3.12 Noise

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
12. NOISE—Would the project:				
a) 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?	☐	☒	☐	☐
b) Result in exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d) Result in 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, would the project expose people residing or working in the area to excessive noise levels?	☐	☐	☐	☒
f) For a project located in the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

3.12.1 Environmental Setting

General Information on Noise

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 zero 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).

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, horns, 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. Noise descriptors discussed 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).

DNL: The day-night noise level (DNL; also referred to as L_{dn}) or the energy average of the A-weighted sound levels occurring during a 24-hour period and which accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night ("penalizing" nighttime noises). Noise between 10:00 p.m. and 7:00 a.m. is weighted (penalized) by adding 10 dBA to take into account the greater annoyance of nighttime noises.

CNEL: Similar to the L_{dn}, the Community Noise Equivalent Level (CNEL) adds a 5-dBA *penalty* for the evening hours between 7:00 p.m. and 10:00 p.m. in addition to a 10-dBA penalty between the hours of 10:00 p.m. and 7:00 a.m.

L_x: The sound level that is equaled or exceeded x percent of a specified time period. The L_{50} represents the median sound level (i.e., the noise level exceeded 50 percent of the time, or 30 minutes out of an hour).

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

Effects of Noise on People

There is no universally acceptable 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 to which one has adapted: the so called "ambient noise" level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise would 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 by 1.5 dBA from 6.0 dBA 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) typically would 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 by 1.5 dBA 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.

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. 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 the average of the squared amplitude of the signal. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration (FTA, 2006).

Existing Ambient Noise Environment

The Project would primarily be located between the community of Shingle Springs in western El Dorado County and the City of Folsom in northeastern Sacramento County. Land uses along the alignment consist primarily of residential areas interspersed with light-industrial development in the unincorporated communities of Shingle Springs, Cameron Park, and El Dorado Hills, and in the City of Folsom. Areas of undeveloped rolling grasslands and oak woodlands exist along portions of the alignment between these populated communities.

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.

The Project would largely be located within the existing PG&E right-of-way and would traverse adjacent to residential, light industrial, and open space land uses. There are nearly 100 residences located within 50 feet of the reconductoring alignments and nearly 900 residences within 500 feet of the segment alignments. Other noise sensitive receptors in the Project area include various churches/places of worship and schools.

Ambient Noise Conditions

The main contributor to the study area noise environment is vehicle traffic noise. Major roadways in the study area include U.S. Highway 50 (U.S. 50), which is adjacent to the majority of the Project reconductoring alignments, Crazy Horse Road in the community of Cameron Park, Silva Valley Parkway in the community of El Dorado Hills, and Broadstone Parkway and Scholar Way in the City of Folsom. The primary existing vehicle noise source in the Project area is traffic along U.S. 50. Because traffic along U.S. 50 is the dominant noise source in the Project area, ambient noise levels were estimated using the Federal Highway Administration's (FHWA) Noise Prediction Model algorithms (ESA, 2014) to characterize ambient noise conditions at various sensitive receptor locations adjacent to the proposed power line segments.

The model uses Calveno reference noise factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle trip volume, speed, distance to the receiver, and the acoustical characteristics of the site. The trip volume estimates are based on California Department of Transportation (Caltrans) 2012 daily and peak hour traffic count data for U.S. 50 (see Table 3.16-1 in Section 3.16, *Transportation and Traffic*) as well as Caltrans annual average daily truck traffic data for 2012, which indicates that traffic along the stretch of U.S. 50 in the vicinity of proposed Project is comprised of approximately 94 percent automobiles, 3 percent medium trucks, and 3 percent heavy trucks (Caltrans, 2014). To model the lowest traffic noise hourly L_{eq}, it was assumed that the minimum daytime hourly trip volume along U.S. 50 is approximately 4.5 percent of the total daily traffic volume. The existing traffic noise was modeled assuming the average traffic speed along U.S 50 is 65 miles per hour. **Table 3.12-1** identifies the modeled ambient traffic noise in terms of the daytime hourly L_{eq} range. For illustrations of the modeled traffic noise receptor locations, refer to **Figures 3.12-1a** through **3.12-1c**.

TABLE 3.12-1
MODELED AMBIENT TRAFFIC NOISE LEVELS AT NEARBY RESIDENCES

Map No.	Modeled Receptor Location	Modeled Daytime (7:00 a.m. - 6:00 p.m.) Hourly L_{eq} (dBA)
1	East of landing zone, adjacent to the backyards of homes along Platt Circle	54.6 - 57.9
2	West of Finders Way, adjacent to backyards along Platt Circle	64.0 - 67.3
3	Merrychase Drive, adjacent to Camerado Springs Middle School	63.1 – 66.1
4	North of intersection of Deer Creek Road and Flying C Road, adjacent to rural residents	58.6 – 61.6
5	Northeast of intersection of Country Club Drive and Los Santos Drive, adjacent to residences	64.0 – 67.2
6	West of Shingle Springs Substation, north of Durock Road, adjacent to rural residences	64.8 – 68.0

NOTES: Modeled noise levels do not reflect topographical features that could partially shield traffic noise.

SOURCE: ESA, 2014.

Existing Features
- Substation
- Gold Hill No 1 (GH) 60 kV Power LIne Reconductoring
- Missouri Flat-Gold Hill (MF-GH) 115 kV Power Line Reconductoring

Existing Structures
- Lattice Steel Towers
- Tubular Steel Pole
- GH Wood Pole
- Distribution Wood Pole

Temporary Features*
- Guard Structure
- Staging Area
- Temporary Line Pole
- Helicopter Landing Zone
- Potential Pull Site

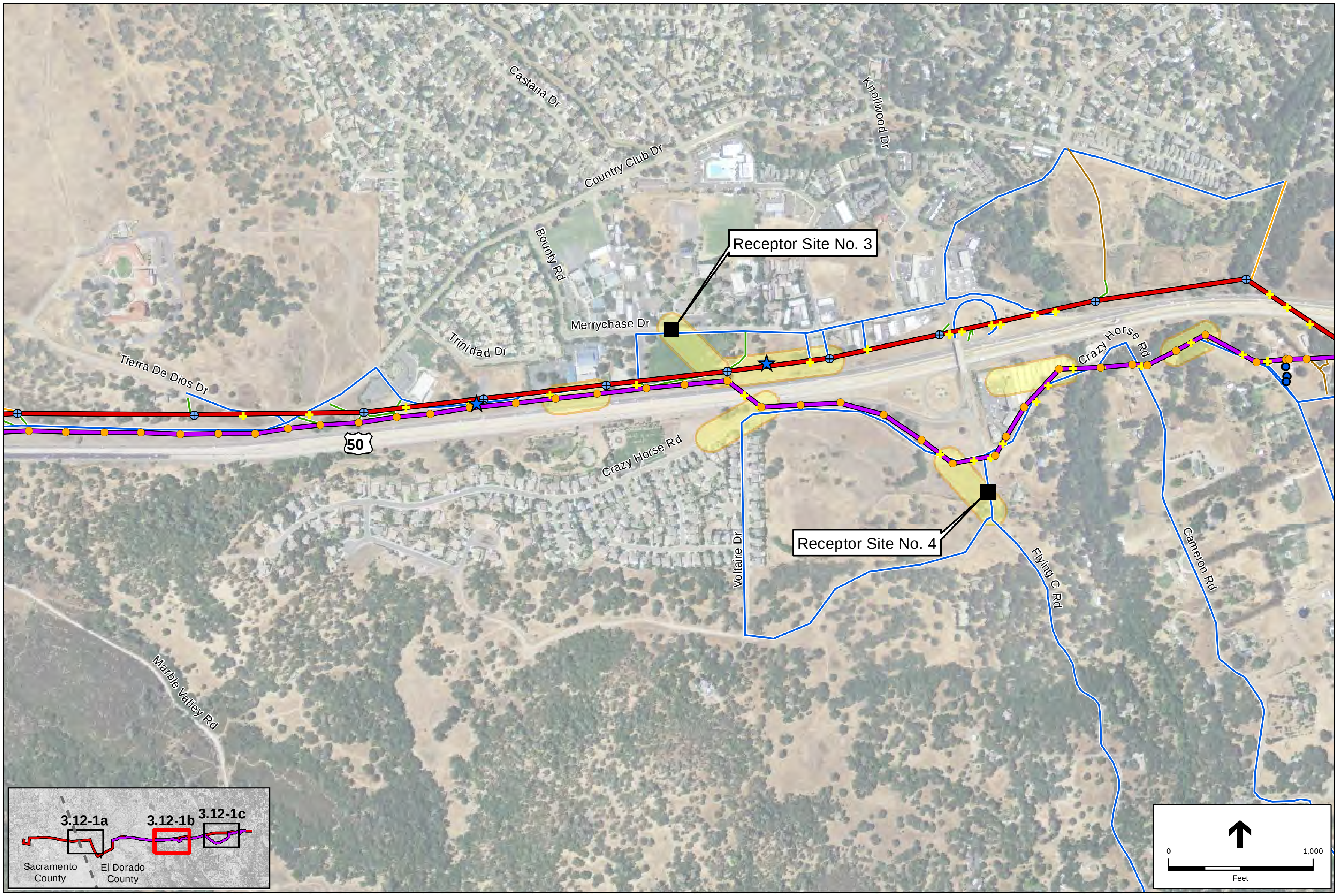
Access Routes
- Existing Dirt/Gravel Road
- Existing Paved Road
- Existing Unpaved Access Road Requiring Improvement
- New Unpaved Access Road
- Overland

* Based on preliminary design; locations are approximate and may be modified based on final design.

SOURCE: ESA, 2014

Missouri Flat Project . D207584.16

Figure 3.12-1a
Modeled Ambient Traffic Noise Receptor Sites (Panel 1 of 3)



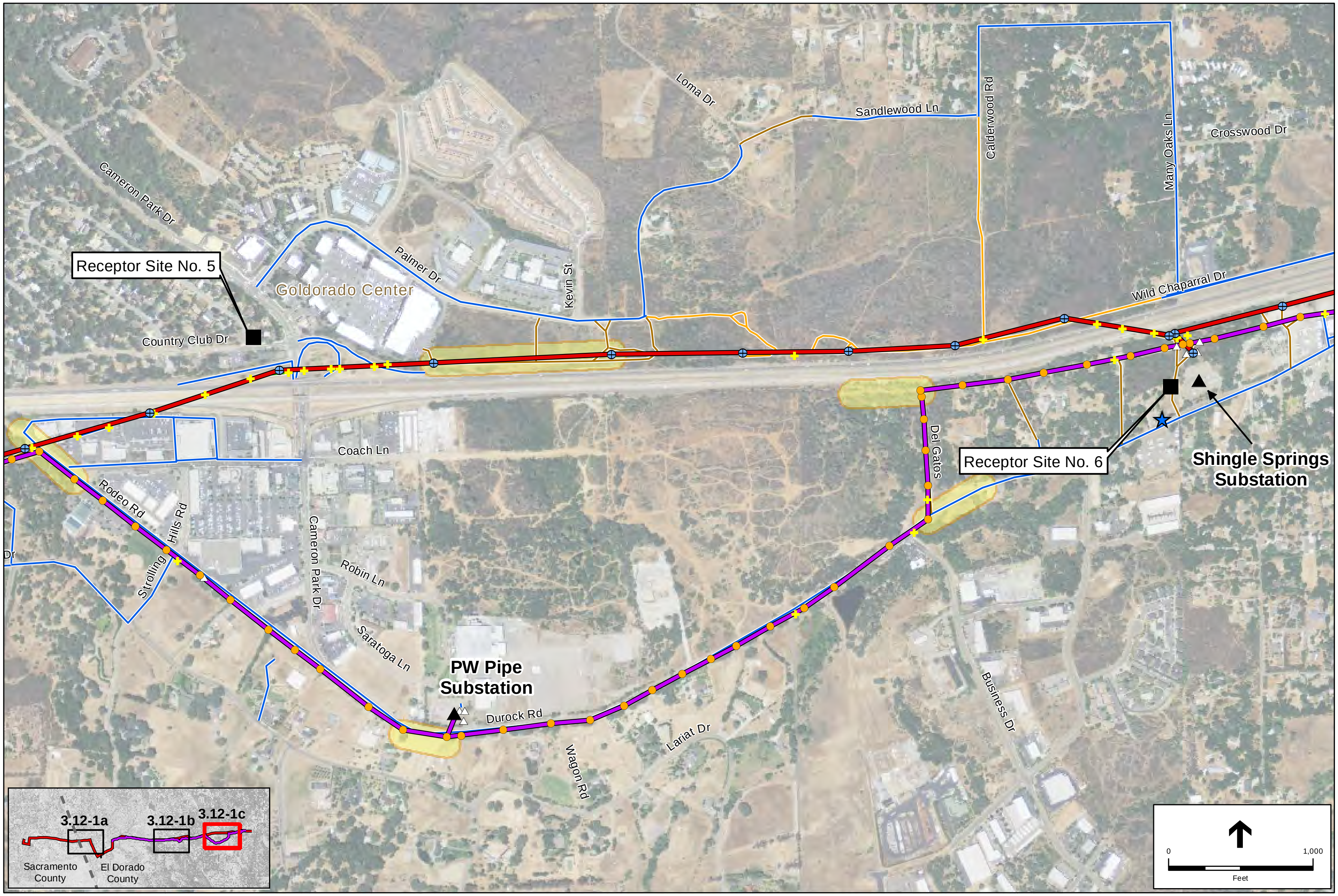
Existing Features	Existing Structures	Temporary Features*	Access Routes
Substation	Lattice Steel Towers	Guard Structure	Existing Dirt/Gravel Road
Gold Hill No 1 (GH) 60 kV Power LIne Reconductoring	Tubular Steel Pole	Staging Area	Existing Paved Road
Missouri Flat-Gold Hill (MF-GH) 115 kV Power Line Reconductoring	GH Wood Pole	Temporary Line Pole	Existing Unpaved Access Road Requiring Improvement
	Distribution Wood Pole	Helicopter Landing Zone	New Unpaved Access Road
		Potential Pull Site	Overland

* Based on preliminary design; locations are approximate and may be modified based on final design.

SOURCE: ESA, 2014

Missouri Flat Project . D207584.16

Figure 3.12-1b
Modeled Ambient Traffic Noise Receptor Sites (Panel 2 of 3)



Existing Features
- Substation
- Gold Hill No 1 (GH) 60 kV Power LIne Reconductoring
- Missouri Flat-Gold Hill (MF-GH) 115 kV Power Line Reconductoring

Existing Structures
- Lattice Steel Towers
- Tubular Steel Pole
- GH Wood Pole
- Distribution Wood Pole

Temporary Features*
- Guard Structure
- Staging Area
- Temporary Line Pole
- Helicopter Landing Zone
- Potential Pull Site

Access Routes
- Existing Dirt/Gravel Road
- Existing Paved Road
- Existing Unpaved Access Road Requiring Improvement
- New Unpaved Access Road
- Overland

* Based on preliminary design; locations are approximate and may be modified based on final design.

SOURCE: ESA, 2014

Missouri Flat Project . D207584.16

Figure 3.12-1c
Modeled Ambient Traffic Noise Receptor Sites (Panel 3 of 3)

As summarized in Table 3.12-1, ambient traffic noise levels at residences near U.S. 50 in the vicinity of the proposed Project alignments are moderate to high with hourly L_{eq} traffic noise levels that range from approximately 55 dBA mid-morning to 68 dBA in the early afternoon. The residential neighborhoods adjacent to the proposed routes that are setback from U.S. 50 and other major roadways are less dominated by vehicle traffic noise sources, and can generally be characterized by moderate (e.g., 50 dBA to 60 dBA range) daytime ambient noise levels. To a lesser extent, aircraft overflights also contribute to the ambient noise environment in the Project area. Cameron Airpark is located approximately 1.8 miles north of the project alignment, just northwest of the Cameron Park Drive and Meder Road intersection; however, the Project segments are outside of the CNEL 55 dBA airport noise contour (EDC ALUC, 2012).

3.12.2 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, and are not directly relevant to this environmental review, while regulation of stationary sources and development of land use noise compatibility policy 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 and codes establish standards and procedures for addressing specific noise sources and activities. Below are the regulatory settings for El Dorado County and City of Folsom, which are the local agencies with jurisdiction in the Project area.

El Dorado County

The *El Dorado County General Plan Public Health, Safety, and Noise Element* outlines policies pertaining to noise generation and defines acceptable noise levels for various land use categories. Noise standards for new uses with non-transportation noise sources are regulated by maximum allowable noise exposure levels at residential land uses, which depending on the density of the exposed residences, limits the L_{eq} to 50 dB or 55 dB during daytime hours (7 a.m. to 7 p.m.), 45 dB or 50 dB during evening hours (7 p.m. to 10 p.m.), and 40 dB or 45 dB during nighttime hours (10 p.m. to 7 a.m.), and limits the L_{max} to 75 dB or 60 dB during daytime hours, 65 dB or 55 dB during evening hours, and 60 dB, 55 dB, or 50 dB during nighttime hours. Pursuant to Policy 6.5.1.11, the maximum allowable noise exposure levels are applicable to construction activities as long as such construction occurs between the hours of 7:00 a.m. and 7:00 p.m., Monday through Friday, and 8:00 a.m. and 5:00 p.m. on weekends, and on federally-recognized holidays; however, *Public Health, Safety, and Noise Element* Table 6-2 indicates that since control of noise from non-transportation regulated public facilities are regulated by CPUC, such non-transportation facilities are not subject to local regulations (El Dorado County, 2009). The El Dorado County Municipal Code does not contain noise regulations that would be applicable to the Project.

The Project alignment would traverse through the Airport Influence Area, as identified in the Cameron Airpark Airport Land Use Compatibility Plan (ALUCP). The plan establishes airport compatibility criteria that all new developments must follow. However, the Project would not be located within identified safety zones and there are no airport compatibility measures in the Cameron Airpark ALUCP that would apply to the Project (see *Section 3.10, Land Use and Planning*, for more information relative to the ALUCP).

City of Folsom

The *City of Folsom General Plan's* Noise Element contains policies that define maximum allowable exterior noise level standards for non-transportation noise sources. For an hourly noise metric, the maximum allowable exterior noise levels at residential uses range from an L_{50} of 50 dBA during daytime hours (7 a.m. to 10 p.m.) to 45 dBA during nighttime hours (10 p.m. to 7 a.m.) to an L_{max} of 70 dBA during daytime hours and 65 dBA during nighttime hours. The City of Folsom Municipal Code Section 8.42 contains exterior noise level standards that are consistent with the Noise Element standards described above. However, Section 8.42.060 of the City of Folsom Municipal Code provides an exemption from these standards for construction activities provided that such activities do not take place before 7 a.m. or after 6 p.m. Monday through Friday, or before 8 a.m. or after 5 p.m. on Saturday or Sunday (City of Folsom, 2014).

3.12.3 Applicant Proposed Measures

PG&E proposes the following applicant proposed measures (APMs) to minimize impacts related to noise. This impact analysis assumes these APMs would be implemented as part of the Project.

APM NOI-1: Minimize Noise-Related Disruption by Notifying Residents

Should nighttime project construction be necessary because of planned clearance restrictions, affected residents will be notified at least 7 days in advance by mail, personal visit, or door hanger and informed of the expected work schedule.

APM NOI-2: Minimize Noise with Portable Barriers

Compressors and other small stationary equipment used during project construction will be shielded with portable barriers if the equipment is located near noise-sensitive receptors.

3.12.4 Environmental Impacts and Mitigation Measures

a) 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: *LESS THAN SIGNIFICANT WITH MITIGATION*.

Construction

The *El Dorado County General Plan* and the *City of Folsom General Plan* and Municipal Code identify maximum allowable noise exposure levels at residential land uses for new uses with non-transportation noise sources (see Section 3.12.2, *Regulatory Setting*). However, the *El Dorado County General Plan* states that control of noise from non-transportation facilities regulated by CPUC are not subject to local regulations. Because construction of the Project would be subject to CPUC regulations, it is assumed that El Dorado County would not consider construction of the Project to be applicable to its exterior noise standards for non-transportation sources. In addition, the City of Folsom Municipal Code provides an exemption from the established noise standards for construction activities taking place between the hours of 7:00 a.m. and 6:00 p.m. Monday through Friday and between the hours of 8:00 a.m. and 5:00 p.m. on Saturday or Sunday.

As indicated in *Chapter 2, Project Description,* construction would generally be limited to daytime hours (7:00 a.m. to 6:00 p.m.); however, infrequent instances may make it necessary for PG&E to work during nighttime hours for safety reasons or clearance reasons. As mentioned above, construction activities in the City of Folsom would be exempt from the City's exterior noise standards if construction activities would be limited to daytime hours; however, it may be necessary for construction activities to occur during nighttime hours for safety reasons or for line clearance reasons and the Project Description does not indicate any hourly construction activity restrictions for the weekend. Nighttime construction activities could conflict with the construction hour limitations set by the City of Folsom, resulting in a potentially significant impact; however, implementation of **Mitigation Measures 3.12-1 and 3.12-2** would ensure that any nighttime construction noise-related impacts would be reduced to a less-than-significant level.

Operation and Maintenance

Long-term operation and maintenance that would be associated with the Project would not increase noise levels relative to baseline conditions; therefore, long-term operation and maintenance of the Project would not result in noise levels in excess of existing local standards. For information relative to long-term noise that would be associated with the Project, refer to discussion c), below.

Mitigation Measure 3.12-1: Construction activity shall be limited to between the hours of 7:00 a.m. and 6:00 p.m., Monday through Friday, and 8:00 a.m. and 5:00 p.m. on weekends, and on federally-recognized holidays, except with CPUC approval to conduct certain work during electrical line clearances pursuant to Mitigation Measure 3.12-2, or where necessary to ensure worker safety.

Mitigation Measure 3.12-2: In the event that limited nighttime (i.e., between 6:00 p.m. and 7:00 a.m.) construction activity is determined to be necessary for safety reasons or for line clearance reasons within 500 feet of an occupied residential dwelling unit, a nighttime noise reduction plan shall be developed by PG&E and submitted to the CPUC for review and approval at least 30 days prior to commencement of construction activities. The noise reduction plan 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 nuisance are reduced. The measures shall include, but not be limited to, the control strategies and methods for implementation that are listed below.

- Plan construction activities to minimize the amount of nighttime construction.
- Provide notice to all residences within 500 feet of planned nighttime construction activities that includes the specific night(s) and approximate timeframe when construction activities would occur.
- Offer temporary relocation of residents within 200 feet of nighttime construction activities that would occur after 10:00 p.m.

- Temporary noise barriers, such as acoustical shields and/or blankets, shall be installed immediately adjacent to all nighttime stationary noise sources (e.g., generators, pumps) that block the line of sound between nighttime activities and the closest residences.

Significance after Mitigation: Less than Significant.

b) Result in exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels: *LESS THAN SIGNIFICANT*.

Construction

Some types of construction equipment can produce vibration levels that can cause architectural damage to structures and be annoying to nearby sensitive receptors. Vibration levels generated during construction of the Project would vary during the construction period, depending upon the construction activity and the types of construction equipment used. Typical vibration levels for the construction equipment types that would generally result in the highest vibration levels (e.g., drill rig, large bulldozers) are presented in **Table 3.12-2**.

TABLE 3.12-2
VIBRATION SOURCE LEVELS FROM CONSTRUCTION EQUIPMENT

	Peak Particle Velocity (in/sec)
Distance (feet)	**Drill Rig, Large Bulldozer**
50	0.031
75	0.017
100	0.011
150	0.006

SOURCE: FTA, 2006.

Because a numerical threshold to identify the point at which a vibration impact occurs has not been identified by the applicable local jurisdictions, this analysis relies on a peak PPV threshold identified by Caltrans to determine the significance of vibration impacts related to adverse human reaction and risk of architectural damage to normal buildings. The PPV threshold is 0.20 in/sec (Caltrans, 2004). This PPV level has been found to be annoying to people in buildings and can pose a risk of architectural damage to buildings.

The nearest residences would be as close as 50 feet to active Project construction equipment. At this distance, construction equipment PPV levels would be as high as 0.031 in/sec, which would be less than the 0.20 in/sec significance threshold. Therefore, short-term construction-related vibration impacts would be less than significant.

Operations and Maintenance

Operation and maintenance of the Project would not introduce any new sources of groundborne vibration to the study area. There would be no long-term impact.

c) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project: *NO IMPACT*.

The Project would not increase long-term noise relative to baseline noise levels associated operations of the substation and switching station modifications, power line corona noise, or maintenance activities.

The substation/switching station equipment that would be installed includes 115 kV circuit breakers, 115 kV switches, 115 kV potential transformers, bus hardware, conductor, and connections, and microprocessor relays. Audible substation noise is primarily generated by power transformers, which would not be replaced or installed as part of the Project. Noise levels for the circuit breakers, switches, and potential transformers proposed as part of the Project would be minimal and would be indistinguishable compared to existing equipment at the substations and switching station. Therefore, the Project would not result in higher noise levels in the vicinity of the substations and switching station compared to existing equipment. The proposed new power line conductor would replace existing conductor with the same voltage. Therefore, there would be no long-term increase in corona discharge noise associated with the Project. In addition, the Project would result in no change to the inspection schedule associated with the existing power lines, substations, and switching station. Therefore, there would be no long-term increase in noise levels associated with maintenance of the Project. Operation of the Project would not result in any long-term changes to the existing ambient noise conditions in the Project vicinity. Therefore, no impact would occur.

d) Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project: *LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED*.

Construction activities that would be associated with the Project would involve temporary noise sources that would increase ambient noise levels in the Project vicinity. Below are descriptions of the temporary noise sources that would be associated with the Project, followed by the overall impact conclusion for this criterion.

Construction Equipment. Construction of the Project would result in exposure of residential land uses to noise levels associated with operation of heavy duty construction equipment. Construction activities would require the use of excavators, graders, trenchers, front loaders, dump trucks, cranes, and augers, etc. Maximum noise levels from such equipment would be up to 85 dBA at 50 feet (FHWA, 2006). There would be approximately 100 residences within 50 feet of active Project construction activities. As part of the CPUC’s permit application process, PG&E provided noise estimates for construction activities that would be associated with the Project. The CPUC’s consultant, Environmental Science Associates (ESA), reviewed the noise level estimates and found them to be partially inaccurate and overly conservative. Therefore, ESA revised the noise estimates using the same assumptions and methods as used for the PG&E estimates, with the exception of the attenuation rate (ESA, 2014). To reflect absorptive surfaces, such as soft dirt, grass, and scattered bushes and trees that exist in the Project area, the ESA estimates use the excess ground attenuation rate. The PG&E estimates use the basic geometric spreading loss rate, which would be more appropriate for reflective ground surfaces, such as a paved lot or smooth water surface.

Noise at any one receptor location would be dominated by the closest and loudest equipment. The worst-case scenario assumes each piece of construction equipment would produce a reference noise level of 85 dB L_{max} at a distance of 50 feet and would be used 40 percent of the time. The analysis includes the assumptions that one piece of equipment would operate 50 feet away, two pieces of equipment would operate concurrently 100 feet away, and a maximum of four pieces of equipment would operate concurrently 200 feet away and beyond from any given sensitive receptor. **Table 3.12-3** summarizes the estimated construction noise levels that would occur at various distances based on this scenario.

TABLE 3.12-3
WORST-CASE NOISE LEVELS FROM CONSTRUCTION EQUIPMENT

Distance from Construction Activities (feet)	Hourly L_{max} (dBA)	Hourly L_{eq} (dBA)
50	85.0	81.0
100	80.5	76.5
200	76.0	72.0
400	68.4	64.5
800	60.9	56.9
1,600	53.4	49.4
3,200	45.9	41.9
6,400	38.3	34.4

SOURCE: ESA, 2014, based on PG&E, 2013.

Helicopter Activity. In addition to conventional construction equipment, the use of a helicopter would be required for a period of approximately 5 days for one of the proposed tower modifications, located approximately 800 feet northwest of the intersection of Broadstone Parkway and Empire Ranch Road. Noise from the helicopter would be substantial at the tower location, along the flight path, and at the helicopter landing zone, which would be as close as 200 feet from the nearest residential receptors. Helicopter noise levels during takeoff, approach, and level flyover would be 85 dBA, 88 dBA, and 86 dBA L_{max}, respectively, with a lateral offset of approximately 500 feet and a helicopter altitude of approximately 400 feet above ground level (PG&E, 2013).[9] Assuming these reference noise levels, the closest residences to the helicopter landing site at 200 feet could be exposed to an L_{max} of up to 96.5 dBA, and an hourly L_{eq} of up to 86.5 dBA, assuming a reference noise level that represents an average of takeoff and approach noise levels with a usage rate of 10 percent. The closest residences to the tower modification site at 230 feet from the site could be exposed to an L_{max} of up to 93.2 dBA, and an hourly L_{eq} of up to 89.2 dBA, assuming a usage rate of 40 percent (ESA, 2014).

Corona Noise. Prior to reconductoring the 115 kV Missouri Flat-Gold Hill line, it would be necessary to convert the Gold Hill No. 1 60 kV line to 115 kV to temporarily provide power during construction. The temporary increase of the power line from 60 kV to 115 kV could slightly increase audible corona noise in the vicinity of the line. The term corona is used to

9 Takeoff and landing noise level data were collected at 492 feet from the side of the approach and departure centerline, assuming a 6-degree approach and departure flight paths and an altitude of 394 feet above ground level. The helicopter represented by these data is the Bell 212.

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 and condition 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 thereby promoting corona discharge.

According to the Electric Power Research Institute (EPRI), corona noise levels 25 feet directly below 138 kV transmission lines (conductors) under wet conditions would be up to 37 dBA (EPRI, 1978). Temporary noise levels from the converted power line conductors would be expected to be lower as the voltage would be 115 kV rather than 138 kV; nevertheless, for the purpose of this analysis the noise level of 37 dB is used to represent the worst-case corona noise levels that would occur directly below the temporarily converted power line conductors.

Impact Conclusion

As stated Section 3.12.1, *Environmental Setting*, up to approximately 100 residences would be within 50 feet of the Project reconductoring alignments. Therefore, based on the noise levels presented in Table 3.12-3, it is reasonable to conclude that some residences along the alignments would be exposed to short-term noise of up to 85 dBA L_{max} and 81 dBA L_{eq}. In addition, residences that would be in the vicinity of the proposed helicopter activities could be exposed to noise levels of up to 97 dBA L_{max} and 89 dBA L_{eq}. Short-term noise levels associated with the converted power line conductors would be expected to be up to 37 dBA directly below the converted power line conductors.

As summarized in Table 3.12-1, ambient noise levels at residences near U.S. 50 in the vicinity of the proposed Project alignments are estimated to range from 55 dBA to 68 dBA L_{eq} and the residential neighborhoods adjacent to the proposed alignments that are setback from U.S. 50 and other major roadways can generally be characterized by 50 dBA to 60 dBA daytime ambient noise levels. Therefore, although the short-term increase in corona noise associated with the temporary conversion of the 65 kV line to 115 kV line would not likely be audible relative to ambient noise levels, Project-related construction equipment and helicopter noise would result in an increase in ambient noise levels at sensitive receptor locations in the vicinity of the Project. The Federal Transit Administration (FTA) has identified a daytime hourly L_{eq} level of 90 dBA as a noise level where adverse community reaction could occur associated with short-term construction activities (FTA, 2006). This level is used in this analysis to gauge whether short-term noise levels would represent a substantial increase in ambient noise levels that could cause a substantial nuisance to local sensitive receptors. Given that noise levels associated with helicopter activity would be up to 89 dBA L_{eq} at the closest residences, the associated increase in local noise levels would not be considered substantial; however, Project-related construction noise could be perceived by nearby residences as a substantial nuisance, potentially resulting in significant impacts.

Implementation of **Mitigation Measure 3.12-3** would require PG&E to implement noise-reducing practices during construction of the Project and **Mitigation Measures 3.12-4** and **3.12-5** would require PG&E to provide written notifications to noise-sensitive receptors in the vicinity of proposed construction sites, including the helicopter activity areas, that include the specific dates that activities will occur as well as descriptions the potential associated nuisances. Given that the proposed construction activities would mostly occur in a linear fashion and the associated short-term nuisances at any given sensitive receptor location would primarily be limited to a period of several days to several weeks, the written notifications that would be required per Mitigation Measures 3.12-4 and 3.12-5 would allow people that would be exposed to adverse noise to plan activities to avoid a substantial nuisance if necessary. This nuisance-related impact would be mitigated to a less-than-significant level.

Mitigation Measure 3.12-3: PG&E and/or the construction contractor shall employ noise-reducing practices during construction of the Project, including, but not necessarily limited to: locating equipment as far a practical from noise sensitive uses; requiring that all construction equipment powered by gasoline or diesel engines have sound-control devices that are at least as effective as those originally provided by the manufacturer; ensuring that all equipment be operated and maintained to minimize noise generation; and prohibiting gasoline or diesel engines from having unmuffled exhaust.

Mitigation Measure 3.12-4: At least 30 days prior to the start of construction, PG&E or the construction contractor shall notify residences (and other noise-sensitive receptors) within 200 feet of the construction areas of the construction schedule and the associated potential nuisance in writing.

Mitigation Measure 3.12-5: At least 30 days prior to the start of helicopter-related construction activities, written notifications shall be provided to residences and other noise-sensitive receptors within 500 feet of the helicopter landing zone, tower modification site, and flight path that include the specific dates and time of day that the helicopter-related activities are expected to occur.

Significance after Mitigation: Less than Significant.

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, would the project expose people residing or working in the area to excessive noise levels: *NO IMPACT.*

The Project would be located approximately 1.3 miles south of the Cameron Airpark Airport. The El Dorado County Airport Land Use Compatibility Plan establishes a noise contour map for the Cameron Airpark Airport that represents the projected noise exposure of the area. The 55-dB contour is the outermost noise boundary, representing the area surrounding the airport with the lowest noise levels. The Project alignment is outside of the CNEL 55 dB airport noise contour and outside of the noise compatibility restrictions on land use. Therefore, aircraft activity associated with the Cameron Airpark Airport would not expose Project construction workers or maintenance workers to excess noise levels. There would be no impact.

f) For a project located in the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels: *NO IMPACT*.

The Project is not located within the vicinity of a private airstrip. Therefore, there would be no impact associated with this criterion.

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