack will require the following additional upgrades at Escondido and Talega Substations to accommodate the new terminal additions:

    a. Relocation and replace Bank 71
    b. Modify the north and south buses to make room for a new bay addition
    c. Install a new 230 kV breaker and half bay to include 1-bank, 1-tie, and 1-line positions and three lot-support structures as required
    d. Install 1-230/69 kV transformer
    e. Install 2-230 kV circuit breakers
    f. Install 5-230 kV disconnect switches
    g. Install power and control wiring
    h. Install tie-line protection
    i. Install metering
    j. Install SCADA and communication interface
    k. Re-route the existing 12 kV ducts to make room for Bank 71

Talega Substation upgrades include:

1. Install a new 230 kV, breaker and half bay to include 1-line and 1-tie positions
2. Install lot-support structures as required
3. Install 2-230 kV breakers
4. Install 4-230 kV disconnect switches
5. Install power and control wiring
6. Install tie-line protection; and
7. Install SCADA and communication interface

Modifications to the SDG&E Talega-Escondido 230 kV Line involve conductor upgrades and stringing a second circuit on the existing structures. A general map showing the location of their upgraded line is shown in Figure 3.6.3.-1 SDG&E 230 kV Transmission Line Upgrade Map (General). TNHC will swing the existing Talega-Escondido 230 kV Line into the new 500/230 kV substation at Case Springs, breaking the existing line into two sections: (1) Talega–Case Springs and (2) Case Springs-Escondido. Both sections will be 230 kV double circuit lines on

the existing structures. Both circuits for Talega–Case Springs will be upgraded with double bundled Curlew 1033.5 ACSR rated at 1047 amps per conductor[1] with a capacity of 912 MVA per circuit. The section between Case Springs and Escondido will be upgraded to double circuit single conductor 1033.5 ASCR with 456 MVA per circuit rating[2]. TNHC is currently proposing the use of 3M Aluminum Conductor Composite Reinforced (ACCR), T13 or equivalent. Technical data on the 3M ACCR system is presented in Attachment 2.

With the exception of new transmission towers and the towers located adjacent to the proposed Case Springs Substation, an approximately 51-mile long second (double circuit) 230 kV transmission line (Talega-Escondido No. 2) will be constructed on and installed along existing support structures (already containing one 230 kV circuit) connecting SDG&E's Talega and Escondido Substations. The existing Talega-Escondido No. 1 circuit will be reconductored as specified in the SDG&E-IFS.

SDG&E's existing Talega-Escondido 230 kV transmission line (23030) was originally licensed and constructed using double-circuit structures with only one circuit installed.[55],[56] The existing 230 kV Talega-Escondido circuit (Talega-Escondido No. 1) will be modified and upgraded to loop it in/out (with the new, second conductor) of the proposed Case Springs Substation. The new 230 kV circuit (Talega-Escondido No. 2) will be added to the existing spare tower steel pole supports. This re-conductoring and added circuit will bring the SDG&E 230 kV Talega-Escondido path rating to 1,500 MW. SDG&E has indicated that information concerning the general arrangement pole type, structure details, and structure stringing loads are "confidential."

SDG&E's typical four-legged double-circuit 230 kV steel-lattice tower is illustrated in Figure 3.6.3.-3 Typical Double Circuit 230 kV Steel Lattice Tower and SDG&E's typical double-circuit 230 kV tubular steel pole tower is illustrated in Figure 3.6.3.-4 Typical Double Circuit 230 kV Steel Pole Tower.

In order to accommodate the second conductor, it will be necessary to rebuild a 7.7-mile section (interconnecting SDG&E's existing Pala and Lilac Substations) of the existing 69 kV transmission circuit on new 69 kV wood and steel poles adjacent to the existing 230 kV line within the existing 300 foot wide Talega-Escondido right-of-way. Subject to SDG&E specifications, the existing 7.7 miles of conductors used in the 69 kV circuit may remain on the 230 kV support structures and would be incorporated into the new 230 kV circuit.[57]

Typical single-circuit 69 kV wood and steel poles are illustrated in Figure 3.6.3.-5 Typical Single Circuit 69 kV Wood and Steel Cable Pole.

The proposed Case Springs 230 kV GIS is the southern interconnection for the proposed TE/VS Interconnect. As indicated in SDG&E's December 15, 2006 IFS,[58] the proposed Case Springs

55/California Public Utilities Commission and Bureau of Land Management (Dudek & Associates), Public Scoping Report – San Diego Gas and Electric Company Valley-Rainbow 500 kV Interconnect Project, CPCN Application No. 01-03-036, October 2001, p. 1.

56/The CPUC issued a Certificate of Public Convenience and Necessity (CPCN) for construction of the existing SDG&E Talega-Escondido 230-kV transmission line in Decision No. 81069 (February 21, 1973). The 230-kV line was originally licensed and constructed using double-circuit structures, with only one circuit installed (Source: San Diego Gas & Electric Company [KEA Associates], Valley-Rainbow Interconnect Proponent's Environmental Assessment, March 2001, p. 2-3).

57/Op. Cit., Valley-Rainbow Interconnect Proponent's Environmental Assessment, p. 2-3.

58/San Diego Gas & Electric Company, Lake Elsinore Advanced Pumped Storage Project, Interconnection Facilities Study, Draft Report, December 15, 2006.

Substation was modeled 14 miles from the SDG&E Talega Substation and 37 miles from the SDG&E Escondido Substation. The existing Talega-Escondido 230 kV line will loop into the Case Springs Substation.

The SDG&E Substation will be constructed with GIS technology. Land requirements for the installation of the switchyard facilities will include:

1. A land right in recordable form that grants perpetual and assignable rights for the switchyard of a size and configuration and otherwise meeting SDG&E's specifications and requirements, all subject to approval by SDG&E in its reasonable discretion, and provided that the land rights may be in a form that limits use of the land to the switchyard.

2. The switchyard pad shall be graded to SDG&E's specifications in its sole discretion, consistent with SDG&E standard practices or good engineering practices, whichever is higher

3. A wall or fence that encloses the switchyard land and provides for adequate access and working room, to SDG&E's specifications in its sole discretion, consistent with SDG&E standard practices or good engineering practices, whichever is higher.

The connection from the 230 kV phase shifting transformers into the switchyard will include three air-to-gas transformer bank terminations, overhead transformer leads, ground grid interconnection, and control junction box.

The SDG&E 230 kV GIS switchyard facilities will include:

1. Breaker and a half-bus design.
2. The 4-bay arrangement of the GIS will accommodate four transmission line positions; three bank positions, and one spare position.
3. GIS facilities will include twelve 230kV circuit breakers and the associated disconnect switches, ground switches, potential transformers, and gas-insulated bus.
4. Two station service transformers.
5. Three metering units.
6. Required line synchronizing potential transformers.
7. All structures and foundations, busses, and equipment within switchyard fence.
8. A reinforced concrete-block built control house, substation below grade conduits and cables, protection systems, supervisory control/telecommunications equipment, batteries and low-voltage circuits (all the required protection, metering, telemetering, SCADA and communication equipment and systems).
9. A ground grid.
10. Lighting.
11. Transmission line air to gas transitions into the GIS.
12. Air to gas transitions for the phase shifting transformer leads.

SDG&E identified the following reliability network upgrades on its system:

1. The Case Springs Substation will be located near the existing SDG&E Tower No. 163 (Z322651). The loop-in consists of Tower No. 163 removal, installation of two 230 kV anchor bolted dead-end steel poles, and hardware and conductor.

2. The following Talega Substation upgrades have been identified:

    - Install a new 230 kV, breaker and a half bay to include 1-line and 1-tie positions
    - Lot-support structures as required
    - Two 230 kV breakers
    - Four 230 kV disconnect switches
    - Power and control wiring
    - Tie line protection
    - SCADA and communication interface

3. With regards to the replacement of 69 kV over-stressed breakers at the Escondido and Penasquitos Substations, the short-circuit analysis also shows that there are ten (10) overstressed breakers that need to be upgraded from 40 kA to 50 kA. Short-circuit constraints require the upgrading of the following breakers at the Penasquitos Substation: PQ 665, 666, 667, and 70. Short-circuit constraints require the upgrading of the following breakers at the Escondido Substation: ES 50, 684, 688, 6908, and 696.

4. The following upgrades have been identified:

    a. Relocate Bank 71
    b. Modify the north and south buses to make room for a new bay addition
    c. Install a new 230 kV breaker and a half bay to include 1-bank, 1-tie, and 1-line positions
    d. Install lot-support structures as required
    e. Install two 230 kV circuit breakers
    f. Install five 230 kV disconnect switches
    g. Install power and control wiring
    h. Install tie line protection
    i. Install metering
    j. Install SCADA and communication interface
    k. Re-route the existing 12 kV ducts to make room for Bank 71

Due to scheduling concerns, under LGIA Section 5.1.3, TNHC will self-perform facilities and upgrades as required, to maintain the project schedule as set forth by FERC. In addition as discussed above, some or all of the re-conductoring is proposed to be 3M ACCR 1033 kmils. Under the EPA 2005, FERC specified certain products that were new advanced transmission technologies. This conductor will give The TE/VS Interconnect project a generous increase in energy transfer, as well as an overload rating. The Applicant is specifically requesting the Commission allow use of this ACCR conductor, as per EPA2005. Technical information is provided in Attachment 2.

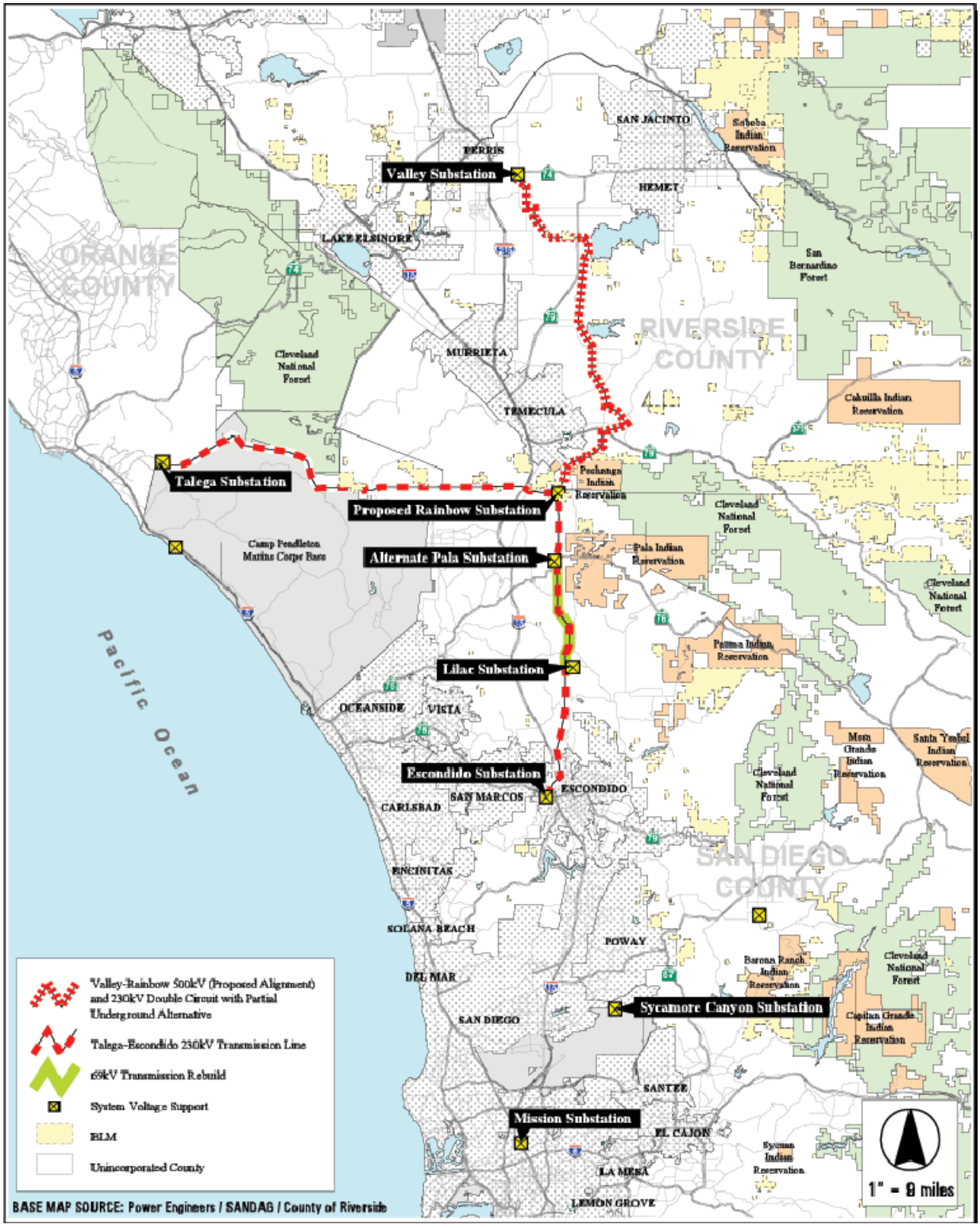

Figure 3.6.3.-1 SDG&E 230 kV Transmission Line Upgrade Map (General)
Source: The Commission/DUDEK & Associates

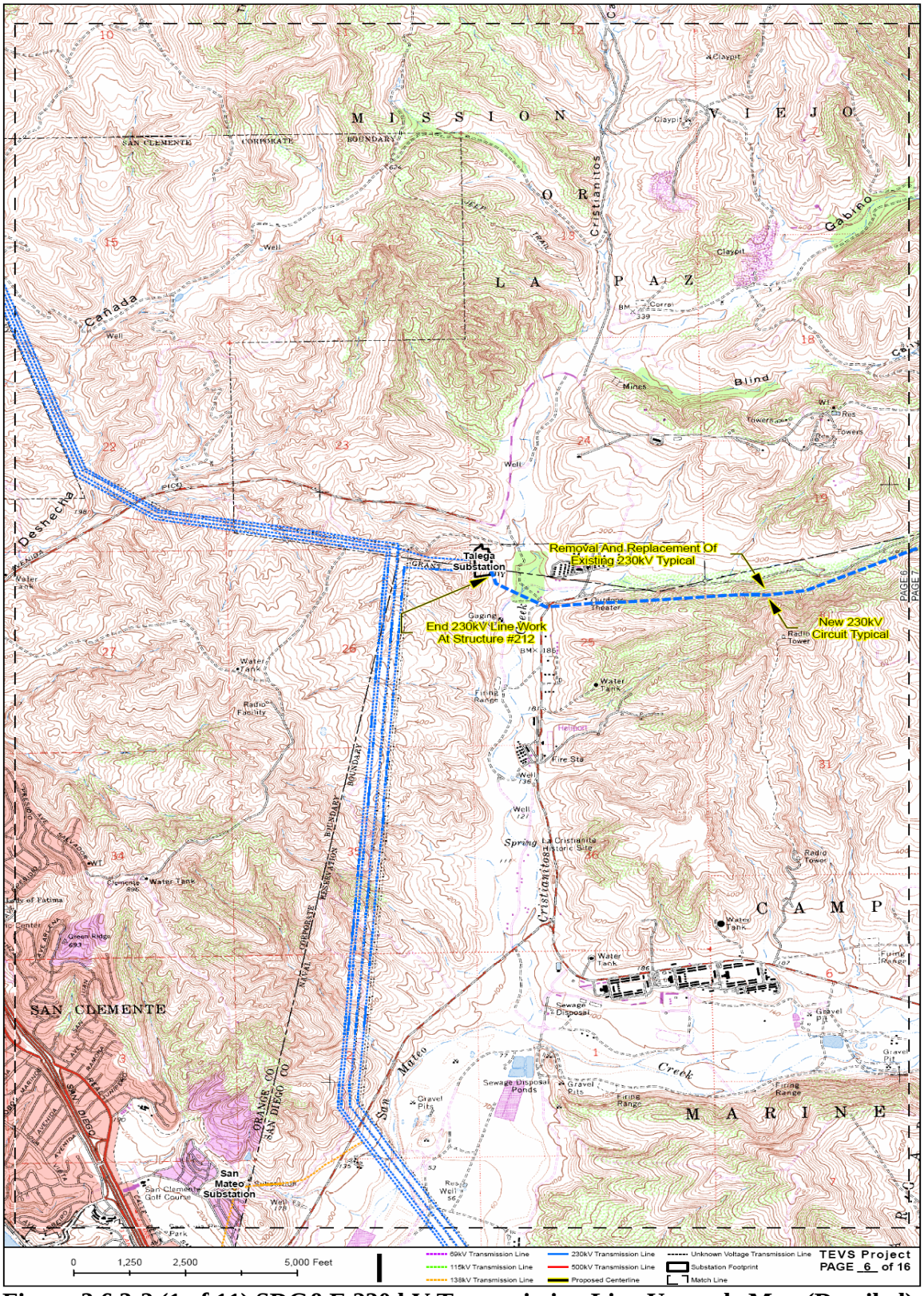

Figure 3.6.3-2 (1 of 11) SDG&E 230 kV Transmission Line Upgrade Map (Detailed)

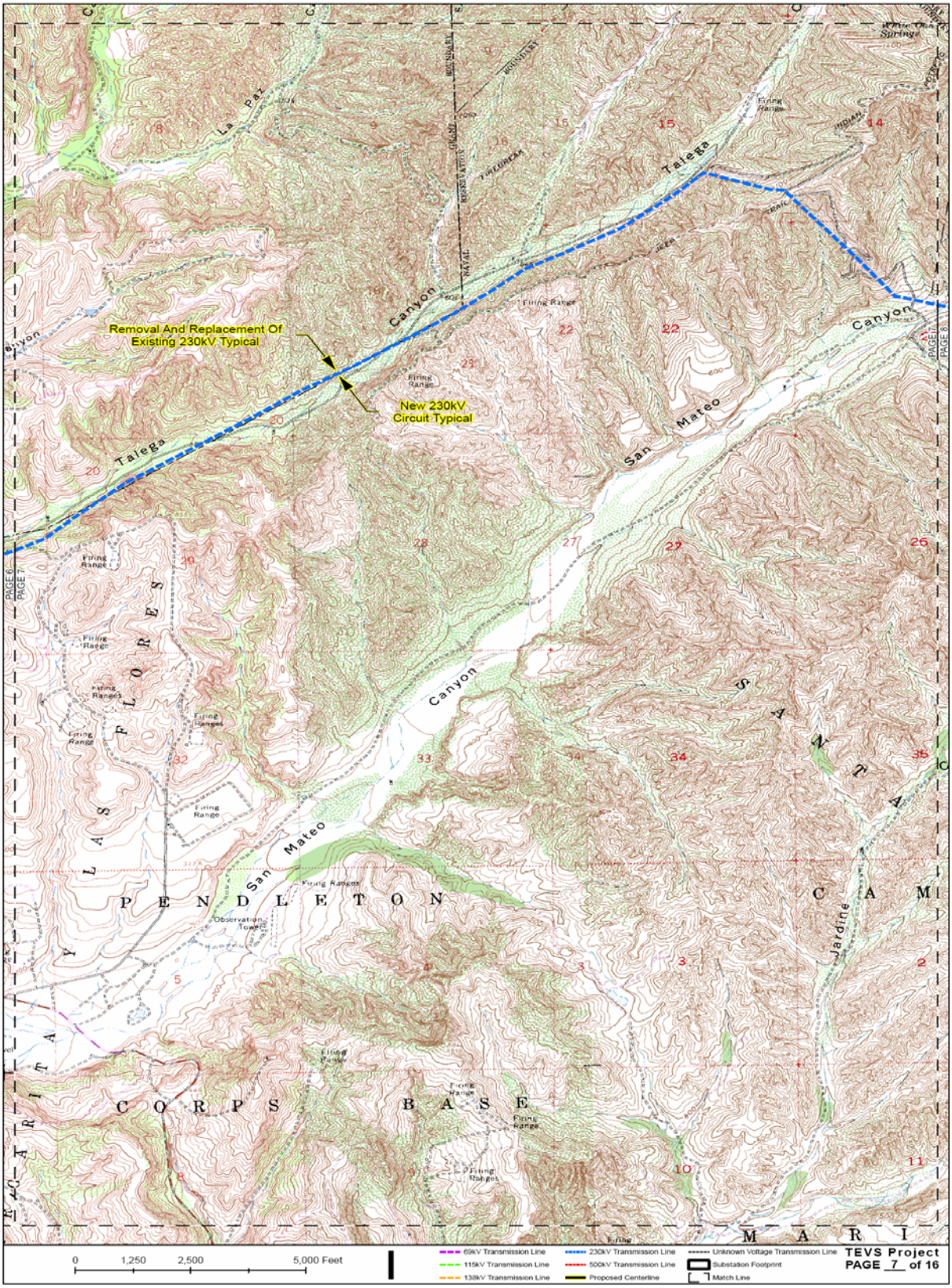

Figure 3.6.3-2 (2 of 11) SDG&E 230 kV Transmission Line Upgrade Map (Detailed)

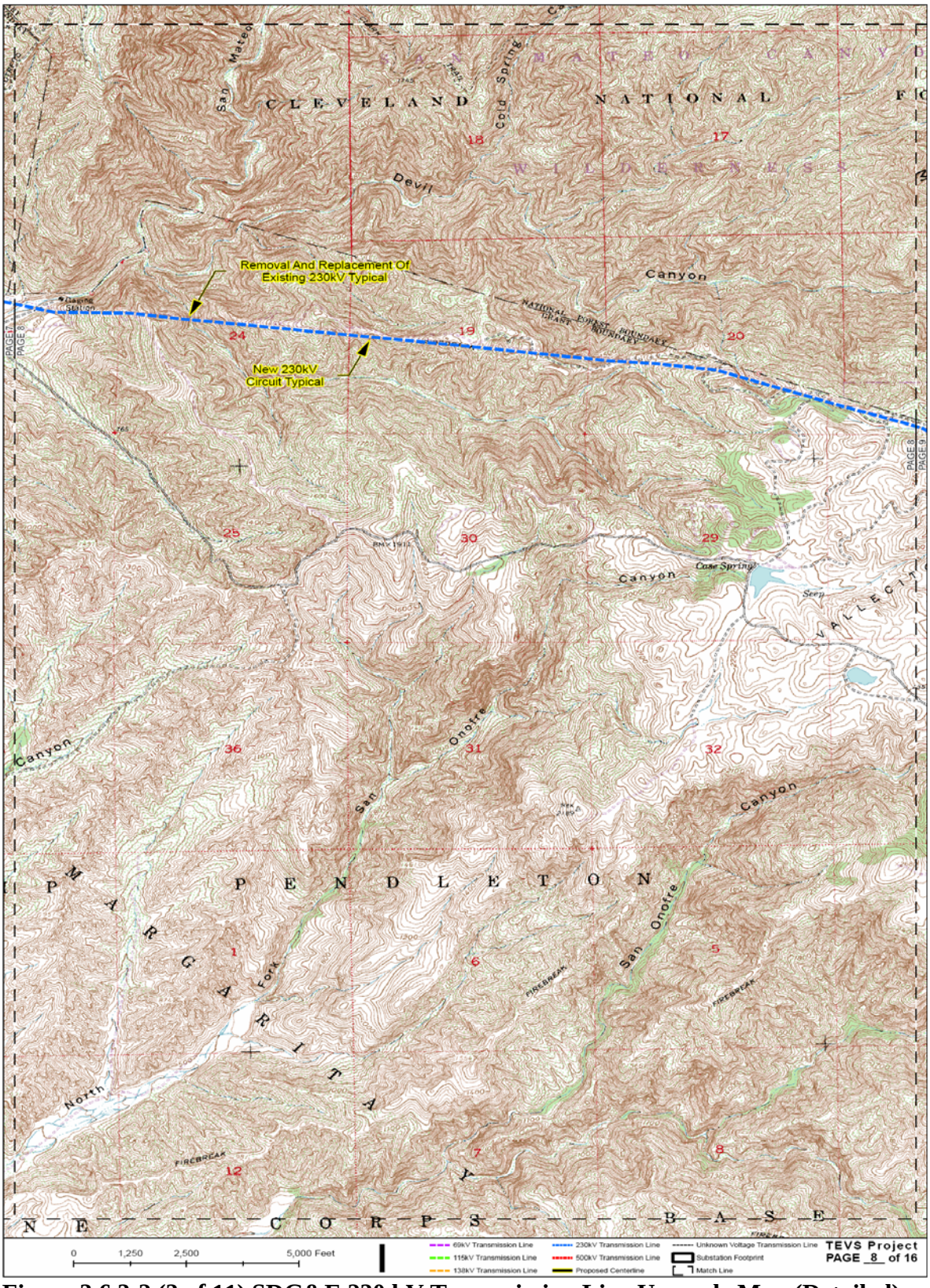

Figure 3.6.3-2 (3 of 11) SDG&E 230 kV Transmission Line Upgrade Map (Detailed)

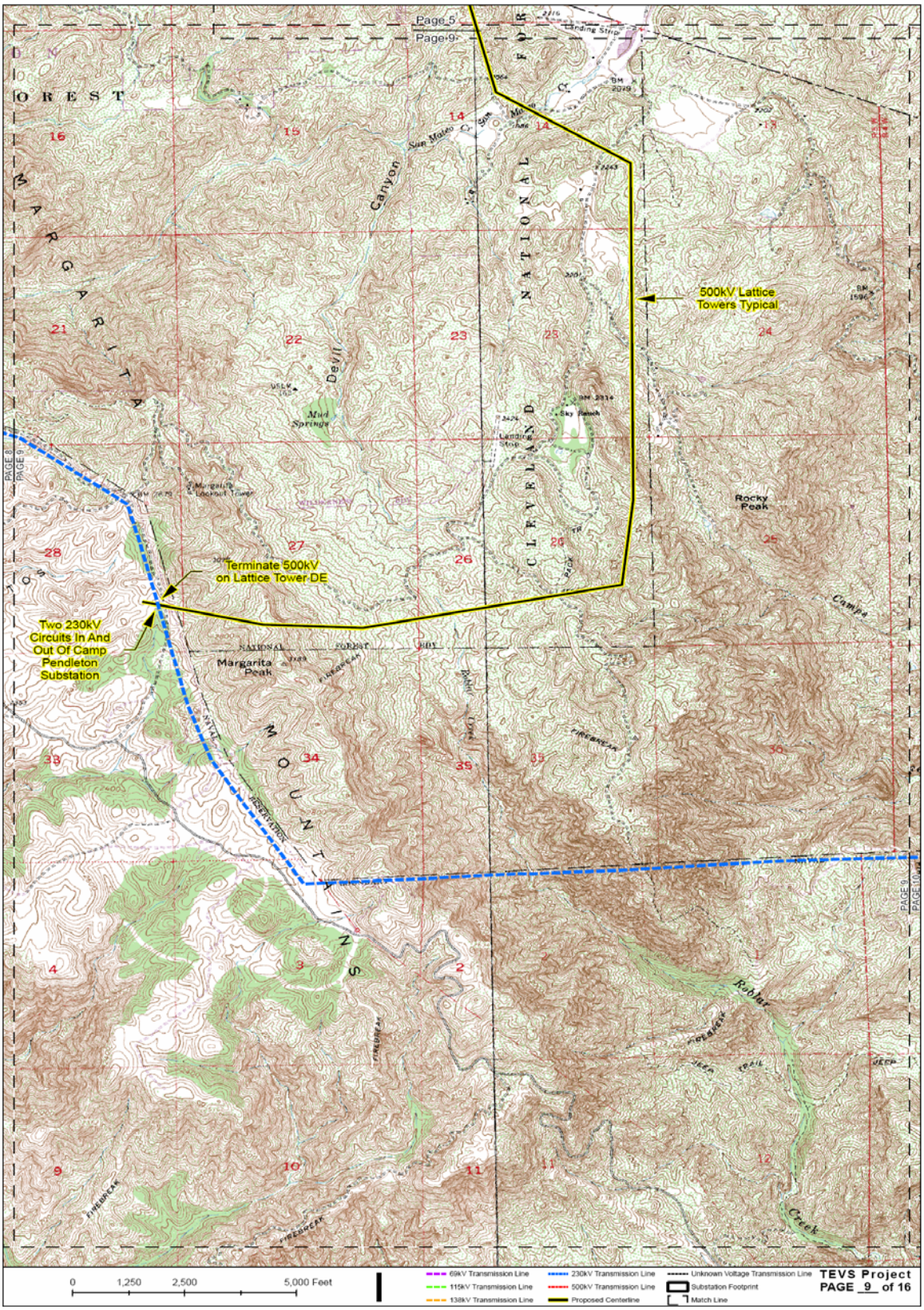

Figure 3.6.3-2 (4 of 11) SDG&E 230 kV Transmission Line Upgrade Map (Detailed)

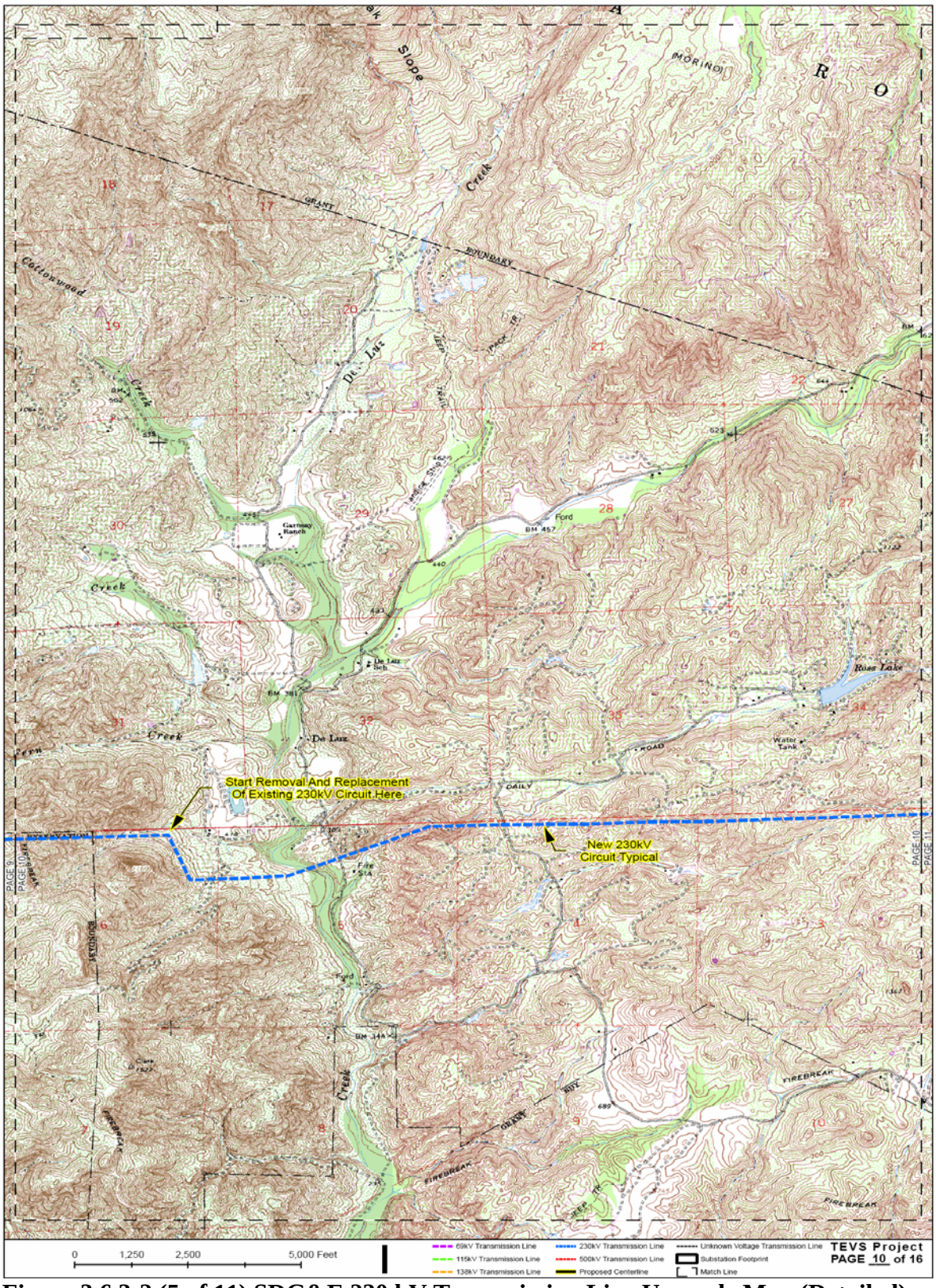

Figure 3.6.3-2 (5 of 11) SDG&E 230 kV Transmission Line Upgrade Map (Detailed)

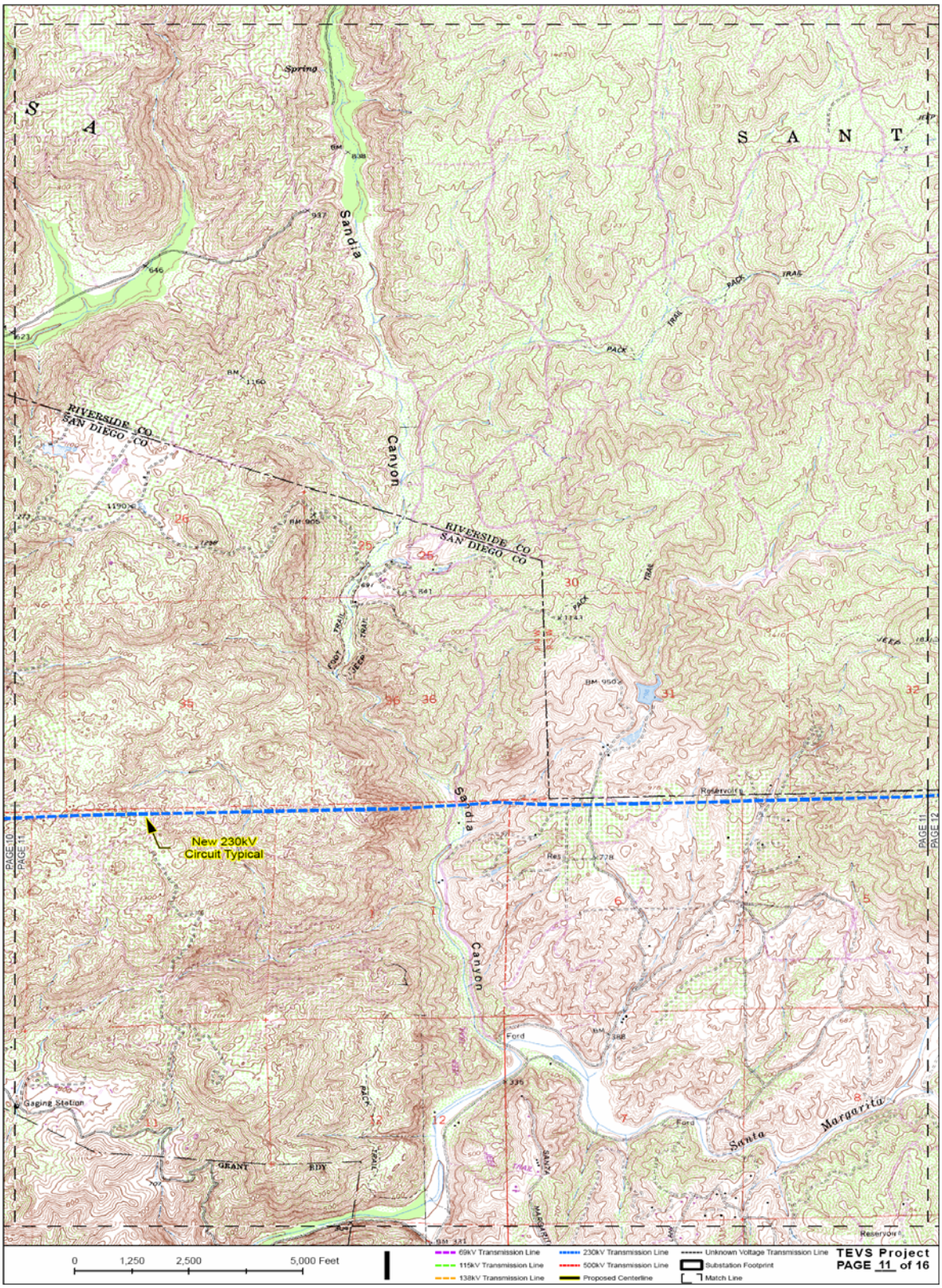

Figure 3.6.3-2 (6 of 11) SDG&E 230 kV Transmission Line Upgrade Map (Detailed)

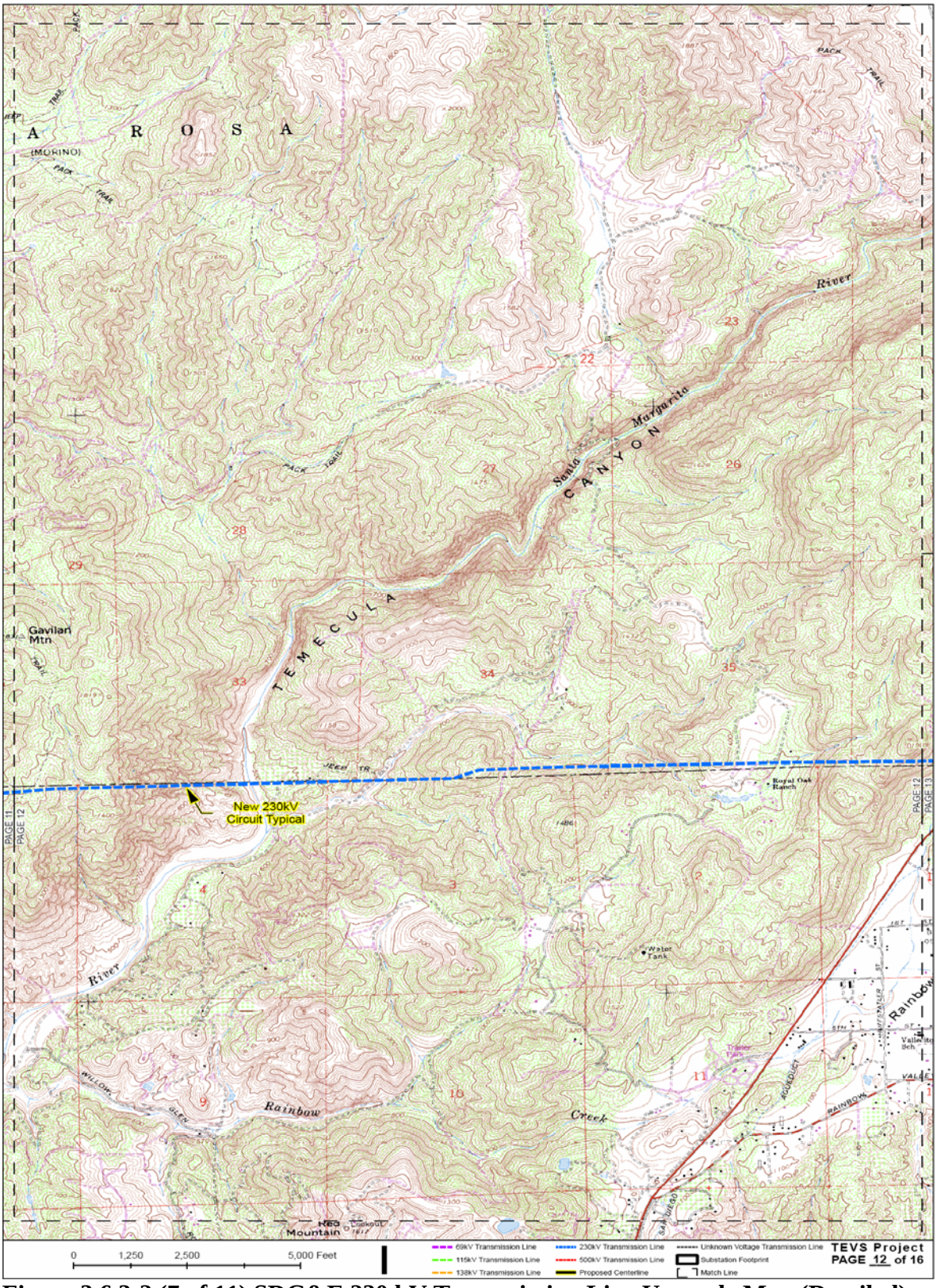

Figure 3.6.3-2 (7 of 11) SDG&E 230 kV Transmission Line Upgrade Map (Detailed)

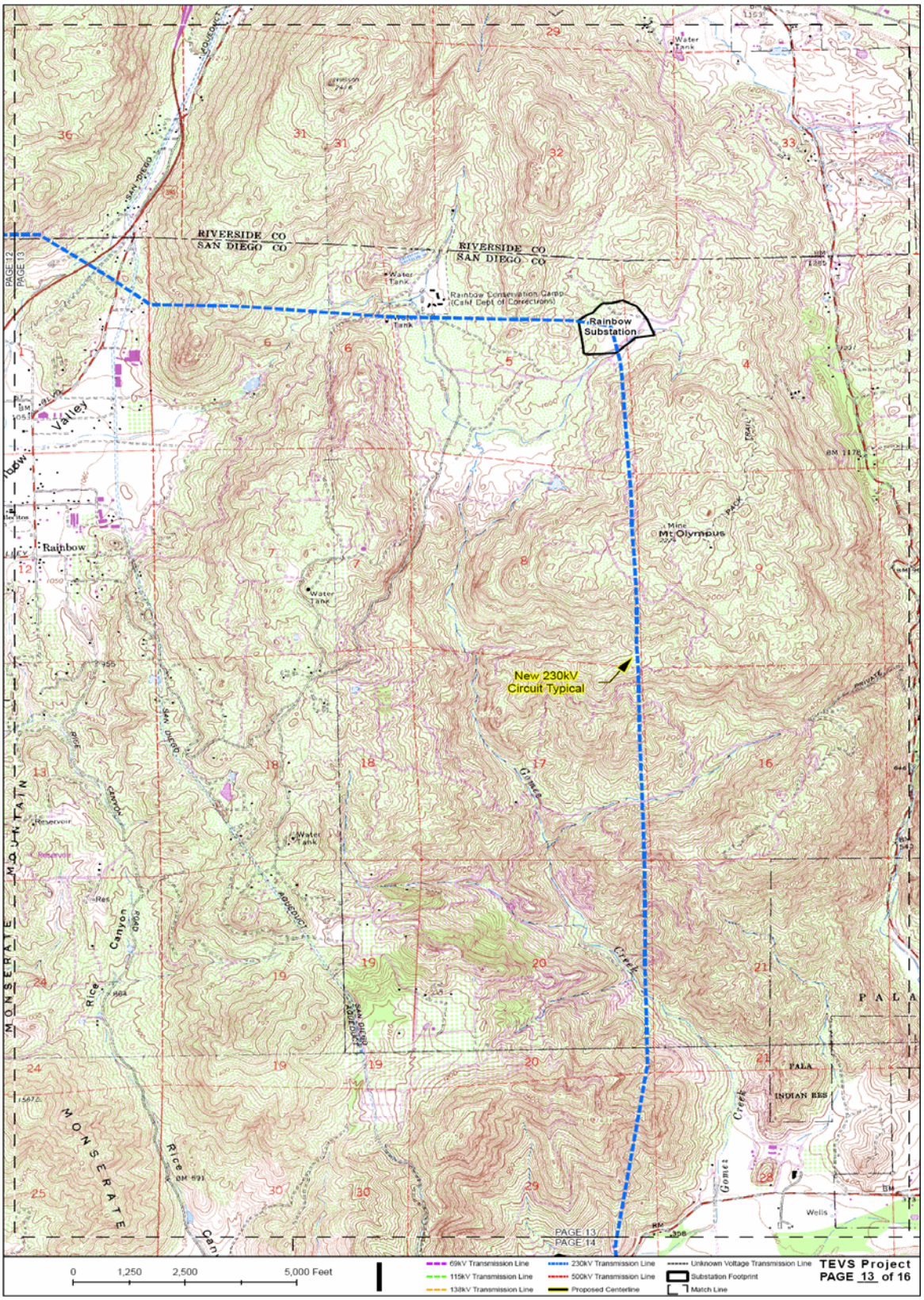

Figure 3.6.3-2 (8 of 11) SDG&E 230 kV Transmission Line Upgrade Map (Detailed)

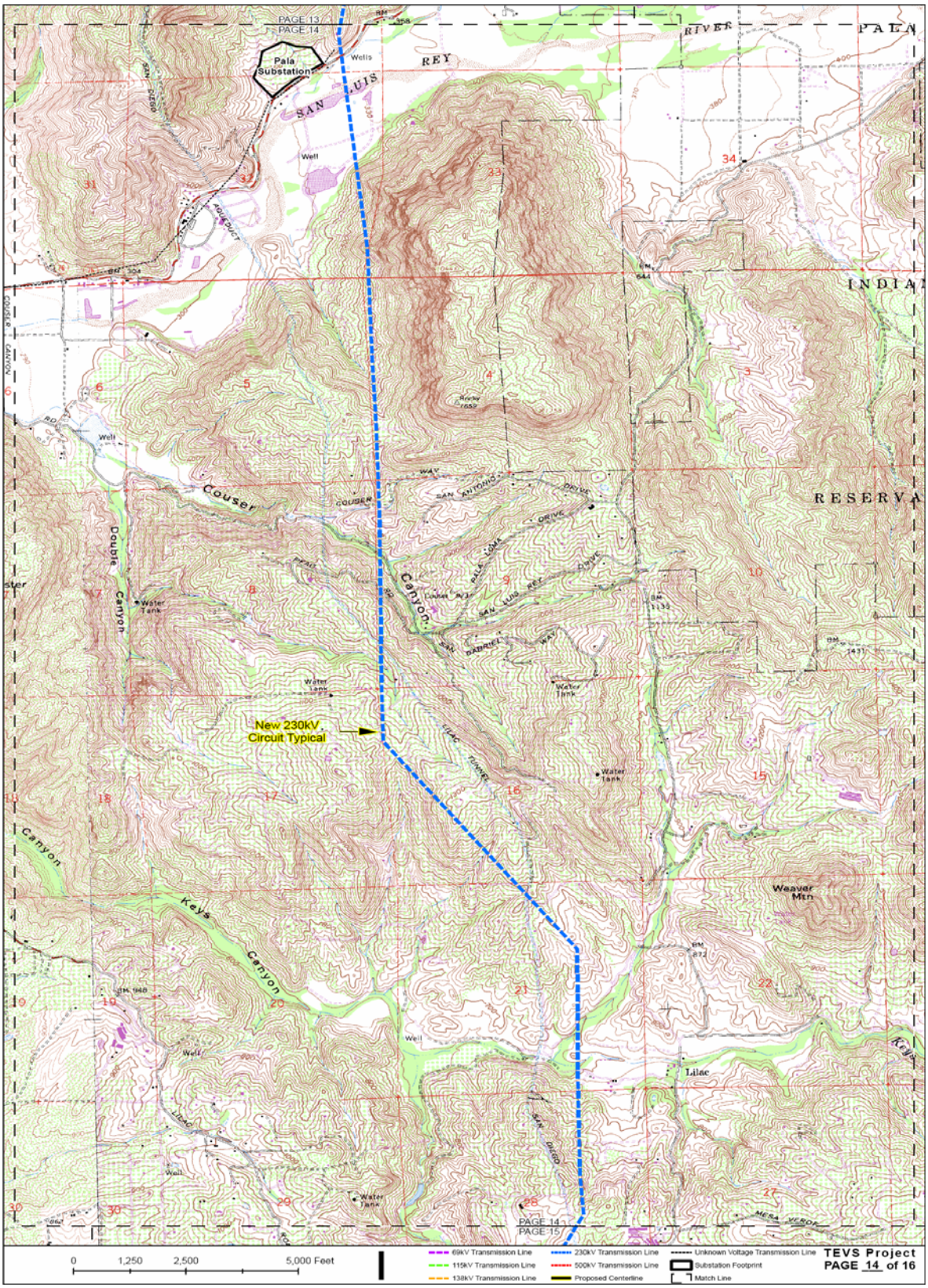

Figure 3.6.3-2 (9 of 11) SDG&E 230 kV Transmission Line Upgrade Map (Detailed)

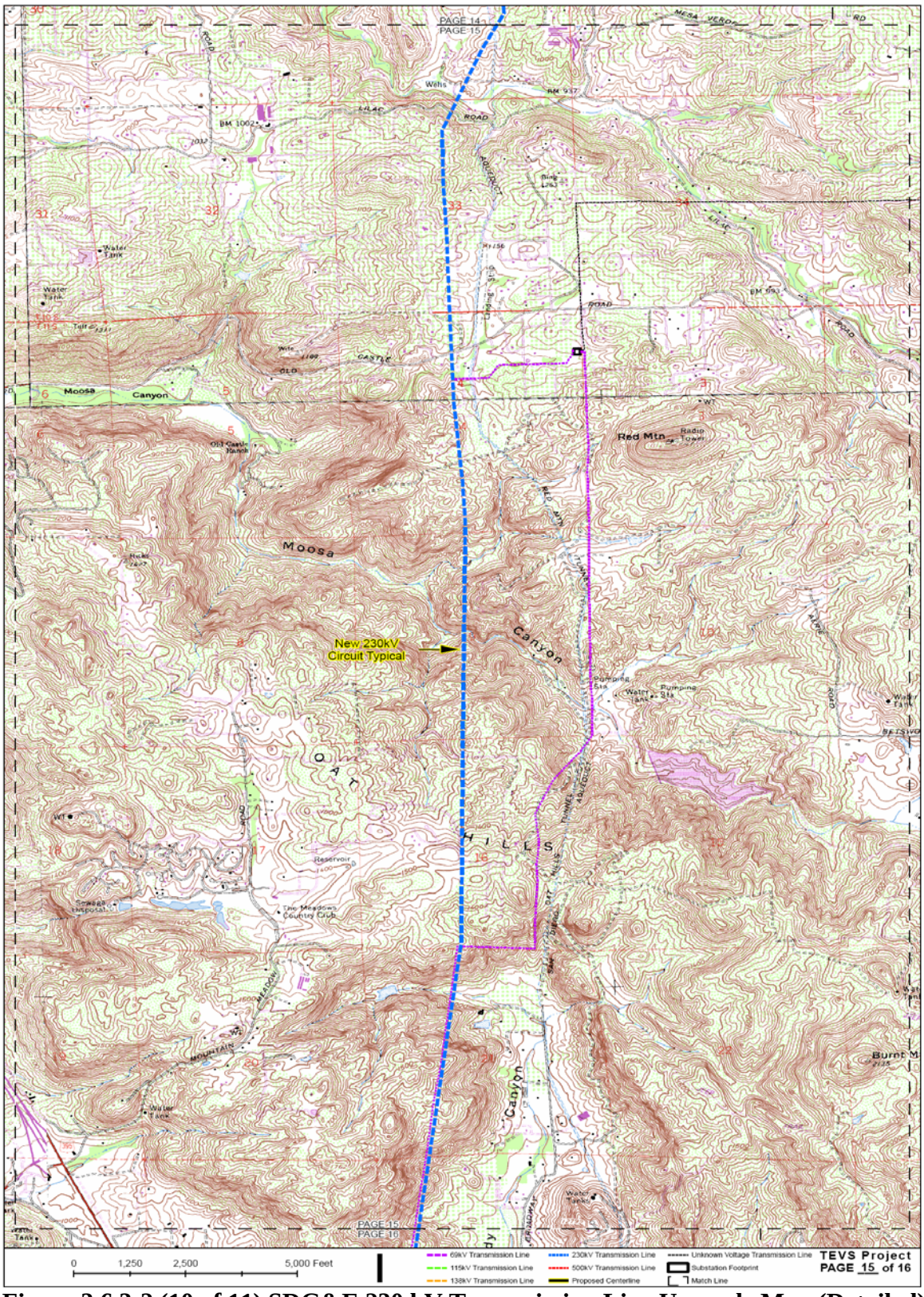

Figure 3.6.3-2 (10 of 11) SDG&E 230 kV Transmission Line Upgrade Map (Detailed)

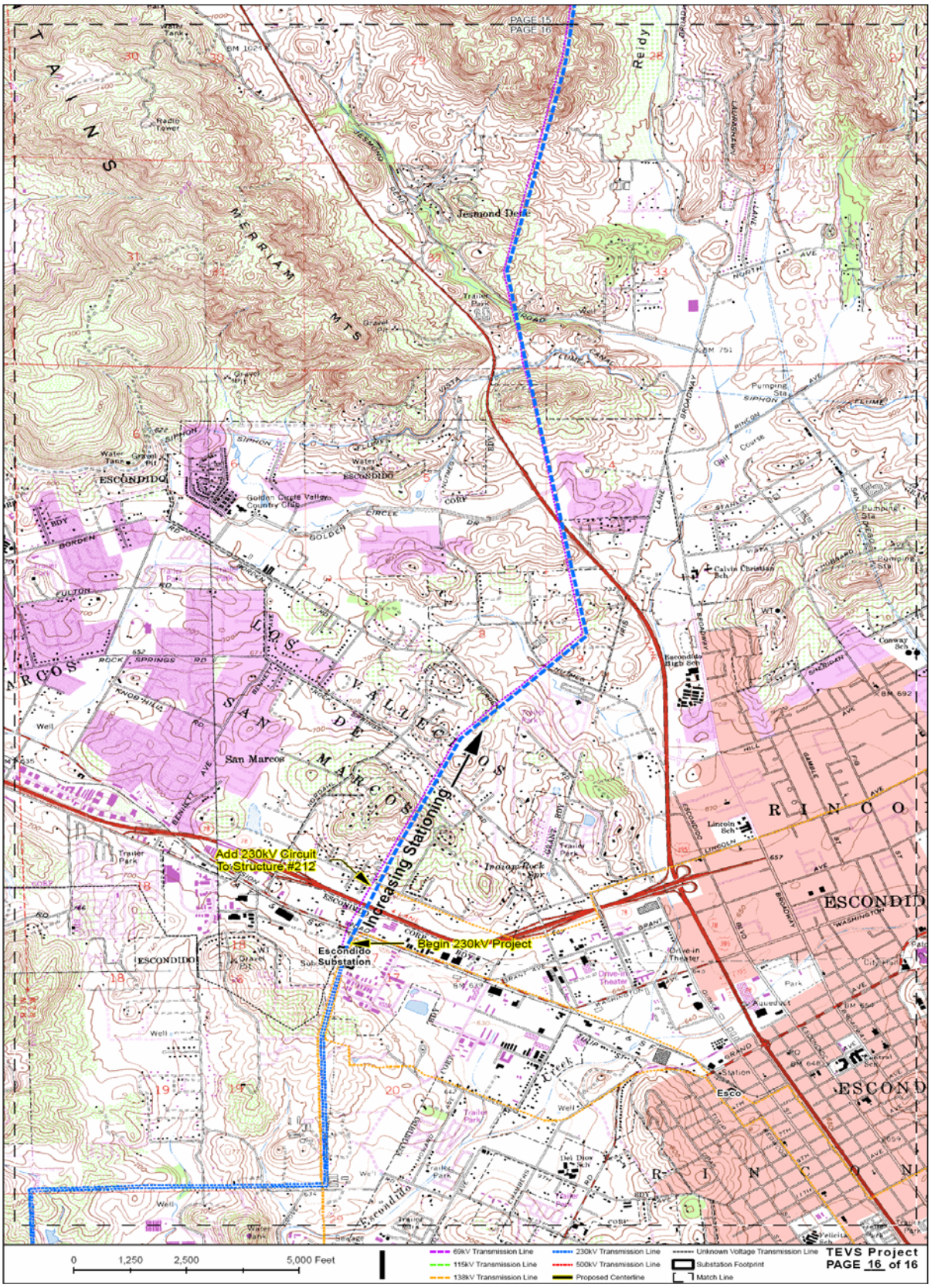

Figure 3.6.3-2 (11 of 11) SDG&E 230 kV Transmission Line Upgrade Map (Detailed)

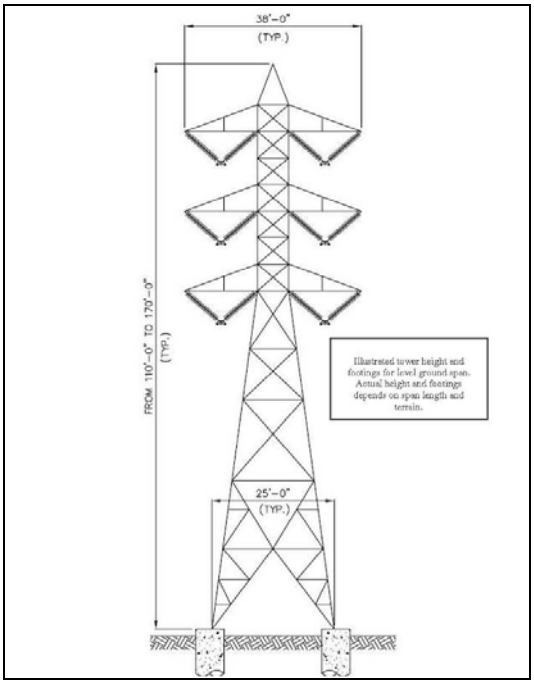

Figure 3.6.3-3 Typical Double Circuit 230 kV Steel Lattice Tower
Source: SDG&E

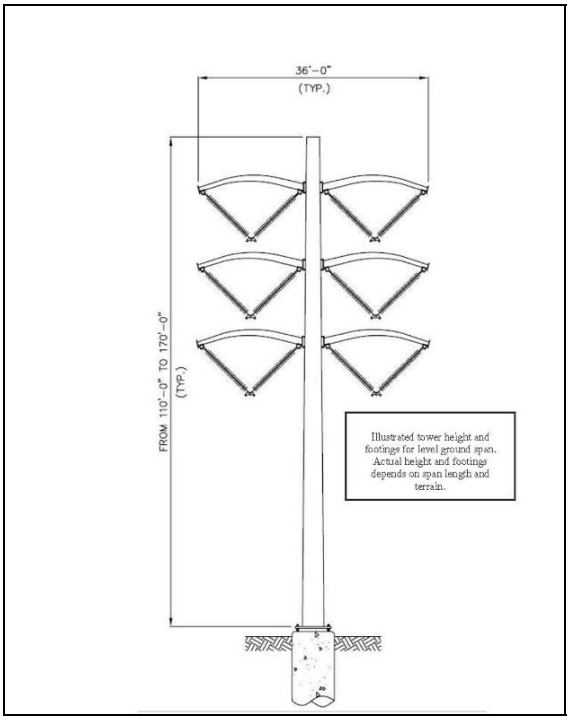

Figure 3.6.3-4 Typical Double Circuit 230 kV Steel Pole Tower
Source: SDG&E

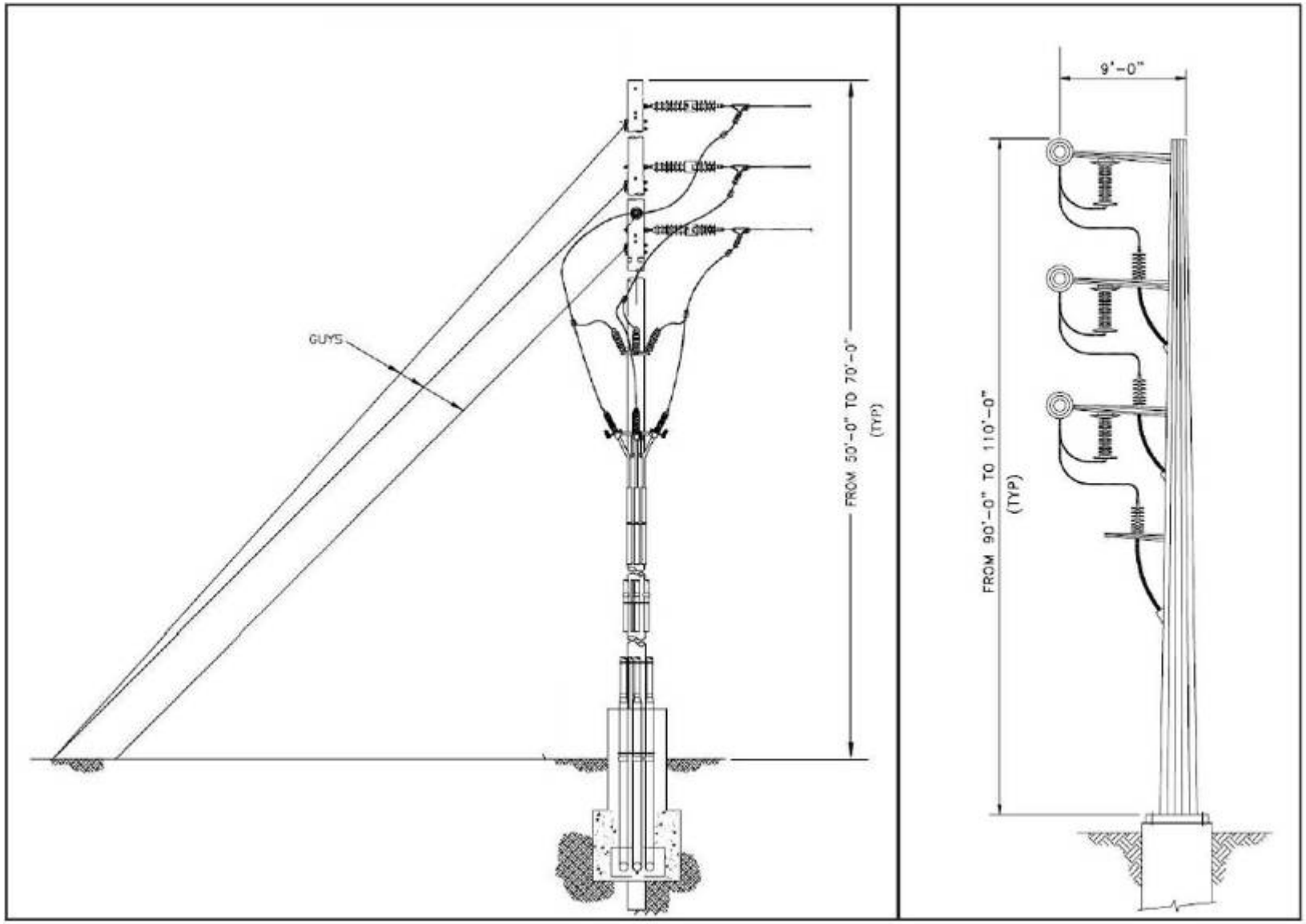

Figure 3.6.3-5 Typical Single Circuit 69 kV Wood and Steel Cable Pole
Source: SDG&E

3.7 Right-of-Way Requirements

The right-of-way (ROW) requirements the Project include approximately 32 miles of transmission ROW along with two substations and one switchyards, powerhouse, upper reservoir and other facilities. Roughly 90% of the ROW is on federal land, specifically within the Trabuco Ranger District of the Cleveland National Forest. As described in section 3.1, LEAPS is subject to licensing through the FERC and is the subject of an FEIS issues by FERC and the US Forest Service.

A detailed description of the ROW is contained in Chapter 4 and a listing of all parcels is contained in Chapter 7.

As the Project is subject to permitting at both the Federal and state levels, the Applicant is unable to discern with certainty if any particular parcel is required at this time.

3.8 Construction

For the purposes of this PEA, the Project has been separated into two components: The TE/VS Interconnect, and LEAPS. Construction activities for each would include establishment of staging areas for materials and equipment, development of access roads and spur roads to reach construction sites and development of helipads and helicopter support staging areas. All construction activity areas are designated on figures referenced individually in their relevant subsections below.

3.8.1 General Approach for Project Construction

For the TE/VS Interconnect line, new tower construction would include clearing of footing locations, installation of foundations, tower assembly, and tower erection. After towers are in place, crews would proceed with stringing of conductor and overhead ground wires. Construction would be completed with clean-up of construction sites and demobilization of personnel and equipment. The exact construction methods employed and the sequence with which construction tasks occur would be dependent on final engineering, contract award, conditions of permits, and contractor preference.

For LEAPS, construction activities would include clearing and laydown area preparation for materials and equipment, excavation spoil temporary and permanent disposal area clearing, grading and drainage construction, upper reservoir clearing and overburden stripping for the reservoir and embankment foundations, and general construction trailer set-up with utilities, temporary fencing, and parking areas. Areas for disposal or stockpile areas for natural earth stripping materials would be identified or temporary stockpile areas would be designated in the event that the stripping materials are re-used in the construction of the dam. Tunnel spoil stockpile or disposal areas will also be cleared and graded to drain off and around the spoils.

Temporary construction support facilities such as temporary office trailers and parking areas would be established. Temporary utilities would be established near the tunnel outlet area and at the upper reservoir, with local sources of power, telephone, water, and sanitary facilities

provided. If local utilities are unavailable, all power will be provided by portable generators, and all water and sanitary facilities would be supplied and serviced remotely.

In general, construction efforts would occur in accordance with accepted construction industry standards. Construction activities above ground generally would be scheduled during daylight hours (7:00 a.m. to 5:00 p.m.), Monday through Friday. Underground construction may proceed round-the-clock, Monday through Friday or under an alternate extended schedule, if permitted. When different hours or days are necessary, TNHC would obtain variances, as necessary, from the jurisdiction in which the work would take place. All materials associated with construction efforts would be delivered by truck or helicopter to established staging and material laydown areas. Delivery activities requiring major street use such as Grand Avenue or Ortega Highway would be scheduled to occur during off-peak traffic hours.

Previously disturbed areas would be used during construction wherever possible. Once sites for construction areas are proposed, biological and cultural resource reviews would be conducted before final site selection. The size of individual construction areas would vary from a fraction of an acre to up to as much as 10 acres, depending on its purpose for construction. In addition to construction materials and equipment, these areas may contain trash and recycle bins. Preparation of the construction areas will including site clearing and grubbing, site grading and drainage preparation, and in all cases, the implementation of Storm Water Pollution Prevention Plan (SWPPP) best management practices.

The following sections provide more detailed information about the construction tasks that would be associated with the TE/VS Interconnect line and LEAPS.

3.8.1.1 Primary Staging Areas

Primary staging areas would be used to stage equipment and materials during the TE/VS Interconnect and TE upgrade construction activities. Materials and equipment typically staged at these staging areas would include, but would not be limited to, tower steel bundles, tubular steel poles, spur angles, palletized bolts, rebar, wire reels, insulators and hardware, heavy equipment, light trucks, construction trailers, and portable sanitation facilities. Also, material that would be removed from existing transmission lines during work associated with the Talega Escondido reconductoring efforts and new wood pole construction for the relocation of the 69 kV line will require staging areas. Dismantled construction materials such as conductor, steel, concrete, and other debris would be temporarily stored in designated areas as it awaits salvage, recycling, or disposal or directly loaded into transport to selected permitted facilities. All effort will be made to ensure that salvageable or recyclable materials will be recovered in accordance with state waste management guidelines.

TE/VS Interconnect includes approximately 8 staging areas as shown on Figure 3.1.1-1 Talega-Escondido/Valley-Serrano 500 kV Interconnect Project that would be selected based on accessibility to construction locations and proximity to transmission line and substation access roads. Where possible, previously disturbed areas would be used. Once sites for primary staging areas are proposed, biological and cultural resource reviews would be conducted before final site selection. An area up to 5-10 acres in size and within 5 or less air miles of the tower locations would be required for each primary staging areas. In addition to construction materials and

equipment these staging areas may contain trash and recycle bins. Preparation of the primary staging areas would include the application of road base, installation of perimeter fencing, and implementation of Storm Water Pollution Prevention Plan (SWPPP) best management practices.

In addition to the primary staging areas, secondary staging areas would be established for short-term utilization near construction sites. Where possible, the secondary staging areas would be sited in areas of previous disturbance along the construction corridors, such as the former access roads and staging areas for TE/VS Interconnect. Final siting of these staging areas would depend upon availability of appropriately zoned property that is suitable for this purpose. The number and size of the secondary staging areas would be dependent upon a detailed R-O-W inspection and would take into account, where practical, suggestions by the successful bidder for the work. Typically, an area approximately 1 to 3 acres would be required. Once sites for secondary staging areas are proposed, biological and cultural resource reviews would be conducted before final site selection. Preparation of the secondary staging areas would include installation of perimeter fencing, and implementation of SWPPP best management practices. Application of road base may also occur, depending on existing ground conditions at the yard site.

3.8.1.2 Work Areas

3.8.1.3 Access Roads and Spur Roads

Transmission line roads are classified into two groups: access roads and spur roads. Access roads are through roads that run between tower sites along an R-O-W and serve as the main transportation route along line R-O-Ws. Spur roads are roads that lead from line access roads and terminate at one or more tower sites.

The TE/VS Interconnect line will require approximately 75 new spur and access roads. The majority of these features can be classified as spur roads, since they consist of short sections of new or improved road that branch off existing roads and do not follow the transmission line right-of-way. The locations of all spur and access roads are also shown on Figure 3.1.1-1 Talega-Escondido/Valley-Serrano 500 kV Interconnect Project.

This project includes construction on both existing R-O-W and new R-O-W. Where construction would take place on existing R-O-W, it is assumed that most of the existing access roads as well as spur roads would be used. However, it is also assumed that rehabilitation work would be necessary in some locations for existing roads to accommodate construction activities. This work may include:

Re-grading and repair of existing access and spur roads. These roads would be cleared of vegetation, blade-graded to remove potholes, ruts, and other surface irregularities, and re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The graded road would have a minimum drivable width of 12 feet and preferably a shoulder width of an additional 2 feet.

Drainage structures such as wet crossings, water bars, overside drains and pipe culverts would be installed to allow for construction traffic usage, as well as prevent road damage due to uncontrolled water flow. Slides, washouts, and other slope failures would be repaired and

stabilized by installing retaining walls or other means necessary to prevent future failures. The type of structure to be used would be based on specific site conditions.

Where construction would take place in new R-O-W, which is particularly applicable to the TE/VS Interconnect line, new access and spur roads would be necessary to access the transmission line structure locations, unless these sites are initially designated as helicopter-access only sites. All proposed access roads will require review and approval by the Forest Service prior to construction. Biological and cultural surveys have been performed for all the proposed access roads as part of this PEA effort. Specific detailed environmental conditions are presented in Attachment 4.

Similar to rehabilitation of existing roads, all new road alignments would first be cleared and grubbed of vegetation. Roads would be blade-graded to remove potholes, ruts, and other surface irregularities, and re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The graded road would have a minimum drivable width of 12 feet (preferably with 2 feet of shoulder on either side). In addition, drainage structures (e.g., wet crossings, water bars, overside drains, pipe culverts, and energy dissipaters would be installed along spur and access roads to allow for construction equipment usage as well as to prevent erosion from uncontrolled water flow. Landslides, washouts, and other slope failures would be repaired and stabilized along the roads by installing retaining walls or other means necessary to prevent future failures. The type of mechanically stabilized earth-retaining structure to be used would be based on site-specific conditions.

It is anticipated that most of the roads constructed to accommodate new construction would be left in place to facilitate future access for operations and maintenance purposes. Gates would be installed where required at fenced property lines to restrict general and recreational vehicular access to road R-O-Ws.

Construction roads across areas that are not required for future maintenance access would be removed and restored after construction is completed. An example of this type of road would be a road constructed to provide access to a splice location during wire-stringing operations. Splice locations are used to remove temporary pulling splices and install permanent splices once the conductor is strung through the stringing travelers located on transmission structures. Access roads to splice locations are sometimes required when a splice location is not accessible from an access or spur road.

3.8.1.4 Helicopter Use

In the event that there are no existing access roads, contractors would hike in or be shuttled to the tower locations by helicopter. Approximately one or two small helicopters would be used to transport equipment to tower sites for conductor and associated hardware removal. A larger, heavy lift helicopter may be used for reconductoring of the existing towers. It is estimated that the small helicopter would generally operate up to 8 hours per day, Monday through Friday, while the large helicopter would operate approximately 6 to 8 hours per day. The operating area of the helicopters would be limited to helicopter staging areas, material and equipment staging areas, and positions along the utility corridors that have previously been used for this purpose and TNHC has determined are safe locations for landing.

Use of helicopters for installation eliminates land disturbance associated with crane pads, structure laydown areas, and the trucks and tractors used for steel delivery to structure sites. Figure 3.1.1-1, Talega-Escondido/Valley-Serrano 500 kV Interconnect Project, designates the tower sites anticipated for helicopter-only construction. All construction work in remote work sites would be completed by hand with the assistance of portable compressors, portable hydraulic accumulators, and portable concrete mixers that would be flown into the tower sites. The use of helicopters for the erection of LSTs or TSPs would be in accordance with the construction specifications and would be similar to methods detailed in IEEE 951-1966, Guide to the Assembly and Erection of Metal Transmission Structures, Section 9, Helicopter Methods of Construction. During helicopter operations, public access to defined areas would be restricted. Temporary road closures, traffic detours, and posted notices and signs would be used to restrict public access to construction areas.

Final siting of staging areas for the TE/VS Interconnect line would be conducted with the input of the helicopter contractor, and affected private landowners and land management agencies. The size of each staging area would be dependent upon the size and number of towers to be installed. Staging areas would likely change as work progresses.

Helicopter fueling would occur at staging areas or at local airports using the helicopter contractor's fuel truck, would be supervised by the helicopter fuel service provider, and SWPPP measures would be followed, as applicable. The helicopter and fuel truck would stay overnight at a local airport or at a staging area if adequate security is in place.

3.8.1.5 Vegetation Clearance

Minimal vegetation clearing will be performed as required for construction of the project components. Care will be taken to minimize soil disturbance during construction and restoration, plus for temporary construction disturbance, areas will be developed with agency concurrence as part of the design and mitigation process.

3.8.1.6 Erosion and Sediment Control and Pollution Prevention During Construction

In compliance with the CWA, site construction activities would be consistent with National Pollutant Discharge Elimination System (NPDES) program requirements, which would include development of an SWPPP for the site before construction commences. The SWPPP would focus on implementation of Best Management Practices and other actions during construction to protect the quality of waters near the construction site.

Construction of new substations and associated access roads would require earthwork activities. Construction sites would first be cleared of vegetation and loose rock and then graded to provide a near-level surface with site slope designed to collect and control drainage that minimizes surface erosion. Sites would be graded such that water would run toward the direction of the natural drainage. In addition, drainage would be designed to prevent ponding and erosive water flows that could cause damage to the tower footings.

Soils generated from the grading activities would be tested to determine if environmental contamination is present before soil removal for disposal. During grading operations, dust would be controlled by measures outlined in the SWPPP.

Construction debris from activities at each substation site would be placed in appropriate onsite containers and periodically disposed of per applicable regulations.

3.8.2 Transmission Line Construction (Above Ground)

This section describes the specific plans for each of the construction area types and individual components of the TE/VS Interconnect line above ground construction. This includes the activities associated with the substations, the new TE/VS Interconnect overhead line construction, and the Talega-Escondido (TE) reconductoring work.

3.8.2.1 Pulling and Splicing Locations

The dimensions of the area needed for the stringing setups associated with wire installation are variable and depends upon terrain. On average, however, pulling and splicing equipment set-up sites require an area of 200 feet by 200 feet (0.92 acre); however, crews can work from within a slightly smaller area when space is limited. These locations require level areas to allow for maneuvering of the equipment. When possible, pulling and splicing locations would be located on existing level areas and existing roads to minimize the need for grading and cleanup. Stringing set-up locations on Forest Service land that would be located outside the established utility corridor would be authorized under a temporary Special Use Permit as necessary.

Each pulling location would include one puller positioned at one end and one tensioner and wire reel stand truck positioned at the other end. Specialized support equipment such as skidders and wire crimping equipment would be strategically positioned to support the operations. Pulling and splicing set-up locations would be used to remove temporary pulling splices and install permanent splices once the conductor is strung through the rollers located on each tower, and are necessary as the permanent splices that join the conductor together cannot travel through the rollers. For stringing equipment that cannot be positioned at either side of a dead-end transmission tower, field snubs (i.e., anchoring and dead-end hardware) would be temporarily installed to sag conductor wire to the correct tension.

The puller, tensioner, and splicing set-up locations associated with the TRTP are anticipated to disturb a total of approximately 317 acres. These disturbances would be temporary and the land would be restored to its previous condition following completion of pulling and splicing activities. Estimates of the land disturbance associated with this activity for each segment are provided in Table 3.8.1, Estimate of Land Disturbance for Substation Sites.

Table 3.8.1. Estimate of Land Disturbance for Substation Sites

	Lake Switchyard		Santa Rosa Substation		Case Springs Substation	
	Dimensions (Ft)	**Area of Disturbance (Ac)**	**Dimensions (Ft)**	**Area of Disturbance (Ac)**	**Dimensions (Ft)**	**Area of Disturbance (Ac)**
Substation Pad	300 ft W 900 ft L	7.86 ac	310 ft W 407 ft L	2.89 ac	363 ft W 771 ft L	6.425 ac

	Lake Switchyard		Santa Rosa Substation		Case Springs Substation	
	Dimensions (Ft)	**Area of Disturbance (Ac)**	**Dimensions (Ft)**	**Area of Disturbance (Ac)**	**Dimensions (Ft)**	**Area of Disturbance (Ac)**
Side Slope Grading		0.14 ac.		2.11 ac.		8.75 ac.
Primary Access Road	Temescal Canyon Rd.	County Rd.	Santa Rosa Avenue	County Rd.	SDG&E Access Rd	Camp Pendleton
Total Estimated		8 ac.		5 ac.		15 ac.

3.8.2.2 Pole Installation and Removal

3.8.2.2.1 Grading and Excavation

For the construction tower pads, each location would first be graded and/or cleared to provide a reasonably level and vegetation-free surface for footing construction. Sites would be graded such that water would run toward the direction of the natural drainage. In addition, drainage would be designed to prevent ponding and erosive water flows that could cause damage to the tower footings. The graded area would be compacted to at least 90 percent relative density, and would be capable of supporting heavy vehicular traffic.

An area of approximately 0.25 acre would be required for the single footing needed for each tubular steel pole (TSP) tower and approximately 0.07 acre would be required to accommodate the four footings needed for each new lattice steel tower (LST).

In mountainous helicopter-access areas, benching may be required to provide access for footing construction, assembly, erection, and wire-stringing activities during line construction. Benching is a technique in which a tracked earth-moving vehicle excavates a terraced access to tower excavations in extremely steep and rugged terrain. It would be used minimally and for two purposes:

1. To help ensure the safety of personnel during construction activities.
2. To control costs in situations where potentially hazardous, manual excavations would be required.

3.8.2.2.2 Foundations

Structure foundations would typically be drilled concrete piers. New lattice steel towers would be constructed on four drilled pier concrete footings, while each tubular steel pole would be constructed on a single drilled pier concrete footing. The foundation process would start with the auguring of the holes for each tower or pole. The holes would be bored using truck or track-mounted excavators with various diameter augers to match diameter requirements of the foundation sizes. Lattice steel structures typically require an excavated hole of 3 to 6 feet in diameter and 15 to 30 feet deep. Tubular steel poles typically require an excavated hole of up to 10 feet in diameter and 60 feet deep. On average each foundation for both pole types would project above the ground approximately 3 feet.

Following excavation of the foundation holes, reinforcing steel and stub angles would be installed and the concrete would then be placed. Steel reinforced cages and stub angles would be assembled at laydown areas and delivered to each structure location by flatbed truck or helicopter. Typical lattice towers would require 15 to 20 cubic yards of concrete delivered to each structure location for tangent structures, 25 to 30 cubic yards for angle towers, and 100 cubic yards for dead-end towers. Typical tubular steel poles would require up to 100 cubic yards of concrete at each structure location.

Footing work would be completed using standard "poured-in-place" augured excavation techniques. At the time of construction, elevations would be established, rebar cages set, spur angles and concrete placed, and survey positioning would be verified. Concrete samples would be drawn at time of pour and tested to ensure engineered strengths were achieved. Typically, on regular terrain, under ideal circumstances, a single footing crew could be expected to excavate, place steel cages and stub angles, and pour in place concrete for one complete LST every 2 days. A foundation set for each LST would include four footings. The single foundation for a TSP can typically be completed in 3 days. A normally specified concrete mix typically takes approximately 20 working days to cure to an engineered strength. This strength is verified by controlled testing of sampled concrete. Once this strength has been achieved, crews would be permitted to commence erection of steel.

Conventional construction techniques would generally be used as described above for new footing installation. In certain cases, equipment and material may be deposited at structure sites using helicopters or by workers on foot, and crews may prepare the footings using hand labor assisted by hydraulic or pneumatic equipment, or other methods.

3.8.2.2.3 Tower and Pole Assembly

LSTs would be assembled at laydown areas at each site, and then erected and bolted to the foundations. Alternatively, the contractor may elect to assemble the LSTs at a pre-determined site, then transport and set the towers as a single unit into the pre-constructed tower foundations as a single operation. If assembly and erection at each site is chosen, tower assembly would begin with the hauling and stacking of bundles of steel at tower location per engineering drawing requirements. This activity requires use of several tractors with 40 foot floats and an onsite loader. After steel is delivered and stacked, crews would proceed with assembly of leg extensions, body panels, boxed sections and the bridges. The steel work would be completed by a combined erection and torquing crew with a lattice boom crane. The construction crew may opt to install insulators and wire rollers (travelers) at this time. Figure 3.6.3-3 provides a representation of this construction process. Ground disturbance would generally be limited to the laydown areas, which would typically occupy an area of 200 feet by 200 feet (0.92 acre).

TSPs may be too heavy to deliver to the site by helicopter, but may be delivered by helicopter in sections and erected on pre-constructed foundations. For manual TSP erection on-site, steel work would consist of hauling the TSPs in sections to their designated sites using semi-trucks with 40 foot trailers and rough terrain cranes. Due to the size of the TSPs, each pole would require at least two trucks. At the site, the poles would be set on the foundations once the proper cure time for the concrete had been attained. The poles could either be assembled into a complete structure or set one piece at a time by stacking them together. This would depend

largely on the terrain and available equipment. Stacking the poles one piece at a time would cause the least amount of ground disturbance. Laydown areas would be established for the assembly process and would generally occupy an area of 200 feet by 200 feet (0.92 acre) at each location.

3.8.2.2.4 Tower and Pole Erection

Where road access is available to tower sites, assembled tower sections would be lifted into place with a minimum 80-ton all-terrain or rough terrain crane that would move along the R-O-W for structure erection purposes.

Use of helicopters for installation eliminates land disturbance associated with crane pads, structure laydown areas, and the trucks and tractors used for steel delivery to structure sites. All construction work in remote work sites would be completed by hand with the assistance of portable compressors, portable hydraulic accumulators, and portable concrete mixers that would be flown into the tower sites. The use of helicopters for the erection of LSTs or TSPs would be in accordance with construction specifications and would be similar to methods detailed in IEEE 951-1966, Guide to the Assembly and Erection of Metal Transmission Structures, Section 9, Helicopter Methods of Construction. During helicopter operations, public access to defined areas would be restricted. Temporary road closures, traffic detours, and posted notices and signs would be used to restrict public access to construction areas.

The operations area of the helicopters would be limited to helicopter staging areas and positions near construction locations that have been designated for this purpose and are considered safe locations for landing. Final siting of staging areas for the TE/VS Interconnect line would be conducted with the input of the helicopter contractor, and affected private landowners and land management agencies. The size of each staging area would be dependent upon the size and number of towers to be installed. Staging areas would likely change as work progresses.

Helicopter fueling would occur at staging areas or at a local airport using the helicopter contractor's fuel truck, would be supervised by the helicopter fuel service provider, and SWPPP measures would be followed, as applicable. The helicopter and fuel truck would stay overnight at a local airport or at a staging area if adequate security is in place.

3.8.2.3 Conductor/Cable Installation

Wire-stringing includes all activities associated with the installation of conductors onto the LSTs and TSPs for the TE/VS Interconnect and for TE reconductoring. This activity includes the installation of primary conductor and ground wire, vibration dampeners, weights, spacers, and suspension and dead-end hardware assemblies. Insulators and stringing sheaves (rollers or travelers) are attached as part of the wire-stringing activity if the work is a part of a reconductoring effort; otherwise they are typically attached during the steel erection process. Wire-stringing activities would be conducted in accordance with the construction specifications, which is similar to process methods detailed in IEEE Standard 524-1992, Guide to the Installation of Overhead Transmission Line Conductors. A standard wire-stringing plan includes a sequenced program of events starting with determination of wire pulls and wire pull equipment

set-up positions. Advanced planning by supervision determines circuit outages, pulling times, and safety protocols needed for ensuring that safe and quick installation of wire is accomplished.

Typically, wire pulls occur every 15,000 feet on flat terrain and every 9,000 feet in mountainous terrain. Wire splices typically occur every 4,500 feet. "Wire pulls" are the length of any given continuous wire installation process between two selected points along the line. Wire pulls are selected, where possible, based on availability of dead-end LSTs at the ends of each pull, geometry of the line as affected by points of inflection, terrain, and suitability of stringing and splicing equipment setups. In some cases, it may be preferable to select an equipment setup position between two suspension towers. Anchor rods would then be installed to provide dead-ending capability for wire sagging purposes, and also to provide a convenient splicing area.
To ensure the safety of workers and the public, safety devices such as traveling grounds, guard structures, and radio-equipped public safety roving vehicles and linemen would be in place prior to the initiation of wire-stringing activities.

The following four steps describe the wire installation activities proposed by TNHC:

Step 1: Sock Line; Threading: A helicopter would fly a lightweight sock line from tower to tower, which would be threaded through the wire rollers in order to engage a cam-lock device that would secure the pulling sock in the roller. This threading process would continue between all towers through the rollers of a particular set of spans selected for a conductor pull.

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

Step 3: Splicing, Sagging, and Dead-ending: After the conductor is pulled in, all mid-span splicing would be performed. Once the splicing has been completed, the conductor would be sagged to proper tension and dead-ended to towers.

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

As noted above, the threading step of wire installation would require helicopter use. While only one small helicopter is needed, two helicopters may be used to shorten the time for this phase. On average, each helicopter would operate 4 hours per day during stringing operations. The operations area of the small helicopter would be limited to helicopter staging areas and positions along the utility corridor that have previously been sited for this purpose and are considered safe locations for landing. Final siting of staging areas for the TE/VS Interconnect transmission line would be conducted with the input of the helicopter contractor, and affected private landowners and land management agencies. The size of each staging area would be dependent upon the size

and number of towers to be removed and installed. Staging areas would likely change as work progresses along the transmission lines.

Helicopter fueling would occur at staging areas or at local airports using the helicopter contractor's fuel truck, and would be supervised by the helicopter fuel service provider. The helicopter and fuel truck would stay overnight at a local airport or at a staging area if adequate security is in place.

3.8.2.4 Guard Structure Installation

Guard poles or guard structures may be installed at transportation, flood control, and utility crossings. Guard structures may also be installed at other locations such as parks or near residences. These are temporary facilities designed to stop the travel of a conductor should it momentarily drop below a conventional stringing height, and are removed after conductors are installed. If required, temporary netting would be installed to protect some types of under-built infrastructure. In some cases, guard structures can be specially equipped boom type trucks with heavy outriggers. Typical guard structures are standard wood poles, 60 to 80 feet tall, arranged in such a manner as to arrest the travel of conductor should it momentarily drop below a conventional stringing height. Depending on the width of the line being constructed, the number of guard poles installed on either side of a crossing would be between 2 and 4.

Public agencies differ on their policies for guard structures and their preferred methods for public safety. For highway and open channel aqueduct crossings, TNHC would work closely with the applicable jurisdiction to secure the necessary permits to string conductor across the applicable infrastructure. For major roadway crossings, typically one of the following four methods is employed to protect the public:

- Erection of a highway net guard structure system.
- Detour of all traffic off of the highway at the crossing position.
- Implementation of a controlled continuous traffic break while stringing operations are performed.
- Establishment of special line trucks with extension booms onto the highway deck at strategic positions.

3.8.3 Transmission Line Construction (Below Ground)

This section describes the specific plans for construction area types and individual components of the Interconnect line below ground, including the north and south transitions.

3.8.3.1 Primary Staging Areas

Primary staging areas would be used to stage equipment and materials during TE/VS Interconnect construction. Materials and equipment typically staged at these staging areas would include, but would not be limited to, tower steel bundles, tubular steel poles, spur angles, palletized bolts, rebar, wire reels, insulators and hardware, heavy equipment, light trucks, construction trailers, and portable sanitation facilities. Also, material that would be removed from existing transmission lines during work associated with the Talega-Escondido

reconductoring efforts and such as conductor, steel, concrete, and other debris, would be temporarily stored in designated areas as it awaits salvage, recycling, or disposal or directly loaded into transport to selected permitted facilities. All effort will be made to ensure that salvageable or recyclable materials will be recovered in accordance with state waste management guidelines.

This project includes 8 staging areas that would be selected based on accessibility to construction locations and proximity to transmission line and substation access roads. Where possible, previously disturbed areas would be used. Once sites for primary staging areas are proposed, biological and cultural resource reviews would be conducted before final site selection. An area up to 5-10 acres in size and within 5 or less air miles of the tower locations would be required for each primary staging areas. In addition to construction materials and equipment these staging areas may contain trash and recycle bins. Preparation of the primary staging areas would include the application of road base, installation of perimeter fencing, and implementation of Storm Water Pollution Prevention Plan (SWPPP) best management practices.

In addition to the primary staging areas, secondary staging areas would be established for short-term utilization near construction sites. Where possible, the secondary staging areas would be sited in areas of previous disturbance along the construction corridors. Final siting of these staging areas would depend upon availability of appropriately zoned property that is suitable for this purpose. The number and size of the secondary staging areas would be dependent upon a detailed R-O-W inspection and would take into account, where practical, suggestions by the successful bidder for the work. Typically, an area approximately 1 to 3 acres would be required. Once sites for secondary staging areas are proposed, biological and cultural resource reviews would be conducted before final site selection. Preparation of the secondary staging areas would include installation of perimeter fencing, and implementation of SWPPP best management practices. Application of road base may also occur, depending on existing ground conditions at the yard site.

3.8.3.2 Access Roads and Spur Roads

Transmission line roads are classified into two groups: access roads and spur roads. Access roads are through roads that run between tower sites along an R-O-W and serve as the main transportation route along line R-O-Ws. Spur roads are roads that lead from line access roads and terminate at one or more tower sites.

Approximately 75 access and spur roads will be required. Most of these features will be built over existing roads or fire breaks.

This project includes construction on both existing R-O-W and new R-O-W. Where construction would take place on existing R-O-W, it is assumed that most of the existing access roads as well as spur roads would be used. However, it is also assumed that rehabilitation work would be necessary in some locations for existing roads to accommodate construction activities. This work may include:

Re-grading and repair of existing access and spur roads will be required. These roads would be cleared of vegetation, blade-graded to remove potholes, ruts, and other surface irregularities, and

re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The graded road would have a minimum drivable width of 12 feet and preferably a shoulder width of an additional 2 feet.

Drainage structures such as wet crossings, water bars, overside drains and pipe culverts would be installed to allow for construction traffic usage, as well as prevent road damage due to uncontrolled water flow.

Slides, washouts, and other slope failures would be repaired and stabilized by installing retaining walls or other means necessary to prevent future failures. The type of structure to be used would be based on specific site conditions.

Where construction would take place in new R-O-W, which is particularly applicable to the TE/VS Interconnect line, new access and spur roads would be necessary to access the transmission line structure locations, unless these sites are initially designated as helicopter-access only sites. All proposed access roads will require review and approval by the Forest Service prior to construction. Biological and cultural surveys have been performed for all the proposed access roads as part of this PEA effort. A summary description of this information is presented in Attachment 3.

Similar to rehabilitation of existing roads, all new road alignments would first be cleared and grubbed of vegetation. Roads would be blade-graded to remove potholes, ruts, and other surface irregularities, and re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The graded road would have a minimum drivable width of 12 feet (preferably with 2 feet of shoulder on either side). In addition, drainage structures (e.g., wet crossings, water bars, overside drains, pipe culverts, and energy dissipaters would be installed along spur and access roads to allow for construction equipment usage as well as to prevent erosion from uncontrolled water flow. Slides, washouts, and other slope failures would be repaired and stabilized along the roads by installing retaining walls or other means necessary to prevent future failures. The type of mechanically stabilized earth-retaining structure to be used would be based on site-specific conditions.

It is anticipated that most of the roads constructed to accommodate new construction would be left in place to facilitate future access for operations and maintenance purposes. Gates would be installed where required at fenced property lines to restrict general and recreational vehicular access to road ROWs.

Construction roads across areas that are not required for future maintenance access would be removed and restored after construction is completed. An example of this type of road would be a road constructed to provide access to a splice location during wire-stringing operations. Splice locations are used to remove temporary pulling splices and install permanent splices once the conductor is strung through the stringing travelers located on transmission structures. Access roads to splice locations are sometimes required when a splice location is not accessible from an access or spur road.

3.8.4 Substation and Switchyard Construction

3.8.4.1 General Construction Considerations – All Sites

Substation and switchyard construction would include construction of three new facilities:

The Lake Switchyard on the northern end of the project.

The Santa Rosa Substation near the Pumped Storage component at the approximate midpoint of the TE/VS Interconnect line.

The Case Springs Substation at the southern end of the TE/VS Interconnect line.

Minor upgrades to protection and communications equipment at SCE's Valley and Serrano Substations, new line positions, and protection and communications equipment at SDG&E's Talega and Escondido Substations are also included in the project. In general, construction efforts would occur in accordance with accepted construction industry standards. Work generally would be scheduled during daylight hours (7:00 a.m. to 5:00 p.m.), Monday through Friday. When different hours or days are necessary, TNHC would obtain variances, as necessary, from the jurisdiction in which the work would take place. All materials associated with construction efforts would be delivered by truck to the individual substation sites or by train to the Camp Pendleton rail head and then trucked up to the Case Springs site. Delivery activities requiring major street use would be scheduled to occur during off-peak traffic hours.

Construction of new substations, substation expansions, and associated access roads would require earthwork activities. Construction sites would first be cleared of vegetation and loose rock and then graded to provide a near-level surface. Soils generated from the grading activities would be tested to determine if environmental contamination is present before soil removal for disposal. During grading operations, dust would be controlled by measures outlined in the SWPPP.

Installation of new equipment and structures at each substation requires excavation for major reinforced concrete footings, GIS equipment slabs, transformer foundations oil containment pits and water separators. In parallel with the foundation excavation cable duct trenches are dug. Soil from these excavations would be redistributed on substation property.

Construction debris from activities at each substation site would be placed in appropriate onsite containers and periodically disposed of per applicable regulations. All construction will be performed by licensed experience substation construction contractors under the control of a general site contractor. Major civil portions of the work including earth work, foundations cable trenching, ground mat, drainage SWPPP, etc will be performed by the civil contractor. The electrical installation will be performed by qualified electrical contractor this work involves equipment assembly, installation, cable and wiring terminations, etc.

TNHC plans to enter into a turn-key project agreement with a major firm for overall electrical system level design, high voltage equipment supply and substation construction. This firm will develop overall EPC requirements incorporating design standards from SCE & SDG&E. The general contractor or Engineer Procure and Construct (EPC) will select qualified subcontractors including specialized contractors for fiber cable splicing, paving access roads with in the switch

yards, fencing, environmental screening and testing, painting, etc. This firm will provide supervisory field engineers for equipment assembly and commissioning. System level design has been performed by Siemens SPTI and PT&D with oversight from CAISO, SCE and SDG&E during the CAISO CSRPT process. Detail design will be performed by a major EPC contractor who will also serve as the general site contractor. Construction design and construction drawings will be prepared by the EPC contractor, and all design will be prepared by or under the supervision of a California Professional Engineer (PE). Commissioning and energization will be conducted by a joint commissioning team consisting of Siemens, SCE and SDG&E field engineers in cooperation with CAISO.

Drainage. The drainage for any site would be developed during final engineering design to control surface runoff. Typical drainage improvements would consist of concrete swales, ditches, and culverts. Surface runoff from existing upslope areas would be modified to direct the flow around the substation facility. Surface runoff would be mitigated as needed through the use of earthen berms and energy dissipation devices, such as filter cloths, slope drains, and riprap placed near drain openings. All of these methods are designed to minimize the velocity of surface water runoff and protect the landscape from erosion.

In compliance with the CWA, site construction activities would be consistent with National Pollutant Discharge Elimination System (NPDES) program requirements, which would include development of an SWPPP for the site before construction commences. The SWPPP would focus on implementation of Best Management Practices and other actions during construction to protect the quality of waters near the construction site.

Access. The primary facility access would be via a new 30 foot wide asphalt concrete paved road with 5 foot wide compacted dirt shoulders connecting the main substation entrance to the exterior access roads.

Paving. For all sites, asphalt concrete paving would be applied to the facility access road and to all designated internal driveways over an aggregate base material and a properly compacted sub-grade, as recommended by the results of geotechnical investigation at the site.

Surfacing. For all sites, those areas within the substation perimeter that are not paved or covered with concrete foundations or trenches would be surfaced with a 4-inch layer of untreated, ¾-inch nominal crushed rock. The rock would be applied to the finished grade surface after all grading and below grade construction has been completed.

Spill Control and Countermeasures (SPCC) Plan. A SPCC plan would be required for all sites. Under U.S. Environmental Protection Agency (EPA) CWA regulations, the owner of a substation facility is required to implement an SPCC plan if the facility meets the following three criteria:

The facility is not related to transportation.

The oil containing equipment at the facility has an aggregate of at least 1,320 gallons (only considering containers that are 55 gallons or more) or an underground oil storage capacity of at least 42,000 gallons.

There is a reasonable expectation of discharge into or upon navigable waters of the United States or adjoining shorelines. In addition, regulations by the State of California independently require that an SPCC plan be implemented for any facility with an aboveground oil storage capacity of at least 10,000 gallons. The total storage capacity of the oil containing equipment of the interconnection facilities at the Lake Switchyard exceeds 1,320 gallons; therefore it would trigger the threshold for the EPA requirement for an SPCC plan. TNHC would proceed with preparation of an SPCC plan in accordance with state and federal requirements.

Storm Water Pollution Prevention Plan (SWPPP). Storm water management measures would be in place to ensure that contaminants are not discharged from the site. A SWPPP would be developed that would define areas where hazardous materials would be stored; where trash would be placed; where rolling equipment would be parked, fueled and serviced; and where construction materials, such as reinforcing bars and structural steel members, would be stored. Erosion control during grading of the unfinished site and during subsequent construction would be in place and monitored as specified by the SWPPP. One or more basins would be established to capture silt and other materials that might otherwise be carried from the site by rainwater surface runoff. Site improvements may result in impervious areas from all concrete foundations used for equipment and structures, and asphalt and concrete driveways. Management of drainage from these areas would be addressed in the facility drainage plan.

Perimeter Security. All alternative sites would require 8 foot high chain link perimeter fence with barbed wire and double drive gates.

The following sections describe the site-specific construction activities that would be associated with the various substations that are part of the proposed TE/VS Interconnect transmission line.

3.8.4.2 Lake Switchyard

The Lake Switchyard would be located north and east of Interstate 15 northwest of the city of Lake Elsinore, as shown on Figure 3.1.1-1 (sheet 1) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project. The substation site is located just north of the junction of Temescal Canyon Road and Lee (Corona) Lake.

Most activities supporting construction of the Lake Switchyard would be common to all sites, although there would be some variation in the amounts of total disturbance required based on the pad configuration on each site and road access to each site. A conceptual grading plant for the Lake Switchyard site is presented in Figure 3.8.4-1, Lake Switchyard Grading Plan.

Site Preparation. The following elements of site preparation would be required for the Lake Switchyard:

- Clear and grub any vegetation and organic materials from the area.
- Grade the entire substation pad.
- Grade the cut and fill side slopes to blend the existing terrain with the new pad.
- Grade and install the substation access roads.

- Excavation for all subsurface features, primarily buried conduits and below-grade construction for structure foundations.

Prior to the start of grading, the entire area to be graded would be stripped of all organic matter and loose rocks. Any waste material encountered would be removed as required by the environmental and geotechnical investigations. Waste collected from these stripping operations would be tested for contamination.

The proposed Lake Switchyard would be located on previously disturbed land adjacent to Lee Lake. For the purposes of determining environmental impacts, an average of 2 inches of stripping is anticipated over the entire substation site resulting in an estimated quantity of 15,000 cubic yards of soil mixed with small stones and organic matter that would need to be transported from the site and disposed of at an appropriate waste disposal facility.

Construction within the switchyard after site preparation involves footings up to 12 ft deep to support equipment and steel structures. The major foundations include the 500 kV switch gear pad. In addition, a network of partially buried concrete trenches, approximately 800 feet in total length, would be installed. The estimated total volume of soil that would need to be excavated for foundation and trenches is 1,200 cubic yards, and would be spread on a portion of the switchyard property.

Guard Structure Installation. Foundations of various sizes would be constructed throughout the switchyard pad to support equipment and steel structures. In addition, a network of partially buried concrete trenches, would be installed. Excavations of these foundations and trenches would commence following the completion of grading and other yard improvements, and would continue for several weeks. The estimated total volume of soil that would need to be excavated for foundation and trenches will be determined in future design stages, but excess excavated soils would be spread on a portion of the switchyard property.

Figure 3.8.4-1 Lake Switchyard Grading Plan

3.8.4.3 Santa Rosa Substation

Site Preparation. The conceptual plan for the Santa Rosa Substation site is presented in Figure 3.8.4-2, Santa Rosa Substation Grading Plan. Prior to the start of grading, the entire area to be graded would be stripped of all organic matter and loose rocks. Any waste material encountered would be removed as required by the environmental and geotechnical investigations. Waste collected from these stripping operations would be tested for contamination. Once the surface has been cleared, the grading operations would begin. An estimated 5,000 cubic yards areas of soil would be cut from the higher elevation and placed as fill over the lower elevation to match the existing 500 kV substation elevation. During grading operations, dust would be controlled by measures outlined in the SWPPP.

Foundation Excavation. Approximately 100 foundations of various sizes would be constructed throughout the substation pad to support equipment and steel structures. In addition, a network of partially buried concrete trenches approximately 200 feet in total length would be installed. Excavations of these foundations and trenches would commence following the completion of grading and other yard improvements, and would continue for several weeks. The estimated total volume of soil that would be excavated for foundation and trenches is 1,800 cubic yards, and would be spread on a portion of the substation property.

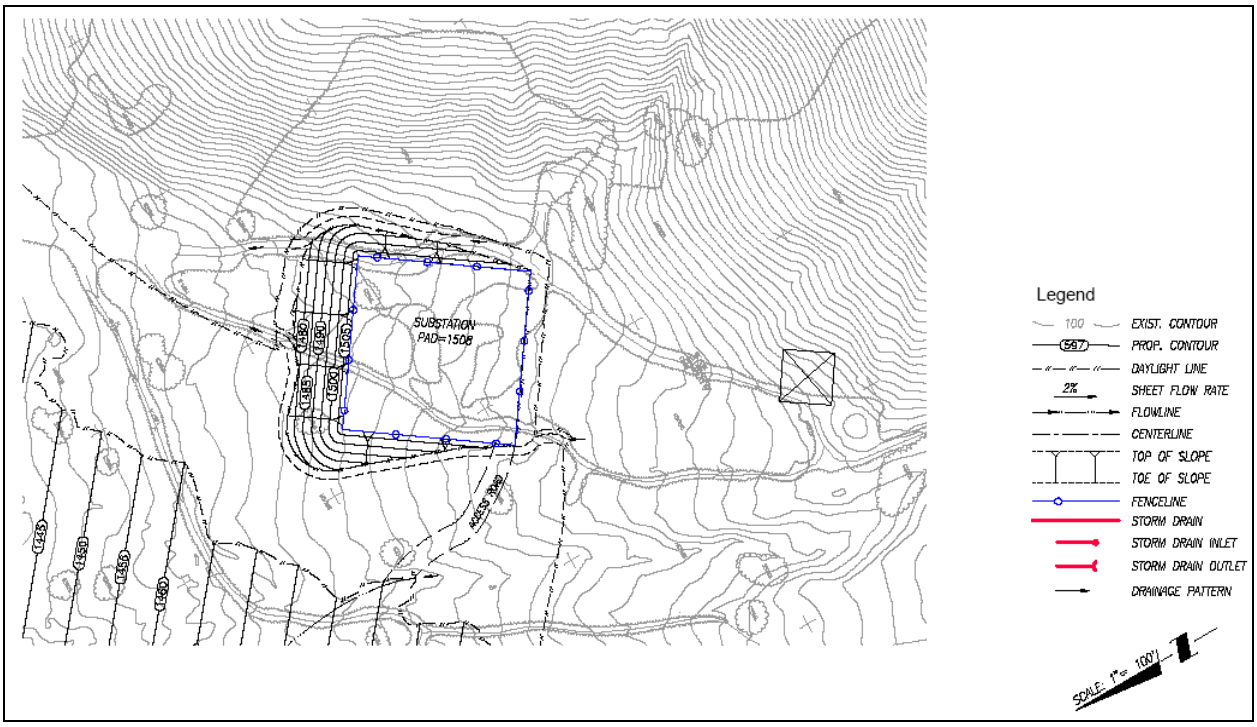

Figure 3.8.4-2 Santa Rosa Substation Grading Plan

3.8.4.4 Case Springs Substation

Site Preparation. For the Case Springs Substation, the proposed 500/230 kV substation would require grading beyond the edge of a sharp drop-off. The conceptual grading plan for the Case Springs Substation is presented in Figure 3.8.4-3, Case Springs Substation Grading Plan. To significantly limit the quantity of earthwork that would be needed to extend the area, a retaining wall would be constructed. The wall would measure approximately 150 feet long, and vary in height between 1 foot high at each end to approximately 13-feet-high near the center. The area between the wall and the existing substation pad would be back-filled with clean fill material that would be brought up to the level of the existing substation pad surface. The backfilled area would require an estimated quantity of 2,000 cubic yards of soil. The final wall design and the actual quantity of soil required would be calculated during final engineering.

In addition, the 500/230 kV substation would require an area approximately 363 feet wide by approximately 771 feet, and would comprise approximately 7 acres. And estimated 72,000 cubic yards of soil would be cut from higher elevations and relocated to the lower elevations as fill to provide a level pad with a slope between 1 and 2 percent.

Foundation Excavation. Approximately 200 foundations of various sizes would be constructed throughout the substation pad to support equipment and steel structures. In addition, a network of partially buried concrete trenches approximately 4,000 feet in total length would be installed. Excavations of these foundations and trenches would commence following the completion of grading and other yard improvements, and would continue for several weeks. The estimated total volume of soil that would be excavated for foundation and trenches is 4,000 cubic yards, and would be spread on a portion of the substation property.

Figure 3.8.4-3 Case Springs Substation Grading Plan

3.8.4.5 Talega-Escondido Line Upgrades

TNHC proposes to remove the existing 230 kV and 69 kV LSTs through the following activities: Grading: Existing access routes would be used to reach tower sites, but some rehabilitation work on these routes may be necessary before removal activities begin. In addition, grading may be necessary to establish crane pads for reconductoring work. Construction of most segments of the TE line upgrades would require the removal and reconductoring of the existing transmission line. Transmission line equipment to be removed includes existing 69 kV conductor. New 69 kV poles and associated hardware (i.e., insulators, vibration dampeners, suspension clamps, ground wire clamps, shackles, links, nuts, bolts, washers, cotters pins, insulator weights, and bond wires), as well as the transmission line primary conductor and ground wire will be installed along a new route as designated on Figure 3.6.3-2 SDG&E 230 kV Transmission Line Upgrade Map (Detailed).

3.8.4.6 IT Facility Construction

New OPGW or optical fiber is typically installed in continuous segments of 5,000 feet or less, depending upon various factors including line direction, inclination, and accessibility. Following placement of fiber on the OHGW, the strands in each segment are spliced together to form a continuous length from one end of a transmission line to the other. Splices occur near the foot of transmission towers, and may be identified by the metal enclosures (3 feet by 3 feet by 1 foot) that are mounted on the tower legs some distance above the ground. At a splice tower, the fiber cables are routed down a tower leg and into the bottom of the metal enclosure where the splice case is placed. On the last tower at each end of a transmission line, the overhead fiber is spliced to another section of fiber cable that runs in underground conduit from the tower into the communication room inside the adjacent substation.

Splicing activities are conducted by dedicated crews. Typically activities are conducted by two crews per each segment, with three persons in each crew. Each crew is also accompanied by a foreman. Both crews and foremen use pickup trucks for transport of materials along transmission line segments. All materials are carried in vehicles; therefore, no staging areas are needed to support OPGW installation. Crews typically complete four splices per 8-hour work period.

TNHC proposes to remove the existing 230 kV and 69 kV LSTs through the following activities: Grading: Existing access routes would be used to reach tower sites, but some rehabilitation work on these routes may be necessary before removal activities begin. In addition, grading may be necessary to establish crane pads for reconductoring work.

The Contractor anticipates a construction schedule of approximately 10 to 12 months for this project, with steel assembly to take place while foundations are being installed along with the legs and body extensions, structures to be flown in month six (6) or seven (7) and being ready to start wire installation starting in month seven (7) or eight (8). Utilization of helicopters during installation of legs and body extensions and especially during the wire installation greatly improves our efficiency minimizes environmental impact and keeps the project on schedule. NHC proposes to remove the existing conductor wire through the following activities:

3.8.5 Construction Workforce and Equipment

The TE/VS Interconnect and LEAPS construction workforces for have been estimated. Table 3.8.5-1, TE/VS Construction Equipment/Workforce and Table 3.8.5-2, LEAPS Construction Equipment/Workforce presents those estimates of workforce on each project.

Table 3.8.5-1. TE/VS Interconnect Construction Equipment/Workforce

TE/VS Construction Equipment Type	Number	Duration Needed	Personnel	Number
4x4 Pickups/Work Trucks	4	10 to 12 months	Supervision	4
4x4 One-Ton Framers	4	10 to12 months	Framers	12
Skycrane	1	3 to 4 weeks	Pilots	2
			Ground Crew	2
Mid-Capacity Lift Helicopter	2	2 to 3 months	Pilots	2
			Ground Crew	2
Yard Crane (30-ton)	3	10 to 12 months	Operator	1
D-8 Sag Cat	1	4 to 5 months	Operator	1
Bundle Tensioner	1	4 to 5 months	Operator	1
50-Thousand Pound Pulling Rig	1	4 to 5 months	Operator	1
3 Reel Wire Trailers	3	4 to 5 months		
4 Drum Pullers with 3/8” Hardline	2	4 to 5 months	Operators	2
Digger Derrick for Guard Poles	1	4 to 5 months	Teamster	1
Fifth Wheel Trucks 6x6	3	4 to 5 months	Teamsters	3
Extra Float Trailer 40’/60’	1	10 to 12 months		
Hughes 500 helicopters	2	7 to 8 months	Pilots	3
			Ground Crew	3
Office Trailer	1	10 to 12 months	Secretary	1
Tool Van	1	10 to 12 months	Warehouseman	1
Bundle Fly Travelers	200	7 to 8 months		
OHGW and OPGW Fly Travelers	150	7 to 8 months		
Reel Jacks for OHGW and OPGW	2	4 to 5 months		
Water Trucks	2	7 to 8 months		
Hydraulic Pole Jack	1	3 to 4 weeks		

Source: The Nevada Hydro Company

Table 3.8.5-2. LEAPS Construction Equipment/Workforce

LEAPS Construction Equipment Type	Number
CAT 436 Rubber Equipment Backhoe	1
Ready Mix Truck	3
150-Ton Crane	1
250-Ton Crane	1
25-Ton Crane	1
60-Ton Crane	1
CAT D10R Dozer	1

LEAPS Construction Equipment Type	Number
CAT D6 Dozers	5
CAT D8R Dozer	3
CAT Motor Graders	1
Misc Compressors & Generators	20
Portable Light Plants	10
CAT Loaders	6
CAT Compactors	2
CAT Scrapers	4
CAT Rock Trucks	5
Crew & Supervisory Pickups	20
Grout Plant	1
Tunnel Drill Jumbos	4
Tunnel Scoop Trams	4
Water Trucks	5
Tunnel Boring Machine	1
Over the road Haul Trucks	20
Workforce	**Number**
Laborers	40
Teamsters	25
Heavy Equipment Operators	60
Tunnel Personnel	70
Carpenters	10
Ironworkers	10
Mechanics & Welders	5
Supervisory	35

Note: Equipment and Personnel needs vary for the anticipate 5-year duration of the project.
Source: The Nevada Hydro Company

3.8.6 Construction Schedule

The TE/VS Interconnect and LEAPS may be bid to different construction contractors under different work scopes. Based on the current understanding of sequencing, the TE/VS interconnect will be constructed first, followed by the LEAPS construction. Table 3.8.5-3 below presents the anticipated development schedule for the TE/VS project and Table 3.8.5-4 presents the anticipated development schedule for LEAPS.

Table 3.8.5-3. TE/VS Interconnect Construction Schedule

Activity	Duration	Scheduled Start	Scheduled Finish
Submit PEA	1 day	7/14/2008	7/15/2008
CPUC Notice of Deemed Complete	1 month	7/15/2008	8/15/2008
CPUC Analysis, Certify EIR, Issue CPCN	6 months	8/15/2008	2/15/2009
SWRCB Review of 401(c) Request	1 month	2/15/2009	3/15/2009
Forest Service Special Use Permit	2 months	3/15/2009	5/15/2009
TE-VS Design	6 months	5/15/2009	11/15/2009

Activity	Duration	Scheduled Start	Scheduled Finish
TE-VS Construction	14 months	11/15/2009	1/15/2011
Project On-Line	30 days	1/15/2011	2/15/2011

Source: The Nevada Hydro Company

Table 3.8.5-4. LEAPS Construction Schedule

Activity	Duration	Scheduled Start	Scheduled Finish
SWRCB 401 Certification	30 days	5/11/2009	6/11/2009
FERC License Granted	60 days	6/11/2009	8/11/2009
Notice to Proceed to Contractor	54 months	8/11/2009	2/11/2014
Startup and Testing	90 days	2/11/2014	5/11/2014
Project On-Line	30 days	5/11/2014	6/11/2014

Source: The Nevada Hydro Company

3.9 Operation and Maintenance

3.9.1 Operation and Maintenance For the TE/VS Interconnect.

Operation and maintenance (O&M) functions are described in this section. The section addresses O&M activities associated with the TE/VS Interconnect followed by a description of O&M activities associated with the pumped hydro facility.

3.9.1.1 Substation Operation and Maintenance

The TE/VS Interconnect involves two operating segments. The northern interface with the SCE main grid involves power flows on the existing Valley – Serrano 500 kV line, which will be under the control of SCE, CAISO and the laws of physics. The southern interface with SDG&E and power flows on the Talega – Escondido 230 kV line, are under control of SDG&E, CAISO and the same laws physics. CAISO's energy center dispatchers and schedulers will have operational control of the breakers, transformer tap positions, generation schedules, power flow and phase shifting operations. Both SCE and SDG&E operation centers will have real time monitoring of power flows, energy exchanges, reactive power flows, protection status, equipment status via existing supervisory control and protection systems (SCADA). Protection, control and communication interfaces with SCE and SDG&E will be in accordance with existing WECC requirements and Good Utility Practice. SCE and SDG&E will furnish, operate and maintain the area wide RAS or SPS system in cooperation with CAISO.

Substation maintenance activities would include equipment testing, monitoring and repair to prevent service interruptions. It is anticipated that routine maintenance activities would require approximately six trips per year to each 500/230 kV substation by a two to four person crew. General substation monitoring and control functions are performed remotely from the operation centers. Regular operation of the substation would require one or two workers in a light utility truck to visit the substation on a weekly basis. Once per year, a major maintenance inspection would be conducted that would require 20 personnel for approximately one week. To prevent unauthorized entry, warning signs would be posted and fencing and locked gates would be present at all substations sites. In addition, a remotely monitored security system will be

installed and monitored by the powerhouse staff. Portions of the stations maintained and operated by SCE and SDG&E will be remotely alarmed to the respective utilities operations centers.

The GIS would require only one visual inspection per year by 2 persons for approximately 2 days. Please also see the attached table for suggested maintenance requirements.

Maintenance activities fall into two categories: planed schedule maintenance and unplanned or corrective maintenance. Schedule maintenance will be in accordance with the various manufacturer's recommended maintenance schedules. Schedule maintenance requiring equipment outages will be coordinated with CAISO in advance. Corrective maintenance is performed as required, generally when equipment monitoring devices connected to SCADA or SER and routine operator equipment inspection trigger corrective actions. Both scheduled and unscheduled maintenance will be performed without line or station outages when possible. If an outage is required the maintenance will be performed during off load periods in accordance with CAISO direction based on power system status. The substation and transmission lines will be designed to meet or exceed the WECC reliability requirements.

3.9.1.1.1 Lake Switchyard and Santa Rosa Substation

Monitoring, control and communications with SCE at Lake Switchyard will be in accordance with existing SCE design standards as defined in the LGIA and applicable requirements of SCE's Interconnection Handbook. SCE and the CAISO will have operational control over the Serrano – Lake 500 kV line breakers at Serrano and Lake as well as the Lake – Valley 500 kV line breakers at Valley. The Applicant (or it's successor) and the CAISO will have control over the Lake – Santa Rosa 500 kV breakers at Lake Switchyard, at the Santa Rosa Substation and Case Springs Substation.

Prior to commercial operation the portion of the substation associated with the SCE breaker positions, 500/13.8 kV auto transformers, control, protection and communications will be transferred to SCE ownership in accordance with the LGIA. At that time, SCE will assume operational control and maintenance responsibility. Both parties will comply with the applicable Reliability Council requirements, and the Applicant (or its successor) will execute the Reliability Management System Agreement for the Applicable Reliability Council. Each Party will provide to the other Party all information that may reasonably be required by the other Party to comply with Applicable Laws and Regulations and Applicable Reliability Standards.

The Applicant (or its successor) will use SCE monitoring, control and communication design standards at the Santa Rosa Substation and for all of the 500 kV developments including the Case Springs southern terminal. Further, the Applicant (or its successor) will contract with SCE or some other experienced utility services origination for operation and maintenance services.

The maintenance contractor will be required to have qualified personal available for around the clock call-outs to investigate equipment status as required by CAISO dispatchers. Based upon such initial findings, the corrective action will be performed or scheduled when the power system can accommodate possible outages or when required crews and equipment is available.

One of the advantages of the planed GIS system, is the reduced maintenance schedules, compared with air insulated equipment.

3.9.1.1.2 Case Springs Substation

At Case Springs, the 230 kV yard will be developed using SDG&E design standards for monitoring, control and communications. Prior to commercial operations, a similar turnover to SDG&E will occur with SDG&E taking over operational control of the Talega – Escondido 230 kV breaker positions, control, protection and communications. The Applicant (or its successor) will maintain ownership of the 500 kV switchyard, and transformers up to 230 kV phase shifting transformer disconnects. Both yards will utilize a common bus differential system.

Transition to commercial operations will be similar to the process described for SCE above. At both points of interconnection, the control, protection and communications systems will be tested and energized by a joint commissioning team. The team will include design and maintenance engineers/technicians/craftsman from the Applicant (or its successor) and transmission operators from SCE or SDG&E. The process will be performed in accordance with well established field test plans and existing operating procedures. Tagging, clearance and outage procedures will be implemented prior to energization at a time when control of the facility is transferred from the construction contractor to utility station operators. After successful commissioning including concurrence from both parties that the facility is ready for commercial operation, operational control will transferred to CAISO.

3.9.1.2 Line Operation and Maintenance

Operation and maintenance activities would include all operation and maintenance requirements set forth by CAISO, and CPUC General Orders including activities such as patrol of the lines, climbing inspections, tower and wire maintenance, routine line washing, and repairs of access and spur roads. The Applicant (or its successor) would keep necessary work areas around all structures clear of vegetation and, to the extent permitted by the Forest Service, would limit the height of vegetation along the ROW. Lines will be inspected frequently and thoroughly for the purpose of insuring that they are in good condition so as to conform with these rules. Lines temporarily out of service shall be inspected and maintained in such condition as not to create a public hazard. The following section provides details on the anticipated operation and maintenance requirements for the Project.

3.9.1.2.1 Inspection Patrols

Regular ground and aerial inspections would be performed in accordance with the CAISO requirements per the Transmission Control Agreement between CAISO and the Applicant concerning transmission facility maintenance. Overhead transmission lines and substations would be inspected for corrosion, equipment misalignment, loose fittings, and other mechanical problems. The need for vegetation management would also be determined during inspection patrols. As required by CAISO, aerial inspection (visual and infrared) of the entire system and climbing inspections of transmission structures would be conducted annually. Aerial inspection would be conducted by helicopter and would require two or three crewmembers, including the pilot.

Ground inspections, including underground system components within each GIL tunnel, would be conducted by up to three crewmembers twice a year. The proposed GIL system includes gas pressure alarm, ground current detection, and protective trip capability. If a cable system is installed, the same inspections would take place.

3.9.1.2.2 Hardware Maintenance and Repairs

Electrical equipment located on transmission structures include conductors, insulators, switches, dampers, and other electrical equipment. Although under normal operating conditions 500 kV lines are maintenance free, this equipment may require addition, replacement or repair over time. Damage from gun fire during hunting seasons or abnormally severe weather are the probable causes for line maintenance. Localizing faulted sections of the line is performed by operations staff using the installed fault locater systems. Typically, equipment repair or replacement would be conducted by a four-person crew with two or three trucks, a boom or line truck, an aerial truck and an assist truck.

In the event of a brush fire under the transmission line, ionized smoke partials can cause line to ground faults or phase to phase faults. Modern line protection relays will detect high impedance faults and open line protection relays. Normally, mid line faults do not cause permanent damage and the line can be returned to service when the fire has moved off of the right-of-way. Such an event would be followed up with a visual inspection for possible resulting damage.

3.9.1.2.3 Insulator Washing

Arcing can occur when an electrical discharge is created from the combination of atmospheric condensation, bird contamination on suspension insulators, salt water spray on coastal installations and dust accumulation on porcelain insulators. Arcing may cause electrical outages, but can be prevented by routinely washing the insulators to keep them free of dust. Insulator washing on 500 kV lines is normally not necessary except in heavily contaminated areas, good design and line location practices avoid line location adjacent to industrial contamination or naturally occurring sources. If washing is required two crewmembers and a water truck are required for insulator washing. Typically, insulator washing takes approximately 30 minutes per transmission structure if access roads are available and requires line outage. Insulator washing is not expected, but if required would involve 300 gallons of water per structure and 3,000 gallons of water per day.

3.9.1.2.4 Right-of-Way Repair

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

3.9.1.2.5 Vegetation Management

Right-of-way requires a minimum clearance of 10 feet around the base or foundation of all electrical transmission structures. In addition, maintenance work areas adjacent to access roads and electric transmission structures for vehicle and equipment access necessary for operations, maintenance and repair are required. Shrubs, brush and other obstructions would be regularly removed near structures to facilitate inspection and maintenance of equipment and to ensure system reliability. CPUC requires a minimum line to ground clearance of 25 feet in areas accessible to pedestrians only and 40 feet for road crossings. In addition, vegetation with a mature height of 15 feet or taller would not be allowed to grow within 15 vertical feet of any overhead conductor in order to protect system reliability and public safety. Actual vegetation management in the Cleveland National Forest will be in accordance with, Project Specific Forest Service Conditions, Condition No. 32 -- Vegetation and Invasive Weed Management Plans Sections:

3.9.2 Pumped Storage O & M

In accordance with Subpart D (Inspection by Independent Consultant), the LEAPS facility will be periodically inspected and evaluated by or under the responsibility and direction of at least one independent consultant in order to identify any actual or potential deficiencies, whether in the condition of those project works or in the quality or adequacy of project maintenance, surveillance, or methods of operation, that might endanger public safety (Section 12.32).

The pumped storage facility powerhouse will be manned around the clock with operations staff monitoring the pump storage operation in accordance with generation/pump schedule issued from CAISO, eventually the facility may be operated from a remote location with the control room manned on a single shift. Operation of the pump storage will be controlled and protected with standard Voith-Siemens equipment and modern industry standards.

3.9.2.1 Santa Rosa Powerhouse

At least three months before Initial Synchronization Date, TNHC shall notify the CAISO, SCE, and SDG&E in writing of the Control Area in which the Large Generating Facility is located. This is a standard process, since all parties have participated in extensive system studies during the CSRPT of 2006 process. Operations will be performed in accordance with the Remote Control Area Generator Interchange Agreements and applicable sections of the LGIAs. The project developers envision that the TV/ES portion of the project will be placed in service several years before the LEAPS powerhouse is fully operational.

3.9.2.2 Decker Canyon Reservoir, Tunnels, and Lake Elsinore Inlet/Outlet

The Decker Canyon Reservoir, tunnel control features, and the Lake Elsinore Inlet/Outlet are expected to operate relatively free of maintenance. General security inspections will be carried out periodically for all these features. This includes assurance that all security fences are intact and that no vandalism has occurred between inspection periods. All flow control features (primarily gates and valves) will have redundant automated and manual controls. It is likely that the gates and valves will be tested periodically in accordance with established protocols for project operation, which will incorporate concerns from regulatory agencies. For example,

operation of Decker Lake will require period testing of gates and valves in accordance with the Emergency Action Plan (EAP) anticipated to be required by the California Division of Safety of Dams (DSOD). Specific maintenance and testing protocols will be determined during later development of the project design.

3.10 Applicant Proposed Measures

The term "Applicant Proposed Measures (APMs)" is assumed to be synonymous with "Protection, Mitigation, and Enhancement Measures (PMEs)," as presented in the FEIS. To the extent that the two terms are intended by the Commission to refer to other than the self-imposed actions of individual project proponents to minimize or eliminate the potential environmental effects of their respective projects, any reference to "APMs" the Project's self-imposed mitigation measures should be changed to "PMEs" therein;

This section describes the largely mandatory conditions imposed by agencies as part of the FERC licensing process for the pumped storage facility. Following this is a discussion of APM's the Applicant is willing to assume under this CPCN proceeding.

3.10.1 Mandatory Conditions and Requirements

As part of the FERC licensing and entitlement processes, various federal and State agencies are empowered to and may elect to impose additional conditions upon the hydropower Project. Any mandatory conditions identified and imposed by those agencies, whether specified herein or identified subsequent to the publication of this document, are incorporated as elements of the proposed project. Unless specifically identified as such, those permit conditions do not constitute mitigation measures under CEQA.

3.10.1.1 Federal Power Act

Section 4(e) of the FPA (16 U.S.C. 797[e]) states that FERC, when considering whether or not to issue a license (in addition to the power and development purposes) is required to give, "equal consideration" to energy conservation, the protection, mitigation, and enhancement of fish and wildlife, recreational opportunities, and other aspects of environmental quality. Section 4(e) further states that FERC may issue a hydropower license for a project on a reservation[59] of the United States only if it finds that the license will not interfere or be inconsistent with the purpose for which such reservation was created or acquired.

The proposed Projects are located primarily on lands within the CNF and Camp Pendleton, which are federal reservations.[60] Under Section 4(e) of the FPA, FERC must include in any license issued for a hydropower project located within a federal reservation all conditions that the managing agency shall deem necessary for the adequate protection and utilization of that reservation. The following additional provisions are stipulated under the FPA.

59/As defined in Section 3 of the FPA, the term "reservation" shall mean "national forests, tribal lands embraced within Indian reservations, military reservations, and other lands and interests in lands owned by the United States, and withdrawn, reserved, or withheld from private appropriation and disposal under the public land laws; also lands and interests in lands acquired and held for any public purposes; and shall not include national monuments or national parks."

60/The Organic Administration Act of 1897 (16 U.S.C. 475) stipulates that national forest lands were established and administered only for watershed protection and timber production.

Section 4(e) and 10(a)(1) of the FPA (16 U.S.C. 797[e] and 803[a][1]) requires FERC, in acting on license applications, to give equal consideration to the development and environmental uses of the waterways on which a project is located. Any license issued shall be such as, in FERC's judgment, best adapted to a comprehensive plan for improving or developing a waterway for all beneficial public uses.

Section 10(a)(2) (16 U.S.C. 803[a][2][A]) requires FERC to consider the extent to which a hydroelectric project is consistent with federal and state comprehensive plans for improving, developing, and conserving waterways affected by the project.

Section 10(j)(1) of the FPA (16 U.S.C. 803[j][1]) requires FERC, when issuing a license, to include conditions based on recommendations of federal and state fish and wildlife agencies submitted pursuant to the Fish and Wildlife Coordination Act (16 U.S.C. 661 *et seq*.) to "adequately and equitably protect, mitigate damages to, and enhance fish and wildlife" affected by the project.

Section 18 (16 U.S.C. 811) provides that FERC shall require a licensee to construct, operate, and maintain such fishways as may be prescribed by the Secretary of the Interior (acting through the National Marine Fisheries Service) or the Secretary of Commerce (acting through the United States Fish and Wildlife Service), as appropriate.[61]

3.10.1.2 Federal Endangered Species Act

Section 7(a)(2) of the Federal Endangered Species Act of 1973 (FESA) (16 U.S.C. 1536[a][2]) require federal agencies to ensure that their actions are not likely to jeopardize the continued existence of federally listed threatened and endangered species or result in the destruction or adverse modification of designated critical habitat. Formal consultation with the United States Fish and Wildlife Service (USFWS) and/or National Marine Fisheries Service (NMFS) shall be initiated if the proposed agency action is likely to affect the listed species, unless through informal consultation the action agencies and the USFWS and/or NMFS determine that there will not likely be an adverse effect. Section 7(b)(3)(A) of the FESA (16 U.S.C. 1536[b][3][A]) requires the USFWS and/or NMFS to provide to the action agency a biological opinion detailing how the agency action would affect the species or its critical habitat.

Section 7(b)(4) of the FESA provides that if, after consultation, the Secretary of Commerce or the Interior concludes that the agency action will not jeopardize the continued existence of a species, the Secretary shall provide the agency with a written statement that species the impact of incidental taking on the species, specifies those reasonable and prudent measures that the Secretary considers necessary or appropriate to minimize such impact, and set forth the terms and conditions that must be complied with to implement those measures. Under Section 7(o)(2) of the FESA, any incidental taking resulting from the Projects' construction or operation must be

61/As indicated in the Federal Register: "Fishways help mitigate the impact of hydropower dams on aquatic ecosystems by providing fish passage. Fishways on dams serve a variety of public purposes and resource goals, including, but not limited to, the safe and timely physical passage of fish past the project; the improvement/augmentation of existing populations within a basin; the reunification of fragmented populations; and the reintroduction/reestablishment of viable fish runs in a basin or watershed" (65 FR 80898, December 22, 2000).

in compliance with the terms and conditions of an incidental take statement to avoid being considered a prohibited taking of the species.

3.10.1.3 National Historic Preservation Act

Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended (PL 89-665, 16 U.S.C. 470) requires that every federal agency "take into account" how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties, and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register of Historic Places.

3.10.1.4 Federal Clean Water Act

Section 401(a)(1) of the CWA (33 U.S.C. 1341[a][1]) requires the license applicant to obtain from the state in which any project discharge into navigable waters originates, certification that such discharge will comply with applicable water quality standards, or waiver of such certification.[62] Section 401(a)(1) requires state water quality certification conditions to be included in the hydropower license. Section 401(d) of the CWA (33 U.S.C. 1341[d]), authorizes state water quality agencies to impose discharge limits and other conditions on their Section 401(a) certifications and provides that all such conditions shall become conditions of the associated FERC license.[63]

3.10.2 Additional Articles, Conditions, and Measures Incorporated into the Project

Specific articles, conditions, and PM&E measures have been identified by FERC, the Forest Service, and by the Applicant. These articles, conditions, and PM&E measures, whether identified by a public agency or self-imposed by the Applicant, are hereby incorporated into the Projects and made a part thereof. As such, these articles, conditions, and PM&E measures do not constitute separate mitigation measures under CEQA but instead are integral parts of the Project itself as proposed.

A list of FERC's standard license conditions (articles), environmental and other measures, the Forest Service's Section 4(e) and EPP conditions, and the Applicant's proposed PM&E measures applicable to the pumped storage facility is presented in Attachment 4 (Articles, Conditions, and Measures).[64] LEAPS will fully comply with all additional and/or alternative licensing conditions as may be established by FERC.

62/Section 401 states, in part: "Any applicant for a Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters, shall provide the licensing or permitting agency a certification from the state in which the discharge originates or will originate. . .that nay such discharge will comply with the applicable provisions of Sections 1311, 1312, 1313, 1316, and 1317 of [the CWA]. . .No license or permit shall be granted until the certification required by this section has been obtained."

63/A state must take final action by issuing, waiving, or denying certification within one year of the date on which a license applicant submits a written request (33 U.S.C. 1341[a][1]). Failure of a state to take action on a request for certification within the one-year time period waives the requirement that the applicant obtain the certification.

64/Section 241 of EPAct 2005 adds Section 33 to the FPA, allowing the license applicant or any other party to the license proceeding to propose an alternative condition or prescription. The Secretary of the agency involved must accept the proposed alternative if the Secretary determines, based on substantial evidence provided by a party to the license proceeding or otherwise available to the Secretary: (a) that the alternative condition provides for the adequate protection and utilization of the reservation, or that the alternative prescription will be no less protective

Unless otherwise exempt, all projects undertaken in California must comply with the statutes, regulations, rules, policies, plans, and standards of those applicable State and local agencies, departments, divisions with jurisdiction over the Projects or the resources located on the Project sites.[65] Since compliance with those statutes, regulations, rules, policies, plans, and standards is already mandated, compliance neither constitute mitigation under CEQA nor requires explicit inclusion as a condition of the Projects' approval.

3.10.3 Applicant Proposed Mitigation Measures

As modified, the revised "additional mitigation measures" identified in the Sunrise DEIR/DEIS and relevant to the "LEAPS Transmission-Only Alternative" and the "LEAPS Generation and Transmission Alternative" would appear to represent a reasonable set of conditions, acceptable to TNHC, that would serve to reduce the potential environmental impacts of those alternatives to the maximum extent feasible. TNHC requests that the mitigation measures presented in the Sunrise DEIR/DEIS and assigned to the TE/VS Interconnect and LEAPS be revised and brought forward as part of this proceeding in the manner described in Attachment 5.

3.10.4 Additional Applicant Proposed Actions (not mitigation)

In addition to the mitigation measures referred to above and in Section 6, the Applicant has identified a number of additional actions designed to further reduce the potential environmental impacts associated with the Projects. Because these additional actions constitute Applicant-nominated conditions, the following actions constitute a part of the Project description and are not, therefore, mitigation measures under CEQA.

Action 1. As exact locations for the various facilities are determined, depending on the type of habitat that will be impacted and the potential for species occurrence, additional biological surveys will be conducted to assess the likely presence or absence of those threatened or endangered plant species that have a moderate or high potential to occur. If the surveys determine that any sensitive plant species are present within the construction footprint, additional consultations shall occur with the appropriate resource agency and additional reasonable actions will be taken consistent with any measures that may be established by the USFWS under Section 7 of the FESA.

Action 2. As currently proposed, transmission towers are generally aligned within USFWS-designated critical habitat for Quino checkerspot butterfly and designated and proposed critical habitat of coastal California gnatcatcher. Installation of the Project's facilities within these critical habitat areas, as well as within other areas of suitable habitat for these species, will not occur prior to consultation with the USFWS under Section 7 of FESA. Mitigation will include

than the fishway initially proposed by the Secretary; and (b) that the alternative will either cost significantly less to implement or result in improved operation of the project works for electricity production.

65/ Section 312 of the CCR contains a set of "general terms" which apply to any approval of a dam safety application. Unless otherwise preempted under the FPA, the following "general terms" are assumed to be integral components of the proposed hydropower project: (1) construction work shall be started within one year from the date of approval; and (2) no foundations or abutments shall be covered by the material of the dam until the Department of Water Resources – Division of Safety of Dams (DSOD) has been given an opportunity to inspect and approve the same. In addition, the law required that a dam shall, at all times, be designed, constructed, operated, and maintained so that it shall not or would not constitute a danger to life or property and the DSOD may, at any time, exercise any discretion with which it is vested or take any action necessary to prevent such danger.

habitat restoration at a ratio determined through agency consultation and may include additional focused surveys.

Action 3. Project elements such as transmission towers will not be located within potentially suitable habitat for threatened or endangered wildlife species that occur within riparian communities or drainage features, including arroyo toad, California red-legged frog, southwestern willow-flycatcher, and least Bell's vireo. Minimum setbacks from streams will be established and appropriate BMPs will be implemented.

Action 4. Southern steelhead is known to occur within San Mateo Creek. A water quality monitoring plan will be developed in consultation with the Forest Service, SWRCB, SDRWQCB, and SARWQCB for the purpose of monitoring project-related effects on both the San Mateo and San Juan Creek watersheds.

Action 5. Because the Project includes areas containing suitable habitat for Stephens' kangaroo rat and are located within the Riverside County Stephens' Kangaroo Rat Habitat Conservation Plan Fee Assessment Area, mitigation for potential impacts to this species will include the payment of a mitigation fee depending on the amount of suitable habitat impacted.

Action 6. In the area of the upper reservoir, rough grading activities shall be monitored by a paleontology construction monitor and shall include the inspection of fresh exposures that are created by grading, trenching, and other earth-moving activities. Monitoring shall allow for the recovery of large fossil remains, if uncovered, and for the recording of associated fossil specimens and site data. If appropriate, monitoring shall also include periodic dry test screening of debris to allow for the recovery of small fossil remains. Initially, monitoring shall be conducted on a half-time basis. If no or only few fossil remains are recovered as a result of monitoring after approximately 50 percent of the earth moving activities have been completed in areas underlain by previously undisturbed rock, monitoring activities shall cease.

The paleontologist shall develop a formal agreement with a recognized museum repository regarding: (1) the final disposition and permanent storage and maintenance of any fossil remains that might be recovered as a result of the mitigation program; (2) the archiving of associated specimen data and corresponding geologic and geographic site data; and (3) the level of treatment (preparation, identification, curation, cataloging) of the remains that would be required before the mitigation program fossil collection would be accepted by the repository for storage. As soon as practical, the monitor shall recover all vertebrate fossil specimens and representative samples of invertebrate and plant fossils. All fossil specimens recovered from the property as a result of the monitoring program shall be treated (prepared, identified, curated, catalogued) in accordance with designated museum repository requirements.

The monitor will maintain monitoring logs that note the locations where monitoring was conducted and the fossil specimens recovered and shall record associated specimen data and corresponding geologic and geographic site data. A final technical report, prepared in accordance with Society of Vertebrate Paleontology (SVP) guidelines, summarizing the results of the monitoring program, shall be submitted to FERC and the Forest Service.

3.11 Electric and Magnetic Fields Summary

CPUC General Order 131-D(X) requires applicants for a CPCN to "describe the measures taken or proposed by the utility to reduce the potential exposure to electric and magnetic fields generated by the proposed facility." In accordance therewith, the Applicant will:

1. Assist the CPUC and other appropriate local, State, and federal governmental agencies in the development and implementation of reasonable, uniform regulatory guidelines.

2. Provide balanced, accurate information to employees and public agencies, including providing electro-magnetic field (EMF) measurements and consultation as required.

3. Take appropriate "no-cost and low-cost" steps to minimize field exposures from facilities.

The Applicant has adopted, as the Applicant's "best accepted practices" applicable to the TE/VS Interconnect project, the methods and techniques outlined in SCE's "EMF Design Guidelines for New Electrical Facilities: Transmission, Substation, Distribution" manual.[66] Using these guidelines, "no-cost and low-cost" measures to reduce EMF fields will be implemented, wherever available and practical, in accordance with CPUC regulations (Decision 93-11-013, November 2, 1993).

Priority in the design of any electrical facility is public and employee safety. Without exception, design and construction of TNHC's transmission facilities will comply with all federal, State, and local regulations, applicable safety codes, and CPUC construction standards. Furthermore, power lines and substations will be constructed so that they can operate reliably at their design capacity. Their design will be compatible with other facilities in the area. The cost to operate and maintain the facilities must, however, be reasonable.

These and other requirements are included in the existing CPUC regulations. As a supplement, the CPUC has directed all investor-owned utilities in California to take "no-cost and low-cost" magnetic field reduction measures for new and upgraded electrical facilities. Any possible "no-cost and low-cost" magnetic field measures, therefore, must meet these requirements.

The Applicant defines "no-cost and low-cost" magnetic field reduction measures as follows:

1. "No-cost" measures include any design changes that reduce the magnetic field in public areas without increasing the overall project cost.

2. "Low-cost" measures are those steps taken to reduce magnetic field levels at reasonable cost.

The 1993 CPUC decision states: "We direct the utilities to use 4 percent as a benchmark in developing their EMF mitigation guidelines. We will not establish 4 percent as an absolute cap at this time because we do not want to arbitrarily eliminate a potential measure that might be available but costs more than the 4 percent figure. Conversely, the utilities are encouraged to use effective measures that cost less than 4 percent." The CPUC agreed that a "low-cost" measure should achieve some noticeable reduction but declined to specify any numeric value.

66/Southern California Edison Company, EMF Design Guidelines for New Electrical Facilities: Transmission, Subtransmission, Distribution, December 2003.

The Applicant's TE/VS Interconnet may use state-of-the-art technology called gas–insulated switchgear (GIS) and gas-insulated transmission line (GIL) technologies, coupled with Siemens concept of Flexible AC Transmission Systems (FACTS). FACTS provides fast voltage regulation, increased power transfer over long AC lines, dampening of active power oscillations, and load flow control in meshed systems. The TE/VS Interconnect project will be the first transmission line in the United States to run GIL for approximately two miles underground. GIL results in much smaller electromagnetic fields than with conventional power transmission systems. This technology can be used close to telecommunications equipment, hospitals, residential areas, and flight monitoring systems since it meets the most stringent magnetic flux density requirements. As indicated by the CEC: "GILs feature a relatively large-diameter tubular conductor sized for the gas insulation and surrounded by a solid metal sleeve. This configuration translates to lower resistive and capacitive losses, no external EMFs, good cooling properties, and reduced total life-cycle costs compared with other types of cables."[67]

67/California Energy Commission, California's Electricity System of the Future: Scenario Analysis in Support of Public-Interest Transmission System R&D Planning, Consultant Report, P500-03-084F, October 2003.

Page Left Blank