

## 5.13 Noise

This section evaluates potential impacts associated with noise levels from construction, operation, and maintenance of the Proposed Project and alternatives.

### 5.13.1 Setting

#### Noise Background

Sound is mechanical energy transmitted by pressure waves through a medium such as air. Noise can be defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. Sound pressure level is measured in decibels (dB), with 0 dB corresponding roughly to the threshold of human hearing, and 120 to 140 dB corresponding to the threshold of pain.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude (sound power). When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequency spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to low and extremely high frequencies instead of the frequency mid-range. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA). All sound pressure levels and sound power levels reported below are A-weighted.

#### ***Noise Exposure and Community Noise***

An individual's noise exposure is a measure of the noise experienced by the individual over a period of time. A noise level is a measure of noise at a given instant in time. However, noise levels rarely persist consistently over a long period of time. In fact, community noise varies continuously with time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. Background noise levels change throughout a typical day, but do so gradually, corresponding with the addition and subtraction of distant noise sources and atmospheric conditions. The addition of short duration single event noise sources (e.g., aircraft flyovers, motor vehicles, sirens) makes community noise constantly variable throughout a day.

These successive additions of sound to the community noise environment vary the community noise level from instant to instant requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The noise descriptors used in this analysis are summarized below:

$L_{eq}$ : The equivalent sound level is used to describe noise over a specified period of time, in terms of a single numerical value. The  $L_{eq}$  is the constant sound level which would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).

CNEL: The Community Noise Equivalent Level (CNEL) is a 24-hour  $L_{eq}$  that adds a five dBA penalty to noise occurring during evening hours from 7:00 p.m. to 10:00 p.m., and a 10 dBA penalty to sounds occurring between the hours of 10:00 p.m. to 7:00 a.m. to account for the increased sensitivity to noise events that occur during the quiet late evening and nighttime periods.

$L_{max}$ : The instantaneous maximum noise level measured during the measurement period of interest.

### ***Effects of Noise on People***

The effects of noise on people can be placed into three categories:

- subjective effects of annoyance, nuisance, dissatisfaction;
- interference with activities such as speech, sleep, learning; and
- physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers at industrial plants often experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction. A wide variation exists in the individual thresholds of annoyance, and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way the new noise compares to the existing noise levels that one has adapted, which is referred to as the "ambient noise" level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference when the change in noise is perceived but does not cause a human response;
- A change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and
- A 10-dBA change is subjectively heard as approximately a doubling in loudness, and can cause an adverse response.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. A ruler is a *linear* scale; it has marks on it corresponding to equal quantities of distance. One way of expressing this is to say that the ratio of successive intervals is equal to one. A *logarithmic* scale is different in that the ratio of successive intervals is not equal to one. Each interval on a logarithmic scale is some common factor larger than the previous interval. A typical ratio is 10, so that the marks on the scale read: 1; 10; 100; 1,000; 10,000; etc., doubling the variable plotted on the x-axis. The human ear perceives sound in a non-linear fashion; hence, the decibel scale was developed. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion, rather they combine logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

### **Noise Attenuation**

Sound level naturally decreases with more distance from the source. This basic attenuation rate is referred to as the *geometric spreading loss*. The basic rate of geometric spreading loss depends on whether a given noise source can be characterized as a point source or a line source. Point sources of noise, including stationary mobile sources such as idling vehicles or on-site construction equipment, attenuate (lessen) at a rate of 6.0 dBA per doubling of distance from the source. In many cases, noise attenuation from a point source increases to 7.5 dBA for each doubling of distance due to ground absorption and reflective wave canceling. These factors are collectively referred to as *excess ground attenuation*. The basic geometric spreading loss rate is used where the ground surface between a noise source and a receiver is reflective, such as parking lots or a smooth body of water. The excess ground attenuation rate (7.5 dBA per doubling of distance) is used where the ground surface is absorptive, such as soft dirt, grass, or scattered bushes and trees.

Widely distributed noises such as a street with moving vehicles (a “line” source) would typically attenuate at a lower rate of approximately 3.0 dBA for each doubling of distance between the source and the receiver. If the ground surface between source and receiver is absorptive rather than reflective, the nominal rate increases to 4.5 dBA for each doubling of distance. Atmospheric effects, such as wind and temperature gradients, can also influence noise attenuation rates from both line and point sources of noise. However, unlike ground attenuation, atmospheric effects are constantly changing and difficult to predict.

Trees and vegetation, buildings, and barriers reduce the noise level that would otherwise occur at a given receptor distance. However, for a vegetative strip to have a noticeable effect on noise levels, it must be dense and wide. For example, a stand of trees must be at least 100 feet wide and dense enough to completely obstruct a visual path to the roadway to attenuate traffic noise by 5 dBA (Caltrans, 1998). A row of structures can shield more distant receivers depending upon the size and spacing of the intervening structures and site geometry. Similar to vegetative strips discussed above, noise barriers, which include natural topography and soundwalls, reduce noise by blocking the line of sight between the source and receiver. Generally, a noise barrier that breaks the line of sight between source and receiver will provide at least a 5-dBA reduction in noise.

## Vibration

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal and is typically expressed in units of inches per second (in/sec). The PPV is most frequently used to describe vibration impacts to buildings. The root mean square (RMS) amplitude is most frequently used to describe the effect of vibration on the human body. The RMS amplitude is defined as the average of the squared amplitude of the signal. Decibel notation (VdB) is commonly used to measure RMS. The decibel notation acts to compress the range of numbers required to describe vibration (FTA, 2006). Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration.

## Existing Ambient Noise Environment

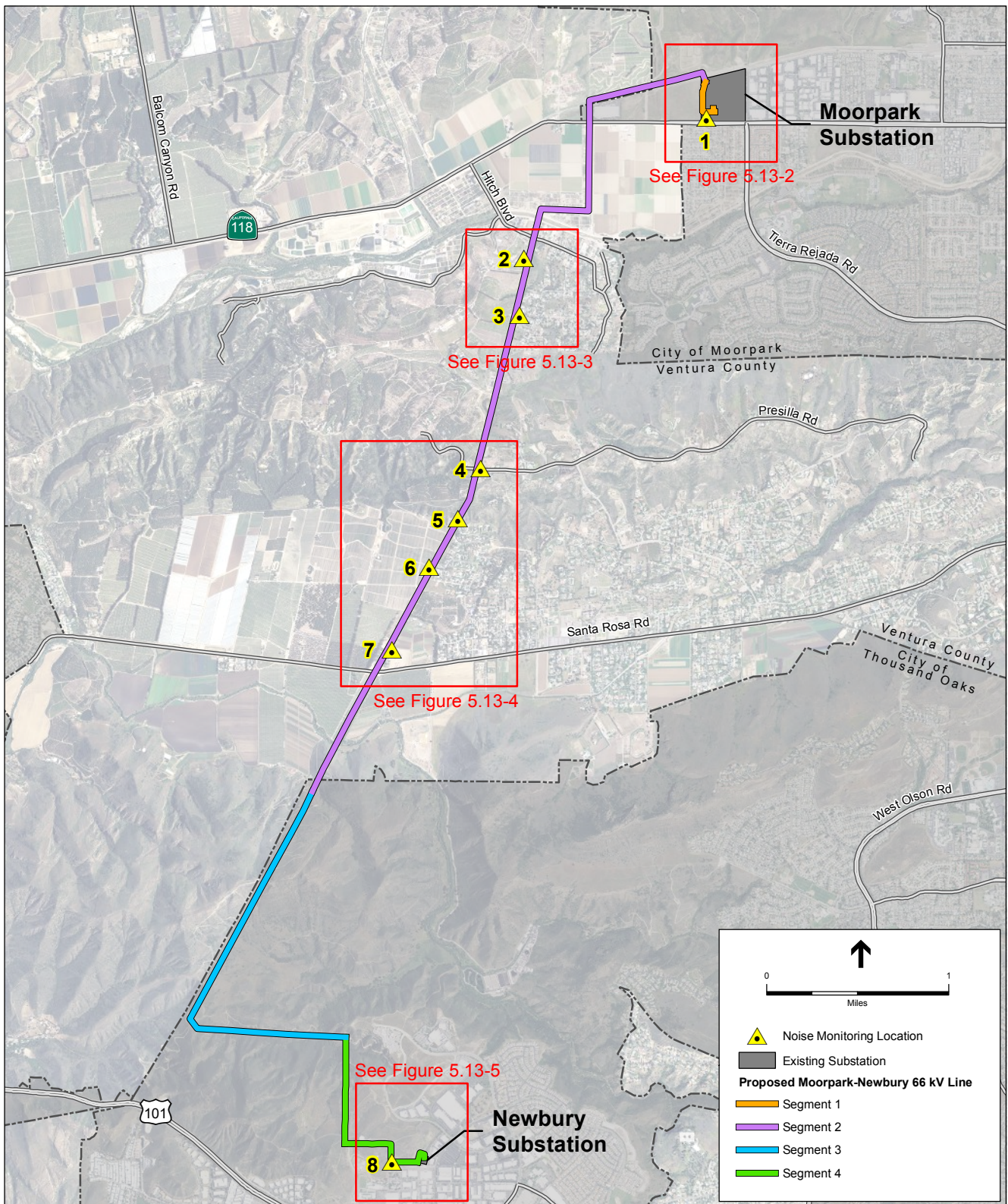
The Proposed Project would be constructed in rural agricultural areas, open space, and adjacent to several residential areas. Existing noise sources in the area are community-related (e.g., lawn mowers, power equipment, air conditioners), vehicles on roadways and trains on a railroad, aircraft overflights, and the operation of agricultural equipment. In order to evaluate existing ambient noise in the Proposed Project area, Southern California Edison (SCE) had noise measurements collected at eight locations along the proposed alignment in noise-sensitive areas (see **Figures 5.13-1, Noise Monitoring Locations-Index**, through **5.13-5, Noise Monitoring Locations-Segment 4**, for illustrations of the noise monitoring locations). Existing ambient noise levels were measured in a series of 1-hour equivalent sound level measurements ( $L_{eq}$ , A-weighted). The results of SCE's noise monitoring are shown in **Table 5.13-1, Measured Ambient 1-Hour Average Noise Levels At Sensitive Receptors**, below. As indicated in the table, 1-hour  $L_{eq}$  noise levels in the majority of the Proposed Project area were in the low to high 40-dBA range, with the exception of near the residences south of Moorpark Substation (location no. 1), which was measured to be approximately 74 dBA. The dominant noise source at this location is moderate to heavy traffic along Los Angeles Avenue (also called State Route 118), which is immediately north of the measurement location.

**TABLE 5.13-1  
 MEASURED AMBIENT 1-HOUR AVERAGE NOISE LEVELS AT SENSITIVE RECEPTORS**

Measurement Location No.	Proposed Project Segment	Noise Measurement Location	1-hour $L_{eq}$ (dBA)
1	Segments 1 and 2	Residential area south of Moorpark Substation	74.2
2	Segment 2	Southeast of intersection of Hitch Boulevard and Ventavo Road	47.4
3	Segment 2	End of Ternez Drive west of Citrus Drive	48.3
4	Segment 2	Western terminus of Presilla Road	44.8
5	Segment 2	Northwest of terminus of Yucca Drive	49.8
6	Segment 2	North of terminus of Churchman Lane	42.4
7	Segment 2	North of Intersection of Santa Rosa Road and Rosita Road	46.4
8	Segment 4	Residences west of Newbury Substation	44.4

NOTE: Noise measurements at locations 1 through 5 were collected in the morning and early afternoon on November 2, 2012, and measurements at locations 6 through 8 were collected in the afternoon on November 1, 2012.

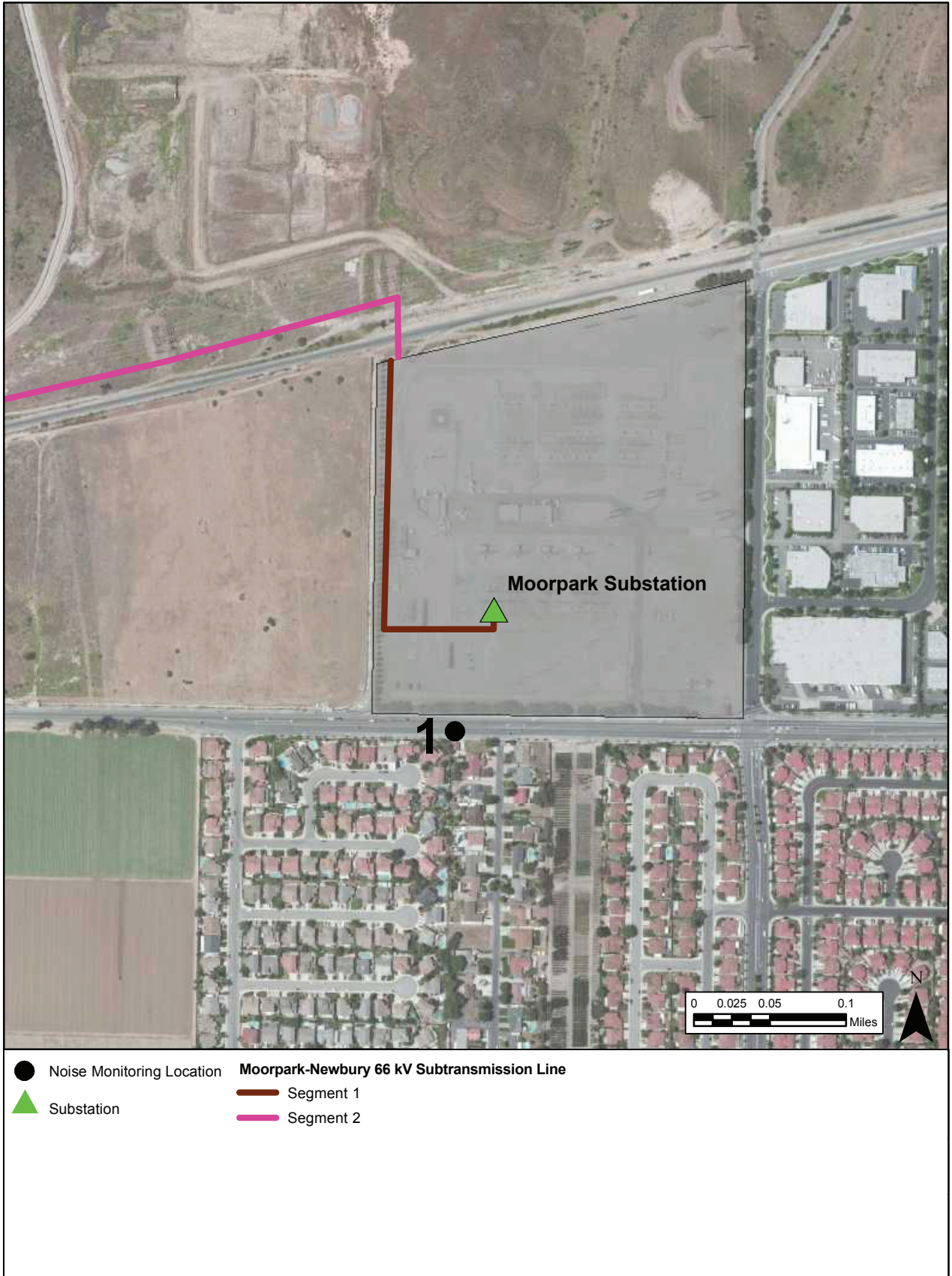
SOURCE: SCE, 2013.



SOURCE: SCE, 2013

Moorpark-Newbury 66 kV Subtransmission Line Project. 207584.15

**Figure 5.13-1**  
Noise Monitoring Locations - Index



SOURCE: SCE, 2013

Moorpark-Newbury 66 kV Subtransmission Line Project . 207584.15

**Figure 5.13-2**  
Noise Monitoring Locations - Segment 1



● Noise Monitoring Location    Moorpark-Newbury 66 kV Subtransmission Line  
 Segment 2

SOURCE: SCE, 2013

Moorpark-Newbury 66 kV Subtransmission Line Project . 207584.15

**Figure 5.13-3**  
 Noise Monitoring Locations - Segment 2







- Noise Monitoring Location
- ▲ Substation
- Moorpark-Newbury 66 kV Subtransmission Line
- Segment 4

SOURCE: SCE, 2013

Moorpark-Newbury 66 kV Subtransmission Line Project . 207584.15

**Figure 5.13-5**  
Noise Monitoring Locations - Segment 4

## **Sensitive Receptors**

Human response to noise varies considerably from one individual to another. Effects of noise at various levels can include interference with sleep, concentration, and communication, and can cause physiological and psychological stress and hearing loss. Given these effects, some land uses are considered more sensitive to ambient noise levels than others. In general, residences, schools, hotels, hospitals, and nursing homes are considered to be the most sensitive to noise. Places such as churches, libraries, and cemeteries, where people tend to pray, study, and/or contemplate are also sensitive to noise. Commercial and industrial uses are considered the least noise-sensitive.

There are numerous residences along the proposed alignment. In Segment 1, there are about three dozen residences between 150 feet to 500 feet south of Staging Yard 1 at Moorpark Substation, in the City of Moorpark. In Segment 2, in the vicinity of Hitch Road and west of Citrus Drive (unincorporated Ventura County), there are approximately 30 homes between 80 feet and 500 feet of the proposed alignment. Within Santa Rosa Valley (unincorporated Ventura County), there are approximately 20 residences between 130 feet and 500 feet of the proposed alignment. One residence, located off Santa Rosa Road, would be located approximately 350 feet west of the proposed helipad located 800 feet west of the alignment near where Segment 2 ends and Segment 3 begins. In the City of Thousand Oaks, there are 12 residences off Marion Street between 70 feet and 500 feet south of the proposed alignment in Segment 4. In addition, the Newbury Park Adventist Academy is approximately 500 feet south of the proposed alignment in Segment 4, off North Wendy Drive.

## **Regulatory Setting**

Federal, state, and local agencies regulate different aspects of environmental noise. Federal and state agencies generally set noise standards for mobile sources such as aircraft and motor vehicles, while regulation of stationary sources is left to local agencies. Local regulation of noise involves implementation of general plan policies and noise ordinance standards. Local general plans tend to identify general principles intended to guide and influence development plans; local noise ordinances establish standards and procedures for addressing specific noise sources and activities.

### ***Ventura County***

#### **General Plan**

California Public Utilities Commission (CPUC) General Order No. 131-D explains that local land use regulations would not apply to the Proposed Project. However, for the purpose of assessing the significance of noise-related impacts of the Proposed Project, the following policies identified in the Ventura County General Plan are otherwise be relevant to the Proposed Project (Ventura County, 2013):

*Policy 2.16.2-1(4)*<sup>1</sup>: Noise generators, proposed to be located near any *noise sensitive use*, shall incorporate noise control measures so that ongoing outdoor noise levels received by the noise sensitive receptor, measured at the exterior wall of the building, does not exceed any of the following standards:

- a. 1-hour  $L_{eq}$  of 55 dB(A) or ambient noise level plus 3 dB(A), whichever is greater, during any hour from 6:00 a.m. to 7:00 p.m.
- b. 1-hour  $L_{eq}$  of 50 dB(A) or ambient noise level plus 3 dB(A), whichever is greater, during any hour from 7:00 p.m. to 10:00 p.m.
- c. 1-hour  $L_{eq}$  of 45 dB(A) or ambient noise level plus 3 dB(A), whichever is greater, during any hour from 10:00 p.m. to 6:00 a.m.

*Policy 2.16.2-1(5)*: Construction noise shall be evaluated and, if necessary, mitigated in accordance with the County *Construction Noise Threshold Criteria and Control Plan*.

### **Construction Noise Threshold Criteria and Control Plan**

The Ventura County *Construction Noise Threshold Criteria and Control Plan* establishes construction noise thresholds and standard noise monitoring and control measures for construction projects located in Ventura County (Ventura County, 2010). **Table 5.13-2, Ventura County Construction Activity Noise Threshold Criteria**, displays daytime, evening, and nighttime construction noise threshold criteria for projects in Ventura County. The criteria presented in the table are expressed in hourly average noise levels not to be exceeded. In addition to hourly average noise levels, the  $L_{max}$  shall not exceed the noise threshold criteria presented in the table by 20 dBA more than eight times per daytime-hour, more than six times per evening-hour, or more than four times per nighttime-hour. If construction projects exceed the noise threshold criteria at sensitive receptor sites, the County requires contractors to implement effective noise mitigation measures recommended by equipment manufacturers (Ventura County, 2010).

While compliance with the thresholds set forth in Table 5.13-2 would reduce the likelihood of strong adverse community reaction, the plan notes that noise complaints are still possible. Therefore, the plan recommends that a “complaint log” noting date, time, complainant’s name, nature of the complaint, and any corrective action be maintained throughout construction of a project. To ensure that complaints are registered effectively, the plan recommends that a “hot line” telephone or pager number that is attended to during active construction working hours be published and distributed to the potentially affected community (Ventura County, 2010).

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<sup>1</sup> Policy 2.16.2-1(4) is not applicable to increased traffic noise along any of the roads identified within the 2020 Regional Roadway Network Public Facilities Appendix of the Ventura County General Plan. In addition, state and federal highways, all railroad line operations, aircraft in flight, and public utility facilities are noise generators having federal and state regulations that preempt local regulations.

**TABLE 5.13-2  
VENTURA COUNTY CONSTRUCTION ACTIVITY NOISE THRESHOLD CRITERIA**

Construction Duration Affecting Noise-Sensitive Receptors	Noise Threshold Criteria <sup>a</sup>	
	Fixed L <sub>eq</sub> (1-hour), dBA	Hourly Equivalent Noise Level (L <sub>eq</sub> ), dBA <sup>b,c</sup>
Daytime (Mon-Fri 7:00 a.m. to 7:00 p.m.; Sat, Sun and holidays 9:00 a.m. to 7:00 p.m.)		
0 to 3 days	75	Ambient L <sub>eq</sub> (1-hour) + 3 dB
4 to 7 days	70	Ambient L <sub>eq</sub> (1-hour) + 3 dB
1 to 2 weeks	65	Ambient L <sub>eq</sub> (1-hour) + 3 dB
2 to 8 weeks	60	Ambient L <sub>eq</sub> (1-hour) + 3 dB
Longer than 8 weeks	55	Ambient L <sub>eq</sub> (1-hour) + 3 dB
Evening (7:00 p.m. to 10:00 p.m.)		
Any duration	50	Ambient L <sub>eq</sub> (1-hour) + 3 dB
Nighttime (Mon-Fri 10:00 p.m. to 7:00 a.m.; Sat, Sun and holidays 10:00 p.m. to 9:00 a.m.)		
Any duration	45	Ambient L <sub>eq</sub> (1-hour) + 3 dB

- <sup>a</sup> The applicable noise threshold criteria shall be the greater of the noise levels presented in the table at the nearest receptor area or 10 feet from the nearest noise sensitive building.
- <sup>b</sup> The instantaneous L<sub>max</sub> shall not exceed the noise threshold criteria by 20 dBA more than eight times per daytime-hour, six times per evening-hour, or four times per nighttime-hour.
- <sup>c</sup> Local ambient L<sub>eq</sub> measurements shall be made on any mid-week day during applicable hours prior to project work.

SOURCE: Ventura County, 2010

### Noise Ordinance

Ventura County Ordinance No. 4124 regulates nighttime noise in residential zones. According to the ordinance, no person shall create within any residential zone of Ventura County, any loud or raucous noise which is audible to the human ear during the hours of 9:00 p.m. to 7:00 a.m. the following day, at a distance of 50 feet from the property line of the noise source or 50 feet from any such noise source if the noise source is in a public right-of-way (ROW) (Ventura County, 1996).

### City of Thousand Oaks

#### General Plan

The General Plan Noise Element includes a program to help the city achieve its noise goals and objectives. As part of this program, the City of Thousand Oaks has defined thresholds for determining significance of noise impacts under CEQA. According to the city, if the annual average CNEL that considers a proposed project, cumulative projects, and General Plan buildout in an area currently designated in the General Plan for noise-sensitive land use is expected to be less than 55 dB, then impacts would be considered less than significant. If the CNEL is expected to be 55 to 60 dB, then a project would be considered to have an individually significant impact if it would increase noise levels by greater than 1 dB. When the CNEL would be expected to be 60 dB or greater, then a project would be considered significant if noise levels increase by 0.5 dB or more (City of Thousand Oaks, 2000).

## **Municipal Code**

Title 5, Chapter 21 of the City of Thousand Oaks Municipal Code regulates noise levels throughout the city. This chapter prohibits any person from causing any loud, unnecessary, and unusual noise that disturbs the peace or quiet of any neighborhood, or which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area (City of Thousand Oaks, 1990).

Acceptable hours for construction activities are set forth in Title 8, Chapter 11 of the city's Municipal Code. According to the code, construction hours are limited to between the hours of 7:00 a.m. and 7:00 p.m., Monday through Saturday, unless a permit for work during different hours or days has been issued by the Public Works Director (City of Thousand Oaks, 1970).

## **City of Moorpark**

### **General Plan**

The City of Moorpark General Plan Noise Element contains the following policies that would be relevant to the Proposed Project (City of Moorpark, 1998a):

*Policy N-1.3:* Provide for reduction in noise impacts from non-transportation sources through adoption of a Noise Ordinance, which is intended to protect people from noise generated on adjacent properties.

*Policy N-1.4:* Require stationary noise sources to limit noise to levels that do not interfere with adjacent uses.

*Implementation N-1.4.1:* The City shall enforce the Municipal Code provisions relating to the time limitations that construction activity in or adjacent to residential areas may occur in order to reduce the intrusion of noise in the early morning and late evening hours, on weekends and holidays. At the time of development project approval, the City shall ensure, through conditions of approval, that adequate noise control measures at all construction sites are provided through the provision of mufflers and the physical separation of machinery maintenance areas from adjacent residential uses.

## **Municipal Code**

The City of Moorpark Municipal Code, Section 17.53.070 regulates noise in the city. In general, noise generated from construction activities are exempt from the noise limits, provided that the construction activities occur between the hours of 7:00 a.m. and 7:00 p.m. Monday through Saturday. Operational noise generated by the Proposed Project would be limited to 55 dBA during the hours of 10:00 p.m. to 7:00 a.m. and 60 dBA between the hours of 7:00 a.m. and 10:00 p.m. (City of Moorpark, 1998b).

## **5.13.2 Significance Criteria**

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

- a) Expose people to or generate noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies;

- b) Expose people to or generate excessive groundborne vibration or groundborne noise levels;
- c) Cause a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- d) Cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- e) For a project located within an airport land use plan area, or, where such a plan has not been adopted, in an area within two miles of a public airport or public use airport, expose people residing or working in the area to excessive noise levels; or
- f) For a project located in the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

### 5.13.3 Applicant Proposed Measures

SCE has proposed the following applicant proposed measure (APM) to minimize impacts of noise from the Proposed Project. The impact analysis assumes that the APM would be implemented (i.e., part of the Proposed Project) to reduce noise-related impacts as discussed below.

**APM NOI-1: Noise Reduction.** Noise-generating construction activities were, and would be, conducted generally only during daytime hours (7:00 a.m. to 7:00 p.m.), Monday through Saturday. Construction activities were, and would be, conducted or staggered to ensure that the noise generated during construction would not exceed significance thresholds or durations identified by the County of Ventura noise regulations set forth in the County's Construction Noise Threshold Criteria and Control Plan (2010).

### 5.13.4 Impacts and Mitigation Measures

#### Approach to Analysis

Equipment noise during construction of the Proposed Project is the primary concern in evaluating short-term noise impacts. During operation, noise from corona discharge along the subtransmission lines and general operation and maintenance activities would be the primary concerns associated with long-term noise impacts.

Evaluation of potential noise impacts from construction, operation, and maintenance of the Proposed Project included a review of relevant Ventura County, City of Moorpark, and City of Thousand Oaks noise standards and policies, as well as a comparison of the existing noise environment with estimated construction, operation, and maintenance noise levels associated with the Proposed Project. Because there are no noise level standards or thresholds applicable to construction activities in the cities of Moorpark and Thousand Oaks, short-term construction impacts that would occur in these jurisdictions were assessed relative to recommendations of the Federal Transit Administration (FTA).

- a) **Expose people to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.**

**Impact 5.13-1: Construction activities would generate noise levels in unincorporated Ventura County that would exceed Ventura County construction noise threshold criteria. Significant and unavoidable (Class I)**

Construction of the Proposed Project would result in temporary increases in ambient noise levels associated with the operation of heavy-duty construction equipment. Ventura County General Plan Policy 2.16.2-1(5), states that construction noise shall be evaluated and, if necessary, mitigated in accordance with the *Ventura County Construction Noise Threshold Criteria and Control Plan*. Several components of the Proposed Project would be constructed within unincorporated Ventura County. For the purposes of evaluating construction noise per the County's construction noise plan, Proposed Project construction noise levels at the nearest sensitive receptors were estimated using methods identified by the County and compared to the County construction noise threshold criteria (Ventura County, 2010).

As part of the CPUC's Permit to Construct application process, SCE provided noise level contour estimates for certain construction activities that would be associated with the Proposed Project (SCE, 2013; 2015). SCE's construction noise contour distance estimates are disclosed in **Table 5.13-3**. The table also includes the approximate distance from the proposed construction activity site to the closest sensitive receptor, as well as the local jurisdiction where the activity would occur. The noise contour distance estimates were independently reviewed by the CPUC's consultant, Environmental Science Associates (ESA) and were found to be adequate. The estimates are based on reference sound pressure levels at 50 feet, incorporate standard spherical spreading attenuation with ground and atmospheric absorption (no topography was assumed between the source and receiver), and account for equipment operating time factors. The percent of time that each piece of equipment would operate over the 10-hour work-day also represents the percent of time the equipment would operate over a 1-hour period (Arcadis, 2014). Therefore, SCE's estimated construction noise level contour distances represent noise levels in terms of both daily and 1-hour  $L_{eq}$  values.

As indicated in the table, the 75 dBA  $L_{eq}$  noise contour would occur at distances that range from 132 feet associated with tubular steel pole (TSP) erection, to 204 feet associated with conductor installation at stringing sites. In other words, the noise level associated with those construction activities would be at least 75 dBA  $L_{eq}$  within those contour distances. At the closest residences to TSP erection and stringing site activities at distances of approximately 450 feet and 550 feet, respectively, the  $L_{eq}$  noise level would be expected to range between 60 dBA and 65 dBA, and 65 dBA to 70 dBA, respectively.

**TABLE 5.13-3  
 CONSTRUCTION ACTIVITY NOISE CONTOUR DISTANCES**

Construction Activity (Local Jurisdiction)	Distance to Closest Sensitive Receptor*	dBA L <sub>eq</sub> Contour Distance (feet)				
		75	70	65	60	55
Conductor Removal (Ventura County)	1,500 feet	183	327	572	975	1,610
Wood Pole Removal (Thousand Oaks)	550 feet	171	307	537	916	1,517
TSP Foundation Installation (Ventura County)	1,300 feet	173	309	539	924	1,534
TSP Foundation Installation (Thousand Oaks)	560 feet	173	309	539	924	1,534
TSP Erection (Ventura County)	450 feet	132	239	420	726	1,219
TSP Erection (Thousand Oaks)	450 feet	132	239	420	726	1,219
Conductor Installation at Stringing Site (Ventura County)	550 feet	204	364	630	1,067	1,757
Conductor Installation at Stringing Site (Thousand Oaks)	500 feet	204	364	630	1,067	1,757

\* Distances estimated by ESA using Google Earth mapping software.  
 Source: Based on SCE, 2013 and 2014.

The construction noise contours data describe the construction noise levels that would be associated with the proposed conductor removal, wood pole removal, TSP foundation installation, TSP erection, and conductor installation at stringing sites. However, noise levels associated with other construction activities that would be associated with the Proposed Project, including stringing at TSP sites using a helicopter, stringing at TSP sites using bucket truck, activities at the helicopter land zones, and road rehabilitation work that would involve a backhoe, were not included in SCE's estimates. Therefore, to more completely disclose the noise-related effects of the Proposed Project, ESA estimated the 1-hour L<sub>eq</sub> values that would be associated with each of these construction-related sources at the closest sensitive receptor locations, using the excess ground attenuation rate (7.5 dBA per doubling of distance) and the same reference noise levels and operating time factors for bucket trucks and backhoes as used for the SCE estimates (SCE, 2014).

For light-duty helicopter noise levels, a reference noise level of 83 dBA L<sub>max</sub> for a Phillips 500 D helicopter hovering at 200 feet was obtained from the U.S. Department of Transportation's Integrated Noise Model, Version 7.0d. This maximum noise level was used to estimate noise levels associated with helicopter construction activity, under the assumption that helicopter operating time would be approximately 15 minutes per hour at TSP sites during sock line stringing and 15 minutes per hour at the helicopter landing zones related to helicopter landing and takeoff. At TSP sites it is assumed that the helicopter would hover approximately 250 feet above the ground surface during line sock stringing. As shown in **Table 5.13-4, Construction Noise Levels at Sensitive Receptor Locations**, construction noise levels associated with these construction activities at the closest sensitive receptor locations would range from 41 dBA for road rehabilitation work in the City of Thousand Oaks, to 71 dBA for helicopter landings and takeoffs at the helicopter landing zone in unincorporated Ventura County.



**TABLE 5.13-4  
CONSTRUCTION NOISE LEVELS AT SENSITIVE RECEPTOR LOCATIONS**

<b>Construction Noise Source (Local Jurisdiction)</b>	<b>Distance to Closest Sensitive Receptor<sup>a</sup></b>	<b>1-hour L<sub>eq</sub> at Closest Sensitive Receptor</b>
Helicopter – Sock Line Installation at TSP Sites (Ventura County) <sup>b</sup>	200 feet	70 dBA
Bucket Truck - Conductor Installation at TSP Sites (Ventura County) <sup>b</sup>	200 feet	69 dBA
Bucket Truck - Conductor Installation at TSP Sites (Thousand Oaks) <sup>b</sup>	550 feet	58 dBA
Helicopter Landing Zone (Ventura County) <sup>c</sup>	350 feet	71 dBA
Helicopter Landing Zones (Moorpark) <sup>c</sup>	1,100 feet	59 dBA
Helicopter Landing Zones (Thousand Oaks) <sup>c</sup>	2,500 feet	50 dBA
Backhoe - Road Rehabilitation Work (Ventura County) <sup>d</sup>	200 feet	63 dBA
Backhoe - Road Rehabilitation Work (Thousand Oaks) <sup>d</sup>	1,500 feet	41 dBA

<sup>a</sup> Distances estimated by ESA using Google Earth mapping software. For helicopters at TSP sites, it is assumed that the helicopter would hover at 250 feet above the ground surface. Pythagorean theorem was used to estimate distance from the helicopter to the receptor with a 250-foot height and the lateral distance from the TSP site to the receptor.

<sup>b</sup> Helicopter 1-hour L<sub>eq</sub> values near TSP locations are calculated assuming the helicopter would hover above the site at an elevation of approximately 250 feet above the ground surface for up to 15 minutes per pole.

<sup>c</sup> Helicopter 1-hour L<sub>eq</sub> values are calculated assuming the helicopter would operate in the immediate vicinity of the helicopter landing zone for up to 15 minutes per hour.

<sup>d</sup> Backhoe 1-hour L<sub>eq</sub> values are calculating assuming it would operate up to 36 minutes per hour.

SOURCE: ESA, 2015 based on SCE, 2013, 2014, and 2015.

The construction activities described in Tables 5.13-3, *Construction Activity Noise Contour Distances*, and 5.13-4, *Construction Noise Levels at Sensitive Receptor Locations*, would take less than 3 days to complete at any given location, with the exception of activities at the helicopter landing zones and conductor installation at stringing sites, where construction-related activities are estimated to occur for periods of up to 2 weeks per site (SCE, 2015). Using the methods identified by the county (see Table 5.13-2, *Ventura County Construction Activity Noise Threshold Criteria*), it is anticipated that conductor installation activities at the stringing site north-northeast of the intersection of Hitch Boulevard and Ventavo Road, and helicopter landings and takeoffs at the helicopter landing zone near the end of Proposed Project Segment 2, would result in noise levels that would exceed the county's construction noise threshold criteria. Therefore, pursuant to Ventura County General Plan Policy 2.16.2-1(5), the Proposed Project would result in a significant, albeit temporary, impact.

As discussed in Chapter 3, *Project Description*, construction activities would normally occur between 7:00 a.m. to 7:00 p.m., Monday through Saturday. If SCE determines that different hours or work on Sunday is necessary, it would obtain variances from local noise ordinances, as necessary. Therefore, no impact would occur related to a potential noise ordinance violation. Although nighttime construction activities would not violate local ordinances if variances are obtained, nighttime construction activities in unincorporated Ventura County would likely exceed the *Construction Activity Noise Threshold Criteria* for nighttime construction sources depending

on the proximity of the nighttime construction activities to the closest unincorporated sensitive receptors, resulting in a significant impact.

Per APM NOI-1, SCE has committed to conducting or staggering construction activities to ensure that the noise generated during construction would not exceed the significance thresholds identified by the County; however, it is not clear how this would be achieved because SCE has identified no specific noise reduction measures as part of APM NOI-1. Therefore, implementation of Mitigation Measures 5.13-1a and 5.13-1b is recommended to require SCE and/or its construction contractors to reduce noise levels and the associated nuisance at sensitive receptor locations to the extent practical.

**Mitigation Measure 5.13-1a:** SCE and/or its contractors shall develop a Construction Noise Reduction Plan. The Plan shall be submitted to the CPUC for review and approval prior to the commencement of construction activities. The Plan shall include, but not be limited to, the following measures for daytime construction activities:

- Distribute to the potentially affected community within 650 feet of the Stringing Site north-northeast of Hitch Boulevard and Ventavo Road, and the residence near the Helicopter Land Zone in unincorporated Ventura County, a “hotline” telephone number, which shall be attended during active construction working hours, for use by the public to register complaints. All complaints shall be logged noting date, time, complainants’ name, nature of complaint, and any corrective action taken.
- All construction equipment shall have intake and exhaust mufflers recommended by the manufacturers thereof, to meet relevant noise limitations.
- Maintain maximize physical separation, as far as practicable, between noise sources (construction equipment) and noise receptors. Separation may be achieved by providing enclosures for stationary items of equipment and noise barriers around particularly noisy areas at the construction sites, and by locating stationary equipment to minimize noise impacts on the community.
- Use construction noise barriers such as paneled noise shields, barriers, or enclosures adjacent to or around noisy equipment associated with conductor stringing north-northeast of Hitch Boulevard and Ventavo Road. Noise control shields shall be made featuring a solid panel and a weather-protected, sound-absorptive material on the construction-activity side of the noise shield.

**Mitigation Measure 5.13-1b:** SCE and/or its contractors shall develop a Nighttime Noise and Nuisance Reduction Strategy plan in the event that nighttime construction activity is determined to be necessary within 1,000 feet of sensitive receptors. The plan shall be submitted to the CPUC for review and approval prior to the commencement of construction activities. The strategy shall include a set of site-specific noise attenuation measures that apply state-of-the-art noise reduction technology to ensure that nighttime construction noise levels and associated nuisances are reduced to the extent feasible.

The attenuation measures may include, but not be limited to, the control strategies and methods for implementation that are listed below. If any of the following strategies are determined by SCE to not be feasible, an explanation as to why the specific strategy is not feasible shall be included in the plan.

- Plan construction activities to minimize the amount of nighttime construction.
- Offer temporary relocation of residents within 200 feet of nighttime construction activities.
- Temporary noise barriers, such as shields and blankets, shall be installed immediately adjacent to all nighttime stationary noise sources (e.g., auger rigs, generators, compressors, etc.).
- Install temporary noise barriers that block the line of sight between nighttime activities and the closest residences within 1,000 feet.
- The notification requirements identified in Mitigation Measure 5.13-1a shall be extended to include residences within 1,000 feet of pending nighttime construction activities.

Although several components of Mitigation Measures 5.13-1a and 5.13-1b would likely reduce the annoyance that would be associated with loud construction activities, it is not possible to firmly substantiate that implementation of Mitigation Measures 5.13-1a and 5.13-1b would achieve the noise level reductions needed to mitigate the impact to a less-than-significant level. Therefore, even with these mitigation measures, daytime construction activities associated with at least one conductor stringing site and one helicopter landing zone would likely exceed the Ventura County construction noise threshold criteria, and nearly all nighttime construction activities within 1,000 feet of Ventura County sensitive receptors would continue to exceed the Ventura County construction noise threshold criteria. Therefore, the impact would be significant and unavoidable.

**Significance after mitigation:** Significant and unavoidable.

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### ***Construction Noise Municipal Codes***

Local municipal codes restrict construction activities in unincorporated Ventura County to between the hours of 7:00 a.m. and 9:00 p.m., and in the City of Thousand Oaks and City of Moorpark to between the hours of 7:00 a.m. and 7:00 p.m., Monday through Saturday. As discussed in Chapter 3, *Project Description*, construction activities would normally occur between 7:00 a.m. and 7:00 p.m. Monday through Saturday. There is a possibility that construction would be required during different hours or days; however, if SCE determines that different construction hours or days are necessary, it has committed to obtaining variances from local noise ordinances, as necessary. Therefore, no impact related to a violation of a local noise ordinance would occur (No Impact).

### ***Operation***

As explained in more detail under the Impact 5.13-2 discussion, there would be no operational impact in this regard because the Proposed Project's operational noise levels would be within the acceptable noise levels for residential uses as identified by the Ventura County General Plan, Thousand Oaks General Plan land use compatibility standards, and City of Moorpark noise limits for operational noise levels (No Impact).

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**b) Expose people to or generate excessive groundborne vibration or groundborne noise levels. (No Impact)**

**Construction**

Temporary sources of groundborne vibration and noise during construction would result from operation of conventional heavy construction equipment such as drill rigs, bulldozers, and loaded haul trucks. These pieces of equipment can generate vibration levels of up to 0.09 inches per second (in/sec) at a distance of 25 feet. However, vibration levels attenuate rapidly from the source. Construction activities would occur as close as 200 feet from residences. At a distance of 200 feet, the vibration level would be up to 0.004 in/sec.

The PPV threshold of 0.20 in/sec identified by Caltrans (2004) is used in this analysis to determine the significance of vibration impacts related to adverse human reaction, and the FTA PPV threshold of 0.12 in/sec for buildings extremely susceptible to vibration damage is used to determine the significance of vibration impacts related to risk of architectural damage to buildings (FTA, 2006). Vibration levels at the closest residence locations would be well below these PPV thresholds. These groundborne vibration levels would not have the potential to cause structural damage to nearby buildings and would not be perceptible at residences or other sensitive uses in the immediate vicinity of construction activities.

Groundborne noise is the rumbling sound of structure surfaces caused by high vibration levels. Because construction of the Proposed Project would not result in exposure of persons to or generation of excessive groundborne vibration, it also would not expose them to or generate excessive groundborne noise levels. Consequently, there would be no groundborne noise-related impact associated with construction of the Proposed Project (No Impact).

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**Operation and Maintenance**

Operation and maintenance of the Proposed Project would not introduce any new sources of perceivable groundborne vibration to the Proposed Project area. Therefore, there would be no operation-related vibration impacts. Because implementation of the Proposed Project would not result in exposure of persons to or generation of excessive groundborne vibration, it also would not expose them to or generate excessive groundborne noise levels. Consequently, there would be no groundborne noise-related impact associated with operation and maintenance of the Proposed Project (No Impact).

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**c) Cause a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.**

**Impact 5.13-2: Operation and maintenance-related noise levels would contribute to ambient noise levels. *Less than significant* (Class III)**

The primary noise sources from operation of the Proposed Project would be associated with corona discharge along the subtransmission line and general maintenance-related activities.

**Corona Noise**

The term corona is used to describe the breakdown of air into charged particles caused by the electrical field at the surface of a conductor. Audible noise levels generated by corona discharge vary depending on weather conditions as well as on the voltage of the line. Wet weather conditions often increase corona discharge due to accumulation of raindrops, fog, frost, or condensation on the conductor surface, which causes surface irregularities that promote corona discharge.

According to the Electric Power Research Institute (EPRI), noise levels 25 feet directly below 138 kV transmission lines under wet conditions tend to be approximately 37 dBA (EPRI, 1978). Noise levels under the Proposed Project conductors would be expected to be lower as the voltage would be 66 kV rather than 138 kV and the proposed conductors would likely sag to a minimum height that would be higher than 25 feet; nevertheless, for the purpose of this analysis the noise level of 37 dBA is used to represent worst case corona noise levels that would occur directly below the subtransmission line conductors. At the closest residences that would be approximately 70 feet from the subtransmission line, this maximum noise level would be approximately 31 dBA. Assuming an  $L_{eq}$  noise level of 31 dBA during all hours of the day, again a worst case assumption, the CNEL of the subtransmission line corona noise would be up to 38 dBA. These noise levels would be below the County's nighttime exterior  $L_{eq}$  standard of 45 dBA, the City of Thousand Oaks CNEL threshold of 55 dBA, and the City of Moorpark 55 dBA standard for the hours of 10:00 p.m. to 7:00 a.m.

The lowest ambient noise level measured along the Proposed Project alignment was approximately 44 dBA (see Table 5.13-2, *Ventura County Construction Activity Noise Threshold Criteria*); therefore, corona noise from the proposed subtransmission line would not be expected to increase ambient levels at sensitive receptor locations. Given that the proposed subtransmission line corona noise would not exceed noise standards established by the local jurisdictions and would not result in an increase to ambient noise levels in the vicinity of sensitive receptors, corona noise that could be associated with the Proposed Project would be less than significant (Class III).

**Substation Noise**

Transformer banks account for the majority of noise generated by substation operations. Transformer noise is caused, in part, by a phenomenon call magnetostriction, which causes the transformer to be magnetically excited and vibrate, producing a "humming" type sound. The Proposed Project would not require installation of new transformer banks or transformer bank

replacements, and the new equipment that would be installed at Moorpark and Newbury substations would not generate noise. Because the Proposed Project would not replace or install any noise-generating components within the substations, and because the transformer banks within the substations would not be replaced or upgraded, there would be no change in existing operational noise levels at the substations. Therefore, there would be no impact related to substation noise (No Impact).

#### **Maintenance Noise**

Maintenance activities would include annual visual inspections of the subtransmission line constructed as part of the Proposed Project as well as the access/spur roads that provide access to the TSPs and LWS pole sites. These activities would require use of a light duty truck and/or a helicopter, which would temporarily increase noise levels in the immediate vicinity of the Proposed Project area. These activities occur infrequently and are already occurring in the Proposed Project area related to inspections of the existing transmission and subtransmission lines. There would be no long-term notable maintenance-related noise level increases, and maintenance activities would not conflict with applicable noise ordinances or plans (No Impact).

**Mitigation:** None required.

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#### **d) Cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.**

##### **Impact 5.13-3: Construction-related nighttime noise levels would substantially increase ambient noise levels in the cities of Moorpark and Thousand Oaks. *Significant and unavoidable* (Class I)**

As described under the Impact 5.13-1 discussion, construction of the Proposed Project would result in temporary increases to ambient noise levels associated with operation of heavy duty construction equipment. Tables 5.13-3, *Construction Activity Noise Contour Distances*, and 5.13-4, *Construction Noise Levels at Sensitive Receptor Locations*, show that maximum construction-related noise levels at the closest sensitive receptor locations in the cities of Moorpark and Thousand Oaks would be less than 70 dBA  $L_{eq}$ , whereas ambient noise levels in the City of Moorpark near Los Angeles Avenue were measured to be 74 dBA  $L_{eq}$  and ambient noise levels at various locations in the City of Thousand Oaks were measured to be in the low to high 40-dBA  $L_{eq}$  range (see Table 5.13-1, *Measured Ambient 1-Hour Average Noise Levels At Sensitive Receptors*). Therefore, Proposed Project construction activities would increase ambient noise levels in the vicinity of the Proposed Project in the City of Thousand Oaks, and would potentially be perceived as a nuisance by the closest sensitive receptors. Proposed Project construction activities would not be expected to increase ambient noise levels at sensitive receptor locations in the City of Moorpark, given the already elevated ambient noise levels in the area.

Construction-related noise impacts that would occur in unincorporated Ventura County are presented in the Impact 5.13-1 discussion, above. Although there are no applicable local policies or standards available to judge the significance of short-term daytime construction noise levels in the

cities of Moorpark and Thousand Oaks, the FTA has identified a daytime hourly  $L_{eq}$  level of 90 dBA as a noise level where adverse community reaction could occur (FTA, 2006). This noise level is used here to assess whether daytime construction-related noise levels would cause a substantial temporary or periodic increase in ambient noise levels at sensitive receptor locations in the cities of Moorpark and Thousand Oaks. Although construction noise could result in a short-term nuisance to the closest sensitive receptors, given that the associated  $L_{eq}$  noise levels in the cities of Moorpark and Thousand Oaks would be less than 70 dBA  $L_{eq}$  and would not exceed the 90 dBA  $L_{eq}$  threshold, Proposed Project-related daytime construction activities in the cities of Moorpark and Thousand Oaks would result in less-than-significant impacts (Class III).

As discussed in Chapter 3, *Project Description*, construction activities would normally occur between 7:00 a.m. to 7:00 p.m., Monday through Saturday. If SCE determines that different hours or days are necessary, it would obtain variances from local noise ordinances, as necessary to avoid conflict with the City of Moorpark and City of Thousand Oaks noise ordinances. Although the ordinances would not be violated if variances are obtained, Proposed Project related nighttime construction noise levels could result in a substantial increase in nighttime ambient noise levels, causing a significant impact on nearby residences.

**Mitigation:** Implement Mitigation Measure 5.13-1b.

**Significance after mitigation:** Significant and unavoidable. Implementation of Mitigation Measure 5.13-1b would reduce the annoyance that would be associated with loud construction activities at night; however, the nighttime construction-related noise impact would continue to be significant.

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- e) For a project located within an airport land use plan area, or, where such a plan has not been adopted, in an area within two miles of a public airport or public use airport, expose people residing or working in the area to excessive noise levels. (No Impact)**

The Proposed Project would not be located within an airport land use plan area nor would it be located within 2 miles of any public airport; therefore, no impact would occur (No Impact).

- 
- f) For a project located in the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels. (No Impact)**

The Proposed Project would not be located in the vicinity of a private airstrip; therefore, no impact would occur (No Impact).

## 5.13.5 Alternatives

### No Project Alternative No. 1

Under No Project Alternative No. 1, the Proposed Project would not be implemented and all infrastructure previously installed for the project would remain in place; therefore, no noise or vibration impacts would occur (No Impact).

### No Project Alternative No. 2

No Project Alternative No. 2 would generate no noise levels associated with helicopter activities or conductor stringing; however, noise levels would be generated from removal of previously installed TSPs and removal of TSP foundations in Segment 2. It is assumed that noise levels associated with these activities would occur over a period of 2 to 4 days at each TSP location and the noise levels would be similar to those described in Table 5.13-3, *Construction Activity Noise Contour Distances*, for TSP erection. The closest residence to any of the TSP poles and foundations that would be removed would be at a distance of approximately 200 feet. At 200 feet, TSP and foundation removal noise levels would be expected to exceed 70 dBA  $L_{eq}$ , which would be the applicable Ventura County threshold given that activities at each pole site would be expected to occur for a period of up to 4 days. Therefore, this alternative would result in significant unavoidable impacts to sensitive receptors in unincorporated Ventura County for Impact 5.13-1, even with incorporation of Mitigation Measures 5.13-1a and 5.13-1b (Class I). Daytime construction-related impacts in the cities of Moorpark and Thousand Oaks would be less than significant (Class III). Although it is unlikely that No Project Alternative 2 would require nighttime construction (Impact 5.13-3), if it did, it would increase ambient noise levels in the cities of Moorpark and Thousand Oaks, and would potentially be perceived as a nuisance by the closest sensitive receptors, even after incorporation of Mitigation Measure 5.13-1b (Class I).

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## References – Noise

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