

5.7 Geology and Soils

This section evaluates whether construction, operation, and maintenance of the Proposed Project and alternatives would result in potential adverse impacts related to local geology, existing soil conditions, or seismicity. The evaluation and analysis of geology, soils, faulting, and seismicity are based, in part, on review of various geologic maps and reports. The primary sources include available resources from the United States Geological Survey (USGS) and the California Geological Survey (CGS). Both short-term and long-term effects are analyzed to determine their significance under the California Environmental Quality Act (CEQA). When impacts are determined to be significant or potentially significant, mitigation measures to avoid or reduce those impacts are identified. Also described here are the existing conditions and regulations relevant to the Proposed Project and alternatives.

5.7.1 Setting

This section describes the existing geologic conditions and soil resources along the Proposed Project alignment. Information in this section was collected from reports prepared by the USGS, CGS, the U.S. Natural Resources Conservation Service (NRCS), and a geotechnical report prepared for the area by Converse Consultants (Converse, 2011).

Regional Geology

The Proposed Project would be approximately 9 miles long, and traverse portions of the City of Moorpark, unincorporated areas of Ventura County, and the City of Thousand Oaks. The Proposed Project would be within the foothills of the Transverse Ranges geomorphic province (CGS, 2002a). The Transverse Ranges are tectonically active, with relatively high rates of uplift resulting in steep terrain. The Transverse Ranges are characterized by west-east trending mountain ranges and ridges (e.g., Las Posas Hills, Calleguas Hills) separated by intervening valleys (e.g., Little Simi Valley and Santa Rosa Valley). Numerous smaller, steep-sided canyons are aligned perpendicular to the major ridges. Elevations across the Proposed Project subtransmission line alignment range from approximately 420 feet above mean sea level (amsl) at Arroyo Las Posas, to approximately 1,150 feet amsl in the Calleguas Hills. Erosion of the steep slopes has created incised canyons and deep sedimentary valleys in the region.

The Proposed Project alignment traverses from north to south across the alluvial plain¹ of Little Simi Valley, over the Las Posas Hills, across the Santa Rosa Valley, and through the rugged Calleguas Hills (Converse, 2011). Little Simi Valley and Santa Rosa Valley are partially filled with alluvial sediments derived from adjacent hills. These sediments consist of Holocene (less than 11,000 years before present [B.P.]) and Late Pleistocene (1.8 million to 11,000 years B.P.) alluvium in Little Simi Valley, and Holocene alluvium in the Santa Rosa Valley. The sediments

¹ A broad, flat plain of unconsolidated earth materials (clay, silt, sand, gravel) deposited by a stream or body of running water.

in the Little Simi Valley generally consist of sand, with layers of silty sand, clayey sand, and clay and silt layers, and are generally loose to medium dense.

The Las Posas Hills are predominantly composed of folded and faulted deposits of the Pleistocene (2.8 million to 11,000 years B.P.) Saugus Formation (Converse, 2011). The Saugus Formation is composed of loosely consolidated, non-marine sandstone, conglomerate, and siltstone. The Proposed Project alignment crosses a small section of the Pleistocene Las Posas Sand, made up of primarily sandstones and gravelly sandstones. The upper Eocene to lower Miocene (37.2 to 16.0 million years B.P.) Sespe Formation is exposed along the crest of the Las Posas Hills adjacent to the Santa Rosa Fault.

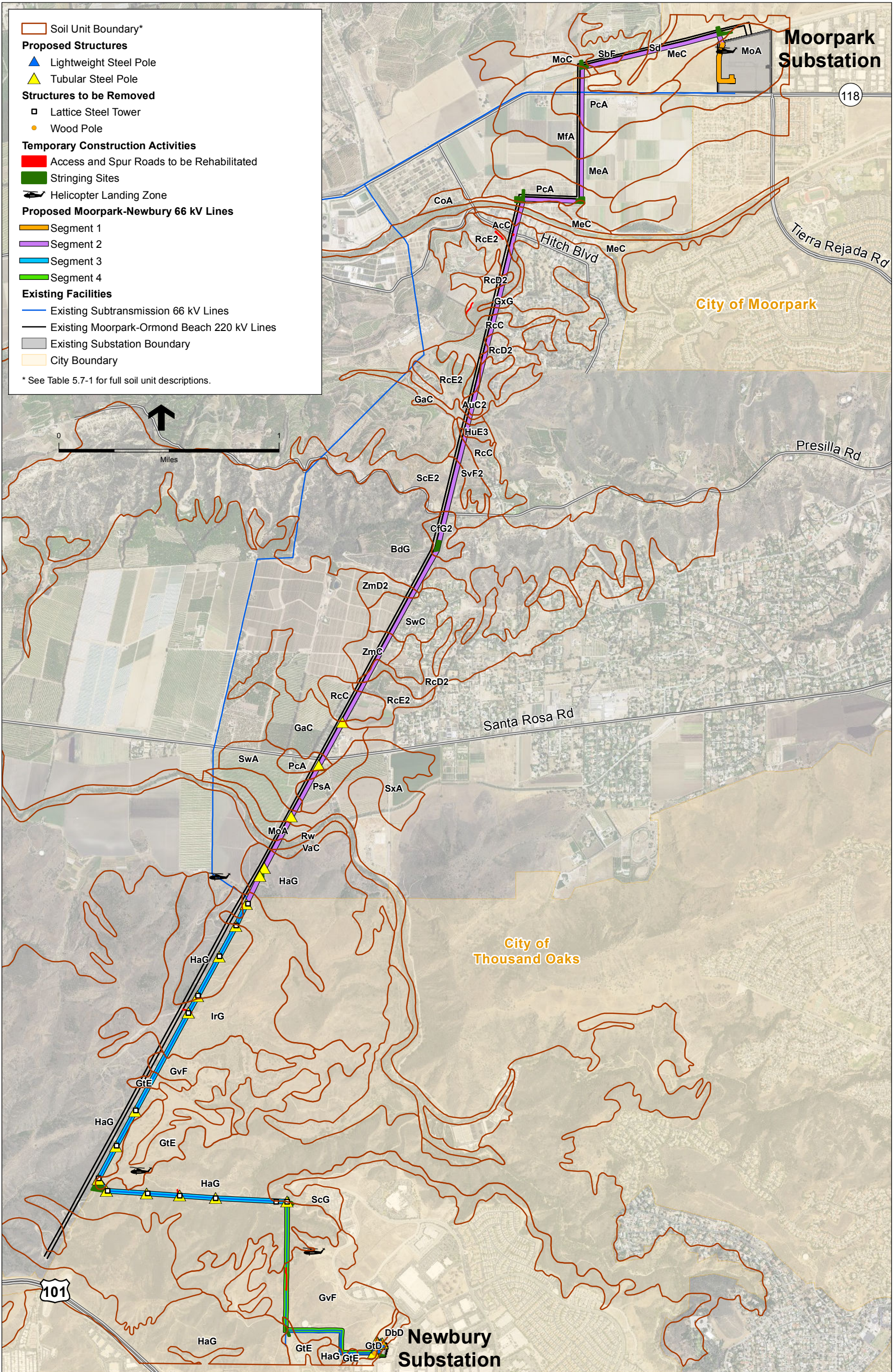
The bedrock of the Calleguas Hills consists of the middle Miocene (16.0 to 11.6 million years B.P.) Conejo Volcanics. Within the Proposed Project alignment, the Conejo Volcanics are composed of andesite and basalt flows and flow breccias (Converse, 2011). Quaternary alluvium and undifferentiated deposits are present along the lower flanks of the Calleguas Hills and in Conejo Valley near the southern end of the Proposed Project alignment.

Soils

A layer of soil overlies the geologic units described above. In general, soil characteristics are strongly governed by slope, relief, climate, vegetation, and the rock type upon which they form. Soil types are important in describing engineering constraints such as erosion and runoff potential, corrosion risks, and various behaviors that affect structures, such as expansion and settlement.

This analysis relies on soils data from both the NRCS and from the borings collected for the geotechnical report prepared for the project. NRCS soils data for the Proposed Project area were reviewed using Web Soil Survey (NRCS, 2014a). These data include information about soil suitability for various land uses, soil chemical and physical properties, and descriptions of soil types. A generalized soils map for the area is included in **Figure 5.7-1, Proposed Project Area Soils**. Soil map units within the Proposed Project area and soil properties relevant to the impact analysis of the Proposed Project and alternatives are summarized in **Table 5.7-1, Proposed Project Area Soils and Soil Properties**. Soil engineering properties were also evaluated at specific boring locations identified in the geotechnical data report prepared for previous construction along the project alignment, shown in **Figure 5.7-2, Well Boring Locations**.

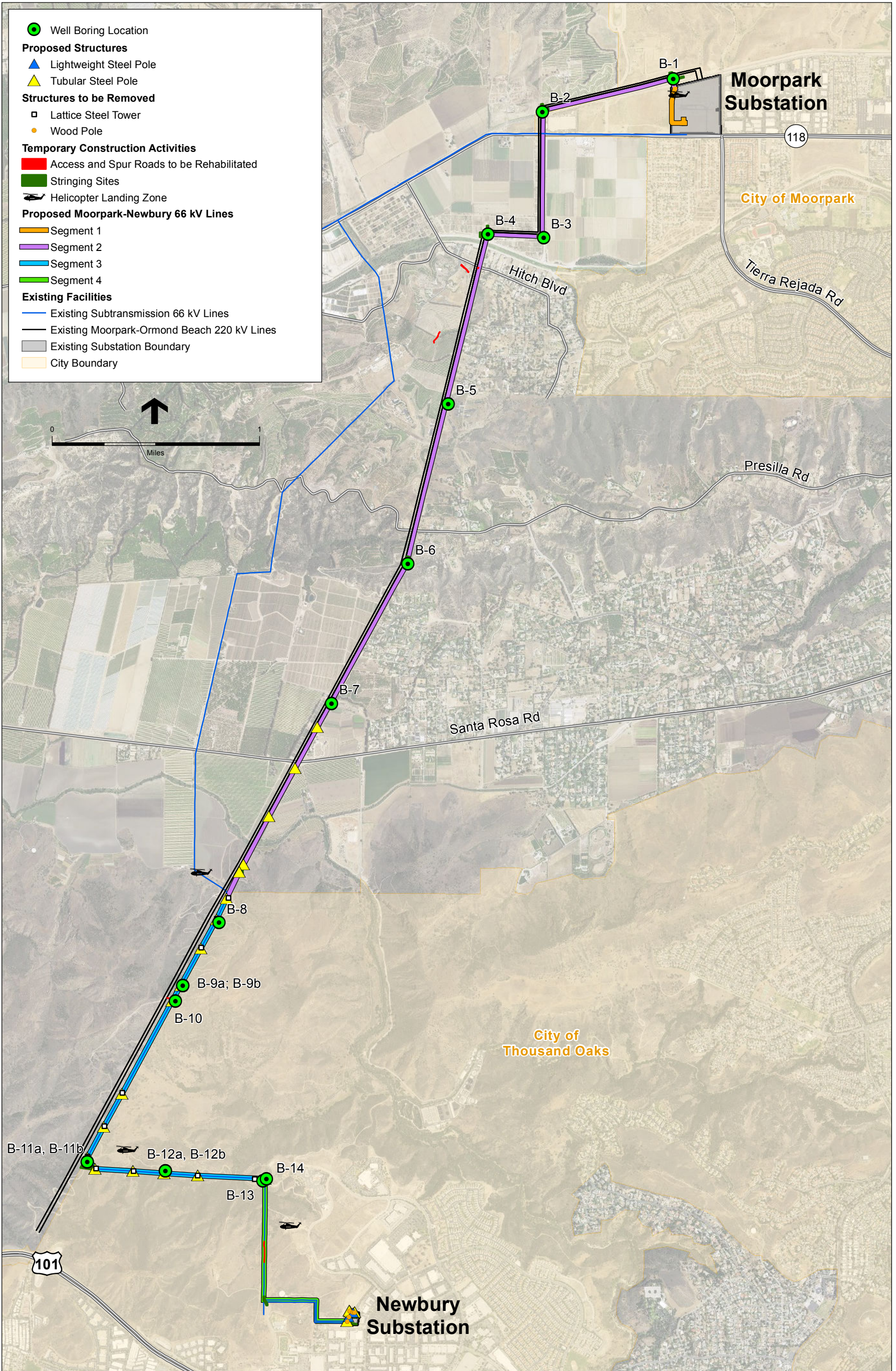
The soil map units that could be disturbed by tubular steel pole (TSP) construction or rehabilitation of access road and stringing sites are highlighted in the table below. These sites are noted because they are the locations of ground disturbance associated with the Proposed Project. The soil properties in these locations are most relevant to the impact analysis in Section 5.7.4, *Impacts and Mitigation Measures*, below.



SOURCE: NRCS, 2014a

Moorpark-Newbury 66 kV Subtransmission Line Project. 207584.15

Figure 5.7-1
Proposed Project Area Soils



SOURCE: Converse, 2011

Moorpark-Newbury 66 kV Subtransmission Line Project. 207584.15

Figure 5.7-2
 Well Boring Locations

**TABLE 5.7-1
PROPOSED PROJECT AREA SOILS AND SOIL PROPERTIES**

Soil Map Unit ID	Soil Map Unit Name	Shrink-Swell Potential ^a	Erosion Hazard ^b	Wind Erodibility Group ^c	Corrosion ^d	
					Uncoated Steel	Concrete
AcC	Anacapa sandy loam, 2 to 9 percent slopes	Low	Moderate	3	High	Low
AuC2	Azule loam, 2 to 9 percent slopes, eroded	Moderate	Moderate	6	High	Low
BdG	Badland		not rated	NA	NA	NA
CfG2	Castaic-Balcom complex, 50 to 65 percent slopes, eroded	Moderate	Severe	4	Moderate	Low
CoA	Corralitos loamy sand, 0 to 2 percent slopes	Low	Slight	2	High	Moderate
DbD	Diablo clay, 9 to 15 percent slopes	High	Severe	4	High	Moderate
GaC	Garretson loam, 2 to 9 percent slopes	Low	Moderate	6	Low	Low
GtD	Gilroy clay loam, 2 to 9 percent slopes	Moderate	Severe	6	Moderate	Low
GtE	Gilroy clay loam, 15 to 30 percent slopes	Moderate	Severe	6	Moderate	Low
GvF	Gilroy very rocky clay loam, 15 to 50 percent slopes	Moderate	Severe	6	Moderate	Low
GxG	Gullied land		not rated	NA	NA	NA
HaG	Hambright very rocky loam, 15 to 75 percent slopes	Low	Severe	7	Moderate	Low
HuE3	Huerhuero very fine sandy loam, 9 to 30 percent slopes, severely eroded	Moderate	Severe	3	High	Low
IrG	Igneous rock land		not rated	NA	NA	NA
MeA	Metz loamy sand, 0 to 2 percent slopes	Low	Slight	2	High	Low
MeC	Milpitas-Positas fine sandy loams, 2 to 9 percent slopes	Low	Moderate	2	High	Low
MfA	Metz loamy sand, loamy substratum, 0 to 2 percent slopes	Low	Slight	2	High	Low
MoA	Mocho loam, 0 to 2 percent slopes	Moderate	Slight	6	Moderate	Low
MoC	Mocho loam, 2 to 9 percent slopes	Moderate	Moderate	6	Moderate	Low
PcA	Pico sandy loam, 0 to 2 percent slopes	Low	Slight	3	High	Low
PsA	Pico loam, sandy substratum, 0 to 2 percent slopes	Low	Slight	5	High	Low
RcC	Rincon silty clay loam, 2 to 9 percent slopes	Moderate	Moderate	7	NA	NA
RcD2	Rincon silty clay loam, 9 to 15 percent slopes, eroded	High	Moderate	6	High	Low
RcE2	Rincon silty clay loam, 15 to 30 percent slopes, eroded	High	Severe	6	High	Low
Rw	Riverwash	Low	not rated	1	NA	NA
SbF	San Andres sandy loam, 30 to 50 percent slopes	Low	Severe	3	Low	High

**TABLE 5.7-1 (Continued)
PROPOSED PROJECT AREA SOILS AND SOIL PROPERTIES**

Soil Map Unit ID	Soil Map Unit Name	Shrink-Swell Potential ^a	Erosion Hazard ^b	Wind Erodibility Group ^c	Corrosion ^d	
					Uncoated Steel	Concrete
ScE2	San Benito clay loam, 15 to 30 percent slopes, eroded	Moderate	Severe	6	Moderate	Low
ScG	San Benito clay loam, 50 to 75 percent slopes	Moderate	Severe	6	Moderate	Low
Sd	Sandy alluvial land	Low	not rated	2		
SvF2	Soper gravelly loam, 30 to 50 percent slopes, eroded	Moderate	Severe	7	Moderate	Low
SwA	Sorrento loam, 0 to 2 percent slopes	Moderate	Slight	6	Moderate	Low
SwC	Sorrento loam, 2 to 9 percent slopes	Moderate	Moderate	6	Moderate	Low
SxA	Sorrento silty clay loam, 0 to 2 percent slopes	Moderate	Slight	6	Moderate	Low
VaC	Vina loam, 2 to 9 percent slopes	Low	Moderate	6	Moderate	Low
ZmC	Zamora loam, 2 to 9 percent slopes	Moderate	Moderate	6	Moderate	Low
ZmD2	Zamora loam, 9 to 15 percent slopes	Moderate	Severe	6	Moderate	Low

- a. The shrink-swell potential is low if the soil has a linear extensibility of less than three percent; moderate if three to six percent; high if six to nine percent; and very high if more than nine percent.
- b. Erosion hazard is rated based on the soil erodibility factor (K), which represents the combination of the susceptibility of soil or surface material to erosion, the transportability of the sediment, and the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. The California Water Resources Control Board identifies erosion hazard as low for K values ranging from 0.05 to 0.2, moderate for K values ranging from 0.25 to 0.45, and high for K values ranging from 0.45 to 0.69.
- c. Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. Wind erodibility groups 1 and 2 correlate to the highest rate of soil loss due to wind; groups 3 through 7 correlate to moderate rate of soil loss to wind; and group 8 correlates to low soil loss to wind.
- d. The risk of corrosion to concrete or steel is rated as high, moderate, or low by the NRCS based on the combination of soil moisture, soil texture, acidity, and other chemical characteristics of the soil (sulfate and sodium content for concrete corrosion; electrical conductivity for steel corrosion).

SOURCE: NRCS, 2014a.

Faults

The Proposed Project is located in a tectonically active area. Motion along active and potentially active faults in the region could cause ground shaking in the Proposed Project area. The State of California considers a fault to be “active” if evidence exists of surface displacement within the past 11,000 years (Holocene epoch) and considers a fault to be “potentially active” if evidence exists of surface displacement within the past 1.6 million years (Quaternary period). Active and potentially active faults within 20 miles of the Proposed Project area are summarized in **Table 5.7-2, *Faults in the Proposed Project Vicinity***. The distances shown in the table are measured from the closest point on the fault to the closest Proposed Project component. **Figure 5.7-3, *Seismic Hazards***, illustrates fault locations within the immediate vicinity of the Proposed Project area. The Simi-Santa Rosa fault, which crosses Proposed Project Segment 2 (see Figure 5.7-3), has been classified by the state as an active fault that has potential for surface fault rupture along its traces. The Oak Ridge, San Cayetano, and Malibu Coast faults are also classified as active. The potential earthquake magnitude identified for each fault below is a modeled estimate of the maximum amount of energy that could be released by each fault based on seismic and geologic information, such as fault slip rates and the rigidity of surrounding geologic units.

**TABLE 5.7-2
FAULTS IN THE PROPOSED PROJECT VICINITY**

Fault Name	Miles from Nearest Proposed Project Component	Age of Faulting (years before present)	Potential Earthquake Magnitude
Simi-Santa Rosa	0	< 15,000 (Active)	7.0
Sycamore Canyon	1.3	< 1.6 million (Potentially Active)	NA
Oak Ridge	2.5	< 15,000 (Active)	7.0
San Cayetano	7.9	< 15,000 (Active)	7.0
Santa Susana	9.1	< 130,000 (Potentially Active)	6.7
Malibu Coast	10	< 15,000 (Active)	6.7
Holser	14	< 130,000 (Potentially Active)	6.5
Santa Monica	15	< 15,000 (Potentially Active)	6.6
Anacapa-Dume	16	< 130,000 (Potentially Active)	7.5
Chatsworth	16	< 130,000 (Potentially Active)	NA
Northridge Hills	18	< 130,000 (Potentially Active)	7.0
Santa Ana	18	< 130,000 (Potentially Active)	7.2

NOTE: NA = information not available.

SOURCES: Cao et al., 2003; USGS and CGS, 2006.

Geologic Hazards

A geologic hazard is a geologic condition, either natural or man-made, that poses a potential danger to life and property. The following sections discuss possible geologic hazards in the study area. Geologic conditions that present potential hazards to people and structures are identified on a county-wide basis in the Ventura County General Plan Hazards Appendix (Ventura County, 2011), and on a local level in the Safety elements of the City of Moorpark General Plan and the City of Thousand Oaks General Plan (City of Moorpark, 2001; City of Thousand Oaks, 2014). Seismic Hazard Zones (areas of seismically induced liquefaction or landslides) have been mapped in the Proposed Project Area by the California Geological Survey (CGS, 2001 and 2002b), and are shown in Figure 5.7-3, *Seismic Hazards*.

Surface Rupture and Groundshaking

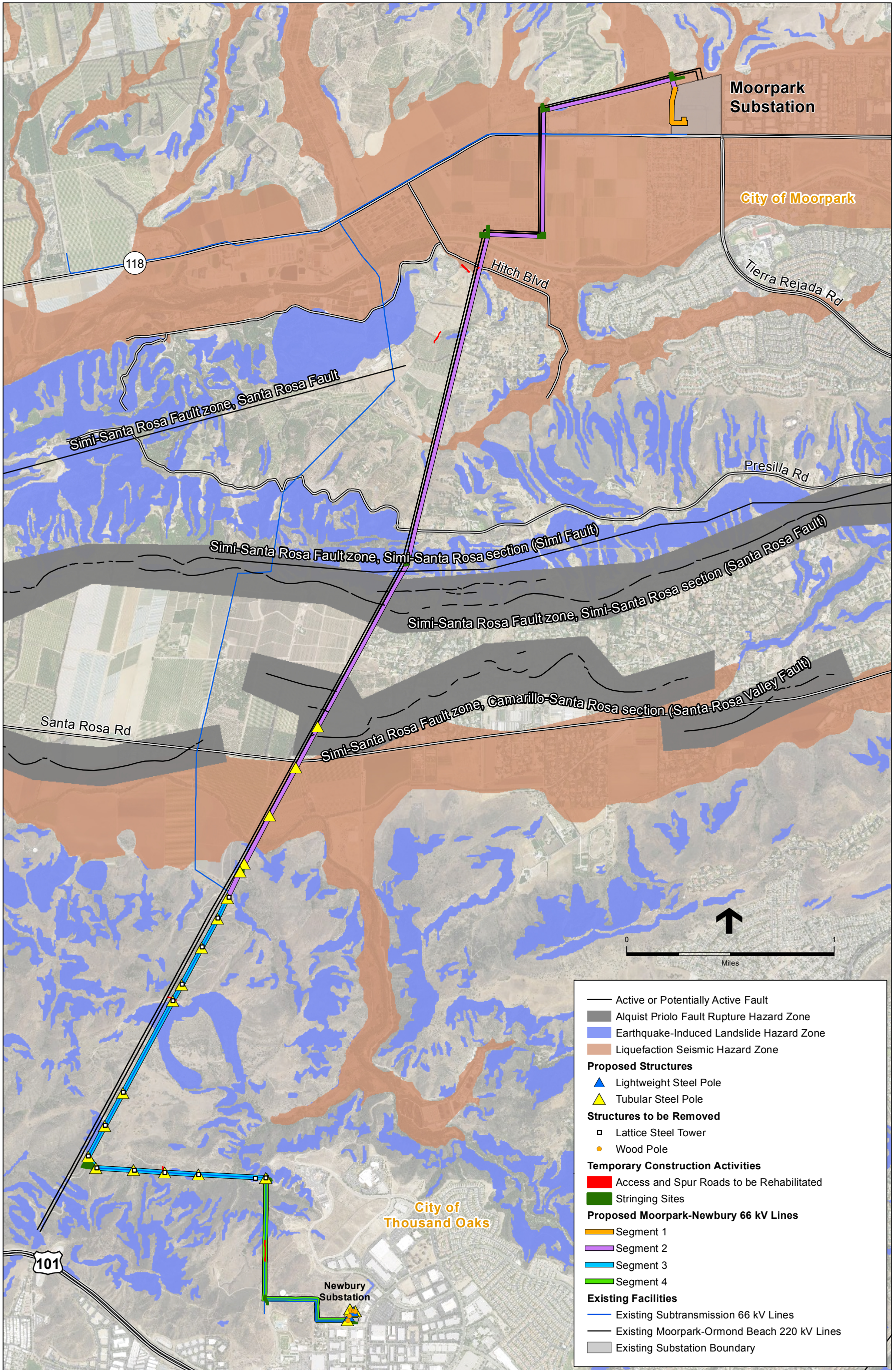
Surface rupture occurs when movement along a fault breaks through the ground surface, and generally occurs along preexisting faults with relatively recent activity (i.e., within the last 11,000 years). The California Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act; described in greater detail below) prohibits the development of structures for human occupancy² across active fault traces.³ Under the Alquist-Priolo Act, the CGS, formerly the California Division of Mines and Geology, must establish zones on either side of the active fault that delimit areas susceptible to surface fault rupture (called A-P Zones). These zones are referred to as fault rupture hazard zones and are shown on official maps published by the CGS. These zones vary in width, but average about one-quarter mile wide.

While it is possible that surface rupture could occur outside of these zones, the risk of occurrence is not substantial. The Proposed Project alignment crosses the Simi-Santa Rosa A-P Zone in two areas: along the northern margin of the Santa Rosa Valley, and near the crest of the Las Posas Hills (CGS, 2002b). The Proposed Project alignment also crosses an older segment of the Simi-Santa Rosa Fault Zone (Simi Fault) near the crest of the Las Posas Hills (USGS, 2010).

Seismically induced ground rupture is defined as the physical displacement of surface deposits in response to an earthquake's seismic waves. The magnitude and nature of fault rupture can vary for different faults, or even along different strands of the same fault. Surface rupture-generated shaking is typically the greatest cause of earthquake damage. The local geologic conditions, principally the softness of the ground and the total thickness of sediments below a particular site,

² A structure for human occupancy is one that is intended for supporting or sheltering any use or occupancy, which is expected to have a human occupancy rate of more than 2,000 person hours per year (Bryant and Hart, 2007).

³ The Alquist-Priolo Act designates zones that are most likely to experience fault rupture, although surface fault rupture is not necessarily restricted to those specifically zoned areas. The zones are defined by the CGS. For the purpose of delineating fault rupture zones, the CGS historically sought to also zone faults defined as potentially active, which are faults that have shown evidence of surface displacement during the Quaternary period (the last 1.6 million years). In late 1975, the State Geologist made a policy decision to zone only those faults that had a relatively high potential for ground rupture, determining that a fault should be considered for zoning as active only if it was sufficiently active and "well defined." Sufficiently active is also used to describe a fault if there is some evidence that Holocene displacement occurred on one or more of its segments or branches. Faults that are confined to pre-Quaternary rocks (more than 1.6 million years old) are considered inactive and incapable of generating an earthquake.



SOURCE: SCE, 2013; CGS, 2001; CGS 2002b; USGS and CGS, 2006

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Figure 5.7-3
Seismic Hazards

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generally control the intensity of ground shaking during an earthquake (Ventura County, 2013a). Shaking tends to be stronger at sites with softer surface materials. Probabilistic approaches to assessing seismic hazards use the statistics of earthquake occurrence in a region to estimate the level of ground motion for which the exceedance probability is acceptably low. The primary tool that seismologists use to estimate ground-shaking hazard and characterize statewide earthquake risks is a probabilistic seismic hazard assessment (PSHA). The PSHA for the State of California takes into consideration the range of possible earthquake sources and estimates their characteristic magnitudes to generate a probability map for ground-shaking. The PSHA maps depict values of peak ground acceleration (PGA) that have a 10 percent probability of being exceeded in 50 years (or a 1 in 475 chance). This probability level allows engineers to design structures for ground motions that have a 90 percent chance of not occurring in the next 50 years, making structures safer than if they were simply designed for the most likely events. The peak ground acceleration value used to estimate the expected groundshaking for the Proposed Project was calculated for a location near the center of the Proposed Project and in proximity to the Simi-Santa Rosa A-P Zone. The PGA expected is 0.504 g (CGS, 2008a), which corresponds to shaking that would cause considerable damage to ordinary buildings and overturn heavy furniture (Wald et al., 1999; USGS, 2000). Specially designed structures, however, would sustain only slight damage under these conditions.

Liquefaction and Lateral Spreading

Soil liquefaction is caused by pressure waves moving through the ground due to earthquakes. Research and historical data indicate that loose granular soils (such as nonindurated sand) and non-plastic silts that are saturated by relatively shallow groundwater (generally less than 50 feet) are susceptible to liquefaction. Liquefaction causes soil to lose strength and act like a liquid, triggering structural distress or failure due to the dynamic settlement of the ground or a loss of strength in the soils underneath structures. Liquefaction in a subsurface layer can in turn cause lateral spreading of the ground surface, which usually takes place along weak shear zones that have formed within the liquefiable soil layer. Lateral spreading has generally been observed to take place in the direction of a free face (e.g., a retaining wall or slope).

As shown in Figure 5.7-3, *Seismic Hazards*, portions of the Proposed Project traverse areas mapped by the State of California as Liquefaction Seismic Hazard Zones (CGS, 2001 and 2002b). The Ventura County General Plan identifies the Santa Rosa Valley and portions of Newbury Park as areas where injury or loss of life could occur as a result of liquefaction (Ventura County, 2013a). The geotechnical report prepared for past work associated with the project identified sandy fill and sand, mixed with varying amounts of silt and clay, in the borings collected at Little Simi Valley close to the Moorpark Substation. Laboratory testing of the bore samples indicated that the sediments are primarily sand with varying amounts of silt. Groundwater was encountered at depths of 22 to 29 feet below ground surface in Little Simi Valley (Converse, 2011).

Subsidence

Land subsidence is the gradual settling or sudden sinking of the earth's surface due to subsurface movement of earth materials (USGS, 1999). Compaction of subsurface water-containing geologic

layers is the primary cause of land subsidence (USGS, 1999). Regional ground subsidence is typically caused by compaction of sub-surface water as a result of petroleum or groundwater withdrawal. The soil compacts because the water or petroleum formerly in the pore spaces of sediments or rock is partially responsible for holding the ground up. Loss of this support when the liquid is withdrawn results in consolidation or settlement of the underlying soils. Local subsidence or settlement may also occur when areas containing compressible soils are subjected to foundation or fill loads. Subsidence has historically occurred in the Oxnard Plain and along the Santa Clara River in southern Ventura County (Ventura County, 2013a). The Proposed Project sites are not located within a subsidence hazard area mapped by Ventura County (Ventura County, 2013a).

Collapsible Soils

Collapsible soils are soils that compact and collapse after they get wet. This can occur when the soil particles are loosely packed. Once water has filled the pores of the loosely packed soil the soil particles become buoyant and then sink, causing a reduction in the overall soil volume. The amount of collapse (or reduction in volume) depends upon how loosely the soil particles were packed and the thickness of the soil. Collapsible soils tend to form in drier climates at valley margins where alluvium is deposited by streams due to the change in topography or where wind-blown sediments are deposited (these sediments are called loess). Collapsible soils are not identified as hazards in the Ventura County General Plan, the Thousand Oaks General Plan, or the Moorpark General Plan. Generally, collapsible soils are found in regions which are more arid than the Proposed Project area.

Expansive Soils

Expansive soils contain significant amounts of clay particles that have the ability to give up water (shrink) or take on water (swell). When these soils swell, the change in volume can exert significant pressures on loads that are placed on them, such as loads resulting from building and structure foundations or underground utilities, and can result in structural distress and/or damage. Often, grading, site preparations, and backfill operations associated with subsurface structures can eliminate the potential for expansion. Linear extensibility and plasticity are used to describe the shrink-swell potential of soils. If linear extensibility is greater than 3 percent (classified as Moderate potential), shrinking and swelling can cause damage to buildings, roads, and other structures (NRCS, 2014b). The plasticity index is defined as the range of water content percentages in a soil within which the soil is deformable without flowing (like a liquid) or breaking. If a relatively large amount of water can be added to the soil before it begins to flow like a liquid (that is, if the plasticity index is high), the soil is considered expansive (as it expanded in order to accommodate the added water). The Proposed Project alignment crosses soils with varying expansive potential, as shown in Table 5.7-1. A soil sample was collected in the Proposed Project area from the northern side of the Las Posas Hills and tested for plasticity. The plasticity index of this sample, taken from 7 feet below ground surface, was 21, which represents a moderate to high shrink-swell potential (Converse, 2011).

Soil Corrosion

Corrosion is the deterioration of metal, concrete, or other material through a reaction with its environment. The corrosivity of soils is commonly related to several key parameters, including soil resistivity, the presence of chlorides and sulfates, oxygen content, and acidity. Typically, the most corrosive soils are those with the lowest pH and highest concentration of chlorides and sulfates. Wet/dry conditions can result in a concentration of chlorides and sulfates as well as their movement in the soil, both of which tend to break down the protective corrosion films and coatings on the surfaces of building materials. High-sulfate soils are corrosive to concrete and may prevent complete curing, reducing its strength considerably. Low pH and/or low-resistivity soils can corrode buried or partially buried metal structures. Depending on the degree of corrosivity of the subsurface soils, concrete, reinforcing steel, and bare-metal structures exposed to these soils can deteriorate, eventually leading to structural failures.

Soil samples taken from the Proposed Project alignment were evaluated for soil corrosion factors. While not a regulation, and only recommended for use as general guidance, the California Department of Transportation (Caltrans) has prepared corrosion guidelines that define the pH, chloride concentration, and sulfate concentration thresholds that are used by Caltrans to determine if a site is “corrosive” or “not corrosive” (Caltrans, 2012). None of the soils sampled are considered corrosive according to the Caltrans criteria (Converse, 2011).

Slope Failures

Slope failures, commonly referred to as landslides, include many phenomena that involve the downslope displacement and movement of material, triggered either by static (e.g., gravity) or dynamic (e.g., earthquake) forces. Exposed rock slopes can cause rockfalls, rockslides, and/or rock avalanches, while soil slopes can cause soil slumps, rapid debris flows, and deep-seated rotational slides. Slope stability can depend on a number of complex variables, including the local geology, geologic structure, and amount of groundwater at the site, as well as external processes such as climate, topography, slope geometry, and human activity. The factors that contribute to slope movements include those that decrease the resistance in the slope materials and those that increase the stresses on the slope. Landslides can occur on slopes of 15 percent or less, but the probability is greater on steeper slopes that exhibit old landslide features such as scarps, slanted vegetation, and transverse ridges.

Slope failures, including those caused by earthquake-induced groundshaking, are a potential hazard in segments of the Proposed Project along the Las Posas and Calleguas Hills. The CGS has evaluated the hazards of landslides in the Proposed Project area. Portions of the Proposed Project alignment in the Las Posas and Calleguas Hills are within areas classified as having low-to-moderate-susceptibility to landslides (CDMG, 1995). Segments of the Proposed Project also cross areas mapped as State of California Earthquake-Induced Landslide Hazard Zones (CGS, 2001 and 2002b). This means that the State of California requires a site-specific investigation to determine the severity of the hazard posed by landslides in the area prior to development there for developments intended for human occupancy.

Landslide hazards in the Moorpark area can be minimized by requiring site-specific engineering geologic investigations prior to development of hillside areas that have been designated as susceptible to landslides or debris flows (CDMG, 1995). A site-specific screening report (called a data report) was prepared for the previous construction along the project alignment and shows that the Proposed Project alignment traverses areas classified as generally susceptible to landslides along the northern flank of the Las Posas Hills (although no new structures are proposed along this portion of the subtransmission line). Disturbed soils attributed to older landslide debris were encountered near the crest of the Calleguas Hills (borings B-9a and B-9b), extending 22 to 23 feet below the ground surface (Converse, 2011). Soils at these locations are potentially unstable, as material deposited by landslides tends to be poorly consolidated and thus structurally weak, and the slopes at these boring sites are relatively steep.

Regulatory Setting

Federal

No federal regulations apply to the Proposed Project because it does not traverse any federal lands or require federal approvals.

State

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. In accordance with this act, the State Geologist established regulatory zones, called “earthquake fault zones,” around the surface traces of active faults and published maps showing these zones. Within these zones, buildings for human occupancy cannot be constructed across the surface trace of active faults. Each earthquake fault zone extends approximately 200 to 500 feet on either side of the mapped fault trace, because many active faults are complex and consist of more than one branch. The potential for ground surface rupture exists along any of the branches.

California Building Code

The California Building Code (CBC), which is codified in Title 24 of the California Code of Regulations, Part 2, was promulgated to safeguard the public health, safety, and general welfare by establishing minimum standards related to structural strength, egress facilities, and general building stability. The purpose of the CBC is to regulate and control the design, construction, quality of materials, use/occupancy, location, and maintenance of all buildings and structures within its jurisdiction.

The 2013 CBC is based on the 2009 International Building Code. In addition, the CBC contains necessary California amendments that are based on the American Society of Civil Engineers (ASCE) Minimum Design Standards 7-05. ASCE 7-05 provides requirements for general structural design and includes means for determining earthquake loads as well as other loads (flood, snow, wind, etc.) for inclusion in building codes. The provisions of the CBC apply to the

construction, alteration, movement, replacement, and demolition of every building or structure, or any appurtenances connected or attached to such buildings or structures, throughout California.

The CBC earthquake design requirements take into account the occupancy category of the structure, site class, soil classifications, and various seismic coefficients, all of which are used to determine a Seismic Design Category (SDC) for a project. The SDC is a classification system that combines the occupancy categories with the level of expected ground motions at the site, and ranges from SDC A (very small seismic vulnerability) to SDC E/F (very high seismic vulnerability and near a major fault). Design specifications are then determined according to the SDC.

The updated CBC no longer cites the 1997 Uniform Building Code Table 18-1-B for identifying expansive soils although the significance criteria in Appendix G of the CEQA Guidelines still refers to this table. The analysis in this Environmental Impact Report relies on the updated CBC section as provided below.

1803.5.3 Expansive Soil. In areas likely to have expansive soil, the building official shall require soil tests to determine where such soils do exist. Soils meeting all four of the following provisions shall be considered expansive, except that tests to show compliance with Items 1, 2 and 3 shall not be required if the test prescribed in Item 4 is conducted:

1. Plasticity index (PI) of 15 or greater, determined in accordance with ASTM⁴ D 4318
2. More than 10 percent of the soil particles pass a No. 200 sieve (75 micrometers), determined in accordance with ASTM D 422
3. More than 10 percent of the soil particles are less than 5 micrometers in size, determined in accordance with ASTM D 422
4. Expansion index greater than 20, determined in accordance with ASTM D 4829

California Code of Regulations Title 8 (Cal/OHSA)

Subchapter 4 of Title 8 of the California Code of Regulations contains Construction Safety Orders that establish minimum safety standards whenever employment exists in connection with the construction, alteration, painting, repairing, construction maintenance, renovation, removal, or wrecking of any fixed structure or its parts. Safety requirements during excavation, such as sloping and benching or support systems, are also enumerated in these orders.

Seismic Hazards Mapping Act (California Public Resources Code Chapter 7.8)

The Seismic Hazards Mapping Act was developed to protect the public from the effects of strong ground shaking, liquefaction, landslides, or other ground failure, and from other hazards caused by earthquakes. This act requires the State Geologist to delineate “zones of required investigation” (i.e., seismic hazard zones) where site investigations are required to determine the need for mitigation of potential liquefaction and/or earthquake-induced landslide ground displacements. Cities and counties shall require, prior to the approval of a project located in a seismic hazard zone,

⁴ ASTM International, formerly known as the American Society for Testing and Materials (ASTM), provides international voluntary consensus standards (ASTM, 2015).

a geotechnical report defining and delineating any seismic hazard. Cities and counties can establish policies and criteria which are stricter than those established by this act.

National Pollutant Discharge Elimination System Program

Under the Clean Water Act (CWA) Section 402, the National Pollutant Discharge Elimination System (NPDES) controls water pollution by regulating point sources of pollution to waters of the United States. The California State Water Resources Control Board (SWRCB) administers the NPDES permit program in California.

Projects that disturb one or more acres of soil must obtain coverage under the state's NPDES General Permit for Discharges of Storm Water Associated with Construction Activity (general permit). A stormwater pollution prevention plan (SWPPP) must be developed and implemented for each project covered by the general permit. The SWPPP provides specific construction-related best management practices (BMPs) to prevent soil erosion and loss of topsoil. A SWPPP must be prepared before construction begins. The required components and BMPs commonly included in a SWPPP are described in greater detail in Section 5.10, *Hydrology and Water Quality*.

Local

California Public Utilities Commission (CPUC) General Order (GO) No. 131-D explains that local land use regulations would not apply to the Proposed Project. However, for informational purposes, the goals and policies of local general plans and other planning documents pertaining to geology, soils, and seismicity that would otherwise be relevant to the Proposed Project and alternatives are described below.

Ventura County General Plan

The Ventura County General Plan contains many policies designed to minimize the effects of geologic hazards and erosion, including the following (Ventura County, 2013b):

Policy 2.1.2.3: Essential facilities shall be designed and constructed to resist forces generated by earthquakes, gravity, precipitation, fire, and winds.

Policy 2.2.2.3: All development projects involving construction within Earthquake Fault Hazard Zones (as depicted on the State of California, Earthquake Fault Hazards Map for County of Ventura; Figure 2), shall be reviewed by the Public Works Agency Certified Engineering Geologist in accordance with the requirements of the Alquist-Priolo Earthquake Fault Zoning Act and the policies and criteria established by the State pursuant to said Act.

Policy 2.2.2.5: Roads, streets, highways, utility conduits, and oil and gas pipelines, shall be planned to avoid crossing active faults where feasible. When such location is unavoidable, the design shall include measures to reduce the effects of any fault movement as much as possible.

Policy 2.7.2.1: Development in mapped landslide/mudslide hazard areas shall not be permitted unless adequate geotechnical engineering investigations are performed, and appropriate and sufficient safeguards are incorporated into the project design.

Policy 2.7.2.2: In landslide/mudslide hazard areas, there shall be no alteration of the land which is likely to increase the hazard, including concentration of water through drainage, irrigation or septic systems, removal of vegetative cover, and no undercutting of the bases of slopes or other improper grading methods.

Policy 2.7.2.3: Drainage plans that direct runoff and drainage away from slopes shall be required for construction in hillside areas.

Policy 2.8.2.1: Construction must conform to established standards of the Ventura County Building Code, adopted from the California Building Code.

Policy 2.8.2.2: A geotechnical report, prepared by a registered civil engineer and based upon adequate soil testing of the materials to be encountered at the sub-grade elevation, shall be submitted to the County Surveyor, Environmental Health Division, and Building and Safety for every applicable subdivision and Building Permit application (as required by the California Building Code).

City of Moorpark General Plan

The Safety Element of the Moorpark General Plan includes land use policies designed to minimize the potential damage from geologic and seismic hazards in the City of Moorpark (City of Moorpark, 2001):

Policy 1.2: Require the preparation of detailed geologic studies for any development proposal within seismic hazard zones and liquefaction hazard areas.

Policy 3.2: Require that slope stability analyses be conducted for new development in hillside areas.

Policy 3.3: Require that hillside developments incorporate measures that mitigate slope failure potential and provide for long-term slope maintenance.

City of Thousand Oaks General Plan

The City of Thousand Oaks General Plan includes the following policies related to geologic hazards and erosion control (City of Thousand Oaks, 2014):

Policy B-1: Require any alteration, grading, excavation or fill activity to comply with the City's Grading Ordinance.

Policy B-3: Perform site-specific geologic and engineering investigations for new developments as specified in the CBC and Municipal Code.

Policy B-4: Prohibit grading or relocation of earth on land having a natural slope greater than 25% unless approval is obtained from the Planning Commission or City Council and a grading permit has been obtained from the City Engineer (Municipal Code Section 7-3.07).

Policy B-9: Require that all development activities provide a setback from potentially unstable areas or from the margins of potential debris flow channels and depositional areas as identified through engineering and geologic studies.

Policy B-10: Require drainage plans designed to direct runoff away from unstable areas.

5.7.2 Significance Criteria

According to Appendix G of the CEQA Guidelines, a project would result in significant geology and soils effects on the environment if it would:

- a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
 - i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault (Refer to Division of Mines and Geology Special Publication 42.);
 - ii. Strong seismic ground shaking;
 - iii. Seismic-related ground failure, including liquefaction; or
 - iv. Landslides;
- b) Result in substantial soil erosion or the loss of topsoil;
- c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse;
- d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property; or
- e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

5.7.3 Applicant Proposed Measures

Applicant proposed measures (APMs) are considered part of the Proposed Project in this impact analysis. One APM applies to geologic hazards and soil resource loss:

APM GEO-1: Geotechnical Design Considerations. A geotechnical data report was prepared for the Project prior to the beginning of construction. The investigation included a total of fourteen (14) soil and rock core borings to collect samples for laboratory testing and analyses and to evaluate the subsurface soil and bedrock conditions. The results of the investigation were utilized to identify the geologic setting and engineering properties of soil and bedrock underlying the ROW, as well as to provide recommendations for the design of foundations for the subtransmission line structures. A geotechnical investigation for the installation of TSPs at the Newbury Substation property would be performed prior to future construction activities at this location.

Based on the findings of the past and future geotechnical analyses, SCE did and would design Project components to minimize the potential for impacts from landslides, lateral spreading, subsidence, liquefaction, or collapse. Measures that have been, or may be, used to minimize impacts could include, but are not limited to avoidance of highly unstable areas and construction of pile foundations. Additionally, subtransmission poles are designed consistent with CPUC GO 95, *Rules for Overhead Line Construction*.

5.7.4 Impacts and Mitigation Measures

Approach to Analysis

This impact analysis considers the potential geology, soils, and seismicity impacts associated with the construction, operation, and maintenance of the Proposed Project. The Proposed Project includes installation of new underground 66 kV subtransmission line within Moorpark Substation, installation of new TSP foundations and poles, removal of existing steel towers and wood poles, installation of new conductor and reconductoring existing subtransmission line, and modifications to Newbury Substation. Proposed Project structures that would be built are not intended for human occupancy. Substation expansion is not part of the Proposed Project and no changes to existing operation and maintenance activities at the Moorpark and Newbury substations are expected once construction is completed. For these reasons, substation components of the Proposed Project would have no impact with respect to geology, soils, or seismicity hazards and impacts. The following discussion therefore includes an analysis of impacts from construction, operation, and maintenance activities associated with the proposed installation of poles, removal of towers and poles, installation of new conductor, and reconductoring.

- a) **Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: rupture of a known earthquake fault; strong seismic ground shaking; seismic-related ground failure, including liquefaction; or landslides.**

Impact 5.7-1: Ground surface rupture of an active fault could damage Proposed Project structures and pose a hazard to the public or structures. *Less than significant* (Class III)

The Proposed Project traverses multiple fault traces. Seismic activity along these fault traces may result in surface rupture and damage to Proposed Project structures. In particular, the Proposed Project crosses, and would have the potential to be directly impacted by, surface rupture of the Simi-Santa Rosa A-P Zone. One TSP, at pole location 23, would be installed within the Simi-Santa Rosa A-P Zone, and conductor wire would cross the A-P Zones as shown in Figure 5.7-3, *Seismic Hazards*.

However, the single TSP within the A-P Zone would not be constructed directly on a fault trace. In addition, the TSP and all other Proposed Project structures are not intended for human occupancy. Infrastructure constructed for the Proposed Project would be designed consistent with CPUC GO 95, *Rules for Overhead Line Construction*, to withstand wind, temperature, and wire tension loads, which would reduce the risk of overhead line breakage or other structural damage should fault rupture affect Proposed Project structures. This impact would be less than significant.

Mitigation: None required.

Impact 5.7-2: Strong seismic ground shaking could damage subtransmission structures. *Less than significant (Class III)*

During construction activities, there would be a risk of very strong seismic ground shaking due to nearby active fault zones. As a result, the Proposed Project could experience strong seismic ground shaking. While the Proposed Project is located in an area susceptible to earthquake forces, the subtransmission infrastructure involved would not be used for human occupancy and would be designed consistent with CPUC GO 95, *Rules for Overhead Line Construction*, to withstand wind, temperature, and wire tension loads. Accounting for these factors would result in a design that would be adequate to withstand expected seismic loading, and therefore impacts due to strong seismic ground shaking would be less than significant.

Mitigation: None required.

Impact 5.7-3: Seismic-related ground failure, including liquefaction, could cause damage to Proposed Project structures and, subsequently, create hazardous conditions. *Less than significant (Class III)*

Liquefaction hazards are considered to be low in all areas of the Proposed Project where structures would be installed, with the exception of installation of underground subtransmission line inside Moorpark Substation within Little Simi Valley, and Segment 2 within Santa Rosa Valley. As shown in Figure 5.7-3, both of these Proposed Project sites are located within mapped Liquefaction Hazard Zones (CGS, 2001 and 2002b). The Proposed Project would result in the installation of new ductbank approximately 3 to 5 feet below ground surface at the Moorpark Substation. The amount of sand in the well borings taken from the Little Simi Valley near Moorpark Substation indicates liquefaction could occur at the site. Liquefaction could cause differential settlement of soil underlying the ductbank and result in damage to the structure. While Moorpark Substation is located in a Zone of Required Investigation for seismic hazards, the Proposed Project would not result in the installation of structures for human habitation and consequently additional investigation of and mitigation for the risk posed by liquefaction at Moorpark Substation would not be required by the state. The Proposed Project components at Moorpark Substation would be constructed in compliance with the Moorpark General Plan, which requires detailed geologic studies for developments proposed in liquefaction hazard zones. The Moorpark General Plan does not require geotechnical engineering recommendations be made or incorporated into the Proposed Project. However, in accordance with APM GEO-1, the Proposed Project would be designed to minimize the potential impacts from hazards including liquefaction by incorporating recommendations from future geotechnical reports. Proposed Project design would thus reduce the exposure to liquefaction at the Moorpark Substation.

TSP structures located in potential liquefaction zones in the Santa Rosa Valley are designed to have large diameter, relatively deep, single (mono) foundations. Settlements induced by dynamic (earthquake) forces are anticipated to be uniform for mono foundations, and therefore use of these foundations reduces the potential for differential settlements and other adverse effects including

loss of functionality, or risk of injury or loss of life. The geotechnical data report prepared for the previous construction of the project was a screening investigation to determine whether the project area had obvious indicators of low potential for liquefaction failure. The results of the report indicate that the Santa Rosa Valley sediments are over 75 percent silt or clay-sized particles (Converse, 2011). The soils in the area of the boring, Rincon silty clay loam, have high linear extensibility (NRCS, 2014a), which means soils in the area of the boring sample are relatively cohesive. Cohesive soils are generally not considered susceptible to liquefaction (CGS, 2008b). Therefore, impacts associated with liquefaction would be less than significant for Proposed Project components within the mapped Liquefaction Hazard Zones.

Mitigation: None required.

Impact 5.7-4: An earthquake-induced landslide could damage Proposed Project structures resulting in hazardous conditions. *Less than significant* (Class III)

As discussed in Section 5.7.1, *Setting*, the potential for seismically-induced landslides are a low to moderate potential hazard in the Proposed Project area due to steep slopes (CDMG, 1995). The hillside areas are rated as having low susceptibility to earthquake-induced landslide instability, with a few areas with steep natural slopes rated with moderate susceptibility. Two of the proposed TSPs (TSP 32 and 40) would be constructed in mapped zones of required investigation for seismically-induced landslide hazards (CGS, 2002b). Grading and excavations associated with access road rehabilitation, construction laydown areas, and pole foundation installation, if improperly performed, could create unstable conditions, or worsen existing landslide risks. Cuts into hillsides could remove material that is needed to support the upland material, and road or staging area fills could slough, slump, or ravel if they result in over-steepened slopes. However, as noted above in APM GEO-1, a geotechnical data report was prepared prior to past project construction, and the results of the investigation were utilized to identify the geologic setting and engineering properties of soil and bedrock underlying the right-of-way (ROW), as well as to provide recommendations for the design of foundations for the subtransmission line structures. Per the requirements of APM GEO-1, SCE would design Proposed Project components to minimize the potential for impacts from landslides. In addition, due to siting and design constraints, as well as access and constructability factors, TSPs would generally not be located on steep slopes, or have deep foundations, which reduce the effects of earthquake-induced slope instability. Adherence to sound grading practices (e.g. bracing or underpinning of excavated faces), as stipulated in CPUC GO 95, the International Building Code, and Occupational Safety and Health Administration regulations followed by all California construction projects, would generally ensure that construction activities would not create new areas of instability. Therefore, construction-related impacts due to seismically-induced landslides would be less than significant.

The aforementioned design and siting considerations would also reduce the risk of potential impacts resulting from seismically-induced landslides during operation of the Proposed Project. Landslides could block access roads and reduce access to Proposed Project facilities. Periodic

maintenance patrols would be conducted during operation of the Proposed Project that would identify areas of active slope instability. Any areas of slope instability that would potentially affect Proposed Project facilities (e.g., access roads and TSPs) would be addressed on a case-by-case basis in order to minimize on-site and off-site impacts. Operational impacts under the landslide criterion would be less than significant.

Mitigation: None required.

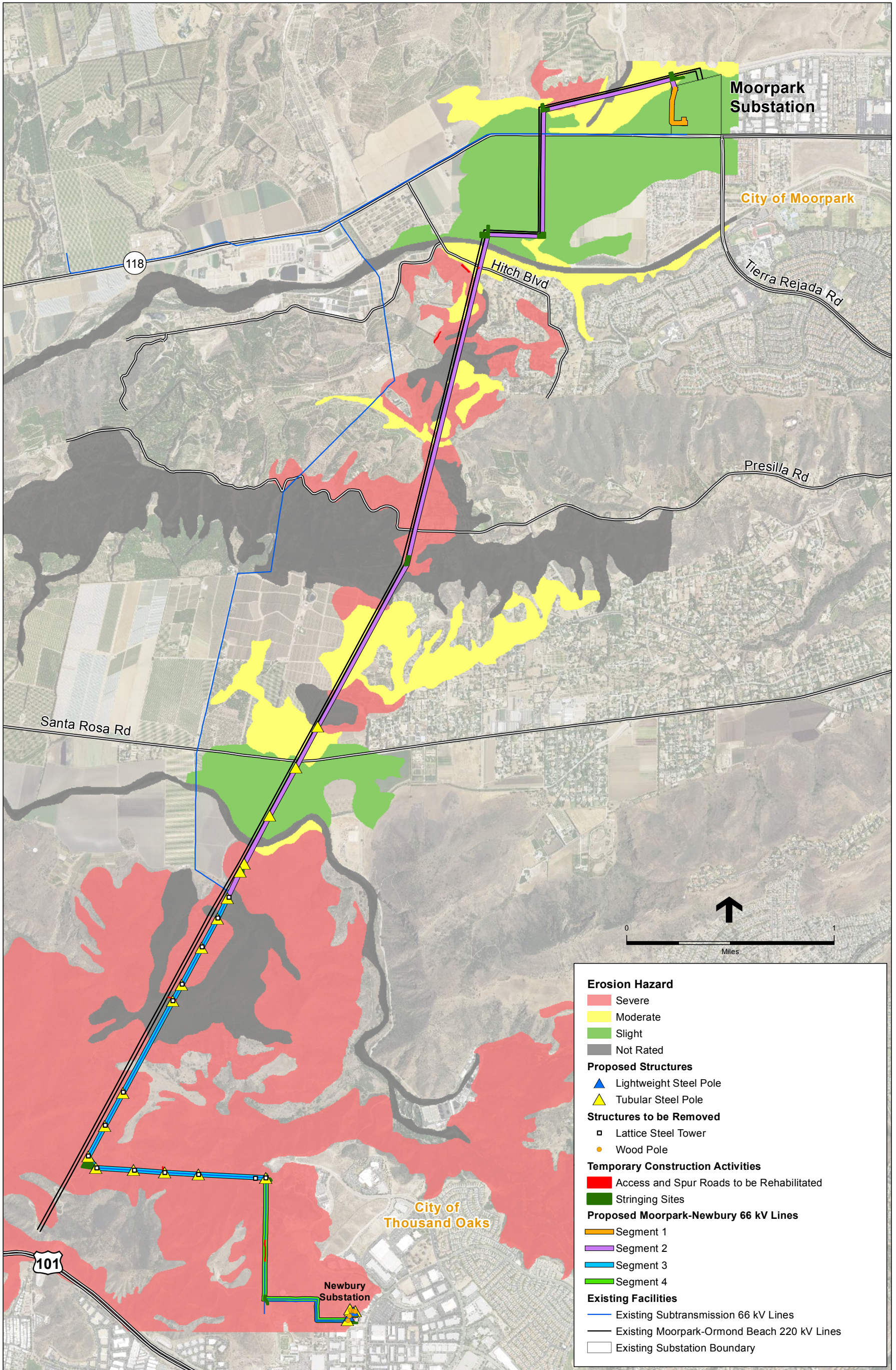
b) Result in substantial soil erosion or the loss of topsoil.

Impact 5.7-5: Construction, operation, and maintenance of the Proposed Project could result in erosion or the loss of topsoil. *Less than significant (Class III)*

Erosion is a natural process whereby soil and highly weathered rock materials are worn away and transported, most commonly by wind or water. Soil erosion can become problematic when human intervention causes rapid soil loss and the development of erosional features (such as incised channels, rills, and gullies) that undermine roads, buildings, or utilities. Vegetation clearing and earth moving reduces soil structure and cohesion, resulting in abnormally high rates of erosion, referred to as accelerated erosion. This typically occurs during construction activity involving grading and soil moving activities (e.g., presence of soil stockpiles, earthen berms, etc.) that loosen soils and make them more susceptible to wind and water erosion. Further, the operation of associated heavy machinery and vehicles over access roads, staging areas, and work areas can compact soils and decrease their capacity to absorb runoff, resulting in rills, gullies, and excessive sediment transport.

Natural rates of erosion vary depending on slope, soil type, and vegetative cover; regional erosion rates are also dependent on tectonics and changes in relative sea level. Soils containing high amounts of silt are typically more easily eroded, while coarse-grained (e.g., sand and gravel) soils are generally less susceptible to erosion. The susceptibility of soils to water erosion along the Proposed Project alignment ranges from low (soils on gentle slopes with bigger particles) to high (relatively steep slopes with a shallow depth to bedrock). Susceptibility of soils to wind erosion generally is low to moderate, but increases to high levels for certain soils along the Proposed Project alignment (soils mapped as CoA, MeA, MeC, MfA, Rw, and Sd in Figure 5.7-3, *Seismic Hazards*). However, these soils are either in areas where poles have already been installed or in areas where soils would not be disturbed.

Table 5.7-1 shows that portions of the Proposed Project alignment would be located in areas designated as having moderate or severe erosion hazard. **Figure 5.7-4, *Erosion Hazard***, shows the locations of these erosion hazard zones with respect to the Proposed Project. As shown in Figure 5.7-4, of the 16 TSPs to be installed along the Proposed Project alignment, excluding the TSPs planned for the Newbury Substation, 14 TSPs would be installed in soils with an erosion hazard rating of severe. Of the nine locations of access roads or stringing sites, eight are located in soils with an erosion hazard rating of severe. A rating of severe indicates significant erosion is



SOURCE: NRCS, 2014

Moorpark-Newbury 66 kV Subtransmission Line Project. 207584.15

Figure 5.7-4
Erosion Hazard

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expected, that roads and trails within these locations would require frequent maintenance, and that costly erosion-control measures could be needed.

The Proposed Project would incorporate an existing SWPPP for Construction Activities under the California 2009-0009-DWQ Construction General Permit that was last revised August 10, 2010. To obtain coverage under this permit, SCE would prepare a SWPPP that includes Proposed Project information, design features, monitoring and reporting procedures, as well as Best Management Practices (BMPs). BMPs such as stormwater runoff quality control measures (boundary protection), dewatering procedures, spill reporting, and concrete waste management would be implemented during construction of the Proposed Project as required under the permit. The SWPPP would be based on final engineering design and would be applicable to all components of the Proposed Project. The BMPs in the SWPPP would require that all sources of sediment associated with construction be controlled and that stabilization BMPs installed to reduce or eliminate sediment mobilization after construction is completed are effective and maintained.

With the implementation of the SWPPP, as described above, as well as Mitigation Measure 5.10-1 (see Section 5.10, *Hydrology and Water Quality*), the Proposed Project would minimize the erosion of soil and topsoil resulting from ground disturbance to a less-than-significant level.

Mitigation: None required.

-
- c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.**

Impact 5.7-6: Some Proposed Project structures would be built on geologic units or soil that could become unstable. *Less than significant* (Class III)

Construction

For discussion of liquefaction hazards, see item a) iii, above. The majority of the Proposed Project would be constructed in areas subject to precipitation-induced slope instability. Site-specific subsurface borings and laboratory analyses have been conducted. One of the TSPs would be constructed over a location found to have landslide deposits (borings B-9a and B-9b) (Converse, 2011).

However, impacts associated with the risk of landslides and lateral spreading would be reduced to less than significant through the design and siting of Proposed Project components:

- Due to siting and design constraints, as well as access and constructability factors, TSPs are generally not located on steep slopes, and/or have deep foundations which reduce the effects of slope instability.

- Lateral spreading is a secondary effect of liquefaction where blocks of ground move down slopes or toward an open face such as a stream bank or manufactured channel. Project TSPs sited in areas with liquefaction potential are not sited in near proximity to open faces, and therefore the potential for damage due to lateral spreading would not be significant.

No areas of subsidence or soil collapse are known within the Proposed Project area, nor are any expected to occur based on review of published soil data; therefore, impacts under the subsidence and collapse criteria would be less than significant.

Operation and Maintenance

The design and siting considerations discussed above reduce the risk of impacts resulting from seismically-induced landslides during construction of the Proposed Project. Portions of the Proposed Project area are prone to landslides (seismically-induced or otherwise). Landslides could block access and spur roads and reduce access to Proposed Project facilities. Periodic maintenance patrols would be conducted over the operational life of the Proposed Project and would identify areas of active slope instability. Any areas of slope instability that would potentially affect Proposed Project facilities (e.g., access roads, TSPs) would be addressed on a case-by-case basis in order to minimize on-site and off-site impacts. Operational impacts related to landslides would be less than significant.

Lateral spreading hazards are expected to be similar throughout the operational life of the Proposed Project and would be the same as presented above for construction of the Proposed Project. Operational impacts due to liquefaction would be less than significant with implementation of the same measures that would be implemented during construction.

As presented above, because no areas of subsidence or soil collapse are known or expected to occur within the Proposed Project area, operational impacts associated with the risk of subsidence and collapse would be less than significant.

Mitigation: None required.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property.

Impact 5.7-7: Three tubular steel poles would be installed in soils that may be expansive. Less than significant (Class III)

Of the 16 TSPs to be installed along the Proposed Project alignment, excluding the TSPs planned for the Newbury Substation, three TSPs would be installed in soils with a linear extensibility rating of moderate or above. This means that soils present could expand and pose a hazard to structures and roads built on these soils. The Proposed Project would be built in accordance with the California Building Code, and would, as required, incorporate engineering design features that would reduce the risks associated with expansive soils. Appropriate design features to

address expansive soils may include excavation of potentially problematic soils during construction and replacement with engineered backfill, ground-treatment processes, direction of surface water and drainage away from foundation soils, and the use of deep foundations such as piers or piles. The use of deep foundations is proposed as part of APM GEO-1. Implementation of these standard engineering methods would ensure that impacts associated with expansive soils would remain less than significant.

Mitigation: None required.

e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater. (No Impact)

The Proposed Project would not include construction of any septic tank or other wastewater disposal system. Accordingly, there would be no potential impact to soils in the Proposed Project area from wastewater disposal (No Impact).

5.7.5 Alternatives

No Project Alternative 1

No Project Alternative 1 would result in the development of no new 66 kV subtransmission line in the proposed location. Under this alternative, no ground disturbing activity would occur along the Proposed Project alignment and no new structures would be built in areas of geologic or soil hazards. No impact would occur under this alternative (No Impact).

No Project Alternative 2

Under No Project Alternative 2, the Proposed Project would not be constructed and the infrastructure already constructed for the Moorpark-Newbury 66 kV Subtransmission line would be removed, with the exception of the previously installed LWS poles and energized conductor. Ground disturbing activity would potentially include grading and/or clearance of vegetation in previously disturbed work areas and roads, as required for access; TSP foundation removal to approximately 2 feet below ground, or the entire foundation, if required; and removal of slurry.

Impacts would be similar to those under the Proposed Project, as No Project Alternative 2 would include similar construction activities and a comparable area of ground disturbance. Infrastructure removal would require coverage under the Construction General Permit, as described in the discussion for Impact 5.7-5, above, and erosion impacts would be less than significant (Class III). Existing infrastructure is not located on mapped landslide deposits or within Earthquake-Induced Landslide Hazard zones. The likelihood that landsliding would occur during No Project

Alternative 2 is thus low, and related impacts would be less than significant (Class III). No Project Alternative 2 would not include construction of any septic tank or other wastewater disposal system, and there would be no potential impact to soils from wastewater disposal (No Impact). Impacts related to all other significance criteria would be less than significant (Class III).

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