

Chapter 3 Project Description

3.1 Introduction

For the purpose of this “Proponent’s Environmental Assessment” (PEA) and any environmental documentation prepared pursuant to the provisions of the California Environmental Quality Act (CEQA) which may follow this document’s submittal, the Nevada Hydro Company’s (Applicant or TNHC) proposed project (Project), as now before the California Public Utilities Commission (CPUC or Commission), is made up of two primary components: (1) a Commission-licensed 500 kV transmission line for which an application has been submitted for a “Certificate of Public Convenience and Necessity” (CPCN); and (2) a federally-licensed hydroelectric generation (pumped storage) facility for which a federal hydropower application has been submitted to the Federal Energy Regulatory Commission (FERC or Commission) (FERC Project No. 11858) under the provisions of the Federal Power Act of 1920 (FPA).

The transmission component, identified herein as the Talega-Escondido/Valley-Serrano 500 kV Interconnect (TE/VS Interconnect), is itself comprised of two subcomponents: (1) new transmission components; and (2) additional network improvements and upgrades. With regards to new transmission components, proposed is a new approximately 32 mile long, single-circuit 500 kV transmission line with a nominal design capacity of 1,500 MW linking Southern California Edison Company’s (SCE) existing 500 kV Valley-Serrano transmission system in western Riverside County and San Diego Gas & Electric Company’s (SDG&E) existing 230 kV Talega-Escondido transmission line (TL23030) in northern San Diego County.

New facilities associated with the transmission line itself include, but are not limited to: (1) new 500 kV Lake Switchyard (Lake Switchyard) at Milepost (MP) 2.0, (2) new 500/230 kV Case Springs Substation, including phase-shifting transformers (Case Springs Substation) at MP 31.5; (3) new 500/115/20 kV Santa Rosa Substation (Santa Rosa Substation) looped down the hill 1 mile from MP 12.5; (4) new 115 kV Santa Rosa-Elsinore circuit extending between the Applicant’s new Santa Rosa Substation and SCE’s existing 115 kV Elsinore Substation (Spring Street at Pottery Street, Lake Elsinore); (5) new 115 kV Santa Rosa-Skylark circuit extending between the Applicant’s new Santa Rosa Substation and SCE’s existing Skylark 115 kV Substation (Cordyon Street at Cereal Street, Lake Elsinore); (6) associated upgrades to SCE’s existing Elsinore and Skylark Substations; (7) system voltage support.

Other Commission-permitted network improvements and upgrades include improvements to both SDG&E’s and SCE’s existing transmission systems. Improvements and associated upgrades to SDG&E’s network include, but are not limited to: (1) the addition of an approximately 52 mile long, second 230 kV circuit (Talega-Escondido No. 2) to SDG&E’s existing 230 kV Talega-Escondido transmission line (TL23030) (TE Line)¹; (2) improvements and associated upgrades to SDG&E’s existing Talega Substation (33000 Avenida Pico, San Clemente, San Diego County) and Escondido Substation (2037 Mission Avenue, City of

¹ / The Commission issued a CPCN to SDG&E for the construction of the existing Talega-Escondido 230 kV transmission line in Decision No. 81069 on February 21, 1973. The 230 kV line was originally licensed and constructed using double-circuit structures (each with three phases of electrical conductors), with only one circuit installed. As a result, there exists an open or vacant 230 kV position. The line was constructed in 1981 and is comprised of lattice towers and tubular steel poles.

Escondido, San Diego County); and (3) rebuilding an approximately 8 mile long existing 69 kV transmission line on new steel poles within SDG&E's existing right-of-way.² Other identified improvements to the SDG&E transmission system include improvements and associated upgrades to the existing 230 kV Peñasquitos Substation (Southeast of Interstate 5 and Highway 56, Carmel Valley, City of San Diego, San Diego County).

SDG&E's existing 230 kV TE line is located within a 300 foot transmission right-of-way. The line is approximately 52 miles long and consists of approximately 213 structures, including 185 double-circuit lattice steel towers, 27 double-circuit steel poles, and one single-circuit 3 pole wood structure. Steel pole locations are as follows: (1) 6 steel poles at the Interstate (I) 15 Freeway crossing; (2) 20 steel poles for approximately 3.6 miles beginning at the Escondido Substation; and (3) one steel pole at Talega Substation. The 3 pole wood structure is located approximately 2.5 miles east of the I-15 Freeway crossing. One side of 32 towers is occupied by a 69 kV circuit (TL6932). This segment is approximately 8 miles in length and is generally situated between State Route (SR) 76 and Old Castle Road. To accommodate a new 230 kV circuit on the existing towers, TL6932 will need to be relocated to new poles located within the existing right-of-way. All other steel structures have a vacant position that is available to accommodate the Applicant's proposed new 230 kV circuit.

The initial work required to install a new 230 kV circuit will consist of improving existing access roads and construction of new spur roads and structure pads for the relocation of TL6932. It is anticipated that all associated work will be completed within the existing right-of-way. New steel pole structures will then be installed for the relocation of TL6932. Additionally, the 3 pole wood structure will be replaced by a 230 kV double circuit steel pole. Modifications to the existing structures may be required. Insulators and hardware for the new transmission line will be installed on approximately 213 structures followed by installation of new conductors.

In addition, existing substations will have to be upgraded in order to accommodate the new 230 kV circuit. SDG&E's existing Talega and Escondido Substations will require new 230 kV terminal positions. In addition, depending upon the rating of the new 230 kV circuit, there may be overloaded breakers on the system that would have to be replaced.³

With regards to SCE's network, improvements and upgrades are proposed to the Etiwanda Generating Station (8996 Etiwanda Avenue, City of Rancho Cucamonga, San Bernardino County), Valley Substation (Menifee Road and Highway 74, Romoland, Riverside County), and Serrano Substation (East Carver Lane, Orange, Orange County). Additional upgrades have also been identified along SCE's existing Etiwanda-San Bernardino-Vista 220 kV transmission line at SCE's existing San Bernardino Substation (San Bernardino Avenue east of Mountain View Avenue, City of Redlands, San Bernardino County), at SCE's existing Vista Substation (22200

² / The existing 69 kV circuit currently occupies an unused 230 kV circuit position on the existing transmission structures along an approximately 8 mile long section of the existing Talega-Escondido transmission line that passes by SDG&E's existing Pala and Lilac Substations.

³ / San Diego Gas & Electric Company, Sunrise Powerlink Project (A.06-08-010, SDG&E's Response to CPUC Data Request No. 6, February 12, 2007.

Newport Avenue, City of Grand Terrace, San Bernardino County) and at SCE's existing 500 kV Mira Loma Substation (13568 Milliken Avenue, City of Ontario, San Bernardino County).

The general location of the Project is shown on Figure 3.1.1-1: Regional Vicinity Map. The location of the various components of the Project is shown on Figure 3.1.1-2: Project Facilities Location Map. A single-line diagram showing the electrical configuration of the project is presented in Figure 3.1.1-3: Project Conceptual Single Line Diagram. More detailed views of the TE/VS Interconnect are shown in Figure 3.1.1-4: Talega-Escondido/Valley-Serrano 500 kV Interconnect Project. The 115 kV component extending from the Santa Rosa Substation is shown in Figure 3.1.1-5: 115 kV Corridor Plan. The TE/VS Interconnect is located at MP 0.0 through MP 31.5.

The general location of the Talega-Escondido 230/69 kV Transmission and Substations Upgrades is illustrated in Figure 3.6.3-2: Talega-Escondido 230 kV Line Upgrade. These last three figures contain a series of map panels and an index map showing the location of each panel in relation to the others and to the overall project. Except as otherwise identified herein, all network improvements and upgrades to SCE's transmission system would occur either within the "fence line" of or affixed to existing SCE facilities. As a result, based on the already degraded conditions of those sites, those facilities are not separately illustrated since no potential for significant environmental impact would result from the proposed improvements and upgrades thereto.

The Project's transmission line (TL) components include all temporary and permanent spur and access roads, construction staging areas, helicopter refueling sites, and pulling, splicing, and tensioning stations and sites as may be required for the construction, operation, and maintenance of transmission-related facilities. Any other sites and/or facilities resulting from agency-imposed permit conditions and mitigation measures relating to the CPCN or such other discretionary permits and approvals as may be associated therewith, in combination with other Applicant-imposed actions, shall also be considered elements of Project's transmission line component.

The Project's pumped storage component, identified herein as the Lake Elsinore Advanced Pumped Storage Project (LEAPS), will be an advanced pumped storage hydropower facility located in southwestern Riverside County, southeastern Orange County, and northwestern San Diego County. It will be located at the approximate midpoint of the TE/VS Interconnect line, offset one mile to the southeast from roughly MP 12.5. Excluding any associated system upgrades, the general configuration of LEAPS is illustrated in Figure 3.1.1-6: LEAPS Pumped Storage Component.

During off-peak periods, LEAPS will pump surface waters from an existing inland lake (Lake Elsinore) into a new water body to be constructed within the Decker Canyon area of the United States Forest Services' (USFS or Forest Service) Cleveland National Forest (CNF or National Forest), Trabuco Ranger District (TRD). LEAPS includes: (1) existing Lake Elsinore (afterbay); (2) new Decker Canyon Reservoir (forebay); (3) new underground LEAPS Powerhouse; (4) associated electrical and water systems and conduits (e.g., power shafts, power tunnels,

penstocks, tailrace tunnels, and inlet/outlet structures); and (5) generation interconnection (generation) facilities.⁴

In addition, LEAPS includes all temporary and permanent spur and access roads, construction staging areas, helicopter refueling sites, and pulling, splicing, and tensioning stations as may be required for the construction, operation, and maintenance of LEAPS-related facilities. Any other sites and/or facilities resulting from agency-imposed permit conditions and mitigation measures relating to the federal hydropower license or such other discretionary permits and approvals as may be associated therewith, in combination with other Applicant-imposed actions, shall also be considered elements of LEAPS.

Operating at an efficiency of about 83 percent, LEAPS would create an impoundment of kinetic energy allowing the storage power during slack demand periods for delivery during peak demand periods. LEAPS will be a rapid response unit particularly well suited to managing intermittent resources such as wind. In addition to a range of ancillary services, LEAPS would be capable of providing 500 megawatts (MW) of electricity for up to twelve hours, and have a storage capacity of 6,000 megawatt hours (MWh). The Applicant does not seek a CPCN for the generation (pumped storage) facility which would be operated in accordance with a federal hydropower license and subject to FERC jurisdiction.⁵

Although not “co-applicants” for the purpose of the CPCN, TNHC and the Elsinore Valley Municipal Water District (EVMWD or District) are currently co-applicants under both FERC Project No. 11858 and for a number of permit applications filed with the Forest Service, United States Department of the Interior - Bureau of Land Management (BLM), and the State Water Resources Control Board (SWRCB). Once licensed, in accordance with the terms of an existing development agreement between TNHC and the EVMWD, the District shall convey any residual rights that the District may then possess with regards to LEAPS to TNHC.

With regards to the FERC license, the filed applications for USFS-issued special use permits (SUPs), and the filed applications for SWRCB-issued water quality certifications or waivers, pending that conveyance, the execution of one or more additional agreements between the EVMWD and TNHC, and/or a modification to existing or submittal of new or revised permit applications, both TNHC and EVMWD collectively constitute the LEAPS’ proponents.

⁴ / “Interconnection facilities shall mean the transmission provider’s interconnection facilities and the interconnection customer’s interconnection facilities. Collectively, interconnection facilities include all facilities and equipment between the generating facility and the point of interconnection, including any modification, additions or upgrades that are necessary to physically and electrically interconnect the generating facility to the transmission provider’s transmission system. Interconnection facilities are sole use facilities and shall not include distribution upgrades, stand along network upgrades or network upgrades” (Source: Federal Energy Regulatory Commission, Standardization of Generator Interconnection Agreements and Procedures [18 CFR Part 35], Final Rule, Docket Nos. RM02-1-000, Order No. 2003, July 24, 2003, p. 224).

⁵ / Under Section 4(e) of the FPA, FERC is empowered to authorize the development of all “project works.” Under Section 3(12) (16 U.S.C. 796[12]), such works are defined as the physical structures of a “project.” Under Section 3(11) (16 U.S.C. 796[11]), a project is a “complete unit of improvement or development” consisting of, among other things, “a power house, all dams and appurtenant works and structures (including navigation structures). . . and all storage, diverting or forebay reservoirs. . . all miscellaneous structures used and useful in connection with said unit or any part thereof, and all water rights, rights-of-way, ditches, dams, reservoirs, lands, or interest in lands the use and occupancy of which are necessary or appropriate in the maintenance and operation of such unit” (16 U.S.C. 96[11]-[12], 797[e]). With regards to any aspect of the Project, the Applicant is unable to predetermine the precise nature of any subsequent actions and entitlements that may be issued by FERC. As such, those federal actions and entitlements may alter the Applicant’s definition, characterization, and/or categorization of any or all the facilities described herein, including the jurisdictional authority associated therewith. Because the Applicant is subject to ex parte rules limiting the nature of communications, the Applicant encourages agency-to-agency consultation between FERC and the Commission to ensure that the Applicant’s definition, characterization, and/or categorization of the Project herein, including its component parts, accurately reflects FERC’s definition, characterization, and/or categorization of those facilities.

Although the TE/VS Interconnect and LEAPS are both addressed herein, in recognition of separate permitting efforts, separate contractual arrangements, different financing and ownership interests, and independent construction schedules, each of these primary components will be constructed, operated, and maintained as “stand-alone” activities.

From an environmental compliance perspective, because CEQA is intended to be interpreted in such a manner as to afford the fullest possible protection to the environment (14 CCR 15003[f]), both the transmission line (TE/VS Interconnect) and the pumped storage (LEAPS) facilities constitute a single “project” (14 CCR 15378) for CEQA purposes. Because the resulting CEQA document will be used not only by the Commission for the issuance of the CPCN but also by other State agencies, including the SWRCB, for other entitlements that may be required for the construction, operation, and maintenance of the Project, the Commission’s upcoming environmental impact report (EIR) needs to address the two primary components as part of a larger undertaking that extends beyond the CPCN authorization.

By combining LEAPS and the TE/VS Interconnect as a single CEQA-based “project” herein, it is not the intent of the Applicant to: (1) change or otherwise modify any jurisdictional authority with regards thereto; (2) establish or otherwise modify the status of any party to these proceedings; and/or (3) change or otherwise modify the physical, procedural, or regulatory relationship between LEAPS and the TE/VS Interconnect with regards to either the environmental review or the entitlement thereof.

As indicated in FERC’s and the Forest Service’s jointly prepared “Final Environmental Impact Statement – Lake Elsinore Advanced Pumped Storage Project, FERC Project No. 11858, FERC/FEIS-0191F”⁶ (FEIS), “the major elements” of the TE/VS Interconnect include: “A new 32 mile long 500 kV transmission line with an approximate 1,500 MW rating that interconnecting a new SDGE Talega-Escondido substation (at MP 31.2) to a new SCE South Valley substation (at MP 0.0); A new NTI [Near-Term Interconnection] substation that interconnects the proposed TE/VS [Interconnect] transmission line with the SDG&E’s existing 230 kV and 69 kV [Talega-Escondido] transmission systems; A new South Valley substation that interconnects the proposed TE/VS [Interconnect] transmission line with SCE’s existing Serrano Valley 500 kV transmission line; A new Talega-Escondido 230 kV transmission line that loops into the new NTI 500 kV substation; New 500 kV transformers at NTI substation; and [6] Additional SDGE 230 kV and 69 kV system improvements.”⁷

Through the FERC licensing process, the Forest Service established Section 4(e) conditions. As indicated in correspondence from Bernard Weingardt, Regional Forester to Philis Posey, Acting FERC Secretary, dated March 29, 2007: “We have no objection to a license being issued, subject

⁶ Federal Energy Regulatory Commission and United States Department of Agriculture, United States Forest Service, Trabuco Ranger District, Final Environmental Impact Statement for Hydropower License – Lake Elsinore Advanced Pumped Storage Project, FERC Project No. 11858, FERC/EIS-0191F, January 2007.

⁷ Ibid., p. B-13.

to certain conditions necessary for the protection and utilization of National Forest System lands and resources affected by the [P]roject.”⁸

In January 2008, the TE/VS Interconnect and LEAPS were both identified as separate alternatives in the CPUC’s and BLM’s “Draft Environmental Impact Report/Statement-Sunrise Powerlink Project, SCH No. 2006091071” (Sunrise DEIR/DEIS). When compared to SDG&E Sunrise Powerlink Project (SRPL), the Sunrise DEIR/DEIS concludes that the “LEAPS Transmission-Only Alternative is found to be the Overall Environmentally Superior Transmission Line Route Alternative.”⁹

The electrical comparability of the TE/VS Interconnect to the SRPL was recently reinforced by a separate FERC ruling. As noted by FERC, “the proposed TE/VS Interconnect will add another major transmission path into the San Diego area with a potential for increasing San Diego’s import capability including relief on currently limiting Paths 43 (North of San Onofre) and 44 (South of San Onofre) while maintaining adequate system reliability.”¹⁰

⁸ / Correspondence from Bernard Weingardt, Regional Forester to Philis J. Posey, Acting Secretary, Federal Energy Regulatory Commission (Re: Forest Service Final 4[e] Conditions for the Lake Elsinore Advanced Pumped Storage Project, FERC Project No. 11858), File Code 2770, March 29, 2007, p. 1.

⁹ / California Public Utilities Commission and Bureau of Land Management, Draft Environmental Impact Report/Environmental Impact Statement and Proposed Land Use Amendment - San Diego Gas & Electric Company Application for the Sunrise Powerlink Project, SCH No. 2006091071, January 2008, pp. ES-64 and ES-65.

¹⁰ / Federal Energy Regulatory Commission, Order on Rate Incentives and Compliance Filings, Issued March 24, 2008, Docket Nos. ER06-278-000 et seq., pp. 12-13.

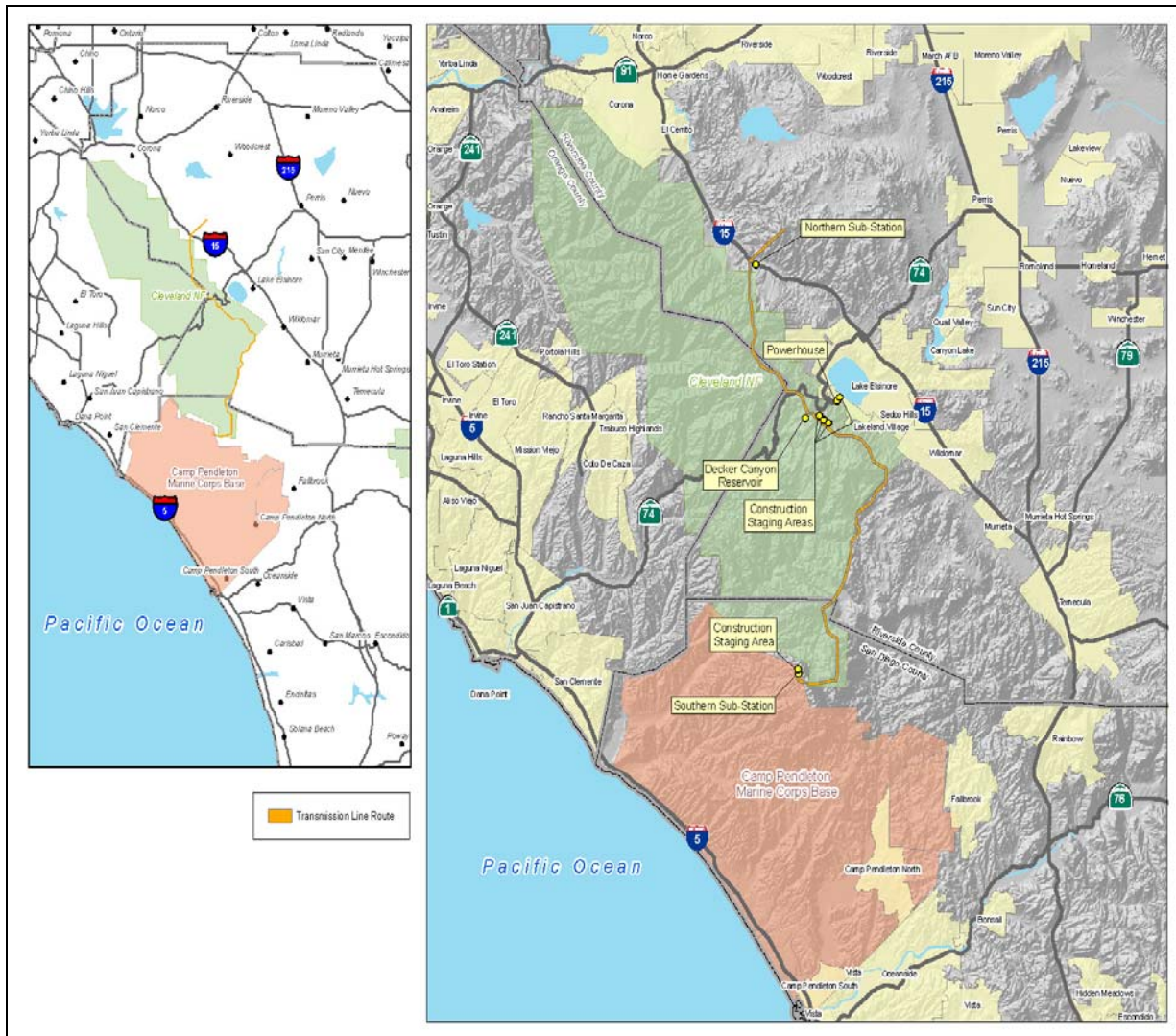


Figure 3.1.1-1: Regional Vicinity Map
Source: The Nevada Hydro Company

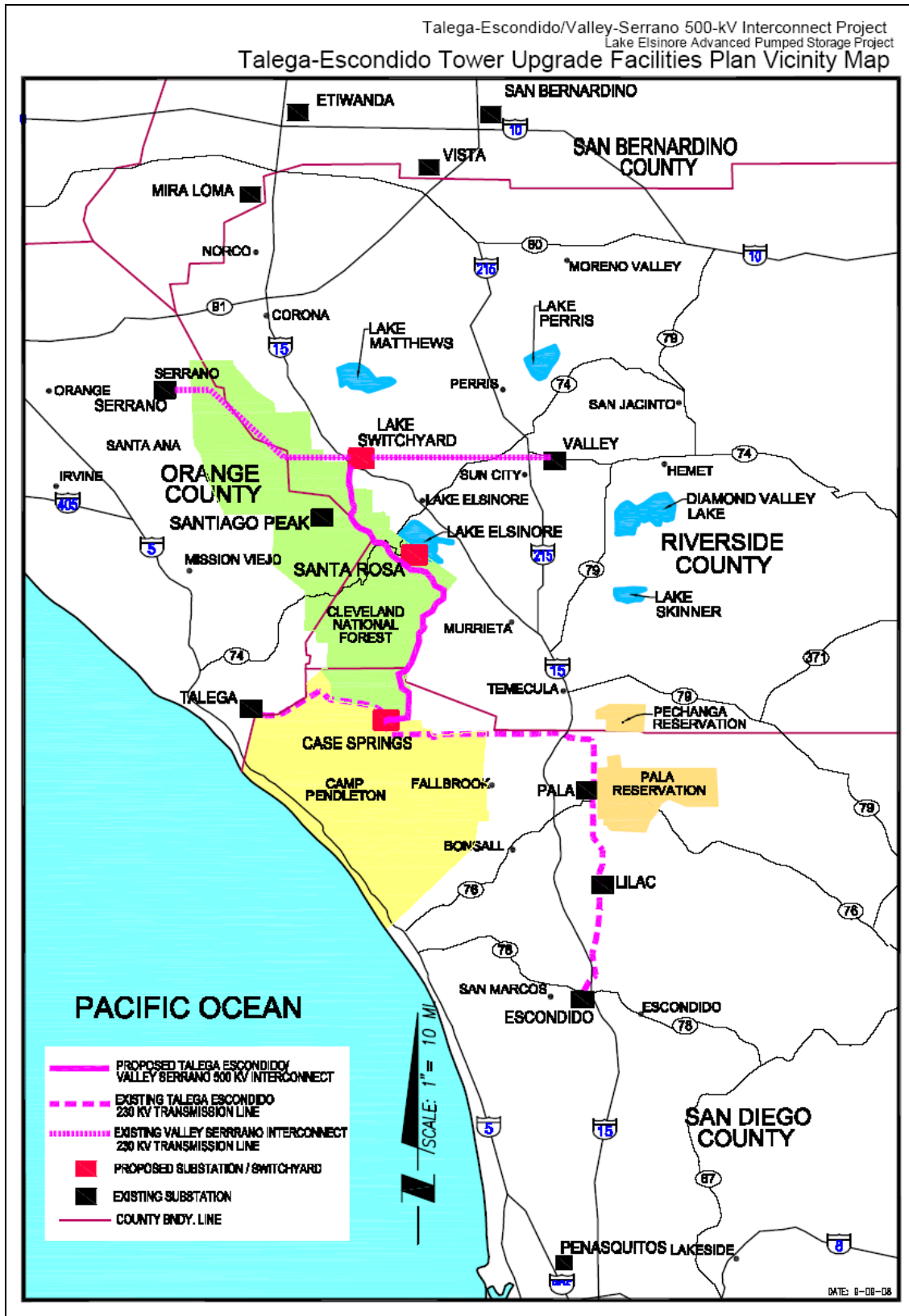


Figure 3.1.1-2: Project Facilities Location Map

Source: The Nevada Hydro Company

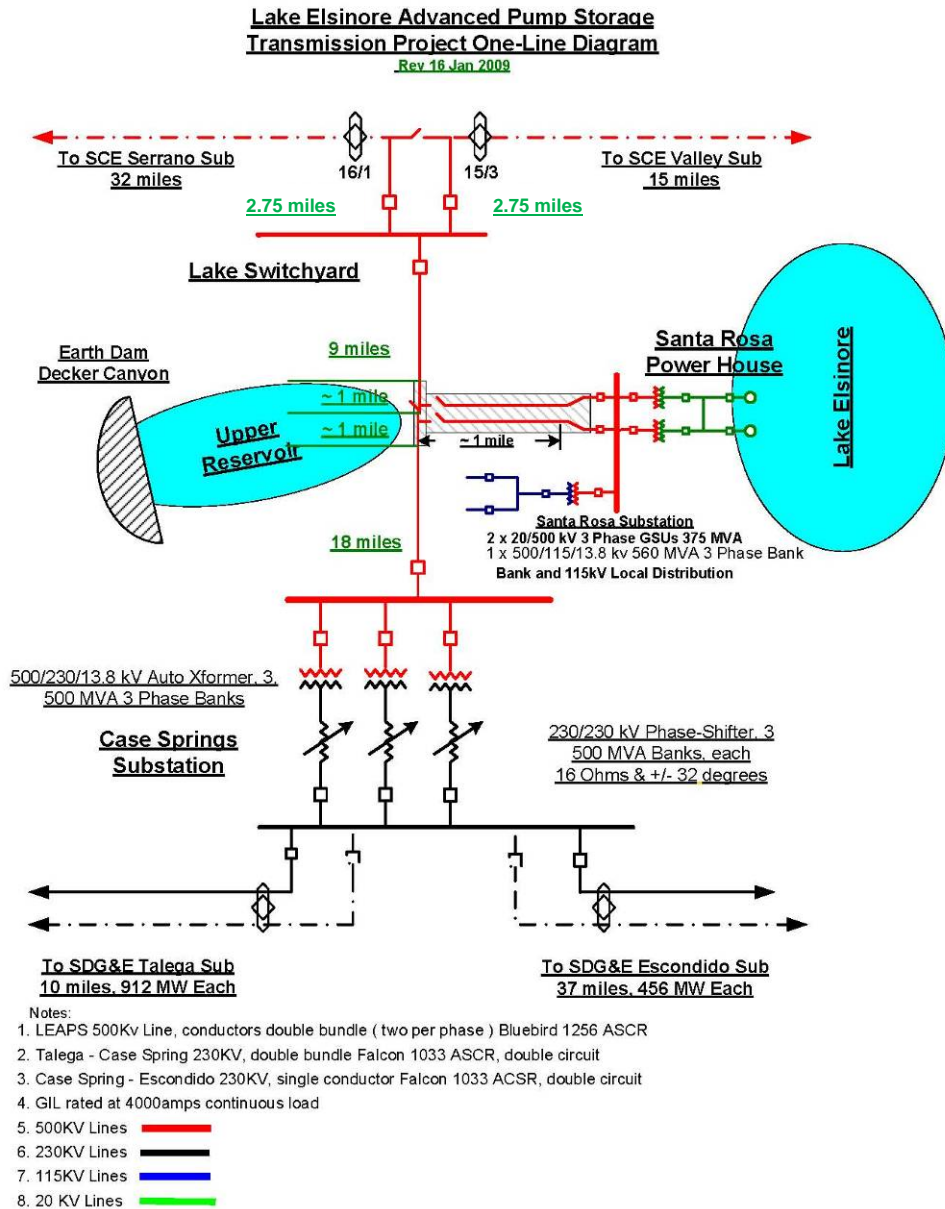


Figure 3.1.1-3: Project Conceptual Single Line Diagram

Source: The Nevada Hydro Company

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Figure 3.1.1-4: Talega-Escondido/Valley-Serrano 500 kV Interconnect Project (Index)

Source: The Nevada Hydro Company

Figure 3.1.1-4: (1 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project

Source: The Nevada Hydro Company

Figure 3.1.1-4: (2 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project

Source: The Nevada Hydro Company

Figure 3.1.1-4: (3 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project

Source: The Nevada Hydro Company

Figure 3.1.1-4: (4 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project

Source: The Nevada Hydro Company

Figure 3.1.1-4: (5 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project

Source: The Nevada Hydro Company

Figure 3.1.1-4: (6 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project

Source: The Nevada Hydro Company

Figure 3.1.1-4: (7 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project

Source: The Nevada Hydro Company

Figure 3.1.1-4: (8 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project

Source: The Nevada Hydro Company

Figure 3.1.1-4: (9 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project

Source: The Nevada Hydro Company

Figure 3.1.1-4: (10 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project

Source: The Nevada Hydro Company

Figure 3.1.1-4: (11 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project

Source: The Nevada Hydro Company

Figure 3.1.1-4: (12 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project

Source: The Nevada Hydro Company

Figure 3.1.1-4: (13 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

Figure 3.1.1-4: (14 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project

Source: The Nevada Hydro Company

Figure 3.1.1-4: (15 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

Figure 3.1.1-4: (16 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

Figure 3.1.1-4: (17 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

Figure 3.1.1-4: (18 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project

Source: The Nevada Hydro Company

Figure 3.1.1-4: (19 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project

Source: The Nevada Hydro Company

Figure 3.1.1-4: (20 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project

Source: The Nevada Hydro Company

Figure 3.1.1-4: (21 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project

Source: The Nevada Hydro Company

Figure 3.1.1-4: (22 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

Figure 3.1.1-4: (23 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project

Source: The Nevada Hydro Company

Figure 3.1.1-4: (24 of 24) Talega-Escondido/Valley-Serrano 500 kV Interconnect Project
Source: The Nevada Hydro Company

Figure 3.1.1-5: 115 kV Corridor Plan Index

Source: The Nevada Hydro Company

Figure 3.1.1-5: 115 kV Corridor Plan (1 of 6)

Source: The Nevada Hydro Company

Figure 3.1.1-5: 115 kV Corridor Plan (2 of 6)

Source: The Nevada Hydro Company

Figure 3.1.1-5: 115 kV Corridor Plan (3 of 6)

Source: The Nevada Hydro Company

Figure 3.1.1-5: 115 kV Corridor Plan (4 of 6)

Source: The Nevada Hydro Company

Figure 3.1.1-5: 115 kV Corridor Plan (5 of 6)

Source: The Nevada Hydro Company

Figure 3.1.1-5: 115 kV Corridor Plan (6 of 6)

Source: The Nevada Hydro Company

Figure 3.1.1-6: LEAPS Pumped Storage Component (1 of 2)

Source: The Nevada Hydro Company

Figure 3.1.1-6: LEAPS Pumped Storage Component (2 of 2)

Source: The Nevada Hydro Company

3.1.1 Background - Permit and Licensing

The Project has already undergone extensive environmental review. In 2002, as part of the separate Valley-Rainbow Interconnect proceedings, the Commission and the BLM, in response to an application from SDG&E (A.01-03-036, filed March 23, 2001) to interconnect SDG&E's Talega-Escondido 230 kV transmission line and SCE's Valley-Serrano 500 kV transmission lines, prepared a detailed analysis of a broad range of alternative transmission alignments meeting, in whole or in part, the stated objectives of SDG&E and the functionality of the Valley-Rainbow Interconnect.

As indicated in the CPUC/BLM jointly prepared "Interim Preliminary Report on Alternatives Screening for: San Diego Gas & Electric Company Valley - Rainbow 500 kV Interconnect Project, CPCN Application No. 01-03-036, U.S. BLM Case No. CACA-43368" (CPUC/BLM Alternatives Analysis) those objectives included: (1) "Providing a separate power transmission path that meets National Electric Reliability Council (NERC) and Western Electric Coordinating Council (WECC) reliability criteria"; (2) "Increasing import capacity into the SDG&E service area by approximately 700 megawatts (MW)"; (3) "Increasing the region's capacity to export in basin generation to the rest of California by approximately 800 MW"; and (4) "Providing a link for the California Independent System Operator's long-term transmission grid enhancement goals."¹¹ As indicated in that independent analysis, the Applicant's TE/VS Interconnect was identified as "electrically the same or similar to the proposed [Valley-Rainbow Interconnect] project."¹²

In January 2007, acting in compliance with the National Environmental Policy Act (NEPA), FERC and the Forest Service released the federal FEIS addressing both LEAPS and a "transmission line only project." With regards to the TE/VS Interconnect, FERC concluded that "the TE/VS [Interconnect] transmission line interconnection between the SCE and SDGE transmission systems could be an appropriate long-term solution to Southern California's transmission congestion bottleneck as well as the transmission-constrained, generation-deficient San Diego area."¹³

From a water quality perspective, LEAPS was also included in and became a part of the Lake Elsinore and San Jacinto Watershed Authority's (LESJWA) "Final Program Environmental Impact Report – Lake Elsinore Stabilization and Enhancement Project, SCH No. 2001071042."¹⁴ As indicated therein, with respect to Lake Elsinore, LESJWA concluded that "no effect on the ecology of the lake in terms of sediment mixing, nutrients or turbidity is expected" and "a large

¹¹ / California Public Utilities Commission and Bureau of Land Management, Interim Preliminary Report on Alternatives Screening for: San Diego Gas & Electric Company Valley - Rainbow 500kV Interconnect Project, CPCN Application No. 01-03036, U.S. BLM Case No. CACA-43368, November 2002, pp. ES-4 and ES-5.

¹² / Ibid., p. ES-30.

¹³ / Ibid., pp. B-21 and B-22.

¹⁴ / Lake Elsinore and San Jacinto Watershed Authority (MWH), Final Program Environmental Impact Report – Lake Elsinore Stabilization and Enhancement Project, SCH No. 2001071042, September 2005.

improvement in lake quality is possible if the inflow and outflow of the pumped water is used correctly.”¹⁵

3.1.1.1 Licensing for Transmission (TE/VS Interconnect)

In addition to the application for a CPCN for the TE/VS Interconnect, the Applicant, acting both individually and in conjunction with EVMWD, is concurrently processing applications for the following discretionary permits and approvals: (1) FERC hydropower license for LEAPS, including associated transmission and such other ancillary facilities as may be licensed by FERC; (2) separate SUPs from the Forest Service for the TE/VS Interconnect and for LEAPS (16 U.S.C. 797[b] and 823[b]; 63 FR 65950-65969); (3) separate Section 401 water quality certifications or waivers from the SWRCB for the TE/VS Interconnect and for LEAPS (33 U.S.C. 1341); (4) separate Section 404 permits from the United States Army Corps of Engineers (USACE) for the TE/VS Interconnect and for LEAPS (33 U.S.C. 1344); and (5) an application for transportation and utility systems and facilities on federal lands (Standard Form 299) from the BLM for the TE/VS Interconnect (43 CFR Part 2800).

Except for those agencies that may operate under the authority of the FEIS only, TNHC seeks to utilize the Commission’s CEQA documentation, as augmented by the FEIS, as the environmental basis for any and all discretionary and ministerial permits and approvals as may be required from any State and local governmental entity with discretionary authority over or for the approval, construction, operation, and maintenance of the TE/VS Interconnect and LEAPS.

For CEQA-compliance purposes, the TE/VS Interconnect constitutes a component of the larger “project” identified herein. The TE/VS Interconnect, however, constitutes a “stand-alone” action and activity (separate and distinct from LEAPS) which the Applicant seeks to separately entitle, construct, operate, and maintain. Because the CPUC does or may not have the jurisdictional authority to approve the pumped storage facility, TNHC is not concurrently processing a CPCN from the Commission for that facility. Instead, unless otherwise authorized by the Commission, TNHC seeks a Commission-issued CPCN only for the TE/VS Interconnect.

3.1.1.2 Licensing for Pumped Storage

The Energy Policy Act of 2005 (PL 109-58) (EPAAct 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.¹⁶ On November 17, 2006, FERC explicitly identified LEAPS as an “advanced transmission technology.”¹⁷ That designation could potentially alter or modify permit options available to FERC, the Commission, and/or the Applicant. As such, the Applicant seeks

¹⁵ / Lake Elsinore and San Jacinto Watershed Authority (MWH), Draft Program Environmental Impact Report – Lake Elsinore Stabilization and Enhancement Project, SCH No. 2001071042, March 2005, pp. 5-11 and 5-12.

¹⁶ / Section 1223(11), Federal Energy Policy Act of 2005 (PL 109-58).

¹⁷ / Federal Energy Regulatory Commission, Order on Rate Request, Issued November 17, 2006, Docket Nos. ER06-278-000 et seq., p. 12.

to avail itself of all existing and evolving statutes, regulations, and agency policies and procedures relating thereto.

Section 215 of EPAct 2005 requires federal agencies to expedite approvals that are necessary for owners or operators of electrical transmission and distribution facilities to comply with applicable reliability standards. FERC has already concluded that TNHC's "TE/VS Interconnect project will ensure reliability, consistent with the requirements of Order No. 679."¹⁸

With regards to the SUP application for LEAPS, in addition to those federal entitlements that may be associated with the proposed pumped storage project, the SUP process was initiated, in part, for the purpose of obtaining separate Forest Service authorization for any additional transmission lines, larger wire sizes, modified tower designs and configurations, increased electrical capacities, and other ancillary facilities as may be required to accommodate both the pumped storage project and the increased power flows associated with the system interconnection and/or system upgrades, above and beyond those flows and "project works" associated with or authorized under the federal hydropower license.

With regards to the SUP, the Forest Service's actions are governed by the provisions of the Multiple Use-Sustained Yield Act and National Forest Management Act of 1976 (16 U.S.C. 472[a], 521[b], 1600, 1601-1614) and other applicable Forest Service statutes, manuals, handbooks, and procedures. Since the Forest Service was a Cooperating Agency in the preparation of the FEIS, the Forest Service has addressed, in whole or in part, its environmental disclosure obligation under NEPA based on the environmental review record established by the FEIS.

The environmental review record for LEAPS includes the following documents, each of which are incorporated by reference herein: (1) "Initial Stage Consultation Document - Lake Elsinore Advanced Pumped Storage Project, Federal Energy Regulatory Commission, Project Number 11858"¹⁹; (2) "Final Application for Major Unconstructed Project - Lake Elsinore Advanced Pumped Storage Project, FERC Project No. 11858"²⁰; (3) "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"²¹; (4) "Draft Environmental Impact Statement for Hydropower License - Lake Elsinore Advanced Pumped Storage Project, FERC Project No. 11858, FERC/EIS-0191D"²²; and (5)

¹⁸ / Federal Energy Regulatory Commission, Order on Rate Incentives and Compliance Filings, Issued March 24, 2008, Docket Nos. ER06-278-000, p. 13.

¹⁹ / 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.

²⁰ / 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.

²¹ / 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.

²² / 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.

“Final Environmental Impact Statement for Hydropower License - Lake Elsinore Advanced Pumped Storage Project, FERC Project No. 11858, FERC/EIS-0191 F.”²³

3.1.1.3 California Environmental Quality Act

As authorized under Section 21083.5 of CEQA, when an environmental impact statement (EIS) has been or will be prepared for the same project pursuant to the requirements of NEPA and its implementing regulations or an EIR has been or will be prepared for the same project pursuant to CEQA and its implementing regulations, any part of that EIS or EIR may be submitted in lieu of all or any part of the EIR required by CEQA for a pending action. Section 21083.7 further notes that in the event that a project requires both an EIR and an EIS, “the lead agency shall, whenever possible, use the environmental impact statement as such environmental impact report as provided in Section 21083.5.” As further indicated in the State CEQA Guidelines, when a project will require compliance with both CEQA and NEPA, State and local agencies should use the EIS rather than preparing an EIR if the following conditions occur: (1) an EIS will be prepared before an EIR would otherwise be completed for the project; and (2) the EIS complies with the provisions of the State CEQA Guidelines (14 CCR 15221).

Because the FEIS and the Sunrise DEIR/DEIS addressed LEAPS and the TE/VS Interconnect, the Applicant requests that: (1) the Commission utilize those NEPA and CEQA documents to fulfill, in whole or in part, the Commission’s obligations with regards to the requested CPCN; (2) the CEQA documentation for both the TE/VS Interconnect and LEAPS avail itself, to the maximum extent authorized under law, of the environmental analysis already conducted for the Project; and (3) that the resulting CEQA documentation for the Project be sufficient to allow the SWRCB and other State and local agency with discretionary authority over the TE/VS Interconnect and/or LEAPS to utilize that documentation as the environmental basis for those discretionary actions, without the need for any further augmentation thereto.

As indicated in Attachment 7 (Environmental Impact Assessment Summary Form) herein, the Applicant has identified a number of State Responsible Agencies, including, but not necessarily limited to: (1) State Water Resources Control Board (SWRCB); (2) California Regional Water Quality Control Board, Santa Ana Region (SARWQCB); (3) California Regional Water Quality Control Board, San Diego Region (SDRWQCB); (4) California Department of Fish and Game (CDFG); (5) the California Department of Transportation (Caltrans); (6) South Coast Air Quality Management District (SCAQMD); (7) San Diego Air Pollution Control District (SDAPCD); (8) California Independent System Operator (CAISO); (9) Counties of Riverside, Orange, and San Diego; and (10) Cities of Escondido, Lake Elsinore, Grand Terrace, Ontario, Rancho Cucamonga, Redlands, and San Diego. The above list of agencies is presented for informational purposes only. The inclusion of any agency herein does not create a discretionary action when no such authority now exists under law.

In addition to FERC, discretionary actions may be required from the following additional federal agencies: (1) United States Department of the Navy (DON) and United States Marine Corps (USMC); (2) United States Department of Agriculture - United States Forest Service; (3) United

²³ / 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.

States Department of the Interior – Bureau of Land Management (BLM); (4) United States Fish and Wildlife Service (USFWS); (5) National Marine Fisheries Service (NMFS); (6) United States Army Corps of Engineers; and (7) United States Department of Energy (DOE).

3.1.1.4 Discretionary Permits, Approvals, and Consultation Requirements

In addition to those agencies identified in Section 3.1.1.3 (California Environmental Quality Act) and Attachment 7 (Environmental Impact Assessment Summary Form) herein, there may exist other federal, State, and local agencies from whom permits and/or approvals will be required for the effectuation of the Project. Presented in Table 3.3.1-1 (Discretionary Permits, Approvals, and Consultation)²⁴ is a list of agencies and tribal governments that may be required to take one or more discretionary actions with regards to LEAPS and/or the TE/VS Interconnect. An agency's inclusion therein does not elevate that agency to Responsible Agency status if it is subsequently determined that no discretionary permits or approvals are required for the approval, construction, operation, and/or maintenance of the Project. The sequence in which those agencies are presented does not imply any prioritization or imply any particular status or order.

If licensed by FERC, the FPA, the EPCRA 2005, and/or other federal statutes, 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 Table 3.1.1-1 (Discretionary Permits, Approvals, and Consultation) 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, but may not be limited to, Section 401(a)(1) of the Federal Clean Water Act (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.

In accordance therewith, the Project shall conform to the applicable standards contained in the following permits: (1) SWRCB's "National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activities, Order 99-08-DWQ, NPDES No. CAS000001" (General Construction Permit)²⁵; (2) SARWQCB's "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" (Riverside County NPDES Permit)²⁶; (3) SDRWQCB's "Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Storm Sewer System (MS4s) Draining

²⁴ / Independent of any further CEQA documentation, certain federal entitlements may be authorized under the provisions of NEPA and based, in whole or in part, on the information contained in FERC's and the Forest Service's "Final Environmental Impact Statement for Hydropower License- Lake Elsinore Advanced Pumped Storage Project, FERC Project No. 11858, FERC/EIS-019113" (FERC/USFS, January 2007).

²⁵ / 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.

²⁶ / 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.

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, Order No. R9-2007-0001, NPDES Permit No. CAS0108758” (San Diego County NPDES Permit)²⁷; and (4) 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.”²⁸

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 and waivers (Section 13160, CWC) and for the administration of surface water rights (Sections 10005976, CWC). A water rights permit is not required for the use of purchased water, groundwater, or reclaimed water. In addition to natural runoff from the San Jacinto River and Lake Elsinore watersheds, including waters released by the EVMWD from Canyon Lake (Railroad Canyon Reservoir), waters discharged to Lake Elsinore by the EVMWD and by others for the purpose of stabilize water levels in Lake Elsinore are from water purchases, groundwater wells, and the authorized discharge of reclaimed waters. As a result, no known water rights issues are associated with the filing of or the extraction of water from Lake Elsinore (afterbay) for the operation of LEAPS, including the filing and operation of the proposed Decker Canyon Reservoir (forebay).

In addition to those public agencies and discretionary actions listed herein, during the environmental review process, other agencies and/or other permits and approval may be identified. Conversely, the Commission and/or the Applicant may subsequently determine that no discretionary actions are required from one or more of the listed agencies. The identification (or lack of identification) of an agency herein does not alter the status of that agency, create a discretionary action when one does not now exist, eliminate the need for any permits or approvals which may be required for the Project’s effectuation, or prevent any State or local agency from utilizing the Commission’s environmental documentation as the CEQA based for any requisite discretionary action.

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²⁷ / California Regional Water Quality Control Board, Santa Diego Region, Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Stonn Sewer System (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, Order No. R9-2007-0001, NPDES Permit No. CAS0108758, January 24, 2007.

²⁸ / 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.

Table 3.1.1-1: Discretionary Permits, Approvals, and Consultation

Federal Agencies	Discretionary Permits, Approvals, Consultation
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 Avenue SW, Washington, DC 20585	Consultation
United States Department of Agriculture – United States Forest Service Cleveland National Forest – Trabuco Ranger District 1147 E. Sixth Street, Corona, California 92879	Forest Plan amendment and SUP authorization Easements or other real property conveyances Timber settlement sale
United States Department of the Interior - Bureau of Land Management Palm Springs South Coast Field Office 690 W. Garner Avenue (P.O. Box 581260) North Palm Springs, California 92258-1260	Easements or other real property conveyances
United States 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 NW, 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, DC 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 Department of the Navy, United States Marine Corps Camp Joseph H. Pendleton - Natural Resources Department Box 555010, Cam 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 NW, 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, CA 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
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 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

State Agencies (Continued)	Discretionary Permits, Approvals, Consultation
California Fish and Game Commission 1416 9 th Street, Room 1320, Sacramento, California 95814	Application for fishway
California Department of Parks and Recreation - Office of Historic Preservation 1416 9 th Street, Room 1442-7, Sacramento, California 95814 P.O. Box 942896, Sacramento, California 94296-0001	Section 106 consultation
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 and NPDES permit Strom 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 and NPDES permits Storm water pollution prevention plan
California Department of Transportation, District 8 464 W. Fourth Street, 6 th Floor, San Bernardino, California 92401-1400	Highway crossing permit and right-of-way easements Encroachment permit
South Coast Air Quality Management District 21865 E. Copley Drive, Diamond Bar, California 91765	Permit to construct Permit to operate
San Diego County Air Pollution Control District 9150 Chesapeake Drive, San Diego, California 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 and 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
California Coastal Commission, San Diego Coast District Office 7575 Metropolitan Drive, Suite 103, San Diego, California 92108-4402	Consultation
California State Universities – San Diego State University Field Stations Program – College of Sciences 5500 Campanile Drive, San Diego, California 92182-4614	Encroachment permit
Local Agencies	
County of Riverside – Planning Department 4080 Lemon Street (P.O. Box 1409), Riverside, California 92502-01409	MSHCP permit General plan amendment, zone change, CUP Tentative map, easement, or lot line adjustment
County of Riverside – Flood Control and Water Conservation District 1995 Market Street, Riverside, California 92501	Development review and site plan review Flood hazard report and conditions Cooperative agreement and encroachment permit
Riverside County Health – Department Environmental Health Services 4065 County Circle Drive, Room 123, Riverside, California 92503	Drilling permit (water well)
County of Orange – Planning Department 300 North Flower Street, Room 122, Santa Ana, California 92705	Tentative map, easement, or lot line adjustment
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
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) General Plan amendment and zone change Shoreline buffer zone
City of San Diego - City Planning & Community Investment Community Planning & Urban Form Divisions 202 C Street, MS 5A, San Diego, California 92101	Design review
City of Escondido - Community Development Department, Planning Division 201 North Broadway, Escondido, California 92025	Tentative map, easement, or lot line adjustment Design review
City of Grand Terrace - Community and Economic Development Department 22795 Barton Road, Grand Terrace, California 92313	Design review

Local Agencies (Continued)	Discretionary Permits, Approvals, Consultation
City of Rancho Cucamonga – Planning Department 10500 Civic Center Drive, Rancho Cucamonga, California 91730	Design review
City of Redlands – Community Development Department 35 Cajon Street, Redlands, California 92373	Design review
City of Ontario – Planning Department 303 East “B” Street, Ontario, California 91764	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	Encroachment permit Water purchase agreement
Western Riverside County Regional Conservation Agency 4080 Lemon Street, Twelfth Floor, Riverside, California 92501	Encroachment permit Joint project review
Lake Elsinore Unified School District 545 Chaney Street, Lake Elsinore, California 92530	School or facilities agreement
Tribal Governances	Discretionary Permits, Approvals, Consultation
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
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

Source: The Nevada Hydro Company, Inc.

3.1.2 Existing 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.

- **1997 Development Agreement.**²⁹ With regards to the “Lake Elsinore Advanced Pumped Storage Project and related transmission facilities,” on May 15, 1997, the EVMWD and TNHC entered into a development agreement whereby the EVMWD 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” (1997 Development Agreement), in

²⁹ / Elsinore Valley Municipal Water District and The Nevada Hydro Company, Inc., Development Agreement by and between Elsinore Valley Municipal Water District and The Hydro Company, Incorporated, May 15, 1997.

combination with any subsequent agreements that may be executed between the parties, defines the roles, responsibilities, and obligations of both parties with respect to LEAPS. As stipulated therein, TNHC “will pay the District for performance of water management services, which performance shall include maintaining the water level sufficient for operation of the project, at Lake Elsinore.”

Although the 1997 Development Agreement does not explicitly cite an elevation at which water levels in Lake Elsinore would need to be maintained for the “operations of the project,” in subsequent discussions between parties, an elevation of 1240 feet above mean sea level (msl) has been identified based on a number of water quality studies.

With regards to the implementation of the 1997 Development Agreement, 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 above msl (considered the appropriate operation range) is 8,800 acre feet per year (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 msl. 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 from either EMWD [Eastern Municipal Water District] or EVMWD.”³⁰

- **Five-Cities Agreement.**³¹ In 1994, the EVMWD executed a letter agreement (Five-Cities Agreement) with the Cities of Anaheim, Azusa, Banning, Colton, and Riverside (Cities) which may remain applicable to LEAPS. Under the terms of that agreement and subject to the provisions therein, the Cities agreed to surrender the Cities’ then existing federal preliminary permit under now-expired FERC PN11261 and support the issuance of any permit, license, or authorization relative to the development of the “Lake Elsinore Pumped Storage Project,” while retaining 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 thereof. In exchange, the EVMWD’s agrees 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”; and (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 power sales agreement (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.

³⁰ / California Regional Water Quality Control Board, Santa Ana Region, Resolution No. Lake Elsinore and Canyon Lake Nutrient Total Maximum Daily Loads, March 26, 2004, revised May 21, 2004, pp. 72-73.

³¹ / Elsinore Valley Municipal Water District and the Cities of Anaheim, Azusa, Banning, Colton, and Riverside, Letter Agreement among the Elsinore Valley Municipal Water District and the Cities of Anaheim, Azusa, Banning, Colton and Riverside, California, August 17, 1994.

- **Lake Elsinore Comprehensive Water Management Agreement.**³² On March 1, 2003, the EVMWD, the City of Lake Elsinore (City), and the Lake Elsinore Redevelopment Agency executed a “Lake Elsinore Comprehensive Water Management Agreement” in order 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 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 above msl.

That agreement included the following provisions with regards to LEAPS: “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.”

As further noted therein: “Two prior agreements also affect Lake Elsinore. The first is the so-called Tilley Agreement, dated October 29, 1927, between the Temescal Water Company and a number of parties, including the City of Lake Elsinore. The Elsinore Valley Municipal Water District is a successor-in-interest to the rights and obligations of the Temescal Water Company under the Tilley Agreement. The second agreement is the ‘Agreement to Fill and Operate Lake Elsinore,’ dated December 19, 1991, between the City of Lake Elsinore, the Community Redevelopment Agency of Lake Elsinore, and the Elsinore Valley Municipal Water District.” The parties stipulated that the “Lake Elsinore Comprehensive Water Management Agreement” “is intended to, and does, supersede and replace the obligations of the Parties under both the Tilley Agreement and the Fill & Operate Agreement. Upon execution of this Agreement, the Tilley Agreement and the Fill & Operate Agreement shall have no further force or effect.”³³

- **Local Cooperation Agreement.** Between 1989 and 1995, in order to prevent the lake from drying out and to mitigate the flooding problem, the United States Bureau of

³² / City of Lake Elsinore, Lake Elsinore Redevelopment Agency, and Elsinore Valley Municipal Water District, Lake Elsinore Comprehensive Water Management Agreement, March 1, 2003.

³³ / Until the late 1920’s, rainwater runoff flowed freely down the San Jacinto River watershed and into Lake Elsinore. In 1928, Railroad Canyon Dam was built, cutting off the flow of water into Lake Elsinore and creating Canyon Lake (Railroad Canyon Reservoir). Before the dam’s construction, George Tilley filed a lawsuit in 1927, to stop the Railroad Canyon Dam project. The terms of the resulting October 29, 1927 settlement, known as the “Tilley Agreement,” stipulated that Canyon Lake was entitled to a maximum of 2,000 acre feet (AF) of watershed runoff. Lake Elsinore would receive any water over that amount. After years of dispute over that agreement, the water district and the City of Lake Elsinore signed the “Agreement to Fill & Operate Lake Elsinore” on December 19, 1991.

Reclamation (BOR), the USACE, and the Riverside County Flood Control and Water Conservation District developed the “Lake Elsinore Management Project” (LEMP). Three major projects were subsequently implemented through the LEMP: (1) construction of a levee to separate the main lake (Main Basin) from the back basin (Back Basin) to reduce the lake surface area and, thereby, prevent significant evaporative losses; (2) realignment of the lake inlet channel to bring natural runoff from the San Jacinto River; and (3) lowering of the lake outlet channel to increase outflow to Temescal Creek when the lake level exceeds an elevation of 1255 feet above msl. As stipulated in the March 1992 “Local Cooperation Agreement,” the LEMP called for the introduction of supplemental makeup water to maintain lake levels at an adopted operation range of 1240 to 1249 feet above msl.³⁴

Under the provisions of a stipulated judgment (City of Lake Elsinore v. Elsinore Valley Municipal Water District),³⁵ as indicated in the EVMWD’s “Urban Water Management Plan, Final Report,” the “EVMWD must release water into Lake Elsinore when the water surface elevation is less than 1,240 feet above msl. Lake replenishment is only necessary in normal and dry years, as there is sufficient surface runoff in wet years to maintain adequate lake levels.”³⁶

3.2 Project Location

3.2.1 Geographic Location

The Project is comprised of two discreet component parts: the TE/VS Interconnect and LEAPS. Project-related facilities include a new approximately 32 mile long 500 kV transmission line and improvements and upgrades to an approximately 52 mile long segment of SDG&E’s existing transmission system (including an approximately 8 mile long segment along which the existing 69 kV circuit will be rebuilt), construction of new and improvements to existing substations and switchyards. The Project is located on lands within the Counties of Riverside, Orange, and San Diego and includes network upgrades and/or other facilities located in the Counties of Riverside, Orange, San Diego, and San Bernardino, in the Cities of Lake Elsinore, Escondido, Grand Terrace, Ontario, Rancho Cucamonga, Redlands, and San Diego, and in a number of federal reserves, including the Cleveland National Forest – Trabuco Ranger District and on the right-of-way (ROW) for the existing TE line.

The section of existing 69 kV circuit (TL6932), currently installed on one side of the existing double-circuit Talega-Escondido 230 kV transmission line structures and generally located between State Route 76 and Old Castle Road (County of San Diego), would be rebuilt on new 69 kV steel structures located within the existing 300 foot wide Talega-Escondido right-of-way.³⁷

³⁴ / California Regional Water Quality Control Board, Santa Ana Region, Public Workshop: Proposed Basin Plan Amendment Incorporation of Total Maximum Daily Loads (TMDLs) for Nutrients for Lake Elsinore and Canyon Lake, Item 14, June 4, 2004, p. 7.

³⁵ / Riverside County Superior Court, Stipulated Judgment - City of Lake Elsinore v. Elsinore Valley Municipal Water District, Case No. 359671, March 1, 2003.

³⁶ / Elsinore Valley Municipal Water District (MWH), Urban Water Management Plan, Final Report, December 2005, p. 3-32.

³⁷ / San Diego Gas & Electric Company, Valley-Rainbow Interconnect, Proponent’s Environmental Assessment, Volume 1, March 2001, pp. S-20, S-21, and 2-3.

The proposed 69 kV line would pass entirely through private lands under the jurisdiction of the County of San Diego.³⁸

It is the Applicant's understanding that all network improvements and upgrades to the SDG&E's transmission system would occur either within the "fence line" of or affixed to existing facilities.

A portion of the FERC identified route for the TE/VS Interconnect is located on public lands located near the Lake Mathews-Estelle Mountain Reserve, jointly or singularly owned by the Riverside County Habitat Conservation Agency (RCHCA), the Metropolitan Water District of Southern California (MWD), the BLM, and the California Department of Fish and Game (CDFG). In this Application, the Applicant has avoided use of this Reserve area. In addition, segments of the TE/VS Interconnect traverse State highways, subject to the jurisdiction of the California Department of Transportation (Caltrans). Portions of LEAPS subsurface elements may also extend across or be located within a Caltrans-administered right-of-way.

The existing TE line passes primarily through the County of San Diego, with a small portion of the line located in the County of Riverside. The existing transmission line is within a 300 foot wide easement owned by SDG&E. The majority of land within the easement is private and under the jurisdiction of the County of San Diego. Approximately 17 miles of the easement are within and located in proximity to the northern boundaries of Camp Pendleton. The Santa Margarita Ecological Reserve (SMER)³⁹ and a BLM-designated "Area of Critical Environmental Concern"⁴⁰ (ACEC) are crossed by the existing TE line ROW.

As indicated in BLM's "South Coast Resource Management Plan and Record of Decision," ACECs were authorized in Section 202(c)(3) of the Federal Land Policy and Management Act of 1976 (FLPMA, P.L. 94-579). ACECs are areas where special management attention is needed to protect, and prevent irreparable damage to, important historic, cultural, and scenic values, fish, or wildlife resources or other natural systems or processes; or to protect human life and safety from natural hazards. The ACEC designation indicates that BLM recognizes that an area has significant values, and establishes special management measures to protect these values. In addition, designation also serves as a reminder that significant value(s) or resource(s) exist which must be accommodated when future management actions and land use proposals are considered in or near an ACEC.⁴¹ The BLM further notes that "the Santa Margarita Ecological Reserve

³⁸ / Ibid., p. 4-57.

³⁹ / The Santa Margarita Ecological Reserve is located in the southwest corner of Riverside County and northern San Diego County. The 4,344-acre SMER is a field station of the California State Universities, administered by San Diego State University.

⁴⁰ / As indicated in the BLM's "South Coast Resource Management Plan and Record of Decision" (United States Department of the Interior, Bureau of Land Management, California Desert District, Palm Springs - South Coast Resource Area, June 1994), it is the policy directive of the BLM to "[d]esignate 1,260 acres within the Santa Margarita Ecological Reserve (including 40 acres within San Diego County) as an ACEC and RNA [Research Natural Area] for protection for sensitive species and natural values. Acquire 300 acres for addition to the ACEC. The ACEC is unavailable for mineral material sales and livestock grazing. The ACEC is proposed for closure to mineral leasing and entry under the 1872 mining law (as amended). The ACEC is a right-of-way avoidance area" (p. 28).

⁴¹ / United States Department of the Interior, Bureau of Land Management, California Desert District, Palm Springs - South Coast Resource Area, South Coast Resource Management Plan and Record of Decision, June 1994, p. 105.

ACEC is designated with the following management prescriptions: The ACEC is a right-of-way avoidance area and is unavailable for mineral material sales and livestock grazing.”⁴²

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 and is a natural low point of the San Jacinto River and its drainage basin. Over 90 percent of that watershed drains first into Canyon Lake (Railroad Canyon Reservoir) and then flows into Lake Elsinore. To the south and southwest of Lake Elsinore are the steep slopes of the Elsinore Mountains of the Santa Ana Mountain Range which form the northernmost range of the Peninsular Ranges Province.

Excluding privately owned lands and lands owned or under the control of SDG&E and SCE, public lands upon which Project facilities are proposed include properties under the ownership and/or control of the following governmental entities:

- United States Department of Agriculture, United States Forest Service, including lands within the Cleveland National Forest, Trabuco Ranger District;
- United States Department of the Navy, including lands within United States Marine Corps Camp Joseph H. Pendleton;
- United States Department of the Interior, Bureau of Land Management, including lands within the Santa Margarita Ecological Reserve and potentially with regards to Riverside-San Bernardino County Management Area BLM Parcel No. 188-041 and San Diego County Management Area BLM Parcel Nos. 216-361, 217-261, 288-031, 219-291, and 229-041;⁴³
- California Department of Fish and Game, including lands within the Lake Mathews-Estelle Mountain Reserve;
- California Department of Transportation, including lands within the rights-of-way for the Interstate 15 (Corona) Freeway, State Route 74 (Ortega Highway), State Route 76 (Pala Road), and State Route 78 (Ronald Packard Parkway);
- California State University, including lands within the Santa Margarita Ecological Reserve;
- Western Riverside County Regional Conservation Agency;
- Metropolitan Water District of Southern California, including lands near the Lake Mathews-Estelle Mountain Reserve and the San Diego Aqueduct;
- County of Riverside, including flood control facilities and the Grand Avenue, South Main Divide Truck Trail (Killen Trail), and other public rights-of-way crossed by Project facilities;
- County of San Diego, including public rights-of-way crossed by Project facilities;

⁴² / Ibid., p. 105.

⁴³ / Ibid., Map 2A (Parcel Locations - BLM Public Lands).

- City of Lake Elsinore, including lands within the ordinary high water mark of Lake Elsinore, Skylark Substation, Elsinore Substation, and the Grand Avenue, Cordyon Street, Riverside Drive, Collier Street, and Spring Street rights-of-way; and
- City of Escondido, including public rights-of-way crossed by Project facilities.

The Talega-Escondido 230 kV and 69 kV transmission lines are located to the west of the Pala Indian Reservation and southwest of the Pechanga Indian Reservation. Since no portion of the Project is located on tribal lands, no tribal lands will be directly or indirectly impacted by the Project.

3.2.2 General Description of Land Uses within the Proposed Project

Please see Chapter 4.11 for a more detailed description of land uses with the Project's vicinity. Detailed land use maps may be found in Chapter 4.11 as well.

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 portion of the route. The following describes land uses along the proposed alignment proceeding from north to south.

At the northern end of the alignment, at MP 2.0, located near the proposed Lake Switchyard is Lee (Corona) Lake. Lee (Corona) Lake is owned by the EVMWD and is an approximately 27 acre man-made reservoir located approximately 10 miles north of Lake Elsinore along Temescal Wash. Excluding the area upstream of Lake Elsinore, the Temescal Wash watershed that drains to Lee (Corona) Lake covers approximately 33,000 acres. Water from this impoundment is pumped out for agricultural and industrial (gravel wash) uses. The lake serves as a fishing area for introduced species (e.g., catfish, bass, bluegill, tilapia, and trout) and includes both boat rentals and picnic areas under a concession agreement. No camping facilities are available. Discharges to the reach of Temescal Wash downstream of Lee (Corona) Lake historically only occur during wet weather.

The Lake Switchyard, at MP 2.0, fronts along Temescal Canyon Road. For a portion of its length, Temescal Canyon Road parallels the I-15 (Corona) Freeway and serves as the primary access way to industrial and rural residential uses located along that road. Temescal Canyon Road also provides direct access to Horsethief Ranch (a master planned community) and, via Indian Truck Trail, to Sycamore Creek (a master planned community).

The Lake Mathews-Estelle Mountain Reserve is located to the north and west of the proposed switchyard. As described by the United States Fish and Wildlife Service: "The Lake Mathews/Estelle Mountain Reserve is located east of Interstate 15 near Lake Mathews in the northwestern Riverside County. The Lake Mathews Multiple Species Habitat Conservation Plan/Natural Communities Conservation Plan established a 2,544 acre mitigation bank adjacent to the existing 2,565 acre State Ecological Reserve. RCHCA [Riverside County Habitat Conservation Agency] owns about 6,296 acres, and BLM owns about 1,032 acres within this

habitat block. These lands all contributed to the establishment of a reserve for multiple species use in western Riverside County encompassing over 12,000 acres. The combined reserve is composed of the multiple species reserve that consists of the State Ecological Reserve and the Lake Mathews HCP [Habitat Conservation Plan] Mitigation Bank, Lake Mathews/Estelle Mountain Core Stephens' kangaroo rat Reserve, the Estelle Mountain Ecological reserve owned by the [United States] Department [of the Interior], and land owned by the BLM located within the RCHCA's proposed Stephens' kangaroo rat Core Reserve." North of the Lake Switchyard, a segment of the TE/VS Interconnect is located within the "Stephens' kangaroo rat Core Reserve."⁴⁴

Along Temescal Canyon Road, a number of industrial uses exist in the general vicinity of the Lake Switchyard. As the line travels southward toward the National Forest, east of Indian Truck Trail, the transmission line crosses the I-15 (Corona) Freeway and De Palma Road at MP 2.4, in the vicinity of Sycamore Creek (a master planned community) and the Glen Eden Sun Club (25999 Glen Eden Road. Corona). The Glen Eden Sun Club is a private adult facility which includes 37 full-service hookups and 28 electrical and water service hook-ups for mobile homes and numerous tent sites. Riverside County's Sycamore Creek Fire Station No. 64 (25310 Campbell Ranch Road, Corona) is located about one mile from the proposed switchyard. Single-family detached residential dwelling and neighborhood-serving commercial uses are developing within the Sycamore Creek area.

South of the Glen Eden Sun Club, the transmission line enters the National Forest at MP 2.7. A substantial portion of the 500 kV transmission line, including both the overhead and underground segments extending from the general area of the Glen Eden Sun Club to Camp Pendleton, traverses the TRD. At times, the transmission line parallels North Main Divide Truck Trail (8S04), South Main Divide Truck Trail (Killen Trail) (6S07), Wildomar Road (7S01), an unnamed dirt road located to the south of the Tenaja Ranger Station (8S01), and the eastern and southern National Forest boundary. All three transition stations (Northern GIL Transition Station, Southern GIL Transition Station, and Middle GIL Transition Station) are located on NFS lands.

Within the National Forest, the transmission line skirts a number of rural residential properties (in-holdings), including the residential enclave of Rancho Capistrano (Morrell Potrero) and El Cariso Village. El Cariso Village is a rural community that includes single-family homes, highway commercial uses (e.g., Hells Kitchen, Kristi's Korner, Ortega Country Cottage Candy Store, The Lookout), the Forest Service's El Cariso Fire Station (32353 Ortega Highway, Lake Elsinore), and an adjacent Forest Service operated visitor center (El Cariso Ranger Station). In addition, the transmission line passes in close proximity to a number of existing campgrounds and trails, including the Morgan Trailhead, Tenaja Trailhead, Horsethief Trail, El Cariso Nature Trail, El Cariso Campground, Fire Fighters Memorial Picnic Area, Wildomar Campground, and the Wildomar Off-Highway Vehicle (OHV) area. At no point does the transmission line encroach within the San Mateo Canyon Wilderness, the Agua Tibia Wilderness Area or the

⁴⁴ / United States Department of the Interior, Fish and Wildlife Service, Memorandum: Intra-Service Formal Section 7 Consultation/Conference for Issuance of an Endangered Species Act Section 10(a)(1)(B) Permit (TE-088609-0) for the Western Riverside County Multiple Species Habitat Conservation Plan, Riverside County, California, June 22, 2004, p. 60.

Santa Rosa Plateau Ecological Reserve. Along the eastern border of the National Forest, the transmission line abuts the unincorporated communities of La Cresta, Tenaja, and De Luz.

At the base of the Elsinore Mountains is the unincorporated area of Lakeland Village (Cleveland Ridge). Existing land uses in the vicinity of the proposed Santa Rosa Substation include undeveloped open space areas, as well as single-family homes (e.g., 16336 Union Avenue, Lake Elsinore), multi-family complexes (e.g., Santa Rosa Mountain Villas [33071-33091 Santa Rosa, Lake Elsinore] and Copper Canyon Villas [16341-16347 Grand Avenue, Lake Elsinore]), and Butterfield Elementary Visual and Performing Arts Magnet School and the Ortega Trails Youth Center (16275 Grand Avenue, Lake Elsinore). Riverside County's Lakeland Village Fire Station No. 11 (33020 Maiden Lane, Lake Elsinore) is located about one mile east of the proposed Santa Rosa Substation site.

The proposed transmission line passes north and east of Elsinore Peak. The Forest Service has granted a number of special use permits to operate telecommunication facilities (Santiago Peak Communications Site) and electric tower sites at Elsinore Peak. Permit holders include Riverside County, Spectrasite Communications, Inc., Comcast Corporation, and Elsinore Peak Facility Corporation.

South of Elsinore Peak and northeast of Camp Pendleton, the transmission line passes near the Forest Service's Tenaja Ranger Station (Tenaja Guard Station) and will traverse existing grazing allotments located within the TRD, including the Tenaja and Miller Mountain Allotments. Additionally, the transmission line will pass in close proximity to an existing private airstrip (Sky Ranch) located on private lands within the Congressional boundaries of the National Forest.

To the west of Sky Ranch is USFWS-designated critical habitat for the thread-leaved brodiaea (Subunit 5b). As indicated in the Federal Register: "This subunit consists of 249 acres (101 hectare) of federally managed land (Cleveland National Forest) in northeastern San Diego County" (70 FR 73841, December 13, 2005).

The proposed Case Springs Substation is located adjacent to the TE line ROW, within land owned by the Fallbrook Land Conservancy (Conservancy), at MP 31.5. The Conservancy land was set up as a buffer for Camp Pendleton, a major United States Marine Corp (USMC) facility serving as the USMC's prime amphibious training base on the west coast.

A map of the Fallbrook Conservancy area may be found at Figure 3.6.1-14: Camp Pendleton Area Map.

3.2.2.2 Land Use Associated with Pumped Storage Facility

Many of the LEAPS facilities are located in the CNF. The CNF is the southernmost of the national forests in California. Its approximately 567,000 acres are located in Orange, Riverside, and San Diego Counties, at elevations ranging from 460 to 6271 feet above msl. The CNF is comprised of three non-contiguous ranger districts (Descanso, Palomar, and Trabuco). LEAPS facilities are located in the TRD, may traverse privately-owned lands within the Congressional boundaries of the CNF, and are located on public and privately-owned lands north of the TRD.

Land use generally within the vicinity of LEAPS was shown by FERC in the FEIS and is reproduced as Figure 3.2.2-1: Land Use Near Pumped Storage Facilities.

The proposed Decker Canyon Reservoir and its associated construction lay-down areas are located along South Main Divide Truck Trail (Killen Trail) (6S07). Those sites are located near two USFS-permitted hang gliding launch areas (i.e., “Edward” and “E” launch sites), as maintained by the Elsinore Hang Gliding Association (EHGA). Additionally, those sites are located in proximity to the Morgan Trailhead which descends from South Main Divide Truck Trail into Morrell Canyon and the San Mateo Canyon Wilderness.

To the east of the proposed upper reservoir sites is Elsinore Peak, where the Forest Service has issued a number of special use permits for operation of telecommunications facilities (currently comprising of six towers and five building). Northwest of the proposed upper reservoir sites, nearby land uses include the Forest Service’s El Cariso Fire Station (32353 Ortega Highway, Lake Elsinore), an adjacent visitor information facility (El Cariso Ranger Station), and the USFS-operated El Cariso Campground.

The LEAPS Powerhouse will be located adjacent to the Santa Rosa Substation. Land uses in proximity to the LEAPS Powerhouse are, therefore, as generally described for the Santa Rosa Substation.

LEAPS also includes the construction of tailrace tunnels and inlet/outlet structures extending northward from the LEAPS Powerhouse into Lake Elsinore. Those facilities will cross beneath Grand Avenue and traverse property between Grand Avenue and the lakeshore containing one or more single-family residences. No boat docks exist in the area of the proposed inlet/outlet structures.

Lake Elsinore, which serves as the lower reservoir (afterbay), is the largest natural lake in southern California and is considered hypereutrophic with characteristic high nutrient (nitrogen and phosphorous) concentrations in the sediment and water column, algae blooms, low water clarity, and large variations in dissolved oxygen (DO) levels. Between 1991 to 1998, fish kills were recorded for every year, except one (1994). Lake Elsinore is a shallow, natural sink that occupies the lowest portion of the Elsinore Valley. Lake Elsinore is a “terminal” water body (one with no outlet under non-flood conditions) because it has no natural outflow until its elevation exceeds 1255 feet above msl. A high evaporation rate (long-term average of 14,500 acre feet per year) contributes to low lake levels during periods with limited runoff. This translates to a lake level reduction of approximately 4.7 feet per year (from elevation 1247 feet above msl) from evaporation alone.⁴⁵

⁴⁵ / Op. Cit., Draft Program Environmental Impact Report - Lake Elsinore Stabilization and Enhancement Project, SCH No. 2001071042, March 2005, p. 2-2.

Overflow conditions are rare and occur only when the lake elevation exceeds that of the Wasson Sill, a natural topographic divide on Temescal Wash in the City of Lake Elsinore.

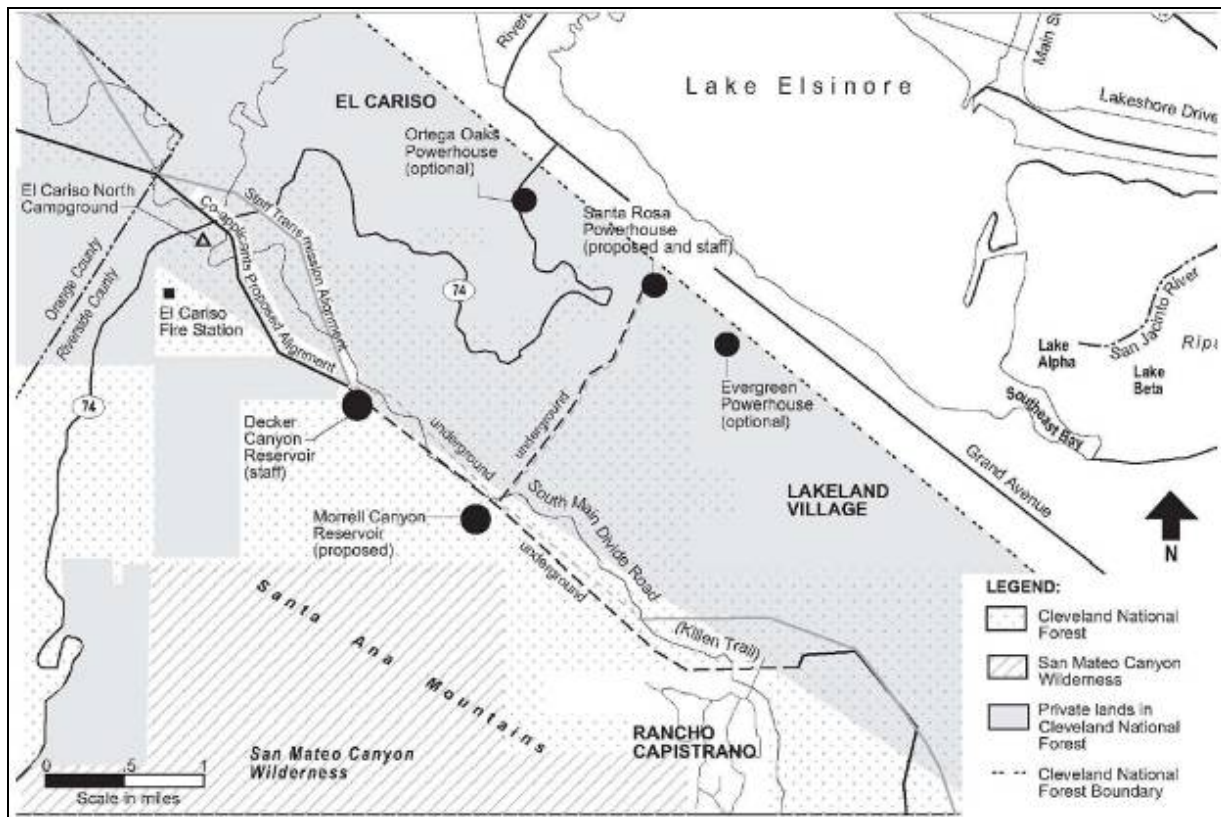


Figure 3.2.2-1: Land Use Near Pumped Storage Facilities

Source: Federal Energy Regulatory Commission

3.3 Existing System

3.3.1 Introduction

The Project sits between the SCE, at MP 0.0 and SDG&E service areas at MP 31.2, 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 3.3.1-1: Southwestern U.S. Transmission System Schematic depicts graphically the relevant portion of the national system with the addition of the Proposed Project. Figure 3.3.1-2: Southern California System Schematic, graphically depicts the southern California system with the addition of the proposed Project.

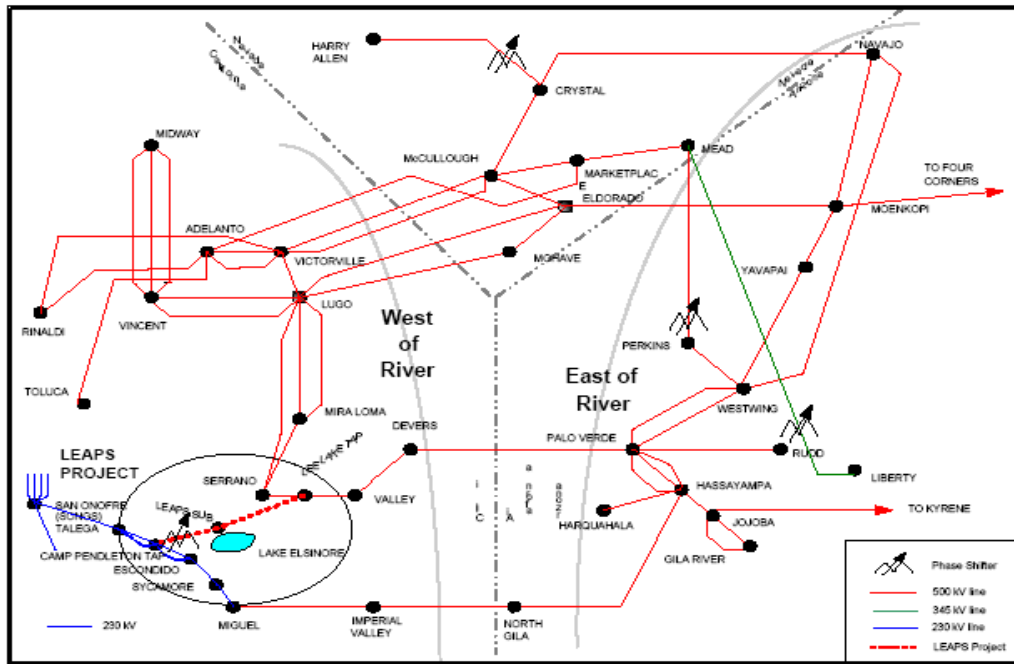


Figure 3.3.1-1: Southwestern U.S. Transmission System Schematic
 Source: The Nevada Hydro Company

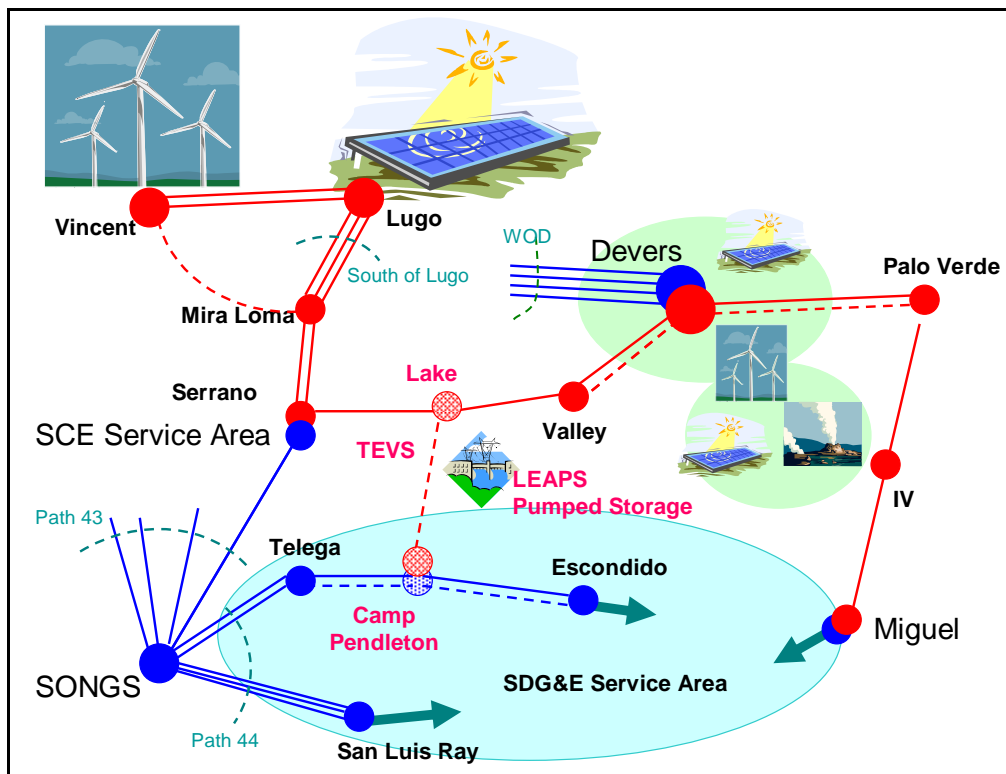


Figure 3.3.1-2: Southern California System Schematic
 Source: The Nevada Hydro Company

3.3.2 SCE System

SCE is the largest electric utility in California, providing service to 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 3.3.2-1: SCE Service Territory.



Figure 3.3.2-1: SCE Service Territory

Source: Southern California Edison

3.3.3 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 3.3.3-1: SDG&E Service Territory.

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.



Figure 3.3.3-1: SDG&E Service Territory

Source San Diego Gas & Electric Company

3.3.4 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 1,000 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 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.⁴⁶ 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.

3.3.4.1 Changes to the SCE System

The TE/VS Interconnect is located in proximity to SCE's major Serrano and Valley Substations. It will affect the flow on the South of Lugo and the Palo Verde – Devers – Valley-Serrano lines to Mira Loma and Rancho Vista. It will affect WECC Path 49 (East of River) and Path 46 (West of River). The TE/VS Interconnect southern terminal, located in the SDG&E system, is close to the San Onofre Nuclear Generation Station (SONGS). Thus, the TE/VS Interconnect provides the only 500 kV interconnection between SDG&E and the SCE system.

The TE/VS Interconnect is parallel to Path 43 (North of SONGS) as well as Path 44 (South of Songs) and will affect their flow as well. Without the phase-shifter transformers controlling the power flow direction, the power flow will most likely move from North-to-South (from Lake to Case Springs). The level of flows on the combined TE/VS and Path 44 will be a function of the import level of SDG&E. Normally both SCE and SDG&E are importing. Under this condition, the TE/VS Interconnect will shift the same total flow more toward the 500 kV in the eastern portion of the SCE system, which 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 to relieve transmission constraints on South of Lugo Path. With the phase shifting transformers at the SDG&E end of the TE/VS line, the ability to manage flows in either direction will be enhanced, although normally flows on TE/VS will be North-to-South.

As part of the TE/VS Interconnect, the construction of the Lake 500 kV Switchyard, at MP 2.0, with its attendant 500/115 kV transformers and 115 kV line extensions, will relieve transformer loading (due to significant load growth in the area), and current operating issues relating to the split bus operation of the Valley 115 kV bus and load balancing between the split 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 northern part of the SDG&E 230kV system and thus to SONGS operation. Currently SONGS operates under complex operating nomograms to maintain voltage support to SONGS under Nuclear Regulatory Commission requirements.

⁴⁶/ 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).

The TE/VS Interconnect and LEAPS will provide local and viable black-start capability to SONGS operation and to the grid.

3.3.4.2 Changes to SDG&E Transmission System

To interconnect the TE/VS Interconnect, a new Case Springs 500/230 kV Substation, at MP 31.2 will be built looping in the existing Talega – Escondido 230 kV lines. The existing line is a single circuit on double circuit towers. The second line position on that circuit will be added. The Talega – Case Springs portion of the existing line will be upgraded to handle up to 912 MVA to match the new second line, also to be rated 912 MVA rating. The existing and additional circuit from Case Springs to Escondido line will be rated 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, (since the tie to CFE in Mexico is limited by the conditions imposed on the SWPL line to Miguel). The import is limited when one of the import paths is lost. TE/VS will provide greater import capability to SDG&E.

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, with more flows likely on the SONGS – San Luis Rey lines. But the flows on these lines, even with the loss of one, is not limiting, as the loss of one of the three phase shifters or 500/230 kV transformers 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 upgrades to SDG&E's internal transmission system (including the 230 kV and the 69 kV systems and as further described herein), the TE/VS Interconnect will significantly increase SDG&E operational flexibility and reliability.
- The TE/VS Interconnect will increase SDG&E import capability and reduce LCR and RMR requirements.
- The TE/VS Interconnect provides a critical route to access renewable energy from Tehachapi, the desert region, and Imperial Valley, among other renewable resources currently under development.
- The TE/VS Interconnect phase shifting transformers can be operated to maximize reliability by managing flows by biasing natural flow balance, and 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.

3.4 Project Objectives

Project Objectives are presented in detail in Chapter 2.

3.5 Proposed Project

3.5.1 Introduction to Whole of the Proposed Project

This section describes the configuration of the Project as an overview to familiarize the reader with the Project's 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; and,
- 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 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, offset approximately 1 mile to the southeast, roughly from MP 12.5. 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 make 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.

Depending upon a number of conditions, including receipt of all required approvals, execution of contracts, and conditions in financial markets, among others, the TE/VS Interconnect and LEAPS facilities may be constructed in phases, likely with construction of the TE/VS Interconnect preceding that of LEAPS.

3.5.1.1 Components of the TE/VS Interconnect

The TE/VS Interconnect components are shown on Figure 3.1.1-3: Project Conceptual Single Line Diagram, and include:

A new 500 kV transmission line from the new Lake 500 kV Switchyard, at MP 2.0, to the new Case Springs 500/230 kV Substation, at MP 31.5, entering service in 2012 (depending upon timing of Commission approval).

A portion of this 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, at MP 11.5 through MP 13.2, and at MP 12.5, where there will be a “T” connection down to the Santa Rosa substation.

The Case Springs Substation is located adjacent to the TE line ROW at MP 31.5, 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 Santa Rosa Substation is located roughly midway between the Lake Switchyard and Case Springs Substation, offset one mile to the southeast from roughly MP 12.3, 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 in the area of Lee (Corona) Lake, at MP 2.0, 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 3.1.1-6: LEAPS Pumped Storage Component. Beginning with the description of 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 reversible 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 off-peak 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 Canyon Reservoir. 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 approximately 6,000 MWh during normal daily cycling and approximately 8,000 MWh available for emergency use. The cycle efficiency of the facility (generation energy to pumping energy) will be approximately 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 to and from the TE/VS Interconnect system and will flow via the Santa Rosa Substation to and from the turbine-generator.

3.5.2 Fit into Regional System

The Project will:

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

The transmission line will have a nominal rating of 1,500 MW and will increase import capability into the San Diego area by at least 1,000 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

As mentioned previously, although it is possible that the TE/VS Interconnect and LEAPS will commence construction at roughly the same time, receipt of all required approvals, execution of contracts, and conditions in financial markets, among other elements, may dictate that the TE/VS Interconnect and LEAPS facilities may be constructed in phases, likely with construction of the TE/VS Interconnect preceding that of LEAPS.

Other than this phased commencement of construction, there are no reasonable foreseeable future phases or consequences of the 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 1,000 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 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 3.1.1-3: 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 Lake Switchyard) to SDG&E's existing and upgraded 230 kV Talega-Escondido transmission line (via a new Case Springs Substation). The upgraded 230 kV transmission line will extend for about 52 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.⁴⁷
- CAISO's reliability criteria⁴⁸ and applicable planning standards.⁴⁹
- 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

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

48/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.

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

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 guidelines⁵⁰ and suggested practices.⁵¹

- SCE and SDG&E design standards, as applicable, and other applicable State and local codes.

3.6.1.2 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 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.

The transmission structure family is shown in Attachment #1. There are a total of 138 structures specified, and these structures are numbered 1 through 138. Of the structures specified, all 138 structures are non-specular lattice steel towers. These lattice steel structures can be erected, and maintained by helicopters, if no other form of access is available.

Upgrades to the SDG&E Talega-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 Attachment 1.

3.6.1.3 Conductor/Cable

3.6.1.3.1 Above-Ground Installation

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

51/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.

The TE/VS Interconnect is a single circuit transmission line utilizing galvanized lattice structures, with 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 1.762 inches in diameter, 2,156 Kcmil (thousands of circular mils) aluminum conductor steel reinforced (ACSR) with a spacing of 18 inches between conductor centers. 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. With this type of conductor, the load flows through the aluminum strands that are formed in a helix around the core of steel strands. The steel strands provide the mechanical tension strength to support the aluminum strands.

The typical conductor phase spacing for the four-legged single circuit towers is 32 feet as shown in Attachment 1. The overhead shield wires, employed to protect the electrical conductors from lightning strikes, would be aluminum-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 include:

- 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 kHz when tested at 350 kV
- SCE lattice design towers will be used for basic construction, EMS and EHT for tangent, ELA for line angles and ELD 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 ACSR
- 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, 32' 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. 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 overhead structures. This section runs from roughly MP 11.5 to MP 13.2, with a T off at MP 12.3 and an approximately one-mile segment to the Santa Rosa Substation.

Figure 3.6.1-3: North & South 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. Three views contained in Figure 3.6.1-4: North & South Transition Elevations (Typical) presents typical elevation views of the transition structures. The general design concept for the underground portion and for interface to the overhead lines is presented in Figure 3.6.1-5: GIL Vault Elevations.

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 (kA) short circuit.

This 1.7 mile underground section will be located underground in an area adjacent to the upper reservoir between structures T63, at MP 11.5 and T64 at MP 13.2, and a T off at MP 12.5 approximately 1,0 mile underground section from transition point to the Santa Rosa Substation.

The 1.7 mile horse shoe shaped underground tunnel has a cross section of about 12 x 12 feet with a declination of 5% to the transition. A vertical shaft with a inner diameter of 16 ft will connect the transition point with the 10% declining horse shoe type tunnel linking Santa Rosa Substation with cross section of 13 x 13 feet. From Santa Rosa Substation up to transition point , 2 GIL circuits will be installed which will split at the transition point to T 63 and T 64, as illustrated in Figure 3.6.1-3: North & South Transition Plan (Typical), Figure 3.6.1-4: North & South Transition Elevations (Typical) and Figure 3.6.1-5: GIL Vault Elevations. 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 affects 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. A representative illustration of the GIL cross section may be found in Figure 3.6.1-1: GIL Cross Section. A representative illustration of the GIL tunnel may be found in Figure 3.6.1-2: GIL Tunnel Illustration.

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

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

Source: Siemens Power Transmission & Distribution

The distance between the Lake Switchyard 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 1.7 SM. The new GIL will be located within the Congressional boundaries of the CNF.

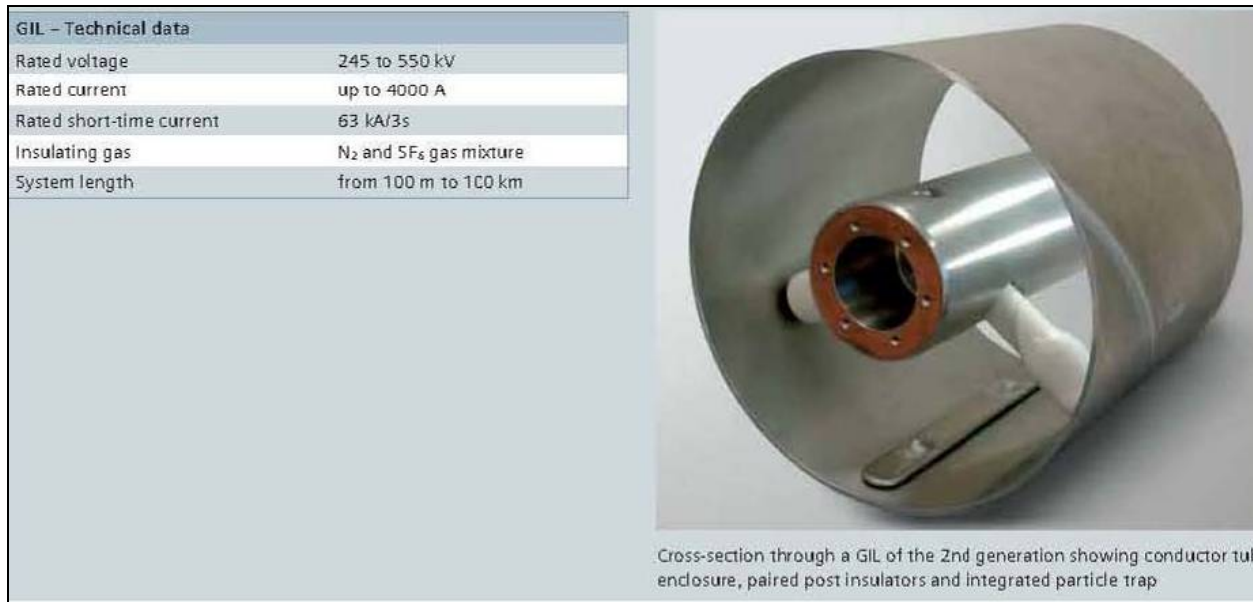


Figure 3.6.1-1: GIL Cross Section

Source: Siemens Power Transmission & Distribution

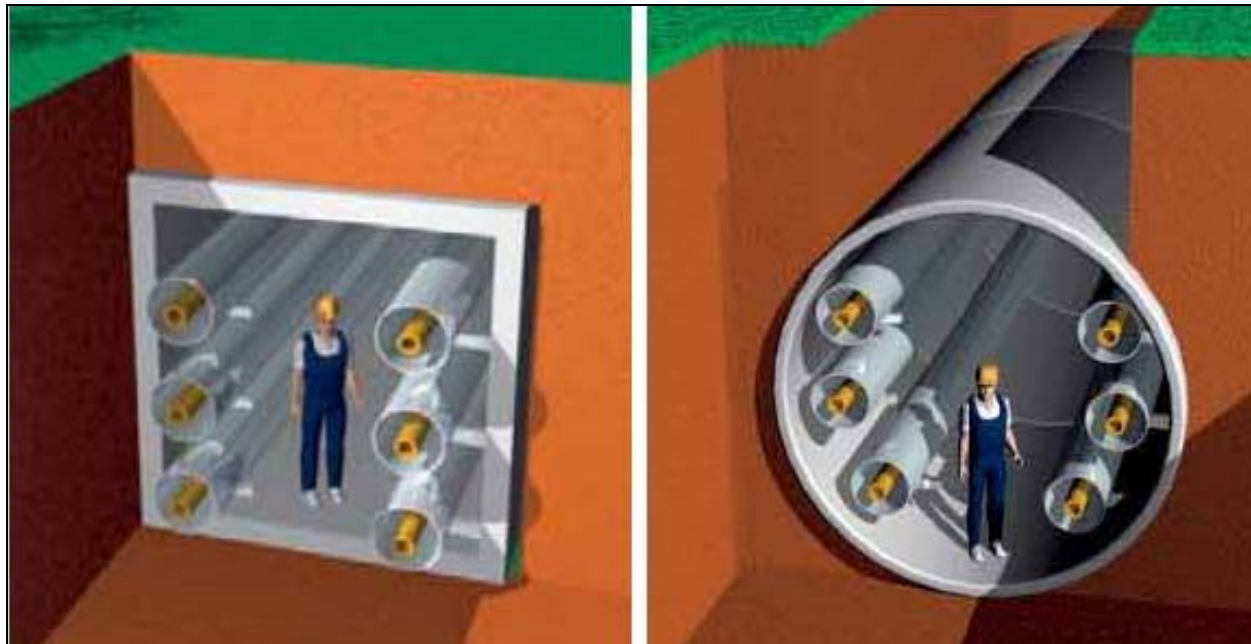


Figure 3.6.1-2: GIL Tunnel Illustration

Source: Siemens Power Transmission & Distribution

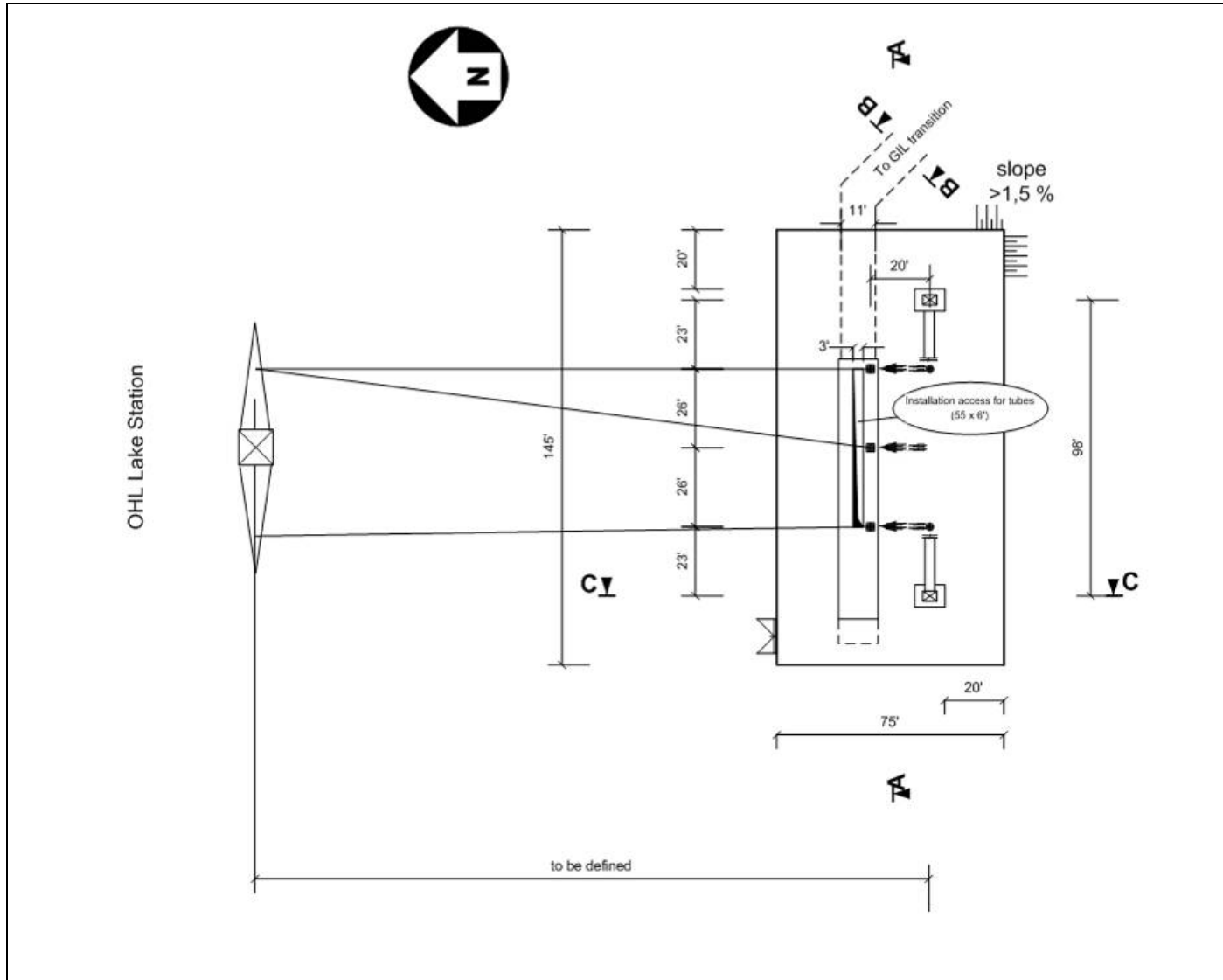


Figure 3.6.1-3: North & South Transition Plan (Typical)

Source: Siemens Power Transmission & Distribution

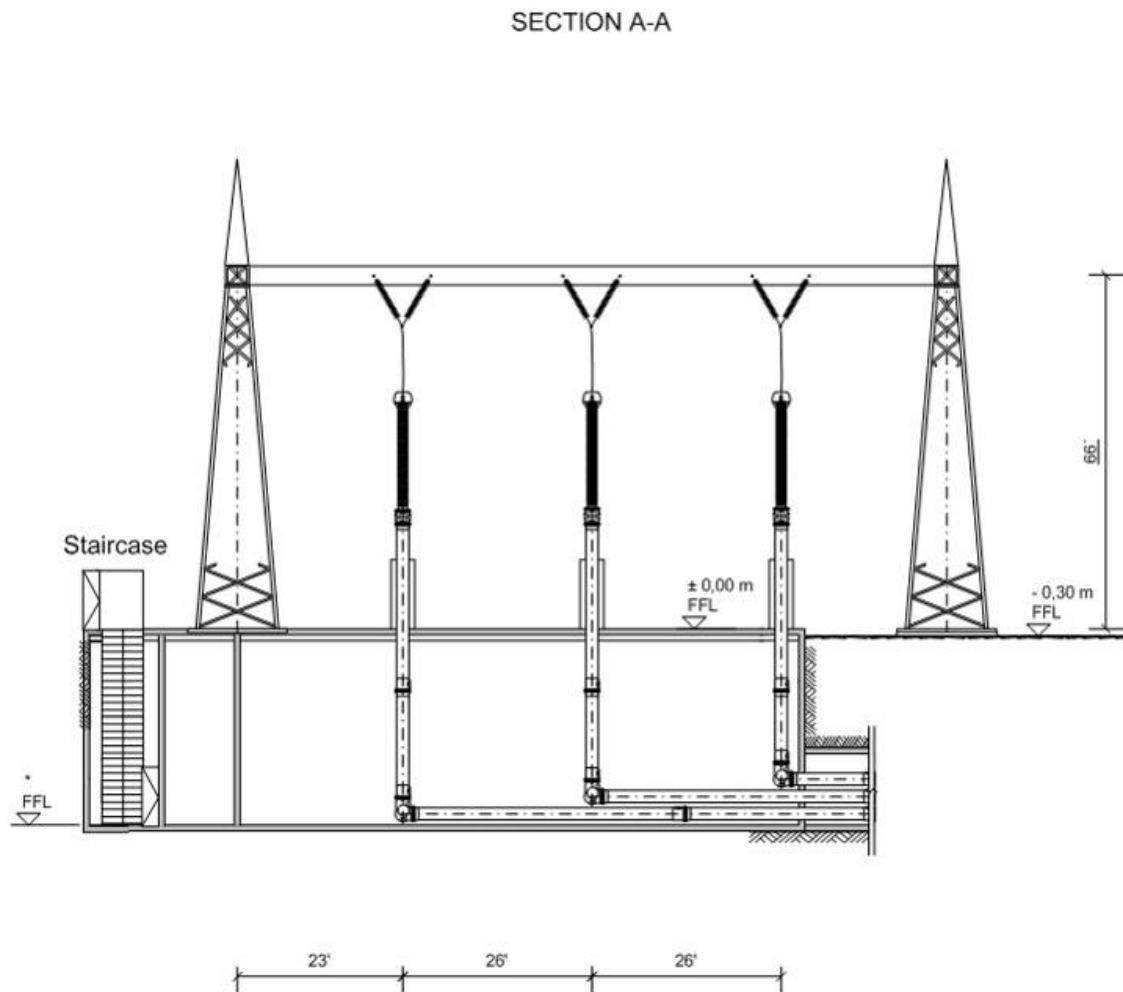


Figure 3.6.1-4: North & South Transition Elevations (Typical) (1 of 3)

Source: Siemens Power Transmission & Distribution

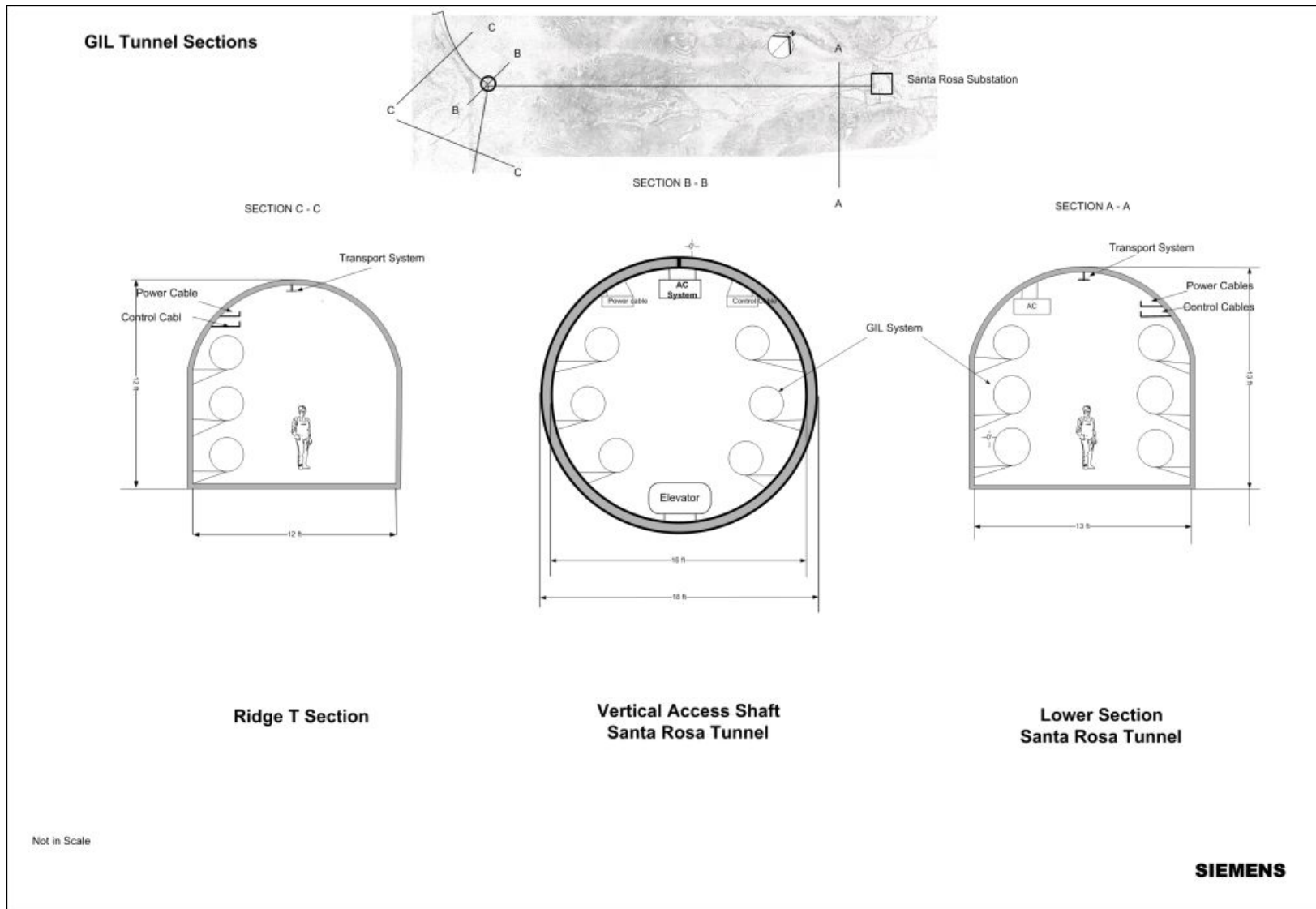


Figure 3.6.1-4: North & South Transition Elevations (Typical) (2 of 3)

Source: Siemens Power Transmission & Distribution

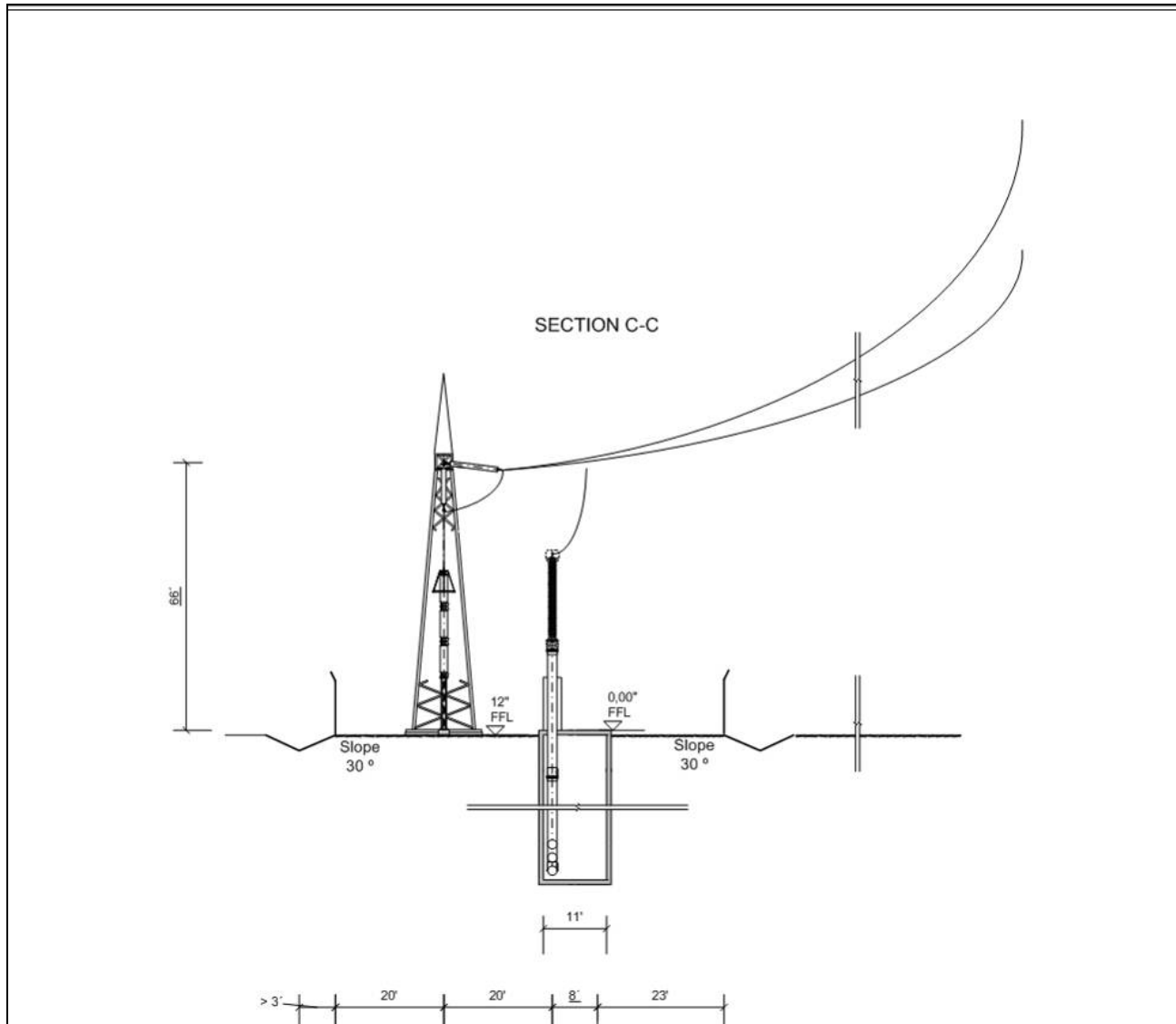


Figure 3.6.1-4: North & South Transition Elevations (Typical) (3 of 3)

Source: Siemens Power Transmission & Distribution

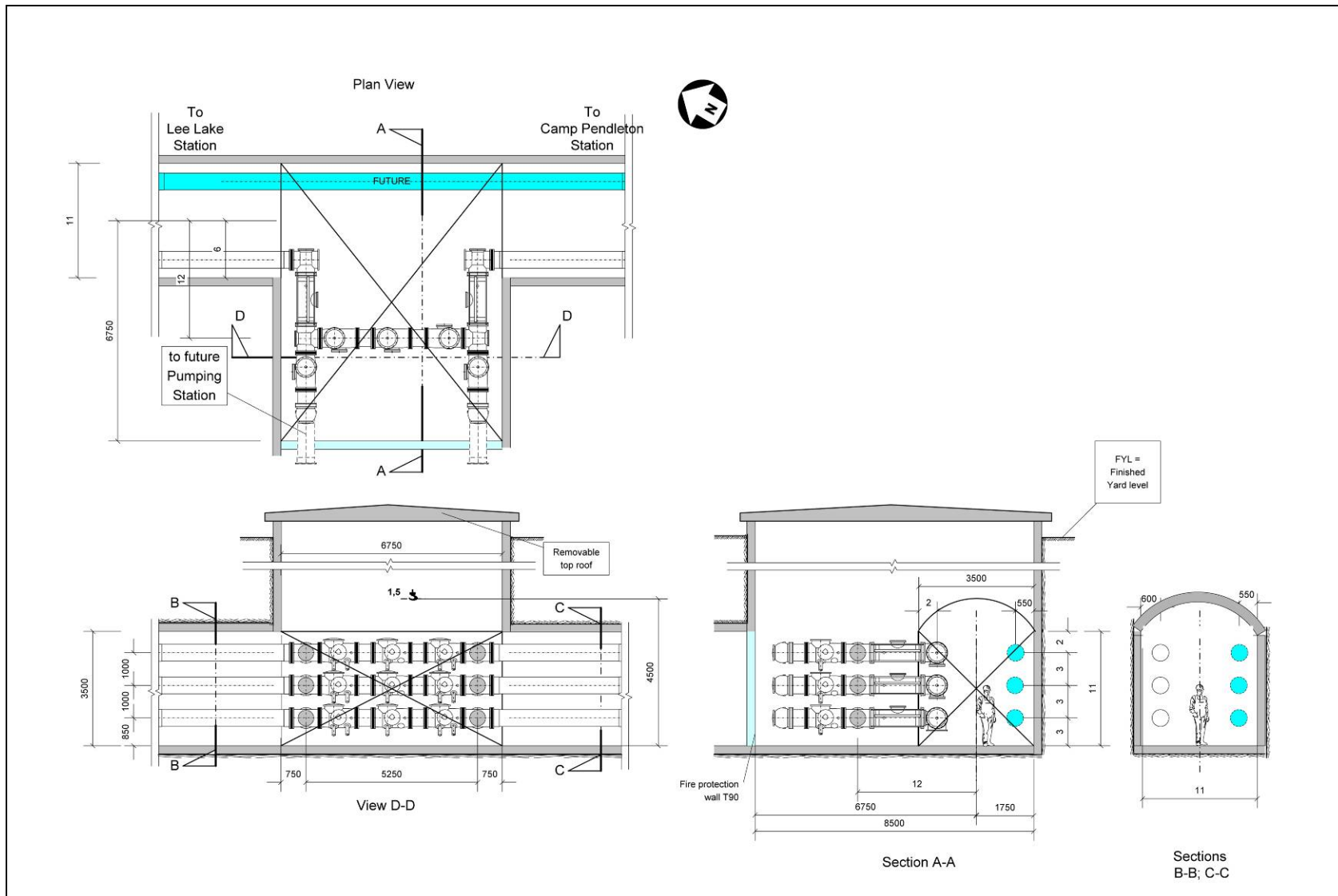


Figure 3.6.1-5: GIL Vault Elevations
 Source: Siemens Power Transmission & Distribution

3.6.1.4 Substations and Switchyards

New substations and switchyards, 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 3.6.1-6: 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, at MP 2.0.

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 6 acres on one pad, which will define the fence line. The switchyard outline itself is approximately 300 ft wide by 300 ft long. The new switchyard will consist of four 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 Lake 500 kV Switchyard is presented in Figure 3.6.1-7: Lake 500 kV Switchyard – Conceptual Plan Layout. Conceptual elevation drawings for that switchyard are presented in Figure 3.6.1-8: Lake 500 kV Switchyard – Conceptual Elevation Drawings. The switchyard is electrically depicted in Figure 3.6.1-9: 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.)

The extension of the Valley-Serrano line involves two single circuits extending between existing structures 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 2.75 miles, for an estimated total of 5.5 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 systems 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 four 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 first 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 Large Generator Interconnect Agreement now under negotiation between the parties, the switchyard will include the following:

1. New light-wave and channel equipment, SCADA and applicable Participating TO voice and data requirements.
2. 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.
3. 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 tower for VHF, UHF & WiFi communications. A typical communications tower may be seen in Figure 3.6.1-18: Representative Communication Tower.

750 kW Emergency diesel generator and day tank, (CARB Certified).

Lighting requirements for the facility fall within the following regulatory constraints.

The location falls within the 45 mile radius of the Palomar Observatory. Due to ambient light pollution, the County of Riverside has enacted Ordinance No. 655 on June 7, 1988. This Ordinance provides limitations on nighttime lighting, to limit impacts on observations from Palomar Observatory.

The facility also falls into Class II, Zone B regulations as specified in Ordinance No. 655. Due to these requirements, the switchyard lighting will be low-pressure sodium (LPS) lighting. In addition the lighting levels are not to exceed 4050 Lumens. Under Class II, Zone B, lighting is not limited to time of day.

Therefore low pressure sodium lights will be installed throughout the facility, for complete exterior coverage, with lighting levels below 4050 Lumens. This lighting will be photocell controlled for energy conservation.

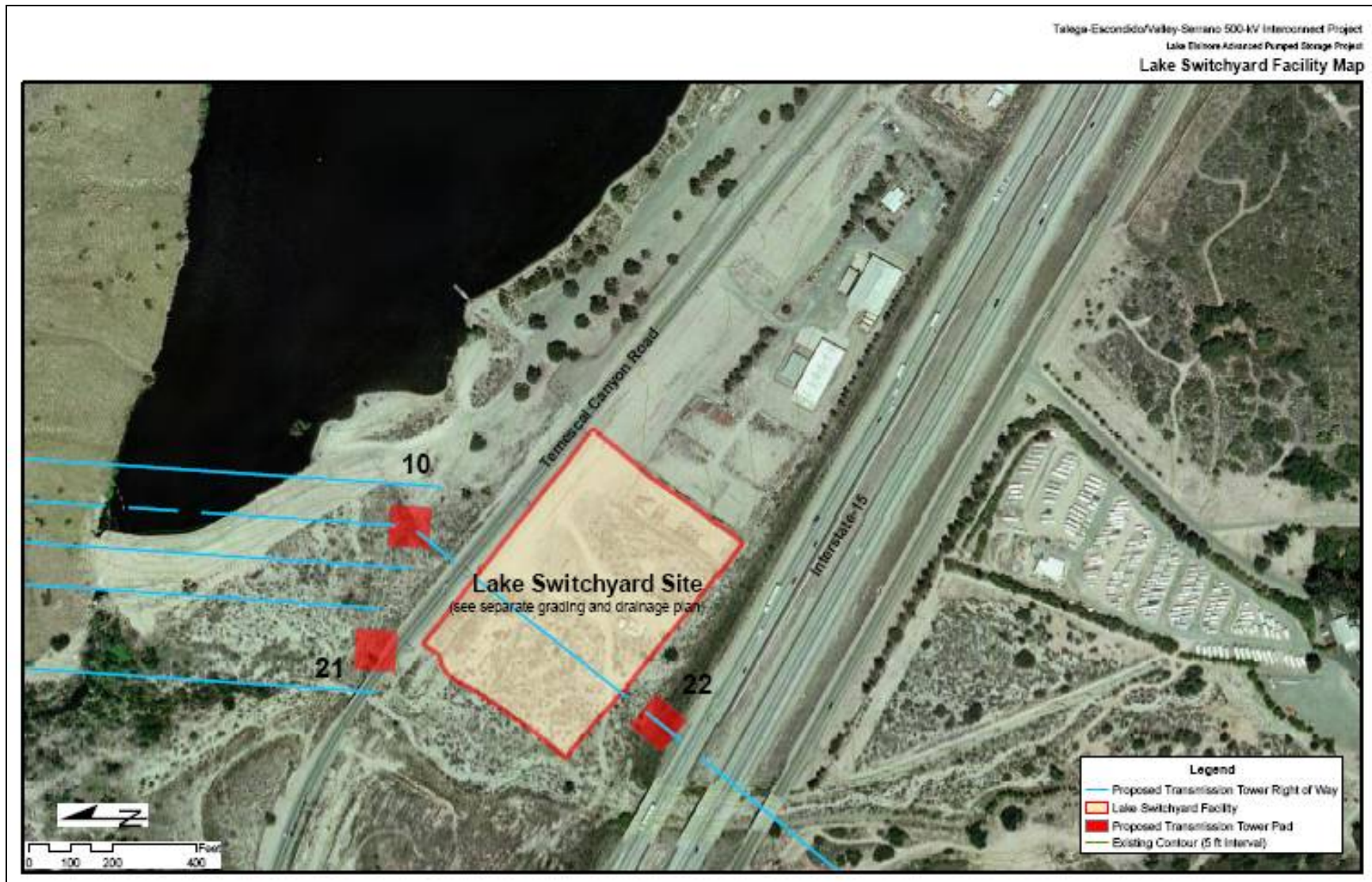


Figure 3.6.1-6: Lake Switchyard Site
Source: The Nevada Hydro Company

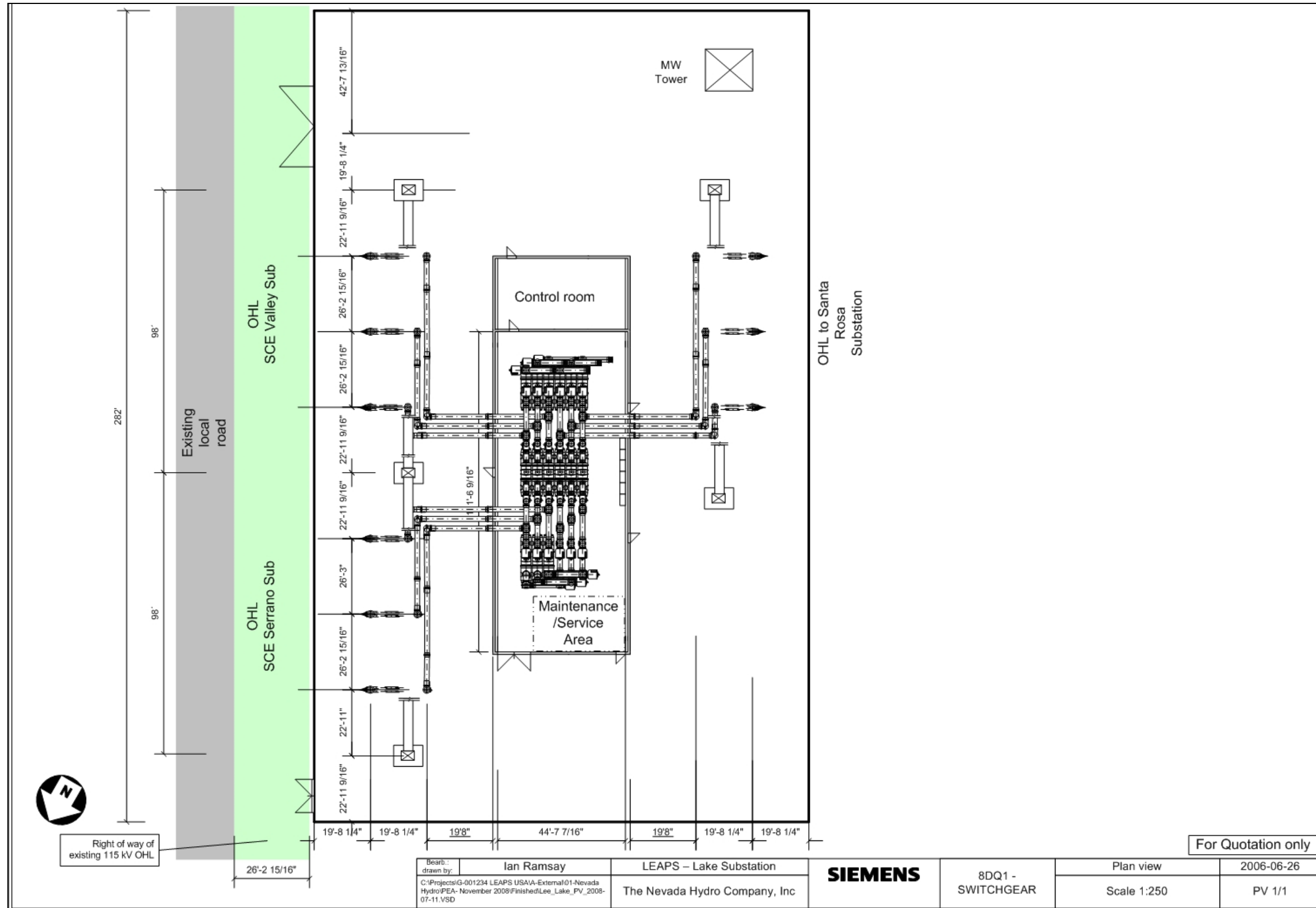


Figure 3.6.1-7: Lake 500kV Switchyard – Conceptual Plan Layout

Source: Siemens Power Transmission & Distribution

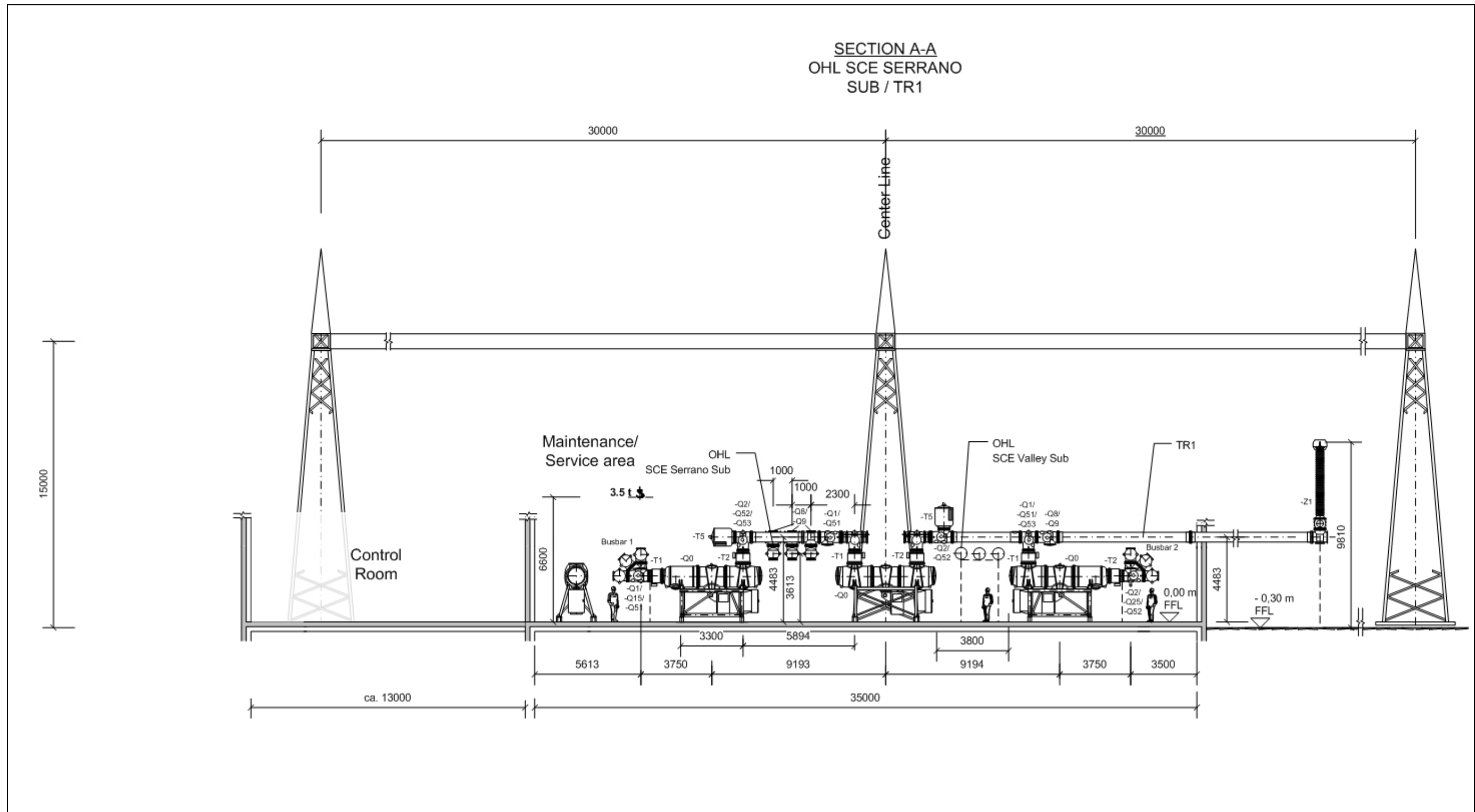


Figure 3.6.1-8: Lake 500 kV Switchyard – Conceptual Elevation Drawings (1 of 3)

Source: Siemens Power Transmission & Distribution

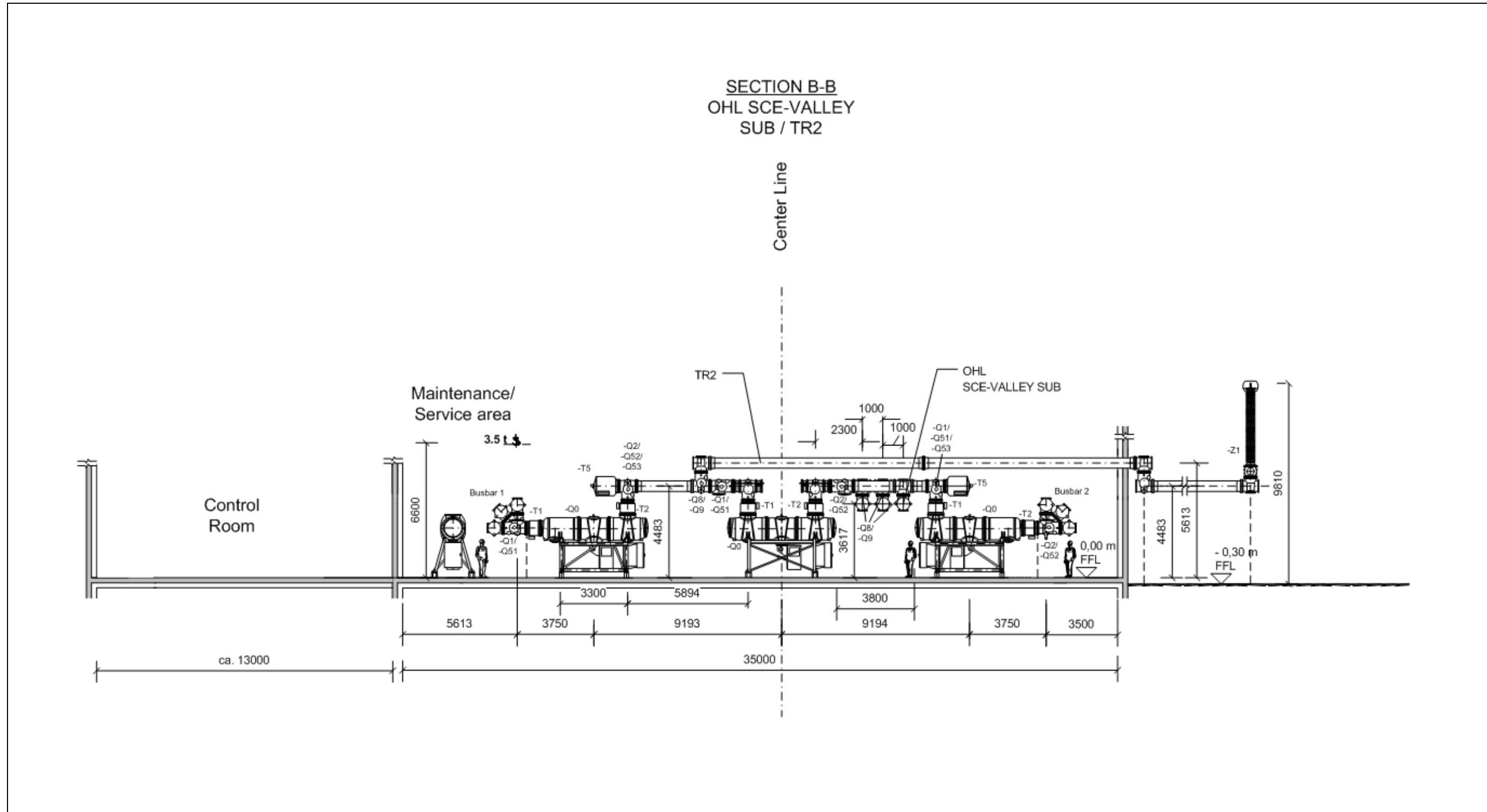


Figure 3.6.1-8: Lake 500 kV Switchyard – Conceptual Elevation Drawings (2 of 3)

Source: Siemens Power Transmission & Distribution

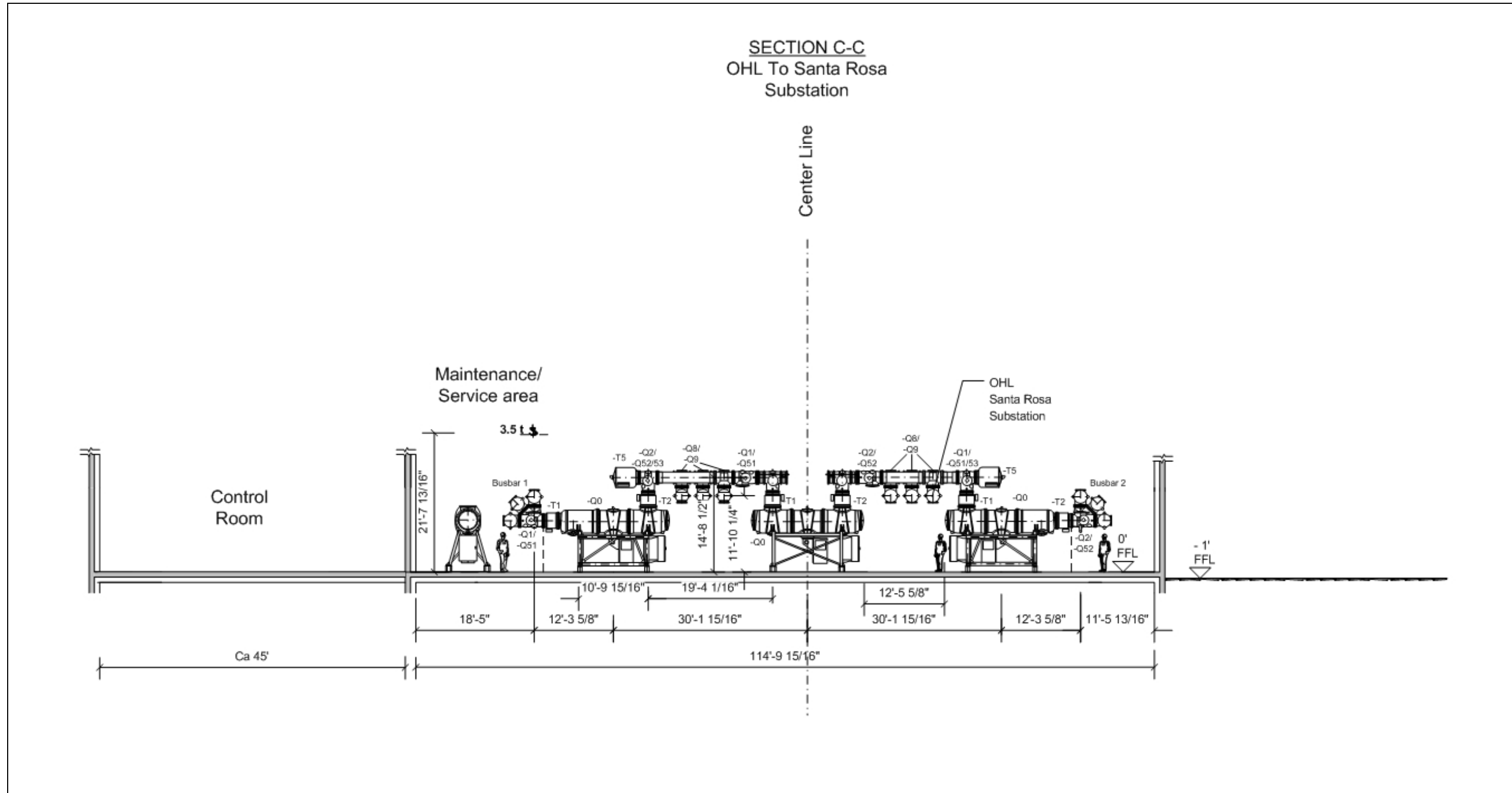


Figure 3.6.1-8: Lake 500 kV Switchyard – Conceptual Elevation Drawings (3 of 3)

Source: Siemens Power Transmission & Distribution

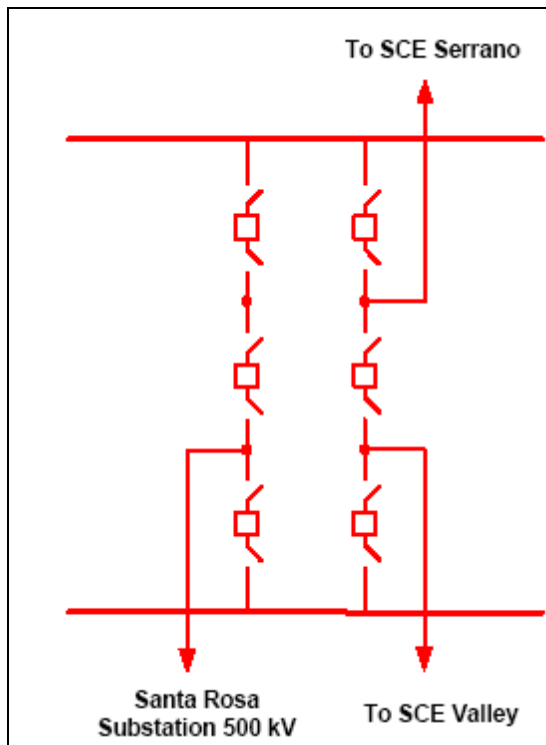


Figure 3.6.1-9: Lake 500 kV Switchyard – Single Line Diagram

Source: Siemens Power Transmission & Distribution

3.6.1.4.2 Santa Rosa Substation

The proposed Santa Rosa Substation is located within an unincorporated area (Lakeland Village) of Riverside County, roughly midway between the Lake Switchyard and Case Springs Substation, offset one mile to the southeast from roughly MP 12.3. The Substation will provide reliability enhancements to the local distribution system and later connect the pumped storage facility to the grid.

As illustrated in Figure 3.6.1-10: 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. See Figure 3.1.1-5: 115 kV Corridor Plan. The approximate load is 100 MW per circuit, for a total of 200 MW of new load served. The load served is for 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 3.6.1-11: Santa Rosa Substation Site – Conceptual Site Plan. Conceptual elevation drawings for that substation are presented in Figure 3.6.1-12: Santa Rosa Substation Site – Conceptual Elevation Drawings. The substation is electrically depicted in Figure 3.6.1-13: Santa Rosa Substation Single Line Diagram.

While serving to reinforce local load, the Santa Rosa Substation may later provide for a connection for the pumped storage facility's powerhouse to connect 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. The generator voltage of the pumped turbine generator is 20kV.

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.

Design parameters are shown on Table 3.6.1-2: Santa Rosa Substation Design Parameters.

Table 3.6.1-2: Santa Rosa Substation Design Parameters

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

Like that for the Lake Switchyard, lighting requirements for the facility fall within the following regulatory constraints.

The location falls within the 45 mile radius of the Palomar Observatory. Due to ambient light pollution, the County of Riverside has enacted Ordinance No. 655 on June 7, 1988. This Ordinance provides limitations on nighttime lighting, to limit impacts on observations from Palomar Observatory.

The facility also falls into Class II, Zone B regulations as specified in Ordinance No. 655. Due to these requirements, the switchyard lighting will be low-pressure sodium (LPS) lighting. In addition the lighting levels are not to exceed 4050 Lumens. Under Class II, Zone B, lighting is not limited to time of day.

Therefore low pressure sodium lights will be installed throughout the facility, for complete exterior coverage, with lighting levels below 4050 Lumens. This lighting will be photocell controlled for energy conservation.



Figure 3.6.1-10: Santa Rosa Substation Site

Source: The Nevada Hydro Company

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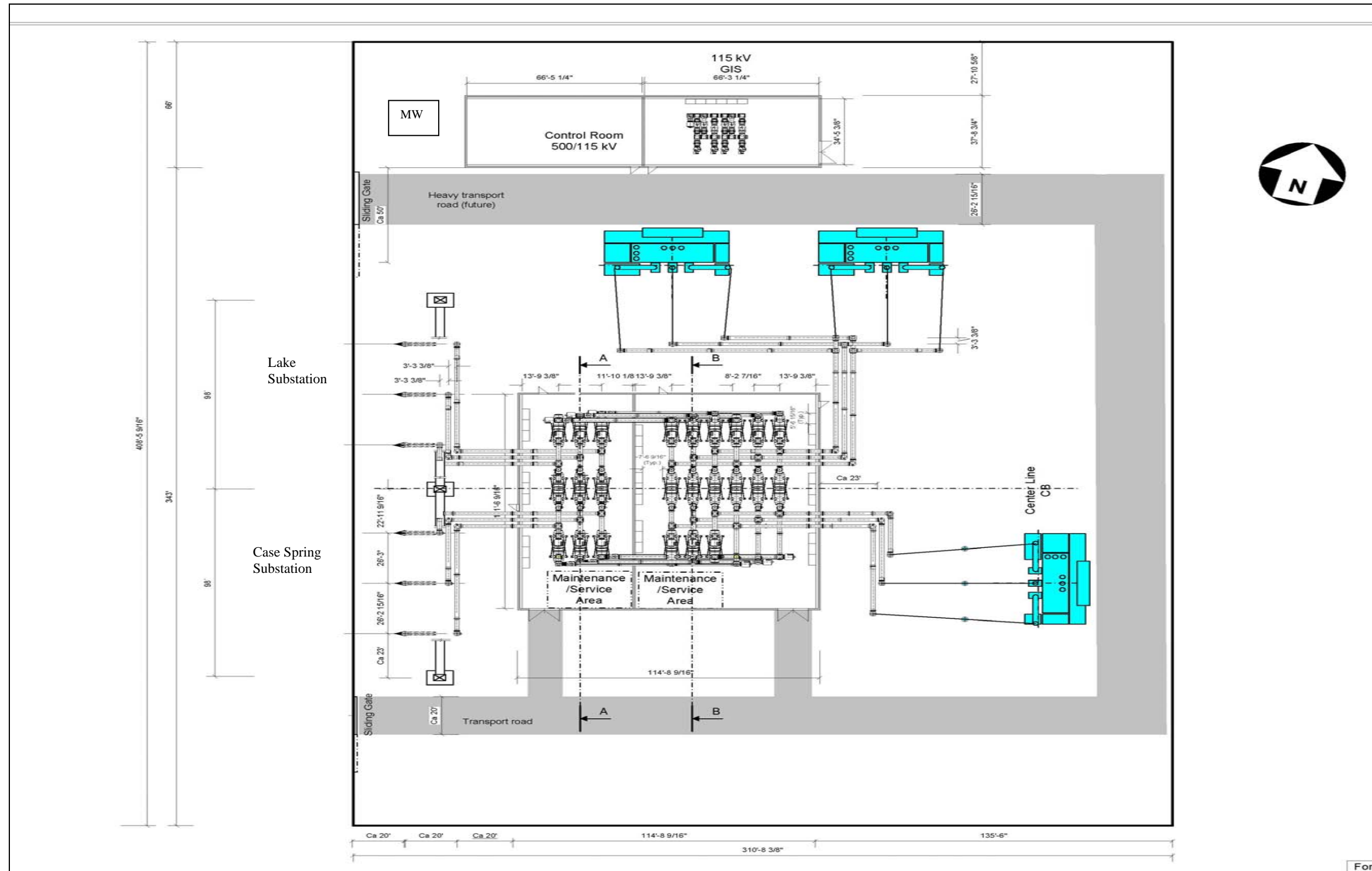


Figure 3.6.1-11: Santa Rosa Substation Site – Conceptual Site Plan
 Source: Siemens Power Transmission & Distribution

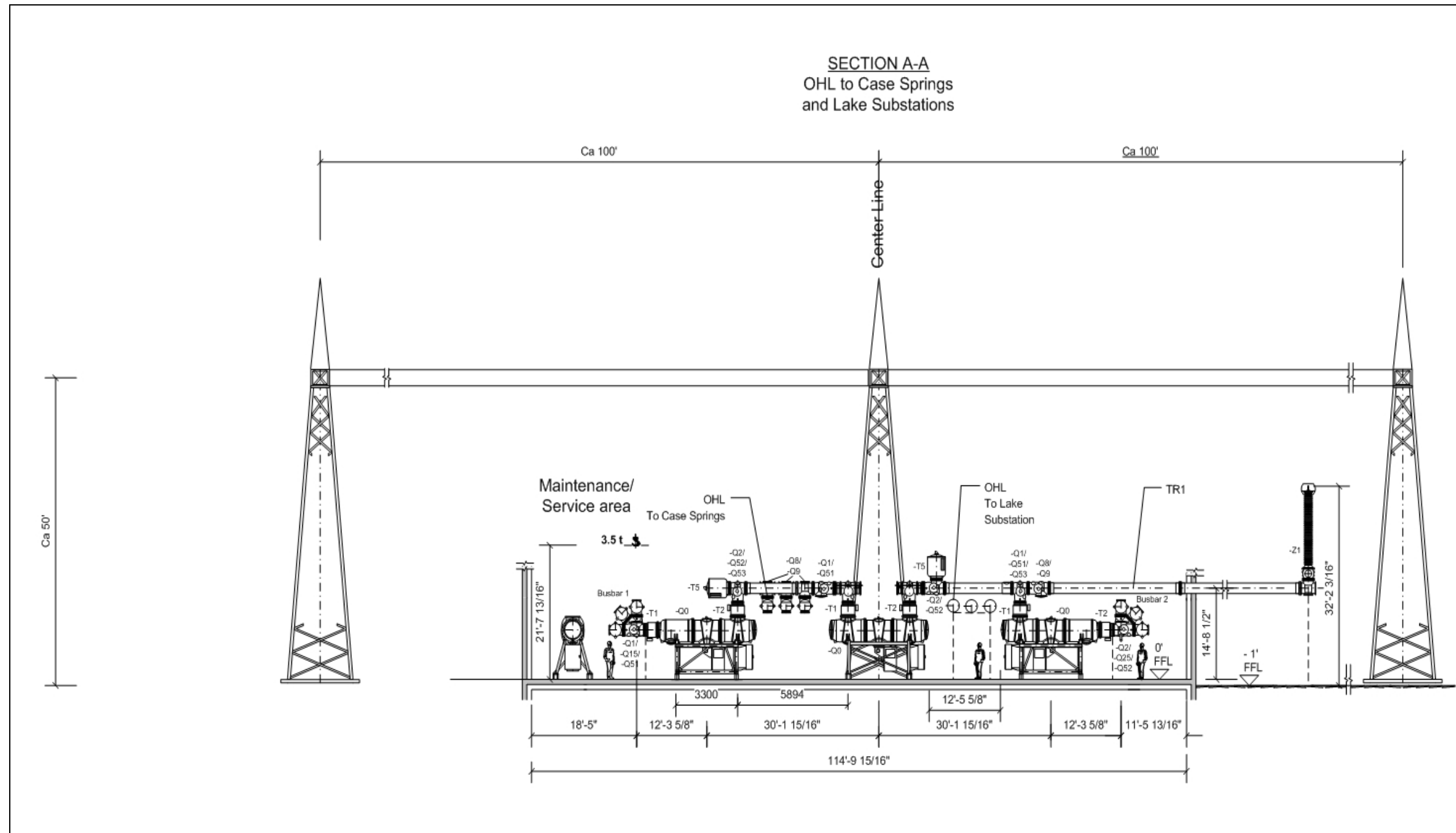


Figure 3.6.1-12: Santa Rosa Substation Site – Conceptual Elevation Drawings (1 of 3)
Source: Siemens Power Transmission & Distribution

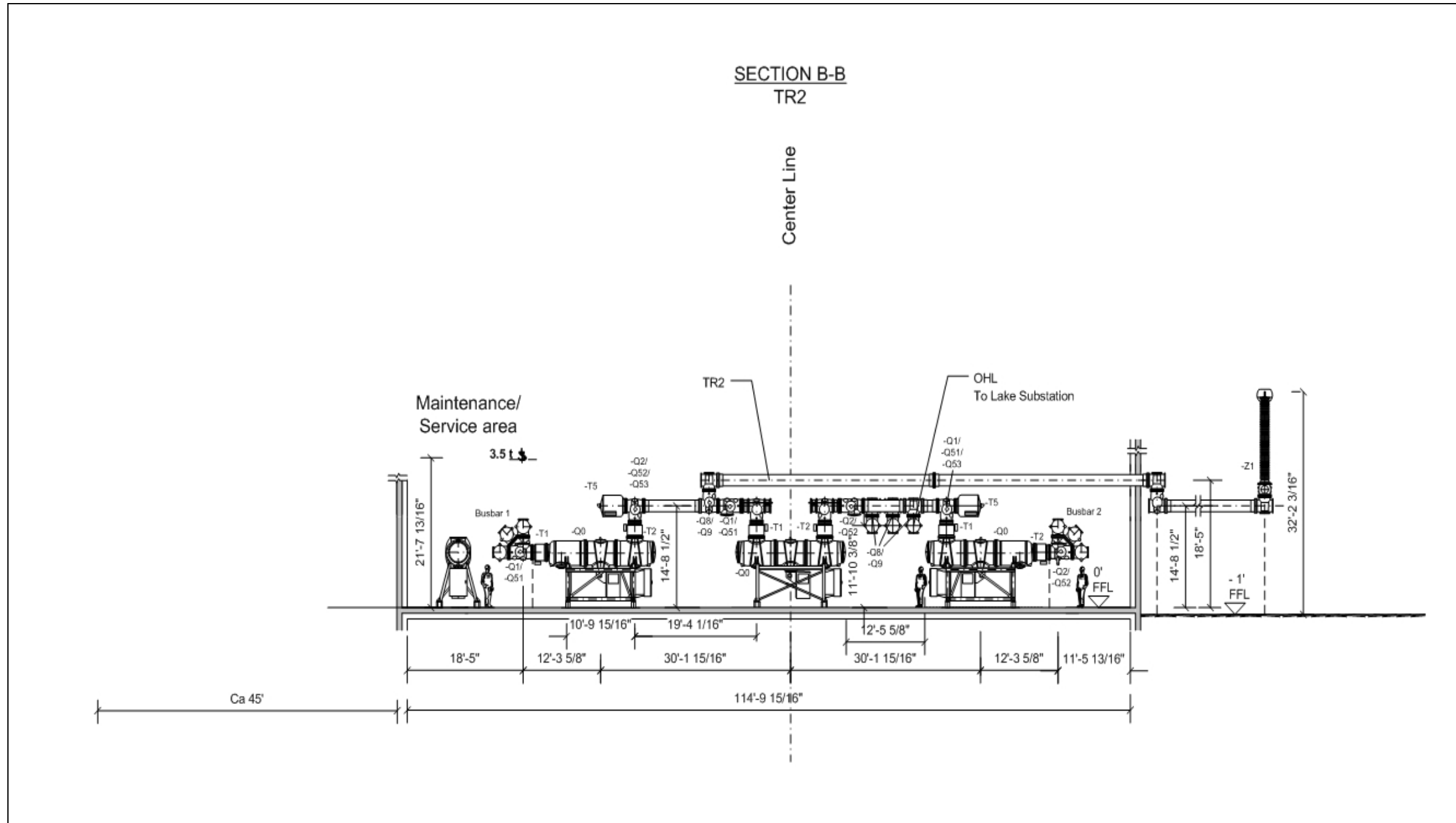


Figure 3.6.1-12: Santa Rosa Substation Site – Conceptual Elevation Drawings (2 of 3)
Source: Siemens Power Transmission & Distribution

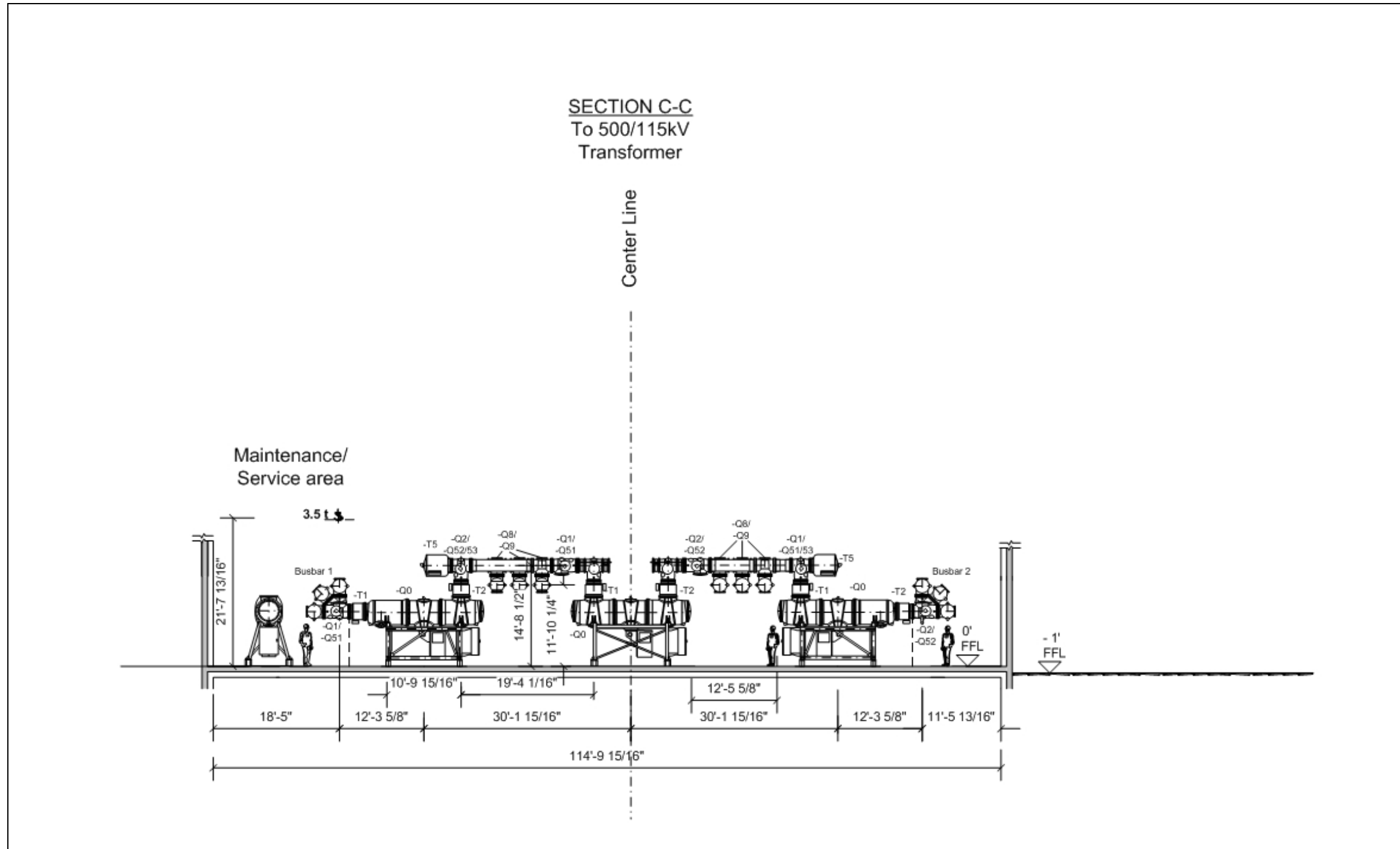


Figure 3.6.1-12: Santa Rosa Substation Site – Conceptual Elevation Drawings (3 of 3)
Source: Siemens Power Transmission & Distribution

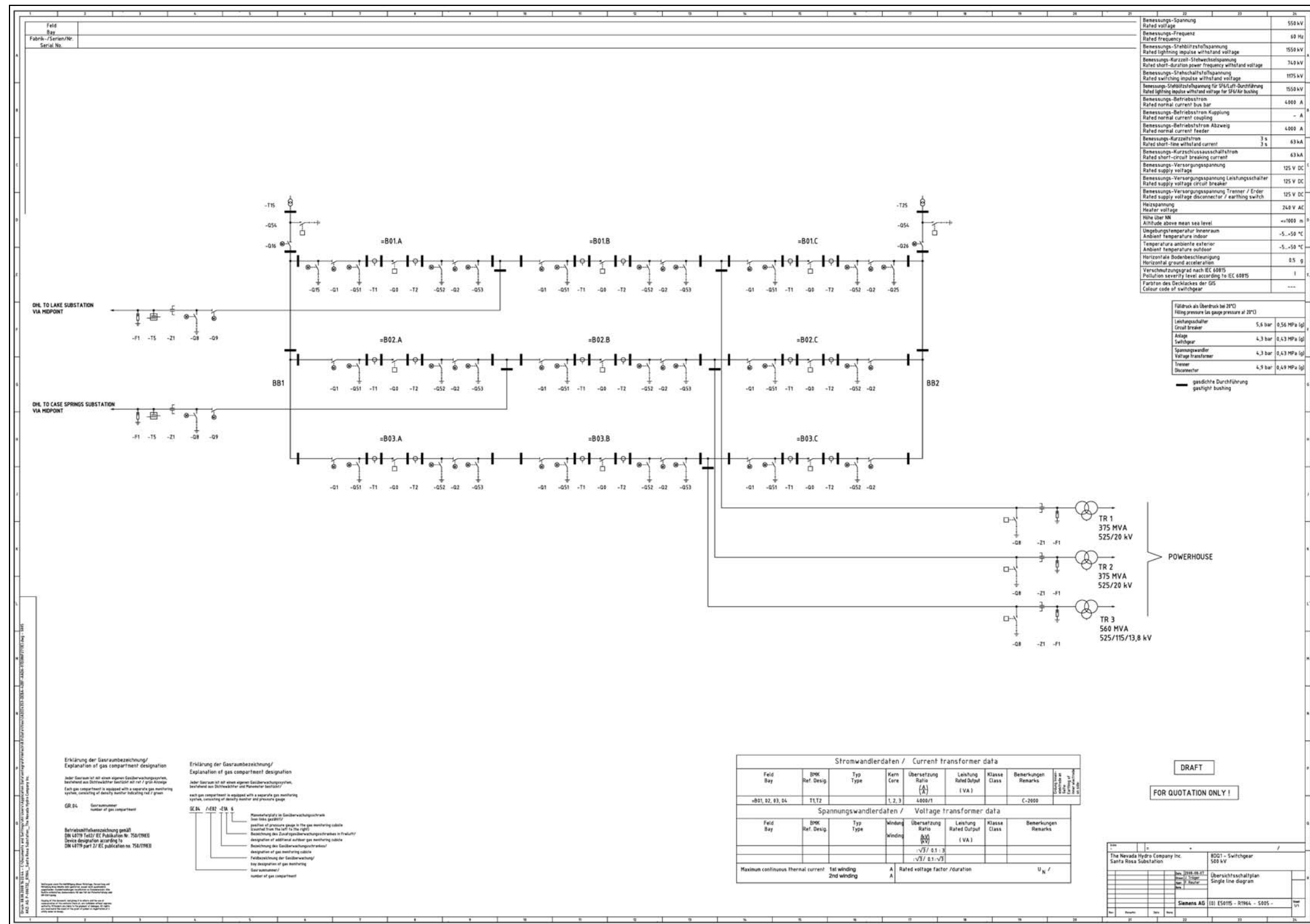


Figure 3.6.1-13: Santa Rosa Substation Single Line Diagram
 Source: Siemens Power Transmission & Distribution

3.6.1.4.3 Case Springs Substation

The proposed Case Springs 500 kV to 230 kV gas-insulated substation (GIS), located near MP 31.5, serves as the southern interconnection of the TE/VS Interconnect to the SDG&E system. The Substation (500 kV, 230 kV, and 13.8 kV station power) will be located adjacent to the ROW of SDG&E's existing 230 kV transmission lines within land owned by the Fallbrook Land Conservancy. A map of the Camp Pendleton and Fallbrook conservancy area near the site may be found at Figure 3.6.1-14: Camp Pendleton Area Map. As illustrated in Figure 3.6.1-15: Case Springs Substation Site, the site is approximately 6 acres. SDG&E's existing 230 kV transmission lines extend between the existing Talega and Escondido Substations. The loop-in consists of installation of four 230 kV anchor bolted dead-end tubular steel poles, and hardware and conductor.

The Case Springs Substation will include:

1. Three bays, 500 kV GIS breaker and a half bus design
2. The initial 4-bay 230 kV 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), including a VHF communication tower. A typical communications tower may be seen in Figure 3.6.1-18: Representative Communication Tower.
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)

In relation to facility lighting, the facility is located within the Camp Pendleton. Federal Lands are exempt from the San Diego County, Division 9 Light Pollution Ordinance, Sections 59.101 through 59.115. Voluntary compliance is encouraged, but not required.

Special lighting requirements are requested by the Camp Pendleton. Due to low level nighttime flight operations, all lighting is to be infrared as specified, directed by their flight operations, and as dictated by the Commanding Officer.

This means that special lighting will be specified and installed. At the same time, this type of lighting would not impact the Palomar Observatory.

For emergency operations or service, only as allowed by the Commanding Officer, low-pressure sodium (LPS) lighting will be installed, not to exceed 4050 Lumens. In this way voluntary compliance per Division 9 Ordinance will be accomplished. This lighting is only to be used when approved by the Camp Pendleton.

Similar lighting requirement will be applied to any new towers adjacent to, and required by the Case Springs Substation. No standard FAA beacons will be utilized on new structures within Camp Pendleton unless approved or directed by Camp officials.

The facility will also include flow control. Three phase-shifting transformers, sized for nominal operation at approximately +16 to -32 degrees with a southern flow of 1,500 MW, are planned. A detailed study was required to select the three 230 kV, 500 MVA phase shifting transformers located at Case Springs Substation. Several major contingencies were studied, and the resulting phase control angles examined. The phase shifting range is important to determine the tap-changer specifications, and to provide good dynamic control. The results of this study are contained within the following Table 3.6.1-3: Power Flow Testing of System Conditions and Associated Angular Phase Shifts.

A conceptual site plan for the new Case Springs Substation is presented in Figure 3.6.1-16: Case Springs Substation – Conceptual Site Plan. The Case Springs Substation is electrically depicted in Figure 3.6.1-17: Case Springs Substation – 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 nominal capacity of 1,500 MW to San Diego. In addition, it will be able to provide 1,000 MW under contingency (G-1/N-1) conditions, and can be dispatched in real-time by the CAISO.

The point of connection between SDGE and The TE/VS Interconnect 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.

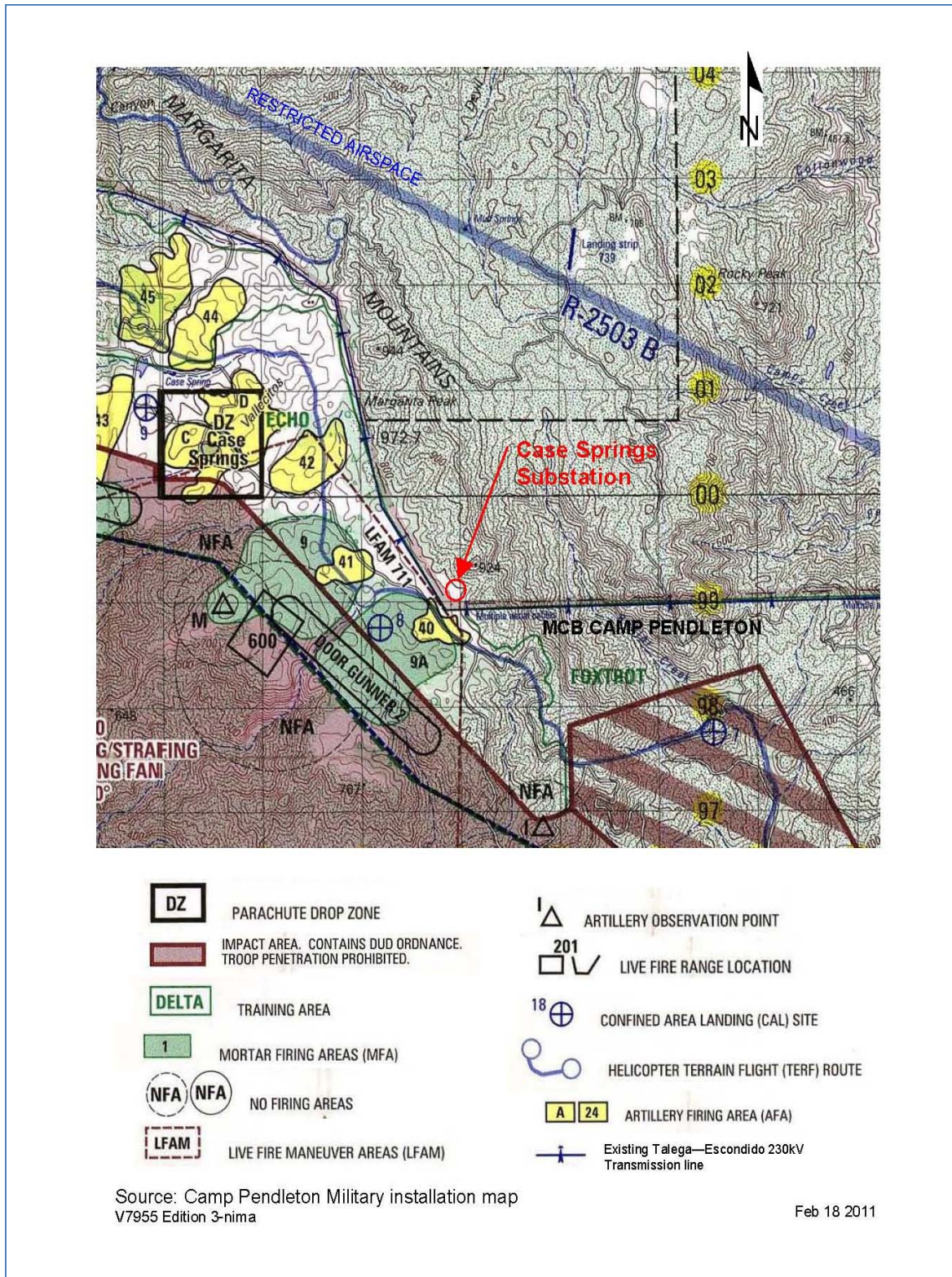


Figure 3.6.1-14: Camp Pendleton Area Map

Source: The Nevada Hydro Company

Table 3.6.1-3: Power Flow Testing of System Conditions and Associated Angular Phase Shifts

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 CS RTP 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

Source: Siemens Power Transmission & Distribution

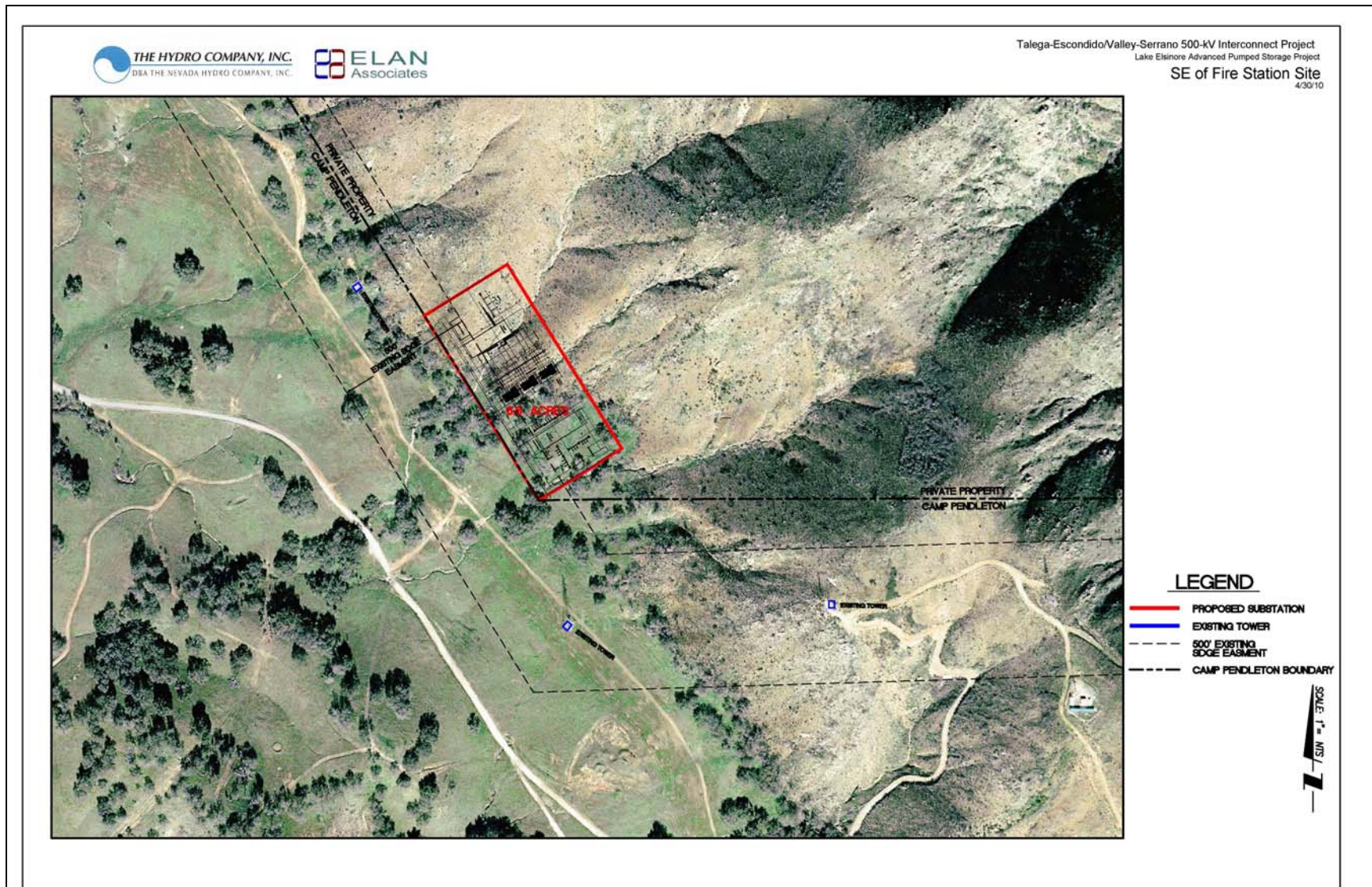


Figure 3.6.1-15: Case Springs Substation Site
 Source: The Nevada Hydro Company

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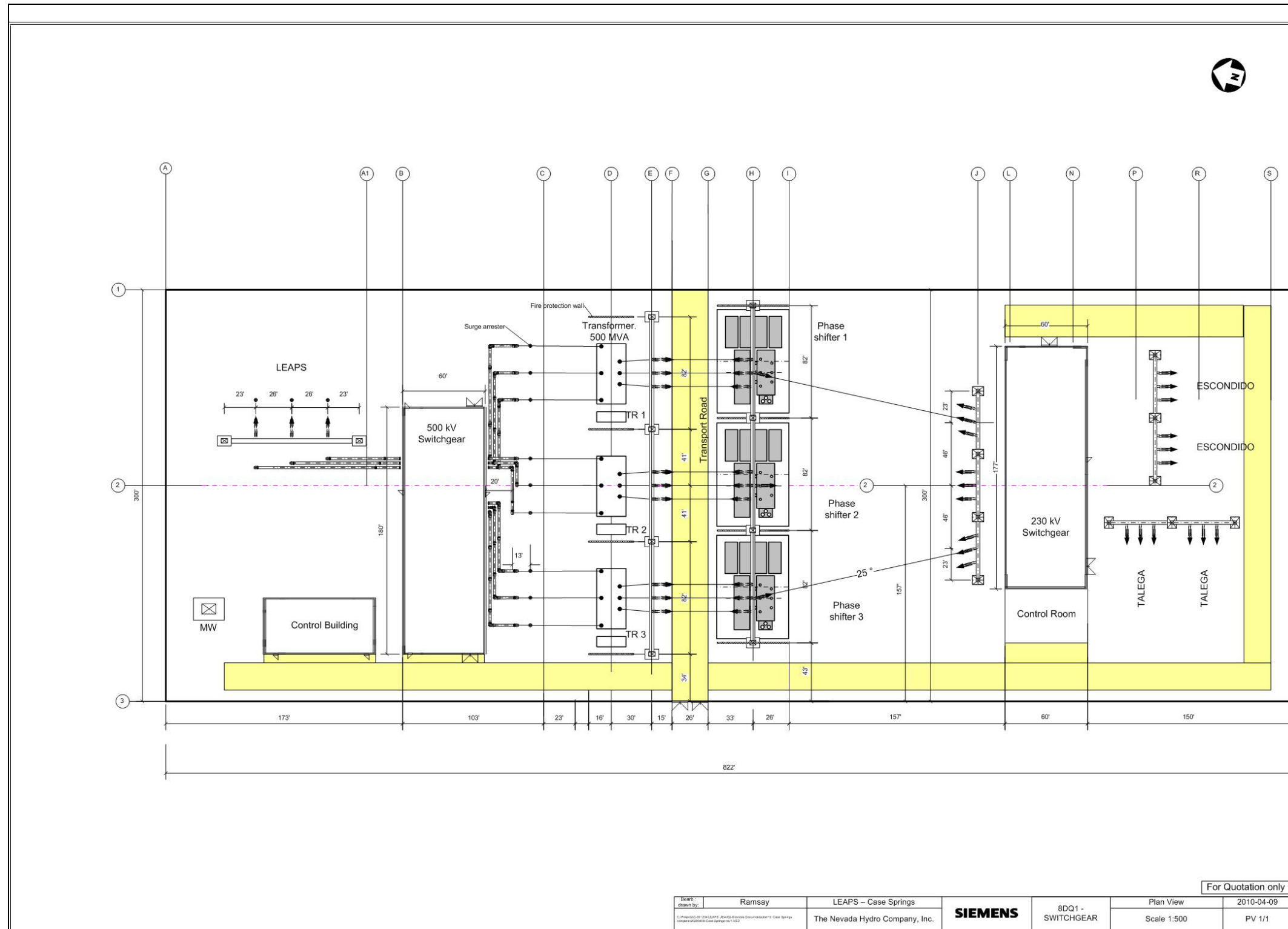


Figure 3.6.1-16 Case Springs Substation – Conceptual Site Plan
 Source: Siemens Power Transmission & Distribution

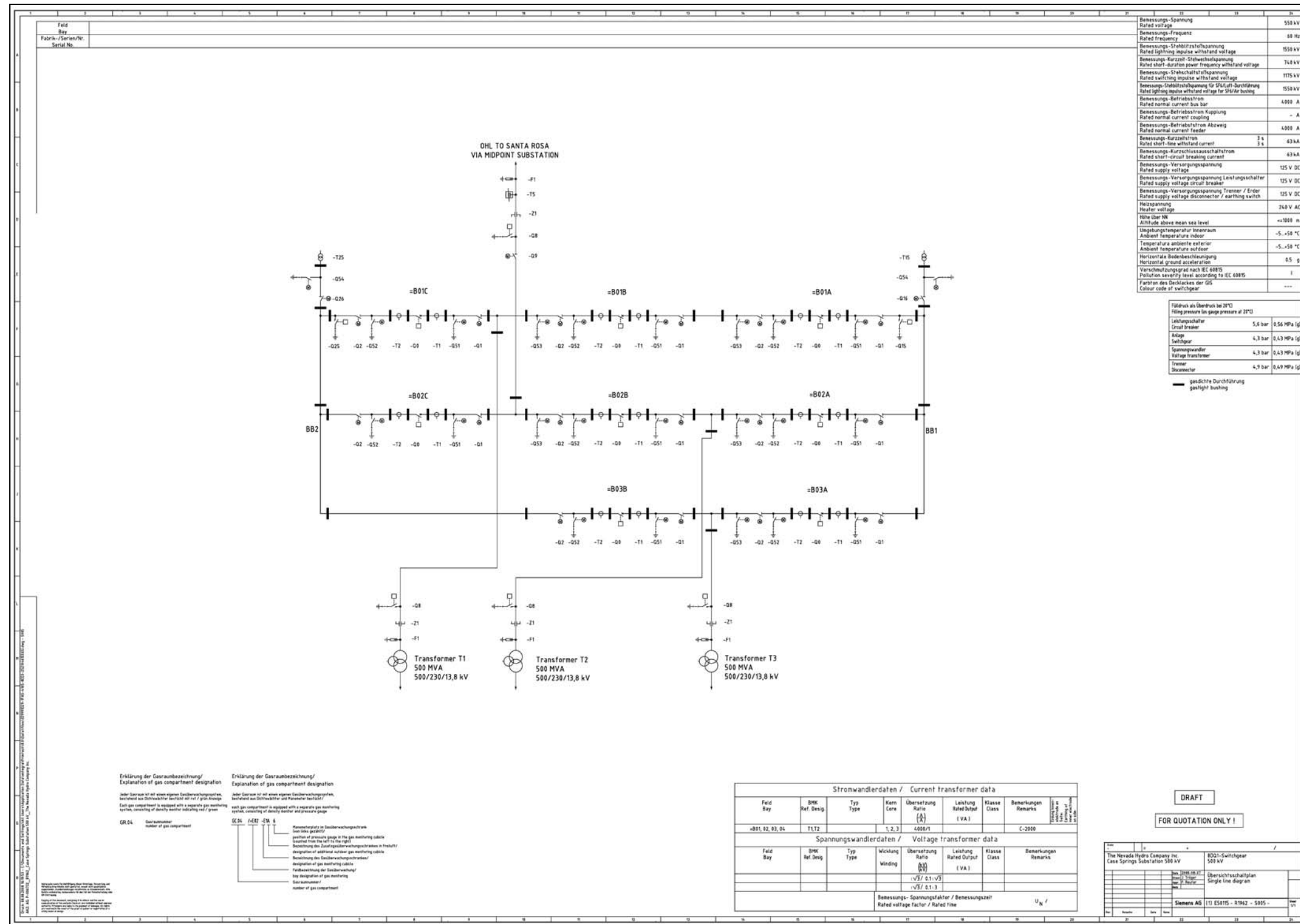


Figure 3.6.1-17: Case Springs Substation – Single Line Diagram (1 of 2)
Source: Siemens Power Transmission & Distribution

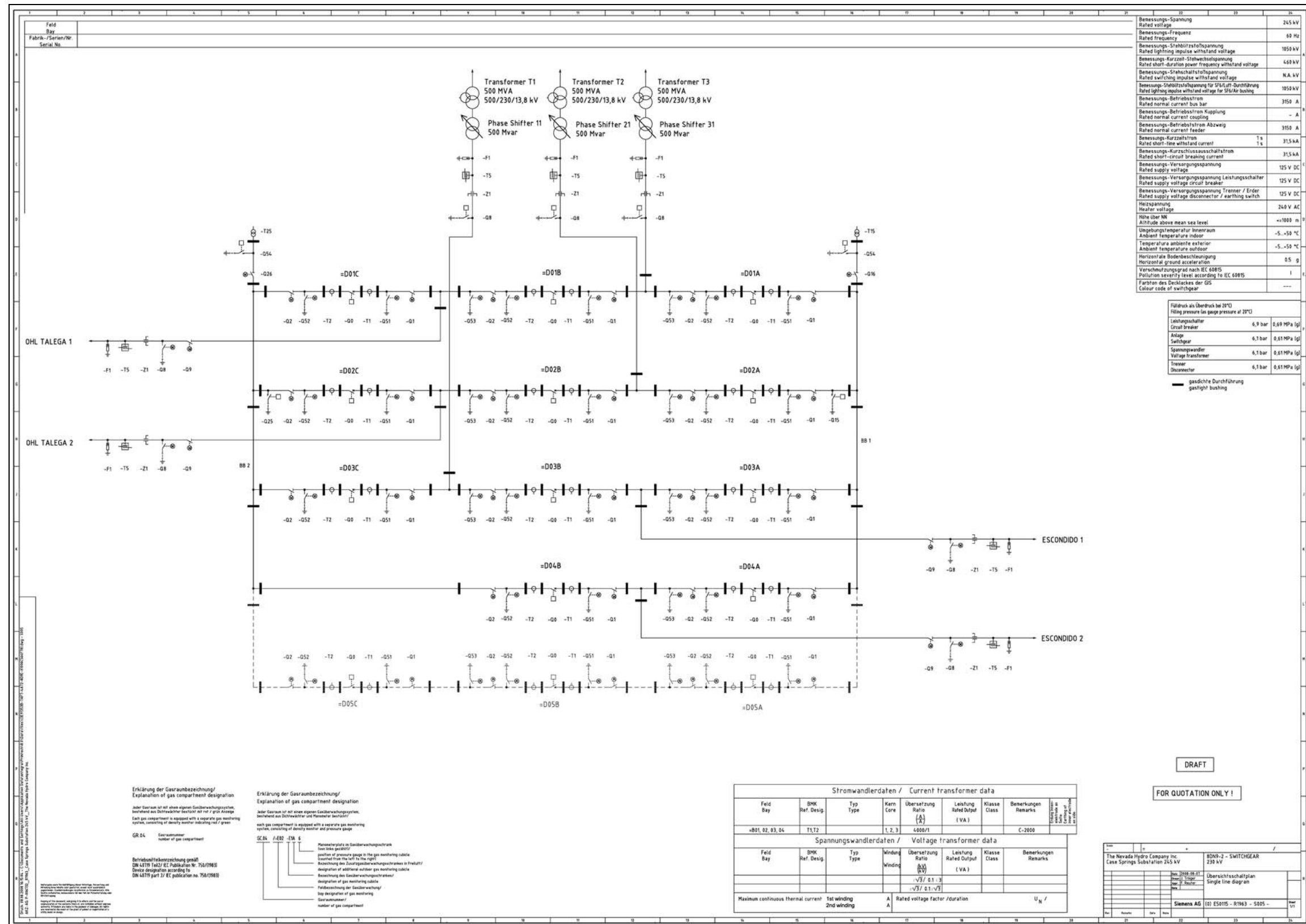


Figure 3.6.1-17: Case Springs Substation – Single Line Diagram (2 of 2)

Source: Siemens Power Transmission & Distribution

3.6.1.5 Telecommunications

Overhead shield wires will be used to protect the electrical conductors from lightning strikes. These wires would be aluminum-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 antenna platforms and anti-collision lights. A representative communications tower may be seen in Figure 3.6.1-18: Representative Communication Tower.

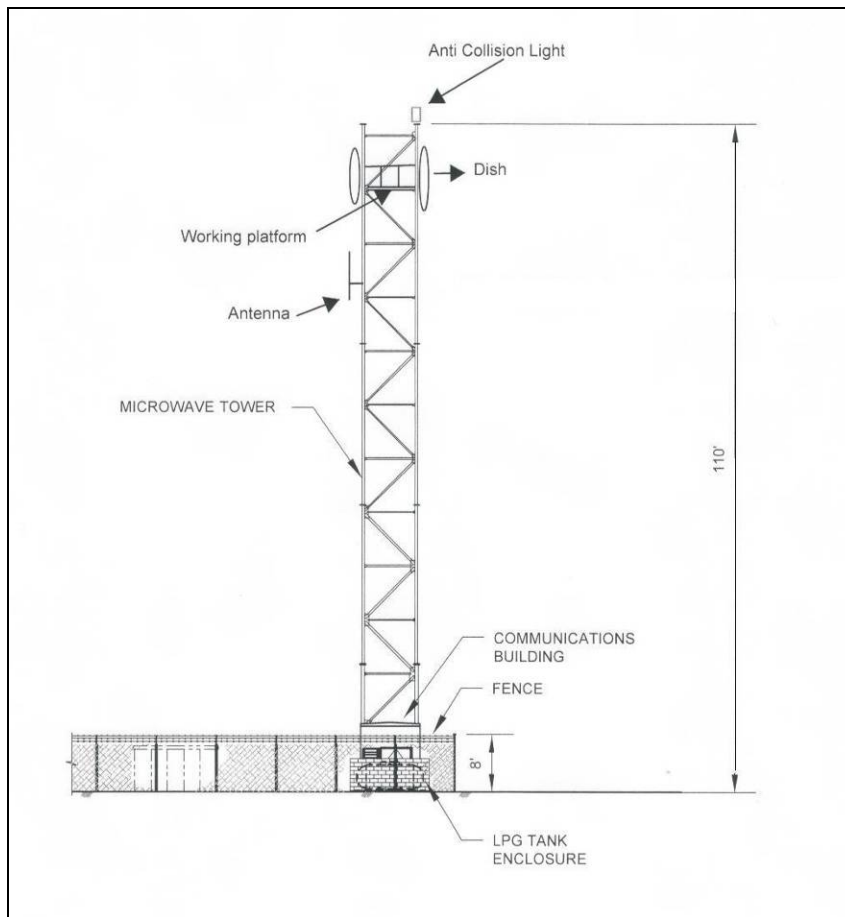


Figure 3.6.1-18: Representative Communication Tower

Source: Siemens Power Transmission & Distribution

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 1,500 feet. The facility will firm up and store renewable energy, primarily wind energy,⁵² 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 FERC⁵³ (FERC PN-11858-002) under the

⁵² 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).

⁵³ 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. Jurisdiction applies regardless of project size. Section 10(a)(1) of the FPA (16 U.S.C. 803[a][1]) establishes the comprehensive development

provision of the FPA and is being permitted by the 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."⁵⁴ 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 filling of the upper 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,"⁵⁵ the EAP will be developed in accordance with FERC⁵⁶ and Federal Emergency Management Agency⁵⁷ (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,⁵⁸ FEMA,⁵⁹ and applicable California Department of Water Resources - Division of Safety of Dams⁶⁰ (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

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).

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

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

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

57/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.

58/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.

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

60/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.⁶¹

Signage, conforming to FERC standards, will be placed at the hydropower facilities.⁶² 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 project.

3.6.2.1 Decker Lake Upper Reservoir

Proposed is the creation of a new approximately 110-acre open reservoir (forebay), located in the south fork of Decker Canyon (Sections 21 and 22, T6S, R5W, SBBM USGS 7.5-Minute Alberhill Quadrangle),⁶³ at the headwaters of San Juan Creek, at MP 11.7. The proposed upper reservoir (forebay) is located within the TRD, at elevations 2440 to 2850 feet above msl, 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 road⁶⁴ 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 acre-feet (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.

61/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.

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

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

64/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 side slopes, 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.

The proposed upper reservoir design includes: (1) an approximately 300 foot high main embankment dam⁶⁵ located on the southwest side of the reservoir; (2) maximum and minimum pond elevation of approximately 2790 feet and 2660 feet above msl, respectively; (3) a crest elevation of 2800 feet above msl; and (4) an inlet at elevation of approximately 2600 feet above msl feet for the intake structure. The conceptual drawing for the proposed upper reservoir is included in Figure 3.1.1-6: LEAPS Pumped Storage Component.

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.⁶⁶

⁶⁵/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).

⁶⁶/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

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.

3.6.2.2 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 above msl.

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.

3.6.2.3 LEAPS Powerhouse

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).

As illustrated in Figure 3.1.1-6: 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 underground powerhouse will be situated approximately 3,000 feet from Lake Elsinore, with its roof located 330 feet below surface at elevation 1,170 msl, and with the centerline of the pump/turbine spiral cases at 1,050 msl. The powerhouse will contain two reversible Francis-type pump-turbine/motor generators, nominally rated at 300 MW each when pumping. The elevation of the pump/turbines at 195 feet below the surface of the Lake is due to their hydraulic characteristics, so as to provide sufficient suction pressure at the impellers. This suction pressure ensures that the machines will operate without cavitation either in the pump mode or in the turbine mode. The entire water conveyance system (that is the headrace tunnels, the pump/turbine cases, and the tailrace tunnel) is a closed conduit system, so that, when generating, the differential head drop from the upper reservoir (Decker Lake) to the lower reservoir (Lake Elsinore) is the motive energy force and the elevation of the powerhouse, whether above or below the surface of Lake Elsinore does not affect the gross head available to drive the machines.

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 gates, as well as other components that may otherwise be susceptible to cavitation, will be of solid stainless steel construction, to prevent cavitation damage.

A service bay will be provided at one end of the powerhouse. Equipment access by overhead crane to the powerhouse will be via a vertical shaft extending from the land surface down to a service bay and laydown area on the generator floor. Personnel will have access via an elevator.

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 will be approximately 175 feet long, 250 feet wide, and 160 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 accommodate spherical turbine inlet 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 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 powerhouse access tunnel will be provided. The major heat-producing units 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.

Two 2,000 kW emergency diesel generators will run an air compressor and essential cooling pumps for the powerhouse complex.

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.

3.6.2.4 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.

As illustrated in Figure 3.1.1-6: LEAPS Pumped Storage Component, Sheets 1 and 2, 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.

A rip-rap lined, reinforced dredged channel at the inlet/outlet (tailrace) structure 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.

3.6.2.5 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.⁶⁷ At the current lake outlet sill elevation of 1255 feet above msl, 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.⁶⁸ 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.⁶⁹

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

Under normal operations, approximately 5,000 AF of water will cycle between the two waterbodies, producing an approximately 20-inch maximum horizontal rise or fall of surface water elevations in Lake Elsinore during a weekly cycle (at lake elevation of 1240 feet ABOVE MSL). 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.

67/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.

68/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.

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

It is assumed that the starting elevation of water in Lake Elsinore is 1240 feet above msl. At an elevation of 1240 feet above msl, 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 above msl, 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.

3.6.2.6 Other Features as Pumped Storage Components

3.6.2.6.1 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.

The EVMWD and TNHC have entered into a development agreement whereby the EVMWD has conveyed to TNHC the “exclusive right to develop the project.” The “Development Agreement by and between Elsinore Valley Municipal Water District and The Hydro Company, Incorporated” (Development Agreement), dated May 15, 1997, in combination with any subsequent agreements that may be executed between the EVMWD and TNHC, define the roles, responsibilities, and obligations of both parties with respect to the proposed projects. Under the terms of the Development Agreement, among other obligations, TNHC shall “pay District for the 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 the power generation operations of the project.”⁷⁰ The Development Agreement does not expressly state the quality of water to be discharged to Lake Elsinore or the elevation at which the lake shall be maintained.

Until the late 1920’s, rainwater runoff flowed freely down the San Jacinto River watershed and into Lake Elsinore. In 1928, the Railroad Canyon Dam was built, cutting off the flow of water into Lake Elsinore and creating Canyon Lake. Before the dam's construction, George Tilley filed a lawsuit in 1927, to stop the Railroad Canyon Dam project. The terms of the resulting October 29, 1927 settlement, known as the “Tilley Agreement,” stipulated that Canyon Lake was entitled to a maximum of 2,000 acre-feet (AF) of watershed runoff. Lake Elsinore would receive any water over that amount. After years of dispute over that agreement, the EVMWD and the City of Lake Elsinore signed the “Agreement to Fill & Operate Lake Elsinore” on December 19, 1991. The deal stipulated that whenever the water level in Lake Elsinore fell below 1240 feet above mean sea level (AMSL), the EVMWD would put water into the lake.

⁷⁰/ Elsinore Valley Municipal Water District and The Hydro Company Incorporated, Development Agreement by and between Elsinore Valley Municipal Water District and The Hydro Company, Incorporated, May 15, 1997, Paragraph 3.2.

In July 2001, the Lake Elsinore and San Jacinto Watershed Authority (LESJWA) issued notice of its intent to prepare a program EIR for the Lake Elsinore Stabilization and Enhancement Project. The LESJWA project's stated objectives included: (1) stabilization of Lake Elsinore's water level by maintaining lake elevation within a desirable operating range (1240 to 1247-foot AMSL); (2) improving the lake's water quality (reducing algae blooms, increasing water clarity and DO concentrations throughout the water column, and reducing or eliminating fish kills); and (3) enhancement of the lake as a regional aesthetic and recreational resource. The Final EIR was certified and the Lake Elsinore Stabilization and Enhancement Project was approved in September 2005.⁷¹

On March 1, 2003, the EVMWD, the City of Lake Elsinore (City), and the Lake Elsinore Redevelopment Agency (Agency) executed a "Lake Elsinore Comprehensive Water Management Agreement" (LECWMA) specifying, in part, that the parties will work together to provide supplemental water supplies, to the extent feasible, to maintain water elevations in Lake Elsinore at a minimum level of 1240 feet above mean sea level (AMSL).⁷² As stipulated therein, subject to any permitted limits imposed by the Regional Water Quality Control Board, Santa Ana Region (SARWQCB) and the State Water Resources Control Board (SWRCB), "whenever the elevation of Lake Elsinore is below 1240 feet the District shall reserve all reclaimed water produced by the District's Regional Water Reclamation Plant, or any remodeling, rebuilding or replacement of such facility, for replenishment of the Lake [Elsinore]."⁷³ The LECWMA contains an explicit reference to the LEAPS project.⁷⁴

The primary source for Lake Elsinore make-up water is the EVMWD's Regional Water Reclamation Facility (RWRF), located adjacent to Lake Elsinore. The EVMWD relies on Water Rights Permit No. 30520 for an exclusive right to all water discharged from the reclamation plant. The EVMWD also can supplement make-up water with groundwater from its island wells.

As indicated in the EVMWD's "Elsinore Basin Groundwater Management Plan": "Maintenance of water levels in Lake Elsinore would be accomplished with a combination of recycled water and groundwater when the lake level drops below 1240-feet [A]MSL. Recycled water would be used as the primary source of replenishment water up to 17.7 mgd. This is the projected capacity of the Regional Plant in 2020 minus 0.5 mgd reserved for discharge to Temescal Wash. One of the three Island Wells would be used as the secondary source when the recycled water supply is not adequate to maintain the lake level at 1240-feet [A]MSL in year 2020, while all three wells are required to maintain lake levels before year 2020 when less recycled water is available. Based on lake balance calculations. . .replenishment with groundwater would occur twice in 41 years with an average of five acre-feet/year. . .The recommended plan limits the use of recycled water to the use for lake replenishment as discussed above. However, the pipeline currently

⁷¹/ 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.

⁷²/ On March 13, 2003, the EVMWD approved an "Escrow Agreement" to handle the "Lake Maintenance Fund" established as part of the LECWMA signed with the City of Lake Elsinore. This agreement provides for the collection and disbursement of monies from the "Lake Maintenance Fund" delineated in LECWMA. The LECWMA outlines the obligations of supplemental water additions to Lake Elsinore and covers ground water as well.

⁷³/ City of Lake Elsinore, Lake Elsinore Redevelopment Agency, and Elsinore Valley Municipal Water District, Lake Elsinore Comprehensive Water Management Agreement, March 1, 2003, Paragraph 3.5(B).

⁷⁴/ Ibid., Paragraph 5.9.

under design from the EMWD [Eastern Municipal Water District] Temecula Regional Plant to the Temescal discharge location near Wasson Sill in the Lake Outlet Channel, will bring additional recycled water to EVMWD's service area when the production of recycled water exceeds EMWD's recycled water demand. This new recycled water source offers the potential for the expansion of recycled water use within the District's service area."⁷⁵

The discharge pilot program was subsequently extended until December 2004 (Order R8-2003-0067) and, under the presumption that the revised waste discharge requirements (WDRs) would include appropriate specifications for long-term recycled water discharges to Lake Elsinore, the permit was subsequently extended until such time that renewed waste discharge requirements were adopted by the SARWQCB (Order R8-2004-0099).

Non-potable water demands within the EVMWD service area are met through a combination of groundwater, surface water, and tertiary-treated recycled water. EVMWD's recycled water comes from the Regional Water Reclamation Facility (Regional WRF), Railroad Canyon WRF, and Horsethief WRF. The Regional WRF currently has a rated capacity of 8 mgd. As demands increase, the EVMWD anticipates future expansions to an ultimate capacity of 30 mgd.⁷⁶ Recycled water supplies do not vary significantly during dry years.⁷⁷

The current NPDES permit for the Regional WRF requires that a minimum of 0.5 mgd of flow be discharged to Temescal Wash for habitat needs. The total recycled water availability from the Regional WRF is projected to be approximately 14.2 mgd in 2030. When necessary, the treated effluent will be used to replenish Lake Elsinore to maintain a minimum lake level of 1240-foot AMSL.⁷⁸

Under the provisions of a stipulated judgment (City of Lake Elsinore v. Elsinore Valley Municipal Water District),⁷⁹ as indicated in the EVMWD's "Urban Water Management Plan" (UWMP): "EVMWD must release water into Lake Elsinore when the water surface elevation is less than 1,240 feet. Lake replenishment is only necessary in normal and dry years, as there is sufficient surface runoff in wet years to maintain adequate lake levels. Based on hydrologic analysis prepared for EVMWD and the Lake Elsinore-San Jacinto Watershed Authority, maintaining a level of Lake Elsinore requires an average of about 5,900 acre-feet/year of replenishment water and up to 10,300 acre-feet/year during dry years. . .In March 2005, EVMWD was issued a revised NPDES permit for the Regional WRF that allow it to treat up to 8 mgd and discharge up to 7.5 mgd into Lake Elsinore for lake stabilization, 0.5 mgd to Temescal Wash for wetland enhancement and any remaining effluent for non-potable use. . .Initially, EVMWD will discharge all available Regional WRF effluent (less 0.5 mgd for wetlands maintenance in Temescal Wash) along with Island Well water to Lake Elsinore. As the available recycled water increases, the amount of Island Well water can gradually be decreased."⁸⁰

75/ Elsinore Valley Municipal Water District (MWH), Elsinore Basin Groundwater Management Plan, June 2003, p. 8-5.

76/ Elsinore Valley Municipal Water District (MWH), Urban Water Management Plan, Final Report, December 2005., p. 3-20.

77/ Ibid., p. 6-5.

78/ Ibid., p. 3-27.

79/ Riverside County Superior Court, Stipulated Judgment – City of Lake Elsinore v. Elsinore Valley Municipal Water District, Case No. 359671, March 1, 2003.

80/ Op. Cit., Urban Water Management Plan, Final Report., pp. 3-33, 3-34, and 6-9.

By 2030, the recycled water demand in the EVMWD service area is expected to increase to about 14,830 AFY in a normal demand year. During dry years, when the maximum amount of water is required for Lake Elsinore and irrigation demand is high, recycled water usage could increase to nearly 20,050 AFY. If EVMWD's available recycled water supply is insufficient to meet local demand, the District can purchase water from the EMWD or supply potable water to meet these demands.⁸¹

The EMWD generates approximately 38 mgd of effluent at four active regional water reclamation facilities. The amount of effluent is expected to grow to 48 mgd by 2013. Approximately 60-70 percent of the effluent currently generated is sold to agricultural and irrigation users. About 10-15 mgd (11,200 to 16,800 AFY) of effluent is available from EVMWD on an annual basis.

From existing EVMWD and EMWD sources, sufficient water supplies exist to ensure the availability of sufficient water supplies in Lake Elsinore to allow the continuous operation of LEAPS into the foreseeable future. Since treated effluent represents the primary source of existing make-up water in Lake Elsinore, under existing permit authorizations, discharge of reclaimed waters into the lake, in quantities sufficient to maintain water levels at 1240-foot AMSL (i.e., average of about 5,900 acre-feet/year) will continue independent of the outcome of the LEAPS project.

The proposed inclusion of a water treatment facility (as discussed in Section 3.6.2.6.2) would serve to facilitate the importation of tertiary treated effluent from the EMWD should water quality standards between the two water districts vary or should supplemental treatment of EMWD waters be needed to conform to the SARWQCB discharge standards.

LEAPS is not exempt from compliance with all applicable water quality standards, including TMDL and waste discharge requirements. However, because LEAPS constitutes a closed-loop system, no substantial changes to water quality, composition, or characteristics will occur as water is cycled back and forth from the lower reservoir (afterbay) to the upper reservoir (forebay). Numerous studies have been conducted by and for the SARWQCB which have demonstrated that LEAPS will have a de minimus impact on Lake Elsinore. Those studies include: (1) "Technical Analysis of the Potential Water Quality Impacts of the LEAPS Project on Lake Elsinore" (Anderson, Michael A., January 31, 2006); (2) "Effects of LEAPS Operation on Lake Elsinore Predictions from 3-D Hydrodynamic Modeling" (Anderson, Michael A., April 23, 2007); and (3) "Ecological Impacts from LEAPS Operation: Predictions using a Simple Linear Food Chain Model" (Anderson, Michael A., May 29, 2007). Each of those studies are incorporated herein by reference and, by reference, made a part hereof.

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 requirements⁸²

81/ Ibid., p. 6-9.

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

and California Well Standards,⁸³ 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.

3.6.2.6.2 Water Treatment Facilities⁸⁴

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. A conceptual site plan for this facility may be seen as Figure 3.6.2-1: Water Treatment Facility Conceptual Site Plan.

The facility will likely consist of one treatment train. Effluent is assumed to be typically 2.5 to 4 mg/L total phosphorus. Addition of alum to flows can enhance phosphorus removal. Chemical phosphorus removal can reliably achieve total phosphorus concentrations below 0.5 mg/L. Alum would be input into an open channel at a point of high turbulence where the chemical is mixed into the flow.

Construction Characteristics. The total construction period for the facility would be approximately 12 months or less. Disturbed soils would be balanced on site to the extent feasible. An estimated 120 cubic yards of soil may be hauled to designated sites. The following elements will be part of the facility:

- One storage tank (5,000 gallon tank is assumed). Containment walls approximately 4 feet high would be provided around the tank to contain the complete contents in the event of a spill. A 2 foot sump would be provided in the corner of the containment area. A four inch diameter ball valve in the sump would allow the area to be drained to a chemical drain line. Normally closed, the ball valve would only be opened to allow accumulated rain or wash-

⁸³Lichvar, 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.

⁸⁴ / Much of the information in this section was extracted from the Lake Elsinore and San Jacinto Watersheds Authority, Lake Elsinore Stabilization and Enhancement Project, Draft Program Environmental Impact Report, SCH no. 2001071042 (LESJWA Report).

down water to be drained. The tank would be provided with an ultrasonic level sensor to monitor the level within the tank.

- Three hydraulic diaphragm metering pumps. The pumps would be installed in a curbed containment area (with canopy) adjacent to the storage area.
- Associated yard piping within the plant site will be double wall pipe, since alum is caustic.
- An emergency wash station will also be provided.

Approximately 30 to 40 tons of solids will be produced annually. This will be disposed of at a permitted facility, likely a composting facility in Riverside County. Please see Figure 3.6.2-1: Water Treatment Facility Conceptual Site Plan for a conceptual site plan. Please see Figure 3.6.2-2: Conceptual Storage Tank Profile for a profile of the tank storage area.

Table 3.6.2-1: Conceptual Design Criteria for Alum Feed Facilities

	Parameter	Units	Value
Flows			
	Design Average	mgd	4
	Minimum	mgd	1
	Peak Flow	mgd	7
Dosages			
	Design Average	mg/l	15
	Minimum (at minimum flow)	mg/l	3
	Peak Flow (at maximum flow)	mg/l	30
Storage of Alum			
	Minimum storage time	days	30
	Minimum storage volume	gal	5,000
	Minimum containment freeboard	ft	0.75
Alum Feed Pumps			
	Number of pumps	--	2+1
	Maximum capacity (each)	gal/hr	93
	Minimum capacity (each)		4
Alum Storage Tanks			
	Number of tanks	--	1
	Capacity (each)	gal	5,000
	Diameter	ft	9
	Liquid depth in tank	ft	11
Containment Area			
	Containment wall height	ft	4
	Containment wall width	ft	16
	Containment area	ft	16

Source: LESJWA Report



Figure 3.6.2-1: Water Treatment Facility Conceptual Site Plan

Source: The Nevada Hydro Company

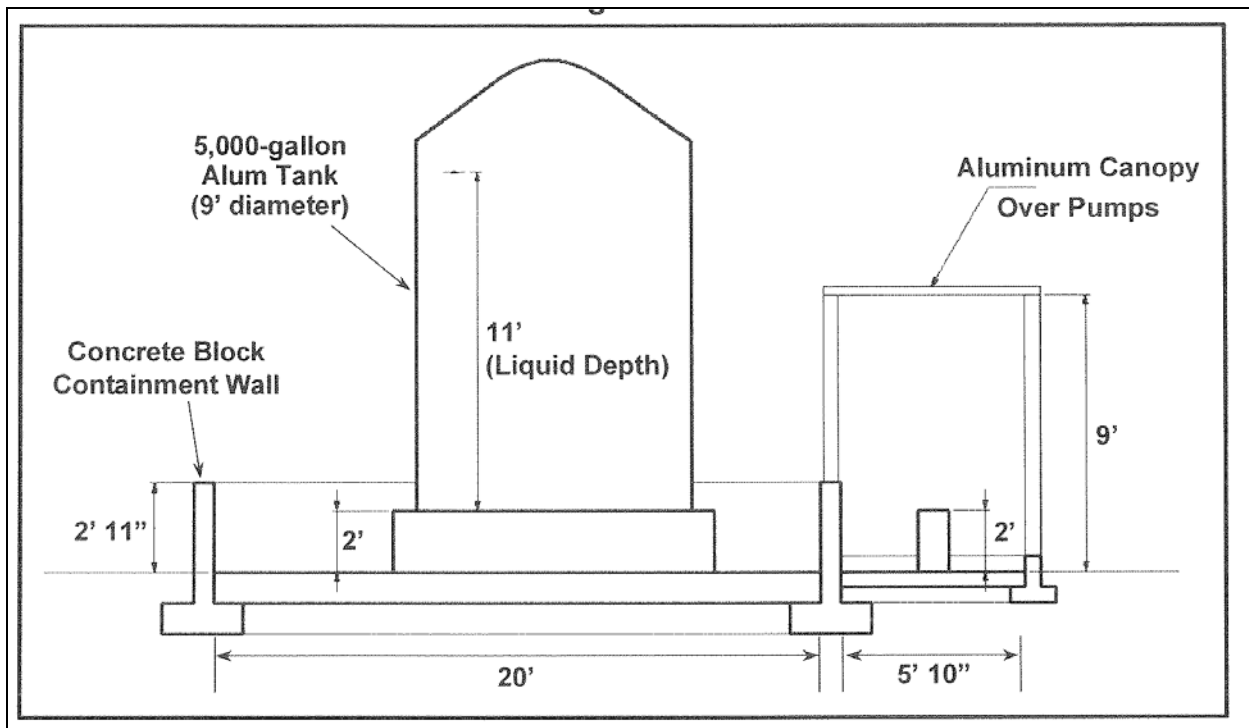


Figure 3.6.2-2: Conceptual Storage Tank Profile

Source: LESJWA Report

3.6.2.6.3 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.⁸⁵ 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.⁸⁶ 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 3.1.1-6: 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,⁸⁷ 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 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 license⁸⁸ and unless an alternative action is either required by the permitting agencies or undertaken by the Applicant (e.g., payment

85/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."

86/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).

87/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.

88/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).

of in-lieu fees⁸⁹), 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 or modified recreational facilities or improvements are included as part of the TE/VS Interconnect project.

3.6.2.6.4 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.⁹⁰ At the base of the Elsinore Mountains, in proximity to

⁸⁹/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.

⁹⁰/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.

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.⁹¹

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.

3.6.2.6.5 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 EVMWD lacks jurisdictional authority to establish a shoreline buffer zone or other land use provisions encompassing the lands which might be so effected.⁹²

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 above msl, 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

⁹¹/Ibid., Figure 7-7.

⁹²/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).

maximum surface elevation of the pumped storage facility reservoir (1240 to 1255 feet above msl) 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,⁹³ 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 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

⁹³Lake 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.

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

3.6.3.1.1 Upgrades to High Voltage System

The new Lake Switchyard Plan will include one 500 kV GIS switchrack with four breaker-and-a-half positions with enough available space to allow the future installation of three additional positions. The station should allow enough space for future installation of two 500 kV Capacitor Banks. In addition, 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:

- a. One 32/64 digital fault recorder
- b. One Ethernet service drop
- c. One SEL-2030 connected to all three SEL-311L relays
- d. Telecommunications tower and microwave dish antenna
- e. Perimeter fence with double barbed wire and a double door 20 ft. gate around the substation
- f. Grounding grid to cover the substation area and additional 10 ft. outside the perimeter fence
- g. Grading and site preparation for the substation area and additional 10 ft. outside the perimeter fence
- h. A 25 foot wide paved driveway around the 500 kV switchyard to provide access to the relay room
- i. All required control cable trenches from the relay room to the 500 kV switchyard

In addition, the Serrano Substation will be upgraded 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

Further, the Valley Substation will be upgraded 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

The Etiwanda Generating Station will be upgraded 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, but 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

3.6.3.1.2 Upgrades to Local 115 kV System

This proposed upgrade would be located at Lake Elsinore, Riverside County, along the western, southern and eastern sides of Lake Elsinore. The proposed upgrade is to reinforce the power supply at SCE's Skylark and Elsinore Substations on the southern and eastern side of Lake Elsinore. The Applicant is proposing to run a 115 kV double circuit transmission line from the proposed Santa Rosa Substation to the existing SCE Skylark substation and then onto the Elsinore Substation using a single circuit system.

As shown in Figure 3.1.1-5: 115 kV Corridor Plan, the proposed transmission line route consists of two segments. Segment A runs from the Santa Rosa Substation to the existing SCE 115 kV Skylark Substation. It is shown on the figure in pink. This segment is approximately 6.6 miles long. Segment B runs from the existing SCE Skylark Substation to the existing SCE 115KV Elsinore Substation. This segment is approximately 4.45 miles long, and is shown on Figure 3.1.1-7 as the blue line.

Proposed Project Description: This upgrade will connect the Proposed Santa Rosa Substation to two existing SCE substations, the Skylark and Elsinore 115 kV Substations. The connection will be via a new 115 kV Overhead Transmission Line.

Segment A will run approximately 5.9 miles from the Proposed Santa Rosa Substation to the existing SCE Skylark Substation. This overhead transmission line will utilize tubular steel double circuit poles from the proposed Santa Rosa Substation along Union Avenue, Magnolia Street, Grand Avenue, Corydon Road to the 115KV Skylark Substation, where one of the two 115KV circuits will be terminated. The entire line route is shown in Figure 3.1.1-5: 115 kV Corridor Plan.

Segment B will then run approximately 4.6 miles from the Skylark Substation to Elsinore Substation. This segment will continue the 115 kV connection from Skylark Substation along Corydon Road, Mission Trail, Malaga Road to Diamond Drive, along Elsinore River embankment towards Interstate 15, along I-15 to Main Street, and along Main Street to the 115 kV Elsinore Substation where this segment will be terminated. The entire line route is shown in Figure 3.1.1-5: 115 kV Corridor Plan.

115 kV Transmission Line Poles: In Segment A, approximately 54 double circuit (DC) poles would be required for the proposed route. These poles would range between 80 and 125 feet above grade, depending on the specific location. These poles would be bolted to a pre-installed steel reinforced concrete foundation with an approximate diameter of 6 feet, extending to approximately 20 to 25 feet deep.

In Segment B, approximately 38 single circuit (SC) poles would be required for the proposed route. These poles would extend to up to 100 feet above grade, and will be buried to a depth of approximately 10 feet.

Typical double- and single-circuit poles may be seen in Figure 3.6.3-1: Typical 115 kV Steel Poles.

The specific height and spacing of poles along the proposed route would be determined upon final engineering and constructed in compliance with CPUC General Order (GO) 95, and other factors including, but not limited to the items listed below.

- Length of span between poles (average span 450 feet; 250 foot minimum span and 1,000 foot maximum span)
- Ground clearance in accordance to GO 95 and SCE construction standards
- Overhead clearance in accordance to GO 95 and SCE construction standards
- Wind loading

- Distance between tension and angle points
- Number and voltage of electrical lines installed on the poles

Conductors and Insulators: The line would consist of a 954 ACSS and a double 4/0 aluminum conductor steel reinforced (ACSR) ground conductor. Conductors would be installed on 115 kV polymer insulator assemblies.

Roads: Construction and maintenance of the proposed line will require access to each of the planned pole locations. Public roads and right of way or privately owned and maintained roads adjacent to the proposed route would be utilized where possible to provide construction and maintenance access.

Two types of roads would be required for construction and maintenance of the proposed line, access and spur roads. The majority of the route runs adjacent to public roads which will be used as access road to the pole locations. Pole locations in areas without existing access roads would require to construct an access or spur roads from the nearest existing public or private roadways. The specific locations of new access and spur roads would be determined after completion of the final engineering with a topographic survey of the proposed route. It is currently estimated that roughly 0.2 mile of new, unpaved access and spur roads would need to be constructed from the Santa Rosa Substation to Pole No.3 in accordance to prevailing standards.

At the existing Skylark 115 kV Substation:

- The scope of upgrades to this substation would be the addition of one dead end structure, disconnect switch, circuit breakers, protective relays, SCADA, and metering.
- In addition to the above, the fault rating of the 115 kV portion of the substation will also be upgraded. This involves replacing various disconnect switches, circuit breakers and bracing.

At the existing Elsinore 115KV Substation:

- The scope of upgrades to this substation would be the addition of one dead end structure, disconnect switch, circuit breakers, protective relays, SCADA, and metering.

In addition to the above, the fault rating of the 115 kV portion of the substation will also be upgraded. This involves replacing various disconnect switches, circuit breakers and bracing.

3.6.3.1.3 Telecommunication Upgrades

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 noted 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 Switchyard 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 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 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. Maps of these segments are shown in Figure 3.6.3-2: Talega-Escondido 230 kV Line Upgrade.

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 Case Spring-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. 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 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 3.6.3-2: Talega-Escondido 230 kV Line Upgrade.

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 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 ACSR with 456 MVA per circuit rating. 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 four new transmission towers that will be constructed 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 installed along existing support structures (already containing one 230 kV circuit) connecting the Talega and Escondido Substations. Finally the existing Talega-Escondido No. 1 circuit will be reconducted as specified in the SDG&E-IFS.

The Talega-Escondido 230 kV transmission line was originally licensed and constructed using double-circuit structures with only one circuit installed.^{94 95} 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-conducting and added circuit will bring the 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 single-circuit 230 kV steel-lattice tower is illustrated in Figure 3.6.3-3: Typical Single 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 an approximately 7.8 mile section (interconnecting SDG&E’s existing Pala and Lilac Substations) of the existing 69 kV transmission circuit on new 69 kV 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 roughly 7.8 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.⁹⁶

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

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

1. The Case Springs Substation. The loop-in consists of installation of four 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

94/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.

95/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).

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

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 additional upgrades have been identified:

Relocate Bank 71
Modify the north and south buses to make room for a new bay addition
Install a new 230 kV breaker and a half bay to include 1-bank, 1-tie, and 1-line positions
Install lot-support structures as required
Install two 230 kV circuit breakers
Install five 230 kV disconnect switches
Install power and control wiring
Install tie line protection
Install metering
Install SCADA and communication interface
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 Energy Policy Act of 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.

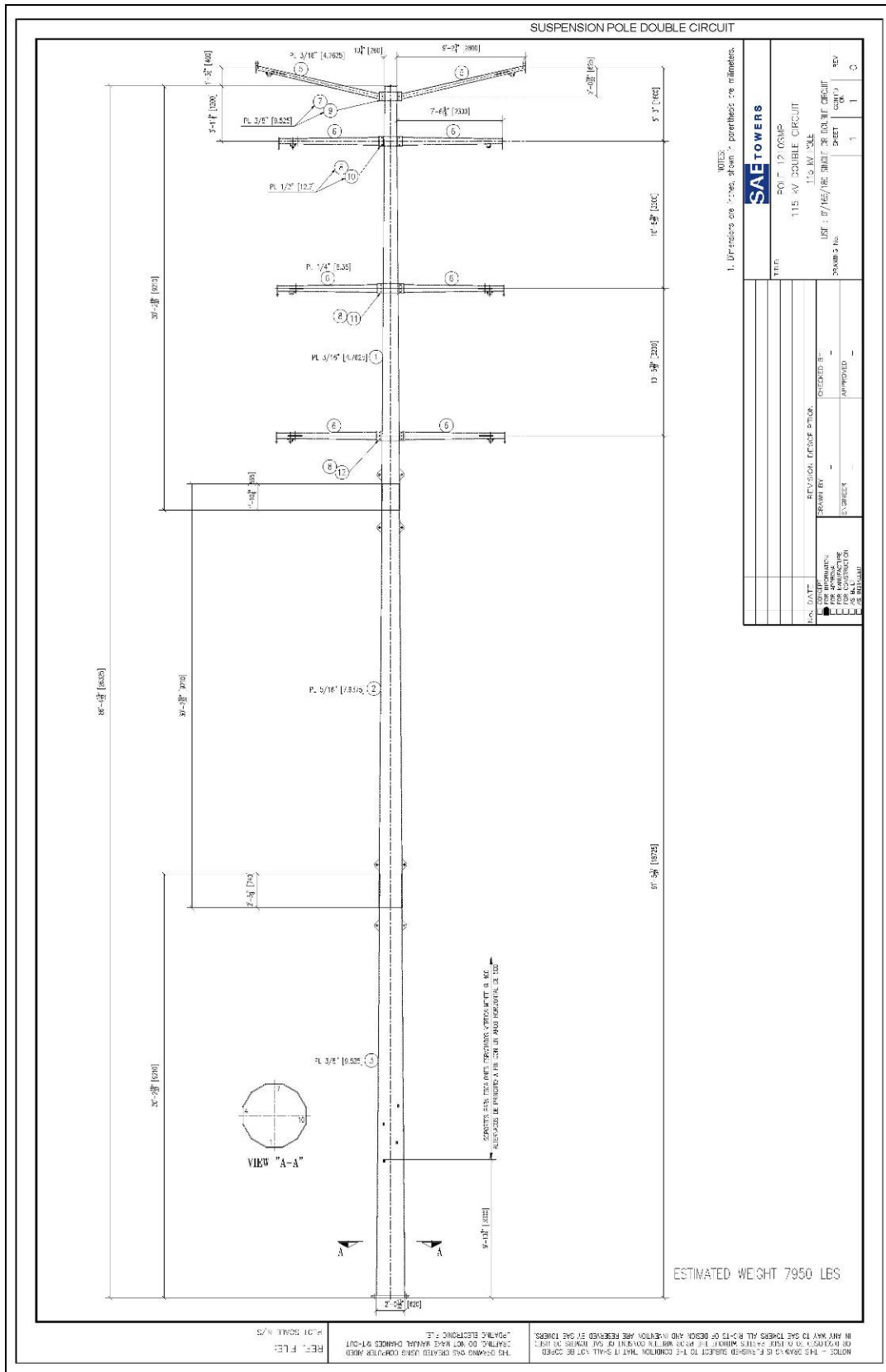


Figure 3.6.3-1: Typical 115 kV Steel Poles (1 of 4)

Source: The Nevada Hydro Company

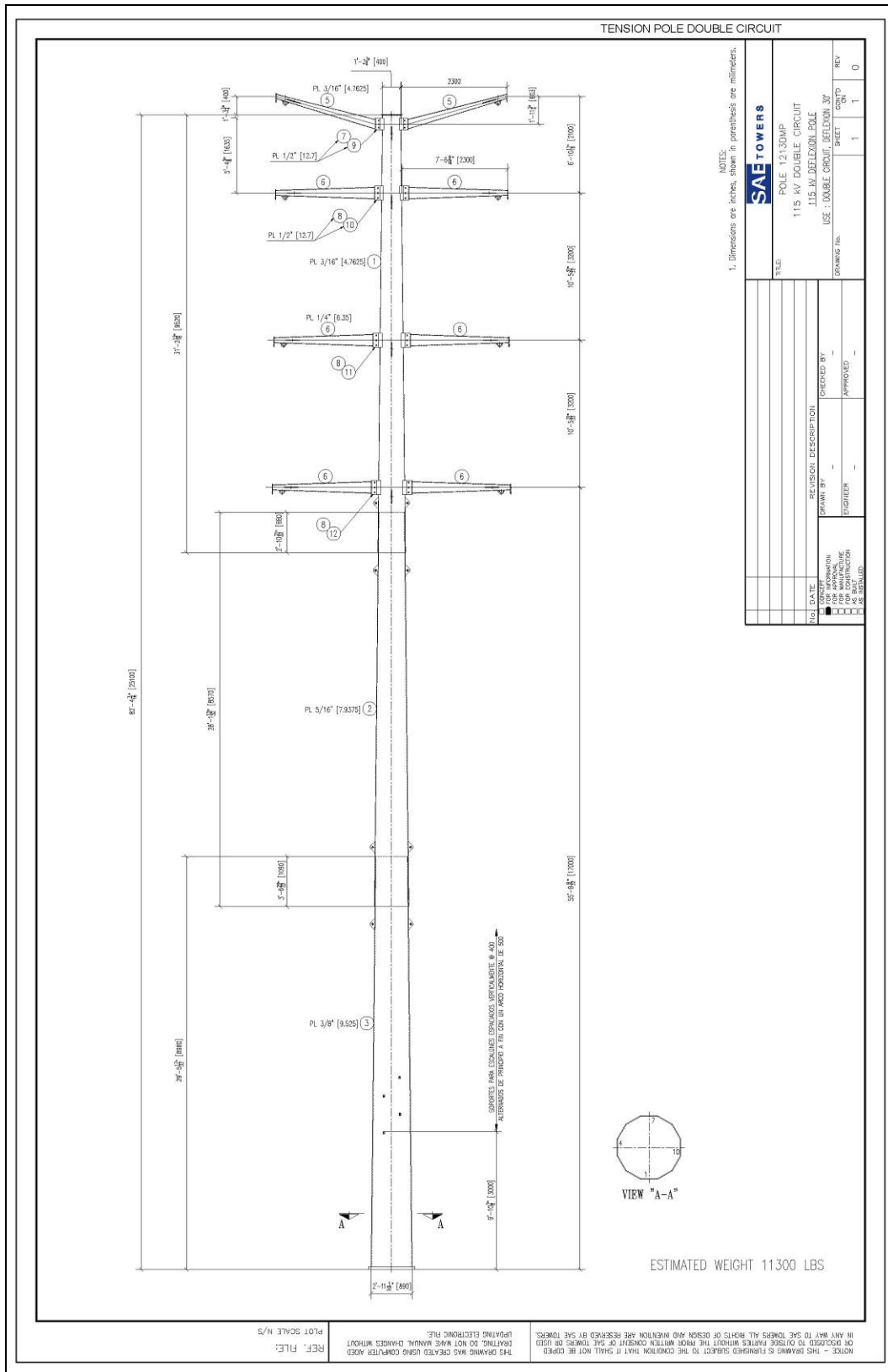


Figure 3.6.3-1: Typical 115 kV Steel Poles (2 of 4)
Source: The Nevada Hydro Company

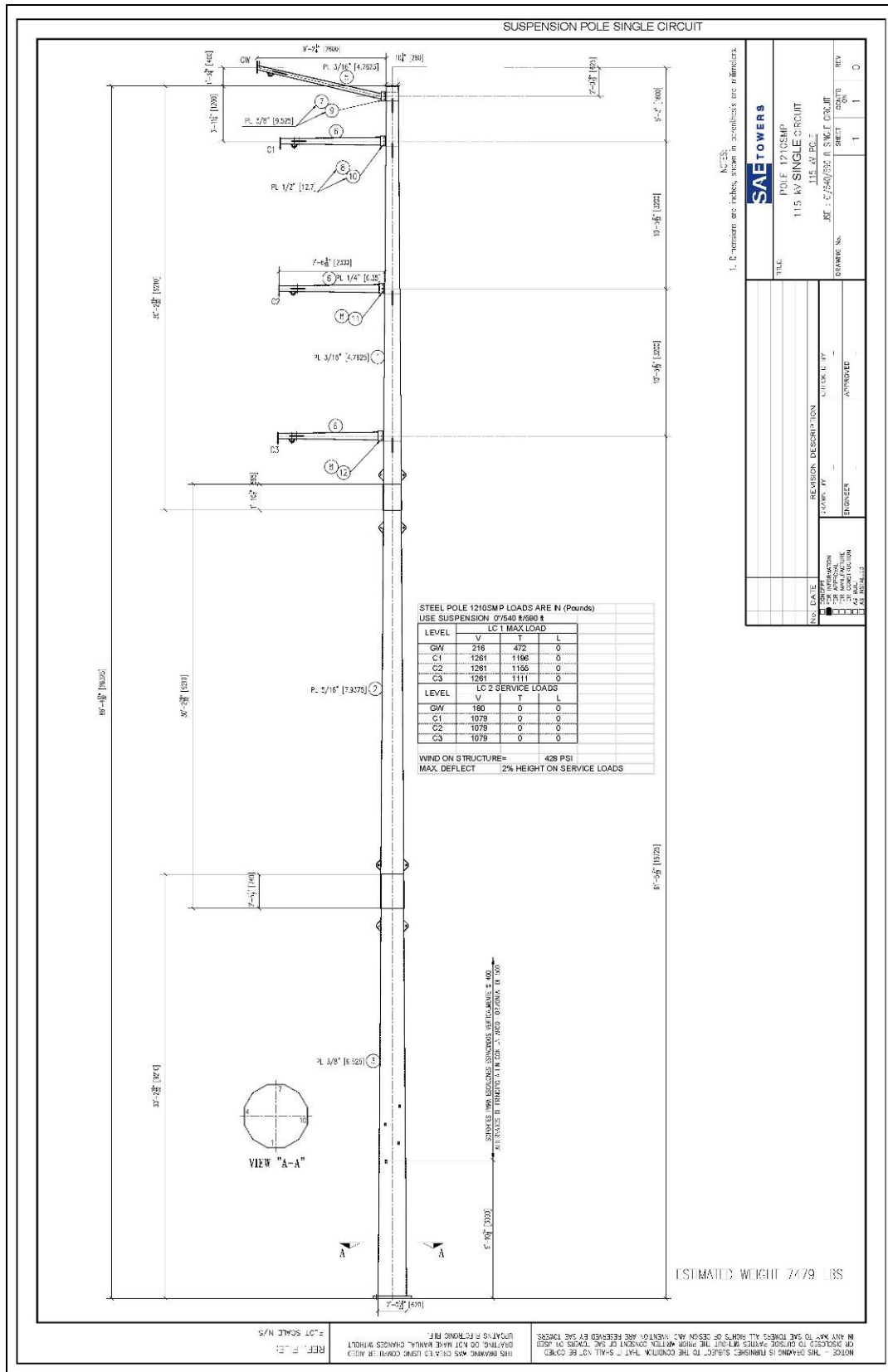


Figure 3.6.3-1: Typical 115 kV Steel Poles (3 of 4)

Source: The Nevada Hydro Company

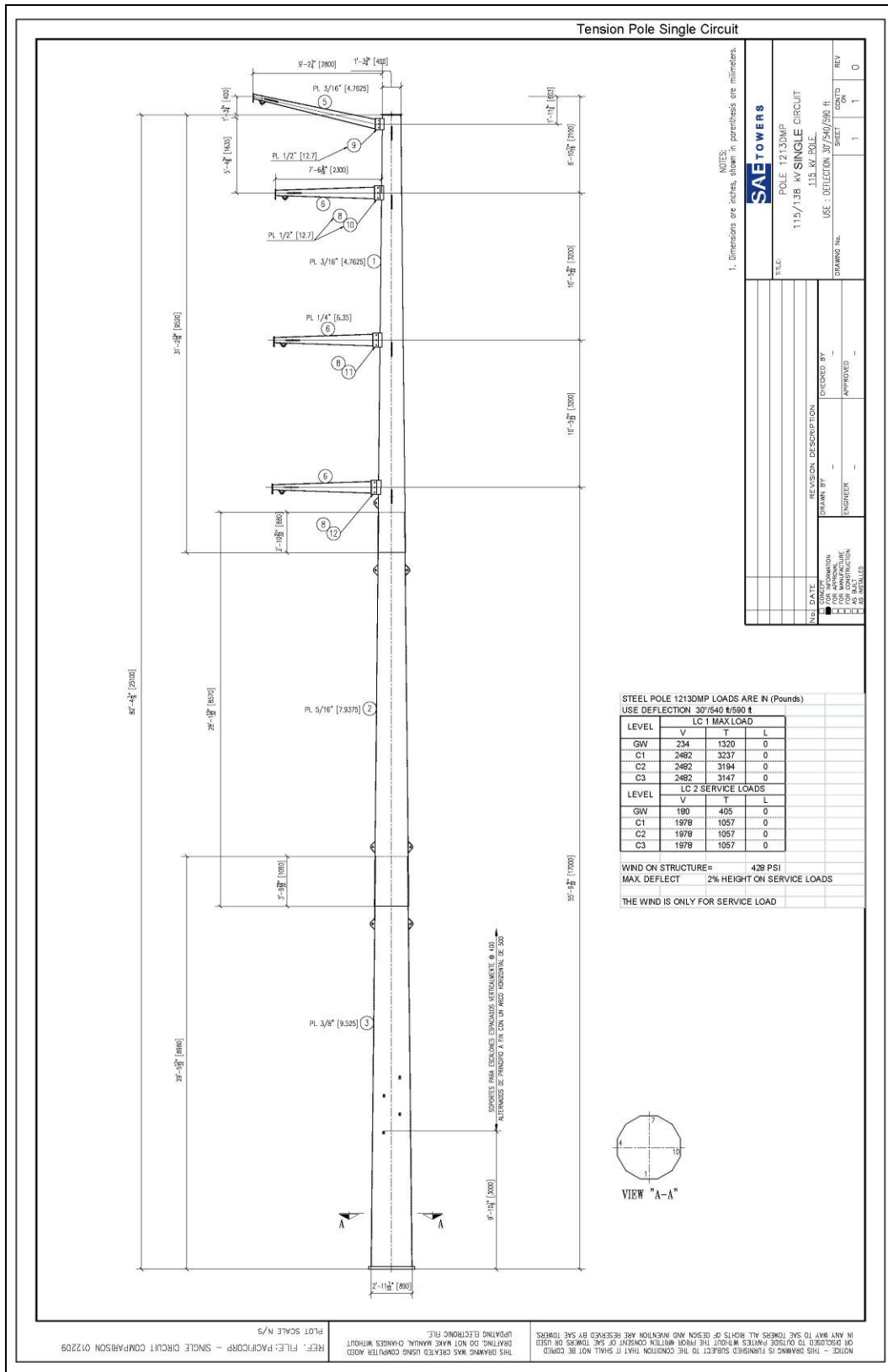


Figure 3.6.3-1: Typical 115 kV Steel Poles (3 of 4)
Source: The Nevada Hydro Company

Figure 3.6.3-2: Talega-Escondido 230 kV Line Upgrade (Index)

Source: The Nevada Hydro Company

Figure 3.6.3-2: Talega-Escondido 230 kV Line Upgrade (1 of 8)

Source: The Nevada Hydro Company

Figure 3.6.3-2: Talega-Escondido 230 kV Line Upgrade (2 of 8)

Source: The Nevada Hydro Company

Figure 3.6.3-2: Talega-Escondido 230 kV Line Upgrade Map (3 of 8)

Source: The Nevada Hydro Company

Figure 3.6.3-2: Talega-Escondido 230 kV Line Upgrade Map (4 of 8)

Source: The Nevada Hydro Company

Figure 3.6.3-2: Talega-Escondido 230 kV Line Upgrade Map (5 of 8)

Source: The Nevada Hydro Company

Figure 3.6.3-2: Talega-Escondido 230 kV Line Upgrade Map (6 of 8)

Source: The Nevada Hydro Company

Figure 3.6.3-2: Talega-Escondido 230 kV Line Upgrade Map (7 of 8)

Source: The Nevada Hydro Company

Figure 3.6.3-2: Talega-Escondido 230 kV Line Upgrade Map (8 of 8)

Source: The Nevada Hydro Company

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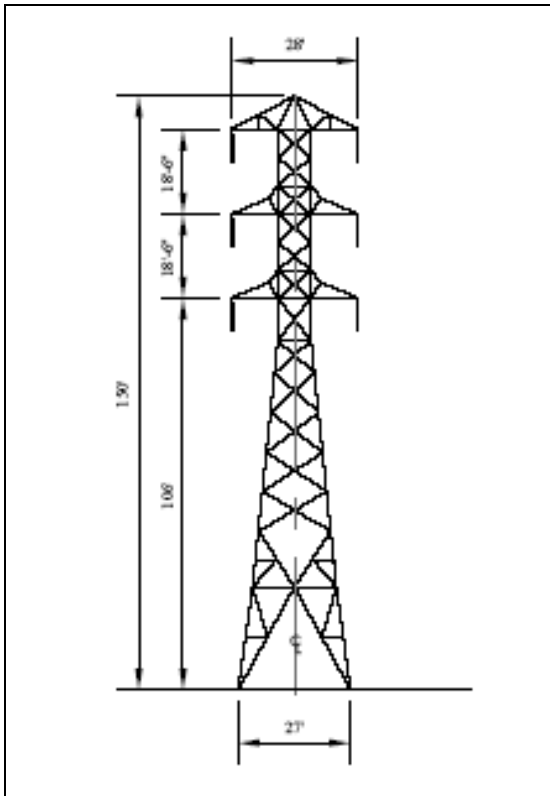


Figure 3.6.3-3: Typical Single Circuit 230 kV Steel Lattice Tower
 Source: Siemens Power Transmission & Distribution

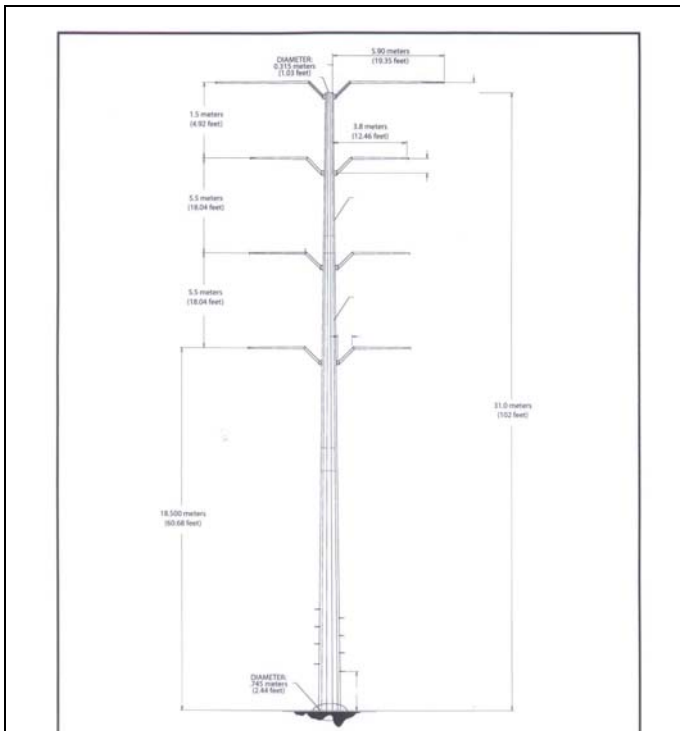


Figure 3.6.3-4: Typical Double Circuit 230 kV Steel Pole Tower
 Source: Siemens Power Transmission & Distribution

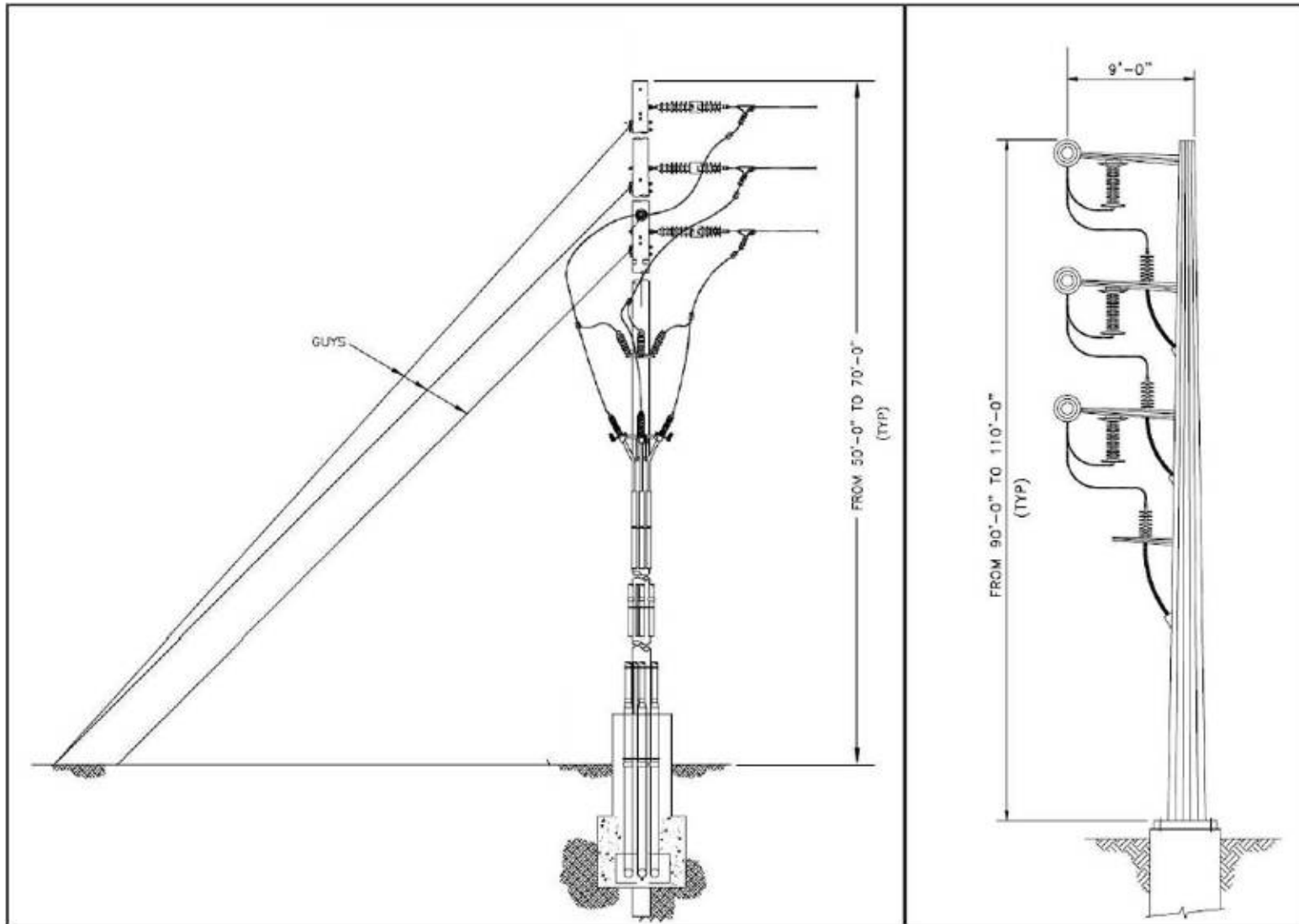


Figure 3.6.3-5: Typical Single Circuit 69 kV Steel Cable Pole

Source: SDG&E

3.7 Right-of-Way Requirements

The right-of-way (ROW) requirements of the Project include approximately 32 miles of transmission ROW along with two substations and one switchyard, 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: 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 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 Saturday. Underground construction may proceed round-the-clock, Monday through Saturday 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 include 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 Talega-Escondido 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 steel 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 project would include several staging yards that would be selected based on accessibility to construction locations and proximity to transmission line and substation access roads, (4 of them are shown on Figure 3.1.1-4: Talega-Escondido/Valley-Serrano 500 kV Interconnect Project).

Where possible, previously disturbed areas would be used. An area up to 5-10 acres in size and within 5 or less air miles of the tower locations is 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 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 ROW 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

Working areas for foundation, erection and string works will be established on the tower locations, and will be re-instated once the construction works are completed..

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 ROW and serve as the main transportation route along line ROWs. 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 3.1.1-4: Talega-Escondido/Valley-Serrano 500 kV Interconnect Project.

This project includes construction on both existing ROW and new ROW. Where construction would take place on existing ROW, 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:

Existing access and spur roads may be re-graded and repaired. 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 ROW, 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 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.

3.8.1.4 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. Helicopters would be used to transport equipment to tower sites. Segments of LST towers will be preassembled in the staging areas and will be airlifted to the tower location, and erected on to the already prepared foundations. It is estimated that the helicopter would generally operate up to 8 hours per day, Monday through Friday. 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 3.1.1-4: 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 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. All stringing equipment & splicing locations are identified and shown in Figure 3.1.1-4: Talega-Escondido/Valley-Serrano 500 kV Interconnect Project, defined as pulling sites, and identified in the legend as Proposed Construction Work Area. Additional splicing locations may only be known after final design is accomplished.

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 construction 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 3.8.2-1, Estimate of Land Disturbance for Substation Sites.

All pulling & splicing locations are indicated on Figure 3.1.1-4: Talega-Escondido/Valley-Serrano 500 kV Interconnect Project, defined as Construction Work Area Polygons.

Table 3.8.2-1: 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	6.20 ac	310 ft W 407 ft L	2.90 ac	300 ft W 900 ft L	6.20 ac
Side Slope Grading		0.14 ac.		2.11 ac.		
Primary Access Road	Temescal Canyon Rd.	County Rd.	Santa Rosa Avenue	County Rd.	SDG&E Access Rd	Fallbrook Conservancy
Total Estimated		6.34 ac.		5.01 ac.		6.2 ac.

Source: The Nevada Hydro Company

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 2,000 to 3,000 square feet 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, either manually or by a tracked earth-moving vehicle, a terraced access is excavated 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.

An illustration of this technique appears as Figure 3.8.2-1: Typical Benching on LST

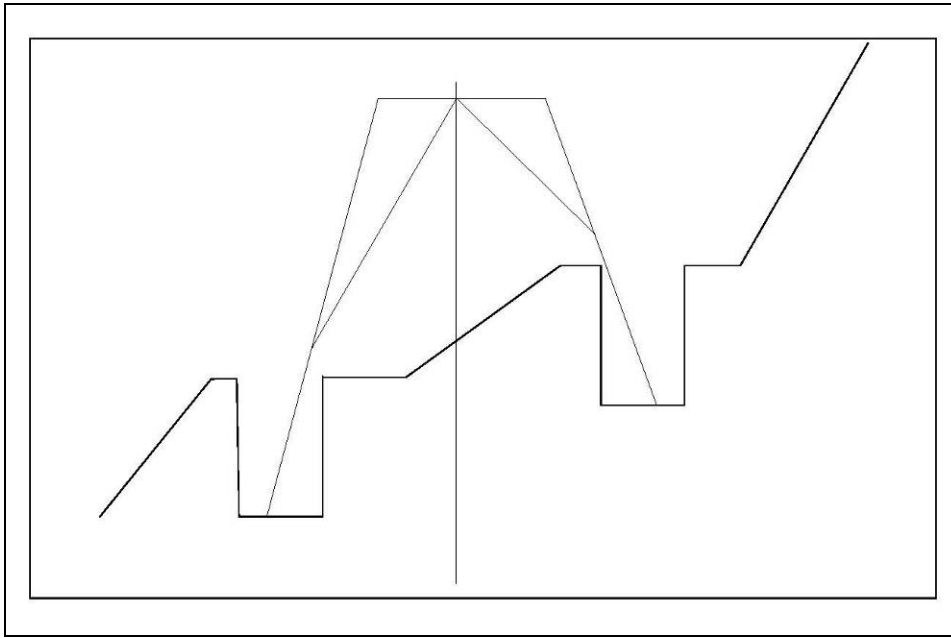


Figure 3.8.2-1: Typical Benching on LST

Source: Siemens Power Transmission & Distribution

3.8.2.2.2 Foundations

Foundation pits for structure foundations would typically be either excavated by (i) excavators (foundation-type for good soil), (ii) rock excavation by means of drilling and blasting (rock foundation) or (iii) rock anchors grouted into solid rock (rock anchor foundations). The maximum augur depth below ground surface for the various types of towers, are expected to be about 35 feet for a 500KV Four-legged Single Circuit Lattice Steel Tower.

Actual foundation depth & design would depend on the soil conditions and topography at each site and would be determined after the soil-investigation during final engineering. However, it is expected that the majority of towers would have foundation depth substantially less than the max depth listed above.

For those tower locations marked with H (Helicopter access only) on Figure 3.1.1-4: Talega-Escondido/Valley-Serrano 500 kV Interconnect Project, all necessary equipment for excavation of the foundation pits, drilling rig for the rock anchors as well as auguring the holes for the blasting will be flown in by helicopter. Blasting will be done in accordance with prevailing blasting conditions and regulations of the State and the Forest Service.

A foundation set for each LST would include four footings.

Following excavation of the foundation pits, 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 lay-down areas and delivered to each tower location by flatbed truck or helicopter. During construction, existing concrete supply facilities would be used where feasible, while in more remote areas, temporary concrete batching plant may be set up on staging areas.

Equipment would include a central mixer unit (drum type), three silos for injecting concrete additives, fly ash, and cement, a water tank; portable pumps; a pneumatic injector; and a wheel loader for handling concrete additives (sand & crushed gravel) not in the silos. Dust emissions would be controlled by watering the area and by sealing the silos and transferring the fine particulates pneumatically between the silos and the mixer.

Concrete would be hauled to tower sites by standard or 4WD mixer truck's and to tower locations marked with (H) by helicopter. At any given lattice steel tower, no more than eight concrete mixer trucks would be working to support the installation of the needed footings. A second lattice steel tower footing project could be under way at the same time, thus doubling the quantity of trucks working. One footing on a 500 kV lattice steel tower could require as much as 16 to 20 cubic yards of concrete, depending on the final foundation design.

Topsoil will be excavated and stored at a separate location and will be used after backfilling as the final top layer. Suitable excavated material will be used for backfilling the foundation pits; the excess material or material not suitable for backfilling will either be used for landscaping around the tower location or be removed from the construction site and disposed at designated sites as permitted.

Concrete samples would be drawn at time of pour and tested according to prevailing specification after 7 and 28 days to ensure engineered strengths were achieved. Once the required concrete compression strength has been achieved, crews would be permitted to commence with the erection of the tower steel.

3.8.2.2.3 Tower and Pole Assembly

At the structure fabrication plant, structural members would be bundled and shipped by rail or trucks to the construction yards, and then trucked to the accessible tower locations. At the tower site, sections would be pre-assembled and erected by crane or derrick post.

At tower locations marked with (H), tower members or prefabricated tower sections will be flown to the individual tower locations and erected by helicopter.

Assembly and erection of structure required would consist of four main activities.

1. Assembly of tower sections
2. Erection of the tower sections
3. Torque down bolts and nuts to the designed torque.
4. Final cleanup

Installation of insulators and sheaves and the final checkout and cleanup would then conclude structure assembly and erection.

3.8.2.2.4 Tower and Pole Erection

The use of helicopters for the erection of LSTs 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 for the TE/VS Interconnect and for TE re-conductoring at the 230KV Talega – Escondido transmission line. 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 re-conductoring 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 tension 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.

Prior to stringing activities, temporary protective netting systems or wood pole guard structures would be erected at crossings for roads, streets, railroad, highways, or other transmission, distribution or communication facilities, as required. On roads where traffic is light, guard structures may not be necessary, however, the use of barriers, flagmen, and/or temporary stopping of traffic would be required.

The stringing of conductor and overhead ground-wire including OPGW on new transmission lines typically commence once a number of structures (sections between 2 tension towers) have been erected, inspected and approved for stringing. Stringing equipment locations would be temporarily set up adjacent to tension towers. These could be areas 200 feet to 300 foot in size adjacent to access roads (within the ROW) and spaced approximately every three to fifteen thousand feet, depending on the accessibility and topography of transmission line.

Due to the very mountainous terrain within the CNF, approximately 54% of the tower locations will only be accessible by means of helicopter. For these, a helicopter would pull a lightweight pilot line through the conductor sheaves. The lightweight pilot-line will be used to subsequently

pull larger pilot wires, which finally will pull the ground wire, OPGW and conductor into position by the means of stringing equipment.

We have identified tower locations on which the set up of stringing equipment and conductor reels could have an excessive impact. In order to avoid the environmental impact we have worked out the following preliminary work program, which may be revised during the final line design. The following example is based on tower locations shown on Figure 3.1.1-4: Talega-Escondido/Valley-Serrano 500 kV Interconnect Project, page 4 of 23, Section T 26 to T30 & T32

- T26 will be the staging area for the conductor reels and rolling machine, on T 32 will be the staging area of the winch machine.
- The conductor will be pulled through from T 26 to T32, also having an angle tension tower T30 in between.
- Once the conductor tension clamp is finally hooked to the insulator on T26, the winch machine placed at T32 will pull the conductor into almost sag position.
- At T30 the stringing crew will place working clamps in both directions to T26 and T 32 and they will install chain hoists with adequate capacity, and sag the conductor in accordance to temperature and sagging chart into final sag.
- The conductor on T30 will be cut to the required length and the compression dead end clamps will be installed and attached to the insulator string.
- At T32 the crew after rechecking the sag will also install the compression dead end clamp and attach it to the insulator string.
- The same method applies for the ground wire too.
- OPGW in anyway will have longer designed sections for splicing, but the stringing method will be the same, however, instead of compression dead end clamp a preformed helix grip will be used.

The same stringing method as described above applies for the following sections which are marked “H” for helicopter erection, and identified in Table 3.8.2-2: Tower Sections Marked for Helicopter Erection.

Table 3.8.2-2: Tower Sections Marked for Helicopter Erection*

Page 4 of 23	T32 via T36 to T39
Page 5 of 23	T41 via T42 to T43
Page 6 & 7 of 23	T43 via T46 via T49 via T51 to T53
Page 7 of 23	T53 via T55 to T56
Page 7 & 8 of 23	T56 via T57 to T58
Page 10 & 11 of 23	T64 via T68 via T71 to 74
Page 11 & 12 of 23	T74 via T76 to T79
Page 12,13 & 14 of 23	T81 via T84 to T90
Page 14,15,16 & 17 of 23	T93 via T107 to T109
Page 18 of 23	T113 via T115 via 116 to T119
Page 19 & 20 of 23	T121 via T128 to T130
Page 21 & 22 of 23	T134 via T136 to T138

* All references are to pages appearing in Figure 3.1.1-4: Talega-Escondido/Valley-Serrano 500 kV Interconnect Project.

Source: The Nevada Hydro Company

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 to be used:

Step 1: Sock Line; Threading: A helicopter would fly a lightweight sock pilot 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 lightweight pilot 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 (in accordance to an approved installation schedule) 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 mobile 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)

3.8.3.1 General

Depending upon final cost and engineering, any of the following four underground technologies may be commercially available for 500 kV transmission: Gas Insulated Line (GIL); high-pressure fluid-filled (HPFF) cables; self-contained fluid-filled (SCFF) and solid dielectric (XLPE) transmission cables.

Below ground construction consists of two defined tunnels. The first is the Ridge Tunnel which runs between towers 63 at MP 11.5 and 64 at MP 13.2, roughly in line with the South Main Divide Road. The second is the Santa Rosa Tunnel which connects the Ridge Tunnel to the Santa Rosa Substation. The arrangement of the tunnels is depicted in Figure 3.1.1-4: Talega-Escondido/Valley-Serrano 500 kV Interconnect Project, sheets 9, 23 and 24, Figure 3.6.1-3: North & South Transition Plan (Typical), sheet 2 of 3 and Figure 3.6.1-5: GIL Vault Elevations.

GIL (Gas Insulated Line): Installation of GIL would require an underground tunnel from Mile Post 11.5 to MP 13.2 (the Ridge Tunnel), with a transition point to the OHL on each end. At MP 12.3 an underground tunnel will link the TE-VS interconnect to the Santa Rosa Substation (the Santa Rosa Tunnel). In this tunnel the 2 GIL circuits will connect northward to Lake Switchyard and southward to Case Spring Substation. These two circuits will turn into north and south directions at MP 12.3. At the Santa Rosa Substation the GIL will be directly connected to the

500kV GIS Switch Gear. See Figure 3.6.1-3: North & South Transition Plan (Typical) for an illustration of the transition structures.

Cable Link: Installation of HPFF, SCFF or XLPE transmission cables will require generally the same underground tunnel already described for construction of the GIL system. In addition to the tunnel on the north end (MP 11.5) and on the south end (MP 13.2), a 500 KV switch yard would be required to accommodate the protection equipment (CB's) for the cable solution, and additional room would be required for the fluid pressurization equipment needed for the HPFF Cable.

While HPFF and SCFF are feasible technologies, they have a potential to release dielectric fluid into the environment. HPFF or SCFF cables installed in a tunnel bear a risk of a fire hazard during a fault in the electrical system. If HPFF cable were installed, additional space would be required at the transition station for the fluid pressurization equipment.

A small number of 500 kV XLPE systems have been installed worldwide to date.

Underground transmission cable manufacturing constraints limit the maximum cable size. In many cases, it is not possible for underground transmission lines to match the capability of overhead transmission lines without the installation of more underground cables than overhead conductors. For example, a 500 kV overhead transmission line requires six conductors, whereas undergrounding would require a minimum of nine, and possibly up to twelve cables.

3.8.3.2 Tunnels: General

In mountainous terrain, the underground tunnel design will result in construction that will be compatible with the mechanical restrictions associated with 500 kV underground cables. In addition, the gravitational pull on the cables in terrain with significant uphill and downhill grades would require the installation of anchoring facilities in order to minimize cable slippage. As with any high-voltage facility, the design would include the installation of the cables and associated underground infrastructure with proper access for maintenance. For all tunnels, the anticipated-construction method will be "Drill and Blast" which, being sub-surface, will cause minimal disturbance to existing ground conditions. The configuration of all of the tunnels is shown in Plate 24 of Figure 3.1.1-4: Talega-Escondido/Valley-Serrano 500 kV Interconnect Project.

3.8.3.3 Construction of Vertical Shafts for the Ridge Tunnel

Construction of the Ridge Tunnel will begin with the installation of four vertical access shafts at locations that, to the extent possible, match the existing terrain and topography, and that also are able to minimize the depth of the shafts below the surface. One of these access shafts will be located at each end of the Ridge Tunnel, that is near Towers 63 and 64. The other two vertical access shafts will be placed approximately at the mid-point between the transition point to the upper end of the Santa Rosa Tunnel and the towers, one on each side.

A fifth vertical access shaft will be located above the transition point of the Ridge Tunnel to the top of the vertical section of the Santa Rosa Tunnel to provide access and a connection to the

transition point and will extend vertically down to meet up with lower section of the Santa Rosa Tunnel. This shaft cannot be used as access for construction of the Ridge Tunnel because it will be excavated much deeper than the Ridge Tunnel invert and tunnel crews cannot work above crews on other tunnels.

The five vertical access shafts will be separated by approximately two thousand two hundred feet.

All of the five vertical access shafts will be constructed simultaneously to minimize schedule requirements.

3.8.3.4 Construction of the Ridge Tunnel

Excavation of the Ridge Tunnel will commence as soon as the access shafts have been completed and load-out facilities have been assembled. The excavation of the tunnel will proceed toward the east from the Tower 63 shaft for approximately 1,100 feet. Similarly, the excavation of the tunnel will proceed simultaneously to the west from the Tower 64 shaft for approximately 1,100 feet. At the same time, excavation will begin at the two mid-point access shafts and will proceed in two directions from each: one approximately eleven hundred feet 1,100 feet toward the tower until it meets with the crew coming from the direction of the respective tower, the other approximately 2,200 feet in the direction of the transition point to the Santa Rosa Tunnel. Therefore, up to a maximum of six excavation crews will be deployed. The east and west sections will converge together and with the vertical shaft of the Santa Rosa Tunnel at a transition point at elevation approximately 2,508 msl.

Removed materials will be lifted out of the shaft and will be moved to the Decker Canyon temporarily for use in the construction of the dam associated with the LEAPS upper reservoir.

The Ridge Tunnel will be approximately 12 feet x 12 feet and will be lined with shotcrete. Further details are shown in Figure 3.6.1-5: GIL Vault Elevations.

3.8.3.5 Construction of the Santa Rosa Tunnel

The average slope of the Santa Rosa Tunnel directly from the substation to the transition point at the Ridge Tunnel is around 25%. As this is too steep for excavation and mining equipment, the Santa Rosa Tunnel will be constructed in two parts: one is a horse shoe-shaped lower section beginning at the substation, which will incline upward at approximately 10%, and the other is a cylindrical vertical access shaft section of around 872 feet extending from the surface elevation of 2,813 msl down to the connection with the lower section at elevation 1,941 msl. which will connect to the transition point.

3.8.3.5.1 Construction of the Lower Section of the Santa Rosa Tunnel

Excavation of the lower section will commence after a portal shaft has been installed for access by equipment and crews. The excavation will proceed in a direction to coincide with the lower end of the vertical shaft. The upward slope of the tunnel will be approximately 10%

The horseshoe-shaped Ridge Tunnel will be approximately 13 feet x 13 feet and will be lined with shotcrete. Further details are shown in Figure 3.6.1-5: GIL Vault Elevations.

3.8.3.5.2 Construction of the Vertical Shaft for the Santa Rosa Tunnel

Construction of the Vertical Access Shaft for the Santa Rosa Tunnel will begin at the upper end in the area of the transition point where the Ridge Tunnel will connect to the Santa Rosa Tunnel. The exact location of the shaft has been optimized in consideration of the requirements of the topography. The height of the shaft will be approximately 872 feet. As mentioned above, this shaft will not be used for construction of the Ridge Tunnel.

Before excavation can begin, a large headworks and permanent elevator structure must be installed for safe construction and also for providing access to the lower section of the tunnel. Once the headworks and elevator structure have been completed, the excavation of the vertical shaft can begin in a downward direction. Removed materials will be lifted out of the shaft by a conveyor or similar equipment and will be moved to the nearby Decker Canyon area for use in the construction of the LEAPS dam.

The vertical shaft will be circular in cross section, with a finished inside diameter of approximately 16 feet. The walls will be lined with reinforced concrete to carry loads applied by the suspended equipment. Access for maintenance and inspection to the equipment in the vertical shaft will be by permanent elevator and a suitable system of permanent and removable platforms. Further details are shown in Figure 3.6.1-5: GIL Vault Elevations.

3.8.3.6 Disposal of Removed Material

3.8.3.6.1 Material Removed during Mining Operations

The TE/VS construction schedule shown on Table 3.8.7-1: TE/VS Interconnect Construction Schedule, calls for mobilization beginning November 2010, at which time the tunneling operations would begin as critical path tasks. The LEAPS construction schedule (Table 3.8.6-2: LEAPS Construction Schedule) calls for mobilization in March 2011, and the construction of the Upper Reservoir at Decker Canyon is a first priority. At Decker Canyon, an area will be set aside immediately for the temporary deposition of removed materials from tunneling associated with the Ridge Tunnel and also the vertical access shaft and the upper part of the lower section of the Santa Rosa Tunnel. These materials will eventually be used in the construction of the dam at the Upper Reservoir in Decker Canyon.

The vertical access shaft at the upper end of the Santa Rosa Tunnel will progress downwards to the designated lowest elevation (approximately 2,100 feet msl) and then the crew will move into the lower section and progress in the direction of the Santa Rosa site. Work will also commence as soon as possible after mobilization in the lower section of the Santa Rosa Tunnel at the Santa Rosa Substation location, and the crew will move toward the vertical access shaft. The two crews will meet up in the lower section. Materials removed from the vertical access shaft (approximately 8,500 cubic yards) and from the lower section down to the meeting point (approximately 13,000 cubic yards) will be taken to the top and will be deposited at the Decker Canyon temporary site. The remaining approximately 19,000 cubic yards removed from the

Santa Rosa Tunnel from the Santa Rosa end will be utilized in the grading to a level condition of the Santa Rosa Substation area, for which approximately 20,000-25,000 cubic yards are needed.

3.8.3.6.2 Material Removed during Tower Installation

Topsoil will be excavated and stored at a separate temporary location and will be used after backfilling as the final top layer. Suitable excavated material will be used for backfilling the foundation pits; the excess material or material not suitable for backfilling will either be used for landscaping around the tower location or be removed from the construction site and disposed of at designated sites as permitted.

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, at MP 2.0.
- The Santa Rosa Substation near the LEAPS Powerhouse, roughly midway between the Lake Switchyard and Case Springs Substation, offset one mile to the southeast from roughly MP 12.3.
- The Case Springs Substation at the southern end of the TE/VS Interconnect line, at MP 31.2.

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 Saturday. 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 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 United States 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 and switchyards that are part of the proposed TE/VS Interconnect.

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, at MP 2.0, as shown on Figure 3.1.1-4: 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 plan for the Lake Switchyard site is presented in Figure 3.8.4-1: Lake Switchyard Conceptual 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 feet 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.

3.8.4.3 Santa Rosa Substation

Site Preparation. The conceptual plan for the Santa Rosa Substation site, located roughly midway between the Lake Switchyard and Case Springs Substation, offset one mile to the southeast from roughly MP 12.3, is presented in Figure 3.8.4-2: Santa Rosa Substation

Conceptual 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 15,000 cubic yards of material removed from the Santa Rosa Tunnel would be added to the 5,000 cubic yards areas of material cut from the higher elevation of the site and placed as fill over the lower elevation to match the 500 kV substation elevation. During grading operations, dust would be controlled by measures outlined in the SWPPP.

Foundation Excavation. 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 about 1,800 cubic yards, and would be spread on a portion of the substation property.

3.8.4.4 Case Springs Substation

Site Preparation. For the Case Springs Substation, at MP 31.5, the proposed 500/230 kV substation would require grading at the base of a sharply rising hill. The conceptual grading plan for the Case Springs Substation is presented in Figure 3.8.4-3: Case Springs Substation Conceptual Grading Plan. To significantly limit the amount of additional property that would be required to construct cut and fill slopes, a crib wall would be constructed along the northerly, easterly, and a portion of the southerly side of the substation. The crib wall would measure approximately 1,350 feet long, and vary in height from 1 foot high at each end to approximately 94 feet high at the northeasterly corner of the substation. A small slope would be constructed along portions of the westerly side of the substation.

The 500/230 kV substation would require an area approximately 300 feet by 900 feet, and would comprise approximately 6.2 acres. An estimated 288,000 cubic yards of soil would be cut from higher elevations of the site. Some of this would be relocated to portions of the lower elevations of the site as fill to provide a level pad with a slope of approximately 2 percent. The rest, approximately 262,000 cubic yards, would be exported from the site.

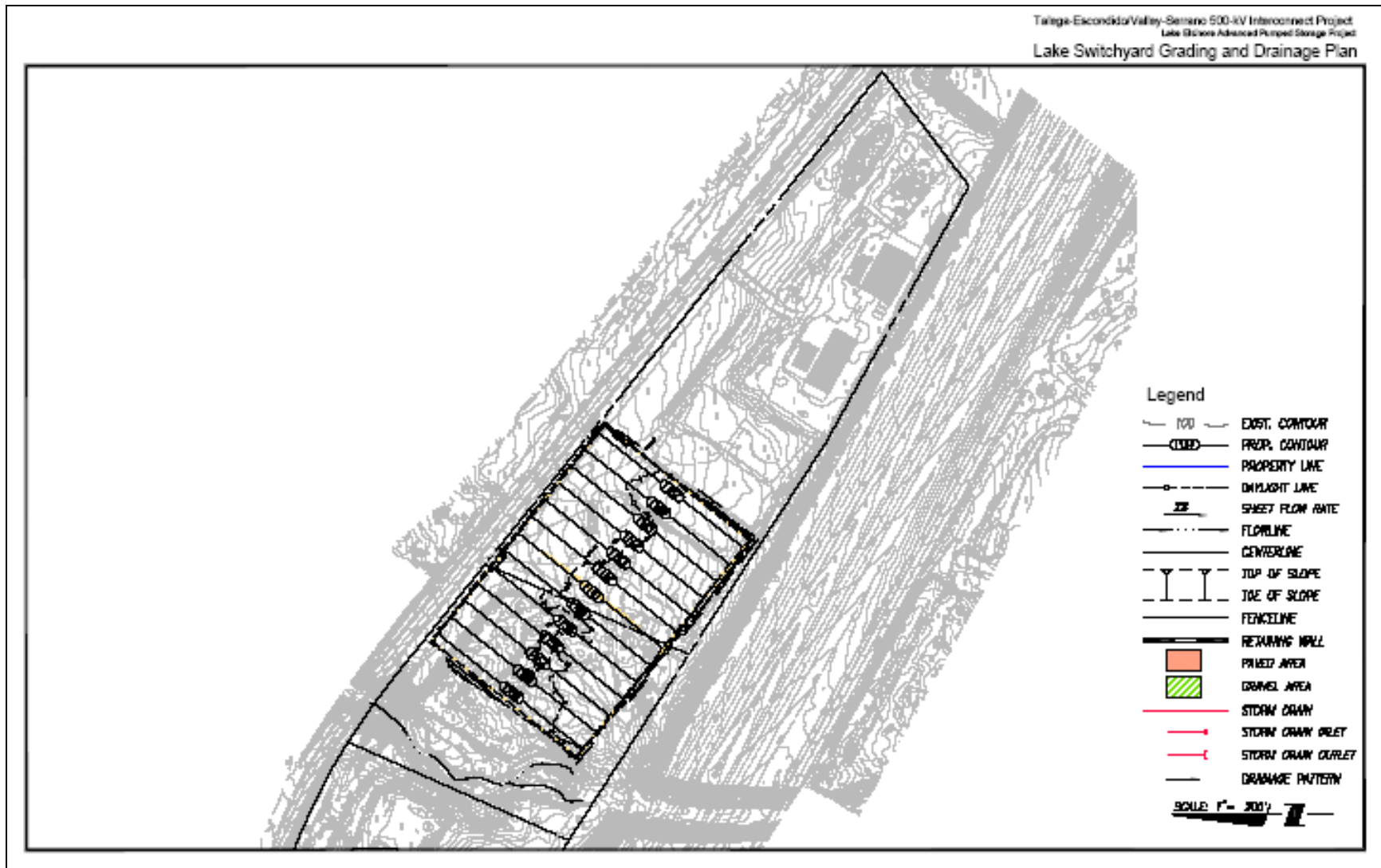


Figure 3.8.4-1: Lake Switchyard Conceptual Grading Plan

Source: The Nevada Hydro Company

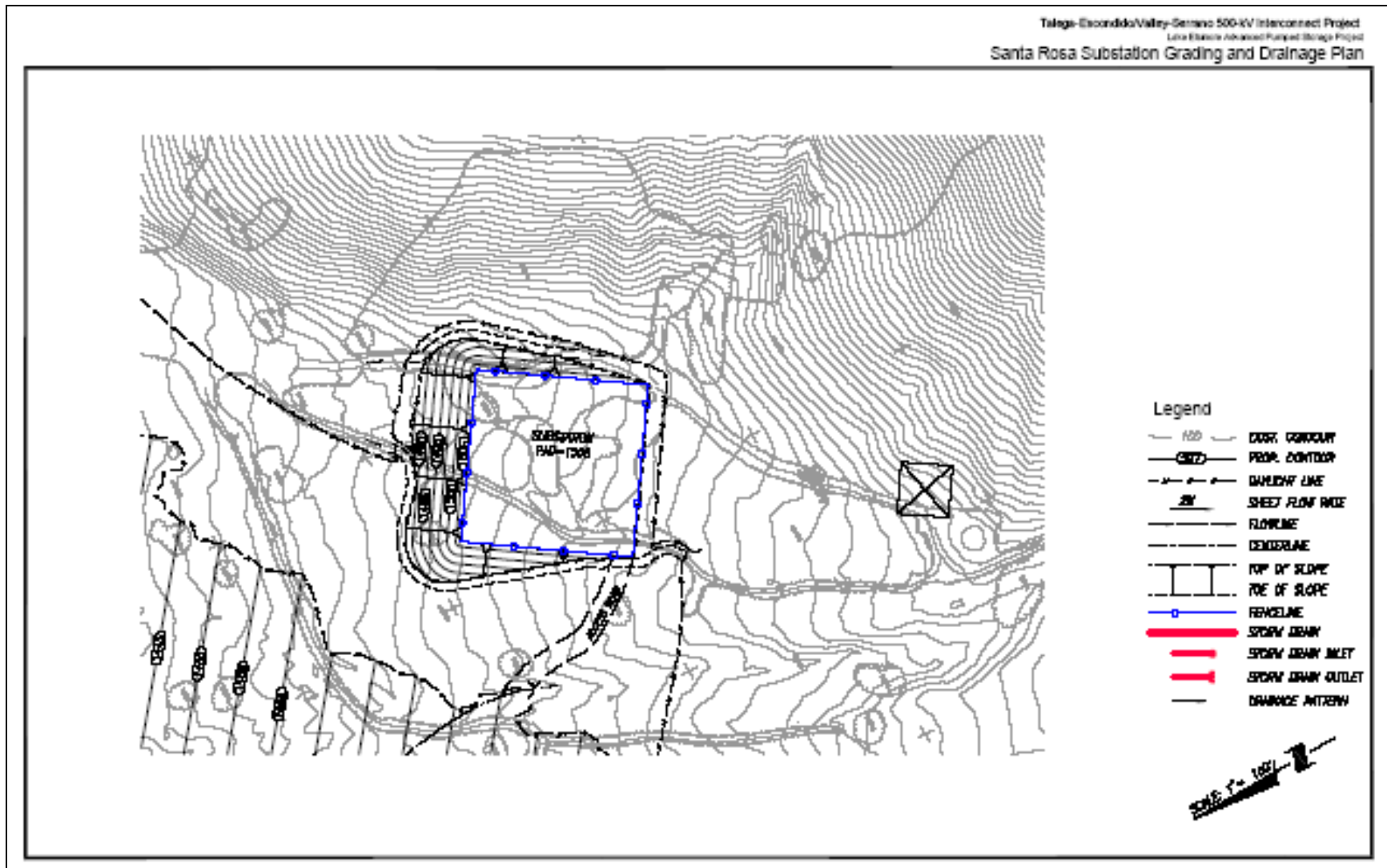


Figure 3.8.4-2: Santa Rosa Substation Conceptual Grading Plan

Source: The Nevada Hydro Company

3.8.5 Upgrade Construction

3.8.5.1 115 kV Santa Rosa – Skylark – Elsinore OHL

Construction of the proposed 115 kV transmission line involves the following elements: Surveying the line route, engineering design based on these survey data's, and finally the construction. Some of the aforementioned activities may overlap. NHC anticipates that the route survey would last for approximately 2 months. Engineering design and physical construction activities, including grading, erecting new poles, and installing conductors would occur over a period of 8 to 10 months.

Survey crews would stake the pole locations, including reference points and centerline hubs, new access and spur roads, crane pads, and lay-down areas, if necessary.

After completion of the final engineering, construction teams would grade all areas for construction. Other construction teams would auger footings, install rebar – anchor bolt cages, and pour concrete pole footings.

While on ground, the new SC & DC poles would be pre-configured with insulators for the conductor installation. Construction teams would erect the poles and install the conductors and ground wire.

The line would be energized once construction is complete and all necessary improvements at both Skylark and Elsinore Substation including the telecommunication facilities are final.

Pole Site Preparation: Most pole locations would need minimal site preparation prior to pole installation. The majority of the pole locations would be along the right of way of public roads. Where new access or spur roads would be needed, pole sites would be cleared and graded at the same time the access or spur roads would be constructed.

Pole Installation: Single circuit poles would be installed in foundation holes bored in the range of 24 to 30 inches diameter to a depth of approximately 10 feet. This will produce roughly 3.55 cubic yards of material per hole. A line truck would be used for the Pole installation. Once the 115 kV pole is set in place, bore spoil material would be used to backfill, and compacted to specification. If the bore spoil were not suitable for backfill, imported clean fill material would be used. Excess and unsuitable bore spoil will be used either for land leveling or to be removed from site and brought to a designated disposal facility.

Double circuit poles would be installed on top of 6 foot diameter and 20 to 25 foot deep cylindrical concrete footings. This will produce roughly 26 cubic yards of excavated material per pole. The hole of the footing would be bored, a rebar cage including anchor bolts inserted, concrete with the specified strength class poured into the hole and compacted with specified vibrators. Once the concrete has reached its final strength (after roughly 28 days) the pole would be lifted by a crane onto the foundation and would be bolted down with the adequate torque. Excess bore spoil will be used either for land leveling or to be removed from site and brought to a designated disposal facility.

Conductor Pulling and Splicing: Conductor pulling includes all activities from unreeling, pulling, sagging until the final clamping of the conductors to the polymer suspension or tension insulators. Pulling locations are areas with a dimension of 100 feet by 50 feet needed for the staging of the stringing equipment such as puller, tensioner, reel-stand truck and conductor reels. Generally, pulling locations would be in line with the overhead conductors, at a distance approximately three times the height of the pole. Pulling locations would be determined after the final design or during construction.

Typical conductor pulls occur from tension tower to tension tower, the distance between the tension towers would be determined during the final design. Conductor pulls are selected, where possible, based on the availability of tension structures at the end of each pull, conductor reel capacity, terrain, and the suitability to stage the stringing and splicing equipment.

3.8.5.2 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 conductors. 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: Talega-Escondido 230 kV Line Upgrade.

3.8.5.3 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:

3.8.6 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 for the TE/VS Interconnect and LEAPS. Finally, Table 3.8.6-3: 115 kV System Upgrade Construction Equipment/Workforce presents the estimate number of personnel and equipment needed for the construction of the proposed 115 kV line.

Table 3.8.6-1: TE/VS Interconnect Construction Equipment/Workforce

TE/VS Construction Equipment Type	Number	Hrs/Day No. of shifts x hrs/shift	No. days/week	Duration Needed	Personnel	Number
Above-Ground Transmission Lines						
4x4 Pickups/Work Trucks	4	1 x 10	6	10 to 12 months	Supervision	4
4x4 One-Ton Framers	4	1 x 10	6	10 to 12 months	Framers	12
Skycrane	1	1 x 10	6	3 to 4 month	Pilots	2
	1	1 x 10	6	3 to 4 month	Ground Crew	2
Mid-Capacity Lift Helicopter	2	1 x 10	6	2 to 3 months	Pilots	2
		1 x 10	6	2 to 3 months	Ground Crew	2
Yard Crane (30-ton)	3	1 x 10	6	10 to 12 months	Operator	1
D-8 Sag Cat	1	1 x 10	6	4 to 5 months	Operator	1
Bundle Tensioner	1	1 x 10	6	4 to 5 months	Operator	1
50-Thousand Pound Pulling Rig	1	1 x 10	6	4 to 5 months	Operator	1
3 Reel Wire Trailers	3	1 x 10	6	4 to 5 months	Operator	3
4 Drum Pullers with 3/8" Hardline	2	1 x 10	6	4 to 5 months	Operator	2
Digger Derrick for Guard Poles	1	1 x 10	6	4 to 5 months	Teamster	1
Fifth Wheel Trucks 6x6	3	1 x 10	6	4 to 5 months	Teamster	3
Extra Float Trailer 40'/60'	1	1 x 10	6	10 to 12 months	Operator	1
Hughes 500 helicopters	2	1 x 10	6	7 to 8 months	Pilots	3

TE/VS Construction Equipment Type	Number	Hrs/Day No. of shifts x hrs/shift	No. days/week	Duration Needed	Personnel	Number
	2	1 x 10	6	7 to 8 months	Ground Crew	3
Office Trailer	1	1 x 10	6	10 to 12 months	Secretary	1
Tool Van	1	1 x 10	6	10 to 12 months	Warehouseman	1
Bundle Fly Travelers	200	1 x 10	6	7 to 8 months		
OHWG and OPGW Fly Travelers	150	1 x 10	6	7 to 8 months		
Reel Jacks for OHGW and OPGW	2	1 x 10	6	4 to 5 months	Operator	2
Water Trucks	2	1 x 10	6	7 to 8 months	Operator	2
Hydraulic Pole Jack	1	1 x 10	6	3 to 4 weeks	Operator	1
Below-Ground Transmission Lines						
4 X 4 Pickup	12	2 x 12	7	16 to 18 months	Operator	18
Yard Cranes 18 ton	6	2 x 12	7	10 to 12 months	Operator	6
200 ton track crane	4	2 x 12	7	10 to 12 months	Operator	4
Double Drum Mine Hoist	1	2 x 12	7	14 to 16 months	Operator	2
Drill Jumbo- 2 boom	9	2 x 12	7	14 to 16 months	Operator	18
3.5 CY Scoop Tram	16	2 x 12	7	10 to 12 months	Operator	32
16-Ton Mine Truck	4	2 x 12	7	10 to 12 months	Operator	8
Shotcrete Pump & Nozzle	7	2 x 12	7	3 to 5 months	Operator	14
950 CAT Loader	6	2 x 12	7	10 to 12 months	Operator	9
Small Motor Grader	1	2 x 12	7	10 to 12 months	Operator	2
10 CY Dump truck	12	2 x 12	7	10 to 12 months	Operator	18
1400 CFM Air Compressor	6	2 x 12	7	10 to 12 months		
500kW Genset	6	2 x 12	7	10 to 12 months		
1000kW Genset	2	2 x 12	7	10 to 12 months		
Fuel truck	1	2 x 12	7	14 to 16 months	Operator	2
Office Trailers	10	2 x 12	7	18 to 19 months	Secretary	4
Tool Van	6	2 x 12	7	12 to 14 months	Warehouseman	2
					Superintendent	6
					Engineers	10
					Lead miner	28
					Miner	96
					Top Landers	22
					Bottom Landers	22
					Surface Laborers	44

* Note: Equipment and Personnel needs vary for the anticipated duration of the project.

Source: The Nevada Hydro Company

Table 3.8.6-2: LEAPS Construction Equipment/Workforce

LEAPS Construction Equipment Type	Number	Hrs/Day No. of shifts x hrs/shift	No. days/week
CAT 436 Rubber Equipment Backhoe	1	2x10	5
Ready Mix Truck	3	2x10	5
150-Ton Crane	1	2x10	5
250-Ton Crane	1	2x10	5
25-Ton Crane	1	2x10	5
60-Ton Crane	1	2x10	5
CAT D10R Dozer	1	2x10	5
CAT D6 Dozers	5	2x10	5
CAT D8R Dozer	3	2x10	5
CAT Motor Graders	1	2x10	5
Misc. Compressors & Generators	20	2x10	5
Portable Light Plants	10	2x10	5
CAT Loaders	6	2x10	5
CAT Compactors	2	2x10	5
CAT Scrapers	4	2x10	5
CAT Rock Trucks	5	2x10	5
Crew & Supervisory Pickups	20	2x10	5
Grout Plant	1	2x10	5
Tunnel Drill Jumbos	4	2x10	5
Tunnel Scoop Trams	4	2x10	5
Water Trucks	5	2x10	5
Tunnel Boring Machine	1	2x10	5
Over the road Haul Trucks	20	2x10	5
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

Table 3.8.6-3: 115 kV System Upgrade Construction Equipment/Workforce

Number of Personnel	Equipment	Hours / Day	Days / Week	Total Days
32	2 Crew Trucks (Gasoline)	10	6	192
	2 Line Trucks	10	6	192
	2 Light Trucks	10	6	192

Number of Personnel	Equipment	Hours / Day	Days / Week	Total Days
	1 Bucket Truck	10	6	192
	1 Water Truck	10	6	192
	2 Truck mounted Cranes	10	6	192
	1 Conductor Pulling Machine	10	6	28
	1 Conductor Tensioner (Gasoline)	10	6	28
	1 30-ton Crane	10	6	28
	1 D6 Bulldozer	10	6	10
	1 Drilling Rig	10	6	32

Note : Fuel for equipment is diesel except where noted

Source: The Nevada Hydro Company

3.8.7 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 3.8.7-1: TE/VS Interconnect Construction Schedule, below, presents the anticipated development schedule for the TE/VS Interconnect and Table 3.8.7-2: LEAPS Construction Schedule presents the anticipated development schedule for LEAPS.

Table 3.8.7-1: TE/VS Interconnect Construction Schedule

Event	Days	Expected Start	Running Days
Re-submit PEA		4/15/10	0
Data Adequate/Schedule	14	4/29/10	14
Prehearing Conf	14	5/13/10	28
File Testimony	14	5/27/10	42
Rebuttal Testimony	14	6/10/10	56
Reply Testimony	14	6/24/10	70
Hearings Start	14	7/8/10	84
Hearings End	14	7/22/10	98
Initial Brief	21	8/12/10	119
Reply Brief	14	8/26/10	133
Proposed PUC Decision	21	9/16/10	154
Final CPCN -- CEQA Cert	30	10/16/10	184
Forest Service SUP	21	11/6/10	205
TE/VS Financial Close	7	11/13/10	212
NTP	0	11/13/10	212
Construction TE/VS	0	11/13/10	212
Mobilize	30	12/13/10	242
Start Construction	9	12/22/10	251
Complete Construction	480	4/15/12	731
Energize TEVS	5	4/20/12	736

Source: The Nevada Hydro Company

Table 3.8.7-2: LEAPS Construction Schedule

Event	Days	Expected Start	Running Days
SWRB 401 Permit	28	11/13/2010	212
FERC Hydro License	21	12/4/2010	233
Forest Service SUP	21	12/25/2010	254
LEAPS Financial Close	30	1/24/2011	284
NTP	0	1/24/2011	284
Construction LEAPS	14	2/7/2011	298
Mobilize	30	3/9/2011	328
Start Construction	9	3/18/2011	337
Complete Construction	1424	2/9/2015	1761
Energize LEAPS	5	2/14/2015	1766

Source: The Nevada Hydro Company

3.8.8 Excavation Volumes

As shown in Table 3.8.8-1: Excavation Volumes, combined fill volumes of the upper dam at Decker Canyon and the embankments at the intake works at Lake Elsinore are estimated to be 2,839,000 cubic yards. It is therefore expected that excavation and fill volumes will be approximately balanced. Please also refer to FERC EIS Paragraph 2.3.2-Construction Sequence.

Table 3.8.8-1: Excavation Volumes

Project Component	Excavation volume (cu yards)
Upper reservoir (will be re-used in dam where possible)	2,036,000
Penstock, (headrace, including adits, inlets etc))	177,500
Powerhouse cavern	207,000
Powerhouse access shaft	53,000
Powerhouse draft tubes	6,000
Penstock (tailrace)	65,000
Ventilation shaft	500
Surge shaft	32,000
Lower reservoir intake	200,000
Santa Rosa Tunnel	33,000
Ridge Tunnel	56,000
Total volume	2,866,000

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 manufacturers’ 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 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 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 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 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 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 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 be 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 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 to 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.

The lattice towers specified, can be climbed for visual inspections. Roughly 20% of the above ground structures will be visually inspected per year. This would mean approximately 28 to 29 structures per year, would be physically climbed, and/or visually inspected.

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 includes 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 locator 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), LEAPS 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 Applicant envisions that the TV/ES Interconnect 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 Canyon Reservoir 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.

3.9.3 115 kV Operation, Inspection and Maintenance

Normal operation of the proposed 115 kV line would be controlled remotely through the control systems of the owner and SCE. The line will be inspected approximately once a year by driving the line route.

Maintenance would occur as needed. Maintenance would include activities such as: repairing conductors, replacing insulators, replacing poles, and maintaining access and spur roads constructed by the owner.

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 APMs 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 LEAPS. 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 reservation⁹⁷ 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 Projects are located primarily on lands within the CNF and Camp Pendleton, which are federal reservations.⁹⁸ 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.

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.

⁹⁷/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.”

⁹⁸/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 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 LEAPS.

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 LEAPS.

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.⁹⁹

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 Project’s construction or operation must be 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,

⁹⁹/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).

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.¹⁰⁰ 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.¹⁰¹

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).¹⁰² LEAPS will fully comply with all additional and/or alternative licensing conditions as may be established by FERC.

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.¹⁰³ Since compliance with those statutes, regulations, rules, policies, plans, and standards is

100/ 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."

101/ 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.

102/ Section 241 of EPAAct 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 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.

103/ 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

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

In addition to the mitigation measures referred to above and in Section 6 of the FESA, the Applicant has identified a number of additional actions designed to further reduce the potential environmental impacts associated with the Project. 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 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.

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.

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.¹⁰⁴ 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.

The Applicant’s TE/VS Interconnect 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

^{104/} Southern California Edison Company, EMF Design Guidelines for New Electrical Facilities: Transmission, Subtransmission, Distribution, December 2003.

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.”¹⁰⁵

^{105/} 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.

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