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CHAPTER 4 – ENVIRONMENTAL IMPACT ASSESSMENT

4.11 NOISE

Would the project result in:	Potentially Significant Impact	Less-Than-Significant Impact with Mitigation	Less-Than-Significant Impact	No Impact
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) If located within an airport land use plan or within 2 miles of a public airport or public use airport where such a plan has not been adopted, would the project result in exposure of persons residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) If located within the vicinity of a private airstrip, would the project result in exposure of persons residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

4.11.0 Introduction

This section assesses the potential noise and vibration impacts associated with the construction, operation, and maintenance of the Sierra Pacific Power Company (SPPCo) 625 and 650 Line Upgrade Project (project). Construction noise has the potential to adversely impact noise-sensitive receptors in the area; however, these impacts will be reduced to a less-than-significant level with the implementation of applicant-proposed measures (APMs). Because the project

involves a minor increase in voltage to existing facilities, operational noise will not increase significantly as a result of the project.

4.11.1 Methodology

The evaluation of potential noise and vibration impacts from the project began with a review of the noise standards for several local agencies. Daytime noise surveys were then conducted on November 7, 2008 to establish the background noise levels in the project area. The sound level in A-weighted decibels (dBA) was measured over set periods¹ using a QUEST Model 2900 sound level meter that was equipped with optional circuitry and microphones to permit it to meet the requirements of American National Standards Institute (ANSI) S1.4 for Type II precision sound level meters. The Bruel & Kjaer Type 4936 pre-polarized random incidence microphone was integral to the noise meter and a foam windscreen, measuring 3.5 inches in diameter, was used to reduce wind-generated noise. The noise meter was positioned approximately 5 feet above the ground during the measurement process. The instrument's calibration was checked before and after the monitoring periods using a Quest QC-10 sound level calibrator. All intermittent calibrations were verified and were within the normal error band. The noise monitoring was completed in accordance with ANSI and Federal Energy Regulatory Commission guidelines. After characterizing the existing noise environment, the survey results and estimated noise levels of the typical major construction equipment to be used during construction and maintenance activities were used to evaluate the potential impacts from project-related noise and vibration.

4.11.2 Existing Conditions

Regulatory Background

Federal

No federal noise standards directly regulate noise from the operation of electrical transmission lines and substation facilities. However, in 1974 the United States (U.S.) Environmental Protection Agency (EPA) established guidelines for noise levels, below which no reason exists to suspect that the general population will be at risk from any of the identified effects of noise. The EPA guidelines include equivalent sound level ($L_{eq}(24) \leq 70$ A-weighted decibels² (dBA) to protect against hearing loss; or day-night equivalent noise level ($L_{dn} \leq 55$ dBA to protect against activity interference and annoyance in residential areas, farms, and other outdoor areas where quiet is a basis for use; $L_{eq}(24) \leq 55$ dBA to protect against outdoor activity interference where limited time is spent, such as school yards and playgrounds; $L_{dn} \leq 45$ dBA to protect against indoor activity interference and annoyance in residences; and $L_{eq}(24) \leq 45$ dBA to protect against indoor activity interference in school yards. These levels are not standards, criteria, regulations, or goals, but are defined to protect public health and welfare with an adequate margin of safety, and to provide guidelines for implementing noise standards locally.

¹ The monitoring duration was selected based on the stability of the noise readings. Five of the six sites were monitored for 20 minutes due to high variability in background noise. The Mount Watson Road site was monitored for seven minutes due to low variability in background noise.

² The human ear is not uniformly sensitive to all sound frequencies; therefore, the A-weighting scale has been devised to correspond with the human ear's sensitivity. The A-weighting scale uses the specific weighting of sound pressure levels from about 31.5 hertz (Hz) to 16 kilohertz (kHz) to determine the human response to sound.

The federal government has passed various general laws to regulate and limit noise levels, identified as follows.

Noise Pollution and Abatement Act of 1970

The Noise Pollution and Abatement Act of 1970 established the Office of Noise Abatement and Control (ONAC) within the EPA to conduct a full and complete investigation of noise and its effect on public health and welfare. The investigation was to include an identification of noise sources, projected noise levels, and effects of noise on persons, animals, and property.

In 1981, the Administration concluded that noise issues were best handled at the state or local government level. As a result, the EPA phased out ONAC's funding in 1982 as part of a shift in the federal noise control policy to transfer the primary responsibility of regulating noise to state and local governments. However, the Noise Control Act of 1972 and the Quiet Communities Act of 1978 (described in this section) were not rescinded by Congress and remain in effect today.

Noise Control Act of 1972

The Noise Control Act of 1972 was the first comprehensive statement of national noise policy. It declares, “It is the policy of the U.S. to promote an environment for all Americans free from noise that jeopardizes their health or welfare.”

Quiet Communities Act of 1978

The Noise Control Act was amended by the Quiet Communities Act of 1978 to promote the development of effective state and local noise control programs, to provide funds for noise research, and to produce and disseminate educational materials to the public on the harmful effects of noise and ways to effectively control it.

Agencies including the Department of Transportation, Department of Labor, Federal Railroad Administration, and Federal Aviation Administration, have developed their own noise control programs, with each agency setting its own criteria.

Occupational Health and Safety Act of 1970

This act covers all employers and their employees in the 50 states, the District of Columbia, Puerto Rico, and other U.S. territories. Administered by the Occupational Health and Safety Administration (OSHA), the act assigns OSHA two regulatory functions—setting standards and conducting inspections to ensure that employers are providing safe and healthful workplaces. OSHA standards may require that employers adopt certain practices, means, methods, or processes reasonably necessary and appropriate to protect workers on the job. Employers must become familiar with the standards applicable to their establishments and eliminate hazards. Included in this act is a regulation for worker noise exposure at 90 dBA over an 8-hour work shift. Areas where exposure exceeds 85 dBA must be designated and labeled as high-noise-level areas and hearing protection is required.

Federal Aviation Administration

The Federal Aviation Administration establishes 65 decibels (dB) Community Noise Equivalent Level³ (CNEL) as the noise standard associated with aircraft noise measured at exterior locations in noise-sensitive land uses⁴ (NSLU). This standard is also generally applied to railroad noise.

Tahoe Regional Planning Agency Code of Ordinances

As described in the Tahoe Regional Planning Agency (TRPA) Code of Ordinances, Chapter 13.5.K, noise ordinances within the jurisdiction of the TRPA are set at the community level by their Plan Area Statement (PAS). The PASs spanned by the project are depicted on Figure 4.9-1: TRPA Community Plan Area Map and include Lower Truckee, Burton Creek, Watson Creek, North Star, Martis Peak, Kingswood East, 64 Acre Tract, Tahoe City Community Area Plan, and Kings Beach Industrial Area Community Plan. The CNEL for each area, as well as the CNEL for any road corridors within each PAS, are presented in Table 4.11-1: Community Noise Level Equivalents for the Plan Area Statements.

According to TRPA Code of Ordinances Chapter 23.8, noise from TRPA-approved construction or maintenance projects or the demolition of structures is exempt from noise standards provided these activities are limited to the hours between 8:00 a.m. and 6:30 p.m.

State

California Noise Control Act

The California Noise Control Act states that excessive noise is a serious hazard to public health and welfare and that exposure to certain levels of noise can result in physiological, psychological, and economic damage. It also recognizes that continuous and increasing bombardment of noise exists in urban, suburban, and rural areas. This act declares that the State of California has the responsibility to protect the health and welfare of its citizens by the control, prevention, and abatement of noise.

California Noise Insulation Standards

The California Noise Insulation Standards were adopted in 1974 by the California Commission on Housing and Community Development, meant to establish noise insulation standards for multi-family residential buildings. This document establishes standards for interior room noise attributable to outside noise sources. The regulations also specify that acoustical studies must be prepared whenever a residential building or structure is proposed to be located near an existing or adopted freeway route, expressway, parkway, major street, thoroughfare, rail line, rapid transit line, or industrial noise source, and where such noise source or sources create an exterior CNEL (or L_{dn}) of 60 dB or greater. Such acoustical analysis must demonstrate that the residence has been designed to limit intruding noise to an interior CNEL (or L_{dn}) of at least 45 dB.

³ CNEL measurements are weighted averages of sound levels gathered over a 24-hour period, essentially measuring ambient noise. Measurements taken during day, evening and nighttime periods are weighted separately, recognizing that humans are most sensitive to noise in late night hours and are more sensitive during evening hours than in daytime hours.

⁴ NSLU is defined as any residence, hospital, school, hotel, resort, library, or any other facility where quiet is an important attribute of the environment.

Table 4.11-1: Community Noise Level Equivalents for the Plan Area Statements

PAS #	PAS Name	CNEL	Road Corridor CNEL	Line									
001A	Tahoe City Community Plan	<ol style="list-style-type: none"> Where applicable, a maximum 55 dB CNEL override for the State Route (SR) 28 and SR 89 corridors is permissible. The maximum CNEL for Special Areas #3 and #4 and #5 is 55 dB CNEL. The maximum CNEL for all areas of the Community Plan except as noted in 1 and 2 above is 65 dB CNEL. The maximum CNEL for Shorezone Tolerance Districts 4, 6 and 7 is 55 dB CNEL and the maximum for the Lakezone is 50 dB CNEL. 	SR 89 corridor - 55 dB SR 28 corridor - 55 dB	625									
026	Kings Beach Industrial Community Plan	<p>The maximum CNEL for this plan area is 65 dB. The following noise standards shall also be met: Performance standards for stationary or industrial noise sources or projects affected by stationary or industrial noise sources (as measured at the property line of a noise-sensitive receiving use):</p> <table border="1"> <thead> <tr> <th>Noise level description</th> <th>Daytime 7 a.m.-7 p.m.</th> <th>Nighttime 7 a.m.-7 p.m.</th> </tr> </thead> <tbody> <tr> <td>Hourly L_{eq}</td> <td>55 dB</td> <td>45 dB</td> </tr> <tr> <td>Maximum Level</td> <td>75 dB</td> <td>65 dB</td> </tr> </tbody> </table> <p>Each of the noise levels specified above should be lowered by 5 dB for simple tone noises—noises that consist primarily of speech or music, or for recurring impulsive noises.</p>	Noise level description	Daytime 7 a.m.-7 p.m.	Nighttime 7 a.m.-7 p.m.	Hourly L_{eq}	55 dB	45 dB	Maximum Level	75 dB	65 dB	Not Applicable (NA)	625, 650
Noise level description	Daytime 7 a.m.-7 p.m.	Nighttime 7 a.m.-7 p.m.											
Hourly L_{eq}	55 dB	45 dB											
Maximum Level	75 dB	65 dB											
003	Lower Truckee	50 dB	SR 89 corridor - 55 dB	625									
004	Burton Creek	50 dB	NA	625									
013	Watson Creek	50 dB	NA	625									
015	North Star	55 dB	NA	625									
019	Martis Peak	50 dB	SR 267 corridor - 55 dB	625, 650									

PAS #	PAS Name	CNEL	Road Corridor CNEL	Line
025	Kingswood East	55 dB	SR 267 corridor - 55 dB	625, 650
174	64-Acre Tract	55 dB	SR 89 corridor - 55 dB	625

Source: TRPA, 2008

Caltrans Transportation- and Construction-Induced Vibration Guidance

This document provides practical guidance to California Department of Transportation (Caltrans) engineers, planners, and consultants who must address vibration issues associated with the construction, operation, and maintenance of Caltrans projects. Continuous or frequent intermittent vibration sources, such as impact pile drivers, are significant when their peak particle velocity (PPV) exceeds 0.1 inch per second. More specific criteria for structures and potential annoyance have been developed by Caltrans and will be used to evaluate potential vibration impacts. Table 4.11-2: Vibration Damage Threshold Guidance lists the maximum levels of vibration allowed by Caltrans for various types of structures.

Table 4.11-2: Vibration Damage Threshold Guidance

Structure Type/Condition	Maximum PPV ⁵ (inches per second)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, and ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Source: Caltrans, 2004

Local

Each local government outlines requirements for noise abatement and control in their general plan and municipal code. The general plans typically set overall goals and objectives, while the municipal codes set specific sound limits. Placer County and the Town of Truckee regulate noise levels in the project area.

Placer County

The allowable noise exposure for sensitive receptors—including single-family and multi-family residences, schools, hospitals, churches, rest homes, and public libraries—is provided in Article 9.36 of the Placer County Code and presented in Table 4.11-3: Hourly Leq and Maximum Noise Levels for Placer County. This article exempts the regulation of noise during construction activities conducted between the hours of 6:00 a.m. and 8:00 p.m. Monday through Friday and between the hours of 8:00 a.m. and 8:00 p.m. Saturday and Sunday provided that construction equipment is fitted with factory-installed mufflers and maintained in good working order.

⁵ Transient sources create a single, isolated vibration event, such as blasting. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Table 4.11-3: Hourly L_{eq} and Maximum Noise Levels for Placer County

Sound Level Descriptor	Daytime (7:00 a.m. to 10:00 p.m.)	Nighttime (10:00 p.m. to 7:00 a.m.)
Hourly L_{eq} (dB)	55	45
Maximum level (dB)	70	65

Source: Placer County, 1994

Town of Truckee

Table 4.11-4: Town of Truckee Noise Level Standard by Receiving Land Use presents noise level standards by receiving land use for the Town of Truckee. Article 18.44.070 of Chapter 18 Noise of the Truckee Municipal Code Chapter exempts noise sources associated with non-single-family residential construction from the previously mentioned noise standards provided the activities do not take place before 7:00 a.m. or after 9:00 p.m. on any day except Sunday, before 9:00 a.m. or after 6:00 p.m. on Sunday, and that all construction equipment is well maintained. The Town of Truckee may impose further limitations on the hours and days of construction or other measures to mitigate significant noise impacts on sensitive uses.

Table 4.11-4: Town of Truckee Noise Level Standard by Receiving Land Use

Cumulative Number of Minutes in any Hour	Day - 7:00 a.m. to 10:00 p.m. (dBA)	Night - 10:00 p.m. to 7:00 a.m. (dBA)
Hospital, Library, Religious Institution, Residential, or School Uses		
30	55	50
15	60	55
5	65	60
1	70	65
0	75	70
Commercial Uses		
30	65	60
15	70	65
5	75	70
1	80	75
0	85	80

Note: For example, 30 cumulative minutes means the measured noise level may not exceed 55 dBA for more than 30 minutes out of any 1 hour period during the day, nor 50 dBA during the night.

Source: Town of Truckee, 2004

Existing Noise Levels

The sound levels in most communities fluctuate, depending on the activity of nearby and distant noise sources, time of the day, or season of the year. In order to characterize the existing

environment, ambient sound measurements were taken at six locations throughout a single day, noting environmental noise sources—such as aircraft and highways—present during measurements. These locations are depicted in Figure 4.11-1: Noise Monitoring Locations and represent various noise environments, including residential areas, substations, remote forest areas, and areas near highways.

Noise Monitoring Locations

Martis Valley Substation

Monitoring was conducted at the northwest corner of Riverview Road near the Martis Valley Substation at approximate milepost (MP) 1.3 of the 132/650 Line Double-Circuit. The surrounding area is comprised of residences, forested areas with some shrubs, and some undeveloped areas. Interstate 80 (I-80) was audible at this location, and traffic was present on Riverview Road during monitoring.

Brockway Summit Access Road

Monitoring was conducted north of SR 267, near Brockway Summit, on Martis Peak Road. The sound meter was positioned under the 650 Line—near approximate MP 5.5. At this location, SR 267 is located approximately 250 feet to the east and was audible during measurement. The surrounding area is primarily forested and some wildlife, including birds, could be heard during the monitoring period.

Kings Beach Residential

Monitoring was conducted at the east end of Canterbury Drive in the community of Kings Beach. This location is situated near the new and existing 625 lines at approximate MP 0.5, and near the 650 Line at approximate MP 8.6. The surrounding area is comprised of both residential and forested areas. Some local vehicle traffic and wildlife, including birds, could be heard during monitoring. Traffic from SR 267 was barely audible at this location.

Tahoe City Substation

Monitoring was conducted near the Tahoe City Substation, approximately 80 feet west of SR 89. While this area is forested, it is also commercially developed. Traffic and wildlife, including birds, were audible during monitoring. An audible buzz from the Tahoe City Substation was heard when traffic and other ambient noises were absent.

State Route 89 at 625 Line Crossing

Monitoring was conducted along the Truckee River, approximately 100 feet southeast of SR 89, near approximate MP 15.1 and 15.5 of the existing and new 625 lines, respectively. The surrounding area is forested, includes commercial businesses, and the Truckee River. Highway traffic was audible at this location during the noise monitoring.

Mount Watson Road

Monitoring was performed along Mount Watson Road near the intersection of the existing 625 Line at approximate MP 6.9 and the new 625 Line at approximate MP 7.2. Mount Watson Road traverses the Tahoe National Forest connecting Tahoe City to SR 267 near the Brockway

Summit. The surrounding area is primarily forested. No other sources of noise were present during monitoring.

Noise Monitoring Results

Table 4.11-5: Noise Monitoring Results presents the existing background noise levels that were measured during noise monitoring. The wide range of noise levels observed indicates the effect that outside sources—such as vehicle traffic, commercial business activities, and people—can have on noise levels. Due to its remote location, the Mount Watson Road monitoring location represents a good baseline for the existing ambient noise levels during the operation of the existing 60-kilovolt (kV) transmission lines. The Tahoe City Substation monitoring location, on the other hand, has many outside noise sources; it is a populated area with commercial development and a highway nearby that affect the overall noise level at this location.

Table 4.11-5: Noise Monitoring Results

Noise Monitoring Location	CNEL/L_{eq} (dBA) - Day	Regulatory Noise Limit
Martis Valley Substation	52.9	60 dBA for 15 minutes (Town of Truckee)
Brockway Summit Access Road	51.7	55 L_{eq} dB hourly (Placer County)
Kings Beach Residential	44.3	55 dB (Kingswood East PAS)
Tahoe City Substation	58.6	65 dB (64 Acre Tract PAS)
SR 89 at 625 Line Crossing	54.1	55 dB (Tahoe City Community Plan)
Mount Watson Road	31.7	55 dB (North Star PAS)

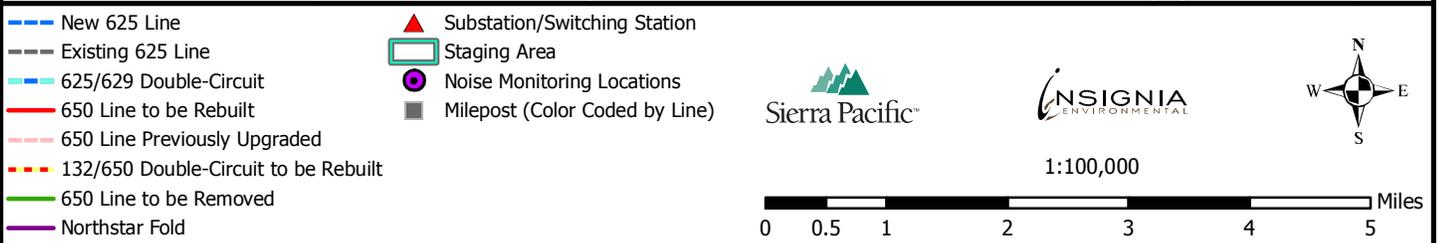
Sensitive Noise Receptors

Sensitive noise receptors are defined as land uses, such as residences, schools, places of worship, hotels, and hospitals that are particularly sensitive to increases in ambient noise. While the majority of the project components traverse sparsely populated, forested areas, the transmission lines originate and terminate at facilities that are located in more populous areas. Numerous residences are located within 1,000 feet of the project as identified in Table 4.9-2: Residences within 1,000 Feet in Section 4.9 Land Use and Planning. Approximately 484 residences are in close proximity (within 250 feet) of the transmission lines and substations, and are the nearest noise-sensitive receptors to the project. Of these residences, approximately 85 are located within 25 feet of the 650 Line between MP 8.0 and 8.6. The location and type of specific sensitive noise receptors that are located near the project's switching stations and substations are described as follows.



**Figure 4.11-1:
Noise Monitoring Locations Map**

625 and 650 Line Upgrade Project



Brockway Substation

The Brockway Substation is located within a residential area that includes multiple single-family residences; the closest residence is located approximately 100 feet from the substation. In addition to these residences, there are multiple hotels, schools, and places of worship within 1 mile of the project. The Kings Beach Elementary School, located approximately 0.2 mile to the southwest, is the closest school to the substation. The closest place of worship is the Kings Beach United Methodist Church, which is located approximately 0.2 mile southeast. The closest hotel—the Seven Pines Motel—is located approximately 0.3 mile south of the substation.

Northstar Substation

The Northstar Substation is located near the Northstar-at-Tahoe Ski Resort and, as a result, near multiple sensitive receptors, including residences and hotels. The closest residences to the substation are located approximately 450 feet to the west. The Northstar-at-Tahoe Village is located approximately 0.4 mile west of the substation and is the closest hotel to the substation. The Northstar Stables is a horse stable and riding ring that provides horse boarding and guided rides to the public. It is located approximately 0.1 mile northeast of the substation.

Squaw Valley Substation

The Squaw Valley Substation is located near the Squaw Valley Ski Resort. As a result, the substation is located near many sensitive receptors, including single-family residences and hotels. The closest sensitive receptor to the Squaw Valley Substation—the Tavern Inn—is a group of condominiums located approximately 500 feet west of the facility. The Squaw Valley Academy is the closest school to the substation and is located adjacent to the Tavern Inn.

Tahoe City Substation

The Tahoe City Substation is located near the Truckee River and downtown Tahoe City. Sensitive receptors located in the vicinity of the substation include residences, hotels, a school, and places of worship. A residential condominium development is located approximately 300 feet east of the substation. The Vineyard Christian Fellowship is the closest place of worship and is located approximately 0.3 mile northwest of the substation. The closest schools to the substation are Tahoe Lake Elementary School and St. Thomas Aquinas School, located approximately 0.5 mile northeast and 0.5 mile south of the substation, respectively.

Kings Beach Substation

The Kings Beach Switching Station, which will be converted to a substation, is located within the Kings Beach Diesel Generation Facility. This existing facility is surrounded by forested areas and is located approximately 0.3 mile north of the Brockway Substation. The closest sensitive receptors to the substation are residences located approximately 0.1 mile to the west and south. The closest place of worship—the Kings Beach United Methodist Church—is located approximately 0.3 mile southeast of the substation. Kings Beach Elementary School—approximately 0.2 mile southwest of the substation—is the closest school.

North Truckee Switching Station

The North Truckee Switching Station is located in a primarily commercial area of Truckee. The Forest Charter School, which is located approximately 0.15 mile southwest of the substation, is the closest school. The closest place of worship to the switching station is the Assumption Catholic Church, located approximately 0.4 mile to the south. The closest residence is located approximately 0.3 mile to the east.

4.11.3 Impacts

Significance Criteria

Noise

Standards of significance were derived from Appendix G of the California Environmental Quality Act (CEQA) Guidelines. Noise impacts are considered significant if they:

- result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- result in exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels;
- result in substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- result in substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- lie within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, and, as a result, expose people residing or working in the project area to excessive noise levels; and/or
- lie in the vicinity of a private airstrip, and, as a result, expose people residing or working in the project area to excessive noise levels.

The operational noise thresholds of significance for the substation and switching stations have been derived from the applicable regulatory documents as discussed previously in Section 4.11.2 Existing Conditions. These thresholds have been summarized in Table 4.11-6: Operational Noise Significance Thresholds.

Vibration

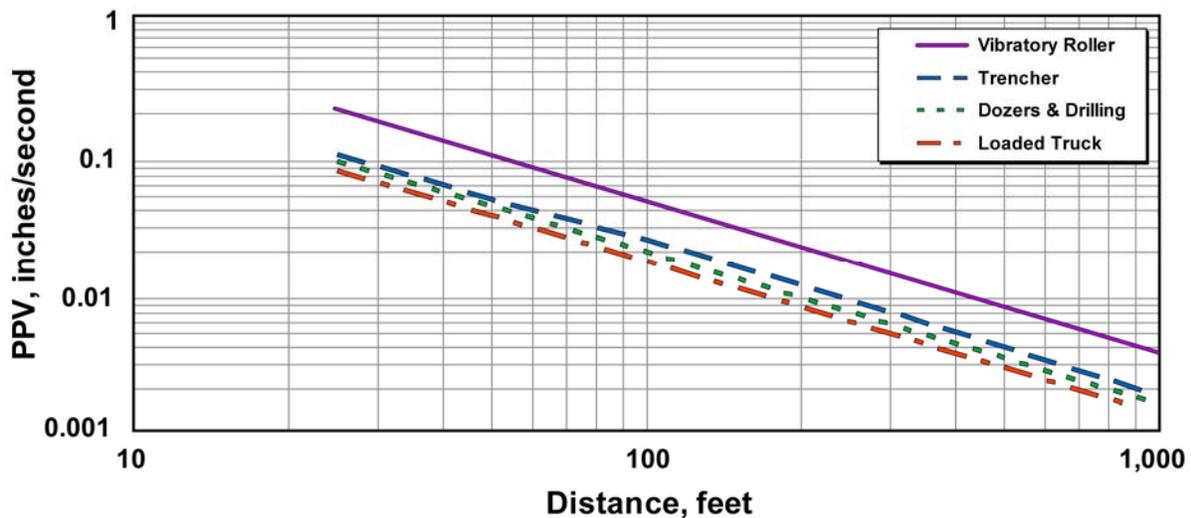
Vibration amplitude decreases with distance from the source, as presented in Figure 4.11-2: Construction Vibration Amplitudes. Damage potential can be estimated by comparing the vibration damage potential threshold criteria provided in Table 4.11-2: Vibration Damage Threshold Guidance to Figure 4.11-2: Construction Vibration Amplitudes. Vibration amplitudes above the damage threshold are considered potentially significant.

Table 4.11-6: Operational Noise Significance Thresholds

Substation/Switching Station	Significance Threshold	Jurisdiction
Brockway Substation	Hourly L_{eq} of 45 dB	Kings Beach Industrial PAS
Northstar Substation	Hourly L_{eq} of 45 dB	Placer County
Squaw Valley Substation	Hourly L_{eq} of 45 dB	Placer County
Tahoe City Substation	CNEL of 55 dB	Tahoe City Community Plan
Truckee Substation	Hourly L_{eq} of 50 dB	Town of Truckee
North Truckee Switching Station	Hourly L_{eq} of 50 dB	Town of Truckee
Kings Beach Substation	CNEL of 50 dB	Martis Peak PAS

Source: TRPA, 2008

Figure 4.11-2: Construction Vibration Amplitudes



A signal’s crest factor is the ratio between its peak and average amplitudes. For groundborne vibration from construction equipment, the crest factor is usually less than 4, meaning the strength of peak vibrations are less than four times that of the average vibrations. As described in Table 4.11-2: Vibration Damage Threshold Guidance, the peak vibration amplitudes allowed for fragile buildings is approximately 0.2. For a crest factor of 4, this PPV value corresponds to an rms value of 0.0056 inches.

Based on the previous discussion, thresholds of significance have been developed for project-related vibration at sensitive receptor locations and are provided in Table 4.11-7: Vibration Thresholds of Significance.

Table 4.11-7: Vibration Thresholds of Significance

Sensitive Receptor Type	Significance Threshold (inches/second)
Institutional land uses with primarily daytime use (e.g., schools, churches, libraries, other institutions, and quiet offices)	0.0056
Buildings where people normally sleep during daytime hours (e.g., hospitals)	0.0040
Fragile historic buildings, ruins, and ancient monuments	0.08
Fragile buildings	0.1
Historic buildings	0.25
Older residential buildings	0.3
Other structures	0.5

Source: Caltrans, 2004

Question 4.11a – Noise in Excess of Standards***Construction – Less-than-Significant Impact***

Construction will require the temporary use of various types of noise-generating equipment, including graders, backhoes, augers, flatbed boom trucks, rigging and mechanic trucks, air compressors and generators, mobile cranes, concrete trucks, man lifts, and impact equipment. Wire stringing operations will require pullers, tensioners, and cable reel trailers. Helicopters will be used to remove and install poles, as well as to deliver materials to and from the right-of way (ROW). Heavy equipment will be used to remove and install substation components. Noise levels during construction typically range from 75 to 95 dBA, measured at 50 feet. The noise level generated from operating a helicopter is approximately 95 dBA at a distance of 200 feet. Typical noise levels from construction equipment are provided in Table 4.11-8: Noise Levels Generated by Typical Construction Equipment.

As discussed in Section 4.11.2 Existing Conditions, construction-related noise sources are exempt from the local noise ordinances when performed during approved hours. The most stringent work hour limitations are from the TRPA, which limit construction to Monday through Saturday between 8:00 a.m. and 6:30 p.m. Except in instances when work must occur on Sundays or outside of the approved construction timeframes to allow for continuous operation of equipment or to coincide with off-peak traffic hours, SPPCo will limit the hours of construction to those permissible by the TRPA, Placer County, and the Town of Truckee, while working within the corresponding jurisdictional boundary to the extent practical, as described in APM-NOI-04 in Section 4.11.5 Applicant-Proposed Measures.

Table 4.11-8: Noise Levels Generated by Typical Construction Equipment

Equipment	Noise Level Range at Approximately 50 Feet (dBA)
Earth-Moving	
Front loader	79 to 80
Backhoe	78 to 80
Tractor, dozer	82 to 85
Scraper, grader	84 to 85
Paver	77 to 85
Truck	74 to 84
Materials-Handling	
Concrete mixer truck	79 to 85
Concrete pump	81 to 82
Crane (movable)	81 to 85
Stationary	
Pump	77 to 81
Generator	70 to 82
Compressor	78 to 80
Impact	
Pneumatic tools	83 to 85
Jackhammers and rock drills	81 to 89
Compactors	80 to 83

Source: The Federal Highway Administration (FHWA), 2006

Should construction occur outside of exempt hours, SPPCo will implement APM-NOI-01 through APM-NOI-08 as outlined in Section 4.11.5 Applicant-Proposed Measures, which include notifying nearby residents of the schedule for the after-hours activities prior to conducting work in the area and attempting to minimize noise near sensitive receptors. As a result, impacts will be less than significant.

Operation and Maintenance – No Impact

Transmission Lines

Modern transmission lines are designed, constructed, and maintained so that during dry conditions they operate below the corona-inception voltage and generate a minimum of corona-related noise. The corona hum typically will produce noise levels of up to 30 dBA when measured at the edge of the transmission line ROW during dry conditions. A noise level of 30 dBA will be practically unnoticeable, as it is easily masked by other ambient noises. In inclement weather conditions, water droplets and fog can produce corona discharges from high voltage lines that can be 5 to 20 dBA higher than usual. Corona levels (and audible noise levels) are highest during heavy rain, when the conductors are wet, but the noise generated by the rain will likely be greater than the noise generated by corona; thus, corona-related noise is not generally noticeable. Rebuilding the transmission lines to operate at 120 kV will cause a small increase in the audible corona noise; however, this noise will be intermittent, generally masked by other noise sources such as vehicular traffic and weather events, and will be in compliance with the noise regulations presented in Table 4.11-6: Operational Noise Significance Thresholds.

Additional noise sources associated with the operation and maintenance of the transmission lines will include vegetation clearance, as needed, and annual inspections and maintenance procedures to maintain service continuity. The total length of transmission line within the project area will not change significantly after construction. All of the transmission lines, except the 625 line, will be rebuilt within existing ROWs; therefore, operation and maintenance activities required for the upgraded lines will not change from the existing practices. As a result, operational noise will remain below standards and there will be no impact.

Substations and Switching Stations

At the substation and switching station sites, the primary sources of operating noise will be the on-site transformers and corona noise. New transformers will be installed at the Tahoe City, Kings Beach, and Northstar substations. The new three-phase transformers will be rated at 120/60/14.4-kV and 75 megavolt-amperes. Transformers of this type typically generate a noise level of approximately 75 dBA at the source. The noise generated by these transformers will attenuate by approximately 15 dBA to 60 dBA at a distance of 50 feet from the transformer. For each doubling of distance in the far field, the noise generated by the equipment will attenuate by approximately 6 dBA until the transformer noise is “lost” amongst ambient sounds.

The Brockway Substation will be decommissioned as a result of the project; therefore, it will no longer generate operational noise. No new equipment will be installed at the Truckee Substation and no new transformers will be installed at the North Truckee Switching Station or Squaw Valley Substation; therefore, the operational noise generated by these facilities is not expected to change as a result of the project. The remaining three substations—Squaw Valley, Northstar, and

Kings Beach—already have transformers operating at these existing facilities. The closest sensitive receptors to these facilities are located at a distance of approximately 0.1 mile. At a distance of 400 feet, the noise level from the newly installed transformers is expected to be approximately 42 dBA. The expected noise level is below the most stringent threshold provided in Table 4.11-6: Operational Noise Significance Thresholds of 45 dBA. In addition, these sensitive noise receptors are shielded from these facilities by forested areas, which will attenuate the operational noise further. As a result, no impact will occur.

Question 4.11b – Ground-Borne Vibration and Noise

Construction – Less-than-Significant Impact

According to Figure 4.11-2: Construction Vibration Amplitudes, the vibration amplitudes for dozers, drilling equipment (augers), and loaded trucks beyond 25 feet from construction activities will be below the damage threshold for older and newer residential buildings. Construction activities within approximately 100 feet of residences will exceed the county's annoyance threshold for frequent events. Because the closest residences are located adjacent to the portion of the 625 and 650 lines that will be double-circuited at a distance of approximately 25 feet from the ROW, damage as a result of vibration from construction is not anticipated. However, due to the proximity of numerous residences to the project, vibration and ground-borne noise associated with earth-moving activities and helicopter use may pose an annoyance to nearby residents, particularly those residents at home during construction work hours. While vibration and noise generated by construction will be temporary, occur for limited amounts of time along the ROW, and will, for the most part, be limited to the hours specified by local noise ordinances, SPPCo will implement APM-NOI-01 through APM-NOI-10 in Section 4.11.5 Applicant-Proposed Measures, which includes providing advance notice of construction activities to residents within 300 feet of the project and establishing procedures for registering complaints, to reduce impacts to nearby residents and businesses. With the implementation of these APMs, impacts will be less than significant.

Operation and Maintenance – No Impact

Vibration and ground-borne sources associated with the operation and maintenance of the transmission lines will include vegetation-clearing activities and annual inspections and maintenance procedures to maintain service continuity. Because the project involves rebuilding existing facilities, the total length of transmission line within the project area will not change significantly after construction. All of the transmission lines, except for the 625 line, will be rebuilt within existing ROWs; therefore, operation and maintenance activities required for the upgraded lines will not change from the existing practices. The new 625 Line will be constructed in close proximity to the existing line. In addition, none of the project facilities will generate vibration as a result of their operation. Thus, no impact due to vibration from operation and maintenance will occur.

Question 4.11c – Permanent Ambient Noise Increases

Construction – No Impact

Construction activities will occur over a finite period; therefore, no permanent increase in noise will occur, and there will be no impact.

Operation and Maintenance – Less-than-Significant Impact

Transmission Lines

As described previously in the response to Question 4.10a, transmission lines are designed, constructed, and maintained so that they operate below the corona inception voltage. The transmission lines will generate a minimum of corona-related noise, which will be practically unnoticeable during dry conditions, masked by other ambient noises, and similar to the corona hum from the existing transmission lines. The total length of transmission line within the project area will not change significantly as a result of the project and the increase in corona noise will be minimal and sporadic in nature; therefore, operational noise will not change significantly as a result of operation and maintenance of the upgraded transmission lines and the impact will be less than significant.

Substations and Switching Stations

As discussed previously, the primary sources of operating noise at the substation and switching station sites will be the on-site transformers and corona noise. New transformers will be installed at the Tahoe City, Kings Beach, and Northstar Substations; however, there are transformers already operating at these facilities. The installation of transformers at these facilities and upgrading them to operate at 120 kV will cause a small increase in their operational noise. The expected noise level from these facilities—approximately 42 dBA at a distance of 400 feet—is lower than the existing noise levels in similar locations as presented in Table 4.11-5: Noise Monitoring Results. Because these facilities already exist in the project area, their noise levels will be similar to existing conditions, and no additional operation or maintenance activities are expected beyond those that are already occurring, impacts will be less than significant.

Question 4.11d – Temporary or Periodic Ambient Noise Level Increases

Construction – Less-than-Significant Impact

Construction of project will result in temporary increases in noise levels in the immediate vicinity of the site. However, the specific impact of construction activities on the nearest noise-sensitive receptor will depend on the method of construction and equipment used. Construction will require the temporary use of various types of noise-generating equipment, including graders, backhoes, augers, flatbed boom trucks, rigging and mechanic trucks, air compressors and generators, mobile cranes, concrete trucks, man lifts, and impact equipment. Wire stringing operations will require pullers, tensioners, and cable reel trailers. Helicopters may be used to remove and install poles as well as deliver materials to and from the ROW. Noise levels during construction typically range from 75 to 95 dBA, measured at 50 feet. The noise level generated from operating a helicopter is approximately 95 dBA at a distance of 200 feet. Typical noise levels from construction equipment are provided in Table 4.11-8: Noise Levels Generated by Typical Construction Equipment.

Two types of noise are associated with construction activities—intermittent and continuous. No continuous noise is anticipated during the construction phase of this project. Construction hours will generally be between 7:00 a.m. and 7:00 p.m. 7 days per week, except when prohibited by local ordinances. There may be some instances when work must occur on weekends or outside of

the approved construction timeframes to allow for continuous operation or to coincide with off-peak traffic hours.

Construction equipment and helicopters that will be used to construct the project will generate localized, temporary increases in ambient noise in the area. Noise will be generated for a period totaling 14 months, distributed over a three-year duration. Due to the fact that this construction noise will be short-term, distributed over the ROW, and conducted in primarily rural areas with no sensitive receptors, these temporary increases in ambient noise will be less than significant.

Helicopters will be used to remove the poles from the existing 625 Line and to set a limited number of new poles along the 650 Line located in areas with limited accessibility. During pole installation and removal activities, helicopters will make one trip to each pole location and will briefly hover in the vicinity for 5 to 10 minutes at a time. These frequent helicopter flights at low altitudes over residential areas during project construction could result in significant temporary noise impacts. To minimize impacts, SPPCo or its contractor will design helicopter flight paths to and from the ROW that avoid residential areas to the greatest extent possible, as described in APM-NOI-08.

Further, noise levels may be higher at staging areas due to helicopter landing zones. Many of the staging areas have residences and/or businesses within approximately 500 feet, as described in Section 4.9 Land Use and Planning. While helicopters will not be used daily at each staging area for the duration of construction, their noise will nonetheless affect the residences and/or businesses in close proximity. The Tahoe City Staging Area will be the principle landing area for helicopter use during the removal of the existing 625 Line. Typically, the helicopter will land during refueling and at the end of the day or approximately five to seven times per day. Approximately two thirds of the poles will be flown to the Fiberboard Highway staging area over the course of approximately 7 days. The remainder of the poles will be flown to the Kings Beach Staging Area over a 4-day span. SPPCo will implement APM-NOI-01 through APM-NOI-10 as described in Section 4.11.4 Applicant-Proposed Measures, which include providing advance notice of construction activities, establishing complaint procedures, and direct noise-generating equipment away from sensitive-receptors. With the implementation of these APMs, impacts are anticipated to be less than significant.

Operation and Maintenance – No Impact

Upgrades to the existing transmission lines and substations will not require any significant changes to the current operation and maintenance activities at the existing facilities. Routine inspections and preventive maintenance will continue with approximately the same crew sizes and frequency. Therefore, no additional noise impacts will occur.

Question 4.11e – Air Traffic Noise from Public Facilities – No Impact

The Truckee-Tahoe Airport is the closest public airstrip to the project and is located approximately 0.7 mile from the 132 Line and 1 mile from the 650 Line. While portions of the project take place within the Airport Influence Area Boundary, aircraft activity and associated noise will not significantly increase near the airport as helicopters will land and refuel in designated helicopter landing zones as opposed to at the Truckee-Tahoe Airport. Because the

transmission lines that will be located within 2 miles of the Truckee-Tahoe Airport are existing and will be upgraded within their existing ROWs, there will be no impact.

Question 4.11f – Air Traffic Noise from Private Airstrips – *No Impact*

Use of private airstrips is not anticipated during the construction of the project. The closest private airstrip is located over 10 miles from the project area. Thus, no impact will occur.

4.11.4 Applicant-Proposed Measures

The following APMs will reduce any potentially significant impacts due to noise and vibration to the less-than-significant level:

- APM-NOI-01: SPPCo will provide notice of construction to all property owners within 300 feet of the project by mail at least 1 week prior to the start of construction activities. The announcement will state the construction start date, anticipated completion date, hours of operation, and the project’s website where questions can be asked and complaints can be received.
- APM-NOI-02: SPPCo will post a telephone number for excessive noise complaints in conspicuous locations in the vicinity of the project site when within 1,000 feet of residences.
- APM-NOI-03: SPPCo will designate a Disturbance Coordinator, who will be responsible for responding to any local complaints about construction noise. The Disturbance Coordinator will determine the nature of the noise complaint and will propose reasonable measures to correct the problem.
- APM-NOI-04: Construction activities will occur during the times established by local ordinances—6:00 a.m. to 8:00 p.m. Monday through Friday and 8:00 a.m. to 8:00 p.m. Saturday and Sunday in Placer County and 7:00 a.m. to 9:00 p.m. Monday through Saturday and 9:00 a.m. to 6:00 p.m. on Sunday in the Town of Truckee—with the exception of certain activities where nighttime construction activities are necessary. These activities include, but are not limited to, the delivery of substation transformers, filling of substation transformers, system transfers, pouring of foundations, and pulling of the conductor across major roadways, which require continuous operation or must be conducted during off-peak hours per agency requirements.
- APM-NOI-05: All internal combustion-engine driven equipment will be equipped with intake and exhaust mufflers that are in good condition and appropriate for the equipment.
- APM-NOI-06: Stationary noise-generating equipment will be located as far as possible from sensitive receptors when they adjoin or are within 1,000 feet of a construction area.
- APM-NOI-07: Quiet air compressors and other stationary equipment will be utilized when possible within the Town of Truckee limits.

- APM-NOI-08: Helicopter flight patterns will be designed to avoid and minimize flights over residential areas to the extent practical.

4.11.5 References

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- FHWA. *FHWA Roadway Construction Noise Model User's Guide*, January. 2006.
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- Placer County. 1994. Placer County General Plan.
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