

5.12 Noise

5.12.1 Environmental Setting

General Background

Noise is defined as unwanted and objectionable sound. Sound levels are usually measured and expressed in decibels (dB), which are logarithmic units that can be used to conveniently compare wide ranges of sound intensities. The A-weighted decibel (dBA) scale of frequency sensitivity accounts for the sensitivity of the human ear, which is less sensitive to low frequencies, and correlates well with human perceptions of the annoying aspects of noise. On the logarithmic decibel scale, a 70 dBA sound level is approximately twice as loud as a 60 dBA sound level and four times as loud as a 50 dBA sound level. Table 5.12-1 lists the definitions of various acoustical terms used in this analysis.

Table 5.12-1. Acoustical Terms and Definitions

TERM	DEFINITION
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound to the reference pressure. The reference pressure for air is 20.
A-Weighted Sound Level (dBA)	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter deemphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear, and correlates well with subjective reactions to noise.
Equivalent Noise Level (L_{eq})	The average A-weighted sound level during the measurement period. The hourly L_{eq} used for this document is denoted as dBA L_{eq} .
Community Noise Equivalent Level (CNEL)	The average A-weighted sound level during a 24-hour day, obtained after addition of 5 dB to sound levels in the evening from 7:00 pm to 10:00 pm and addition of 10 dB to sound levels in the night from 10:00 pm to 7:00 am.
Day/Night Noise Level (L_{dn})	The average A-weighted sound level during a 24-hour day, obtained after addition of 10 dB to sound levels measured in the night from 10:00 pm to 7:00 am.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	Noise that intrudes over and above the existing ambient noise level at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, time of occurrence, and tonal or informational content, as well as the prevailing ambient noise level.

Source: Caltrans 1998

Community Noise. Community noise levels can be highly variable from day to day as well as between day and night. For simplicity, sound levels are usually best represented by an equivalent level over a given time period (L_{eq}) or by an average level occurring over a 24-hour day-night period (L_{dn}). The L_{eq} , or equivalent sound level, is a single value (in dBA) for any desired duration, which includes all of the time-varying sound energy in the measurement period, usually one hour. The L_{50} , is the median noise level that is exceeded fifty per cent of the time during any measuring interval. The L_{dn} , or day-night average sound level, is equal to the 24-hour A-weighted equivalent sound level with a 10-decibel penalty applied to nighttime sounds occurring between 10:00 p.m. and 7:00 a.m. Community Noise Equivalent Level (CNEL) is another metric that is the average equivalent A-weighted sound level during a 24-hour day, obtained after addition of five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and after addition of 10 decibels to sound levels in the night from 10:00 p.m. to 7:00 a.m. To easily estimate the day-night level caused by any noise source emitting steadily and continuously over

24-hours, the Ldn is 6.4 dBA higher than the source's Leq. For example, if the expected continuous noise level from equipment is 50.0 dBA Leq for every hour, the day-night noise level would be 56.4 dBA Ldn.

Community noise levels are usually closely related to the intensity of human activity. Noise levels are generally considered low when below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. In wilderness areas, the Ldn noise levels can be below 35 dBA. In small towns or wooded and lightly used residential areas, the Ldn is more likely to be around 50 or 60 dBA. Levels around 75 dBA are more common in busy urban areas, and levels up to 85 dBA occur near major freeways and airports. Although people often accept the higher levels associated with very noisy urban residential and residential-commercial zones, they nevertheless are considered to be adverse to public health.

Surrounding land uses dictate what noise levels would be considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than what would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments are about seven decibels lower than the corresponding daytime levels. In rural areas away from roads and other human activity, the day-to-night difference can be considerably less. Areas with full-time human occupation and residency are often considered incompatible with substantial nighttime noise because of the likelihood of disrupting sleep. Noise levels above 45 dBA at night can result in the onset of sleep interference. At 70 dBA, sleep interference effects become considerable (EPA, 1974).

Groundborne Vibration

Vibrating objects in contact with the ground radiate energy through the ground. Vibration from large and/or powerful objects can be perceptible by humans and animals if the velocity of ground movement is substantial. The rumbling sound caused by vibrating room surfaces is called groundborne noise. Ground vibration is recorded in terms of peak particle velocity in inches per second (in/sec).

The U.S. Department of Transportation (USDOT) has guidelines for vibration levels from construction activities, and recommends that the maximum peak particle velocity levels remain less than 0.05 in/sec at the nearest structures. Vibration levels greater than 0.5 in/sec have the potential to cause architectural damage to normal dwellings. The USDOT also states that vibration levels greater than 0.015 in/sec are sometimes perceptible to people, and the level at which vibration becomes annoying to people is 0.64 in/sec (USDOT, 2006).

Regional Noise Environment

The proposed power line would connect the Gallo Substation to the Cressey Substation near the towns of Livingston and Cressey, and crossing SR-99. None of the project elements would be within the City of Livingston. Land uses along the alignment and vicinity are primarily agricultural with intermittent rural residences. Agricultural uses include orchards, vineyards, field crops, pastures, poultry farms, and dairies. Open fields and landscaping are located along the project route. The Gallo Winery facility and some light industry are located adjacent to the project route, such as on the southwest side of the project route intersection with SR-99. The baseline noise level of agricultural and rural-residential land is approximately 30 dBA, whereas commercial use and urban areas have an average baseline noise level between 60 and 70 dBA (Caltrans, 1998). Table 5.12-2 shows typical sound levels from various environmental noise sources.

Table 5.12-2. Typical Sound Levels Measured in the Environment

Examples of Common, Easily Recognized Sounds	Decibels (dBA), at 50 feet	Subjective Evaluations
Near Jet Engine	140	
Threshold of Pain (Discomfort)	130	Deafening
Threshold of Feeling – Hard Rock Band	120	
Accelerating Motorcycle (at a few feet away)	110	
Loud Horn (at 10 feet away)	100	
Noisy Urban Street	90	Very Loud
Noisy Factory	85	
School Cafeteria with Untreated Surfaces	80	Loud
Near Freeway Auto Traffic	60	Moderate
Average Office	50	
Soft Radio Music in Apartment	40	Faint
Average Residence Without Stereo Playing	30	
Average Whisper	20	
Rustle of Leaves in Wind	10	Very Faint
Human Breathing	5	
Threshold of Audibility	0	

Note: Continuous exposure above 85 dBA is likely to degrade the hearing of most people. Range of speech is 50 to 70 dBA.

Source: U.S. Department of Housing and Urban Development, *The Noise Guidebook*, 1985.

Sensitive Receptors

Noise exposure goals for different types of land uses depend on the noise sensitivities of those uses. Religious centers, schools, guest lodging, hospitals, and libraries are particularly sensitive to noise intrusion and, therefore, have more stringent noise exposure limits than manufacturing or agricultural areas.

Sensitive receptors found in the project vicinity include residences and schools. Figure 5.10-1a through 5.10-1d at the end of Section 5.10 (Land Use and Planning) shows the locations of the sensitive receptors within a 0.5-mile buffer of the project area.

Noise Standards

CEQA does not define what noise level increase would be considered substantial. Regulating environmental noise is generally the responsibility of local governments. In 1974 the U.S. EPA published guidelines on recommended maximum noise levels to protect public health and, and the State of California maintains recommendations for local jurisdictions in the General Plan Guidelines published by the Governor’s Office of Planning and Research (OPR, 2003).

Given that environmental noise levels vary widely over time, a three dBA change is the minimum change in environmental noise that is perceptible and recognizable by the human ear. Permanent increases in day-night environmental noise levels of more than 5 dBA (Ldn or CNEL) are considered to be substantial. Intermittent noise sources, such as construction, may be temporary or periodic and may cease after a short time. Factors to be considered in determining the significance of an adverse impact include: (1) the

resulting noise level, (2) the duration and frequency of the noise, (3) the number of people affected, and (4) the land use designation of the affected receptor sites.

Applicable Regulations

Federal. There are no federal regulations that limit overall environmental noise levels; however, federal guidance documents address environmental noise and regulations for specific sources (e.g., aircraft or federally funded highways). Table 5.12-3 summarizes federal guidelines for exterior noise.

Table 5.12-3. Summary of Federal Guidelines and Regulations for Exterior Noise (dBA)

Effect	Maximum Level	Exterior or Interior Area
Hearing loss	Leq(24) < 70 dB	All areas.
Outdoor activity interference and annoyance	Ldn < 55 dB	Outdoors in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use.
	Leq (24) < 55 dB	Outdoor areas where people spend limited amounts of time, such as schoolyards, playgrounds, etc.
Indoor activity interference and annoyance	Ldn < 45 dB	Indoor residential areas.
	Leq(24) < 45 dB	Other indoor areas with human activities such as schools, etc.

Source: U.S. EPA, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. Section 4, Identified Levels of Environmental Noise In Defined Areas. March 1974.

Leq(24) = the sound energy averaged over a 24-hour period.

Ldn = the Leq with a 10 dB nighttime penalty.

State. Although there is no statewide noise regulation or specific threshold for determining what constitutes a “substantial increase” in noise, the State of California maintains recommendations regarding land use compatibility for local jurisdictions in the General Plan Guidelines published by the Governor’s Office of Planning and Research (OPR, 2003).

Local. Regulating environmental noise is generally the responsibility of local governments. The following summarizes the applicable local requirements.

Section 10.60.030 of the Merced County Ordinance Code (Merced County, 2009) states the following regarding noise limits:

- A. *No person shall cause, suffer, allow, or permit the operation of any sound source on private property in such a manner as to create a sound level that results in any of the following, when measured at or within the real property line of the receiving property:*
 1. *Exceeds the background sound level by at least ten (10) dBA during daytime hours (seven a.m. to ten p.m.) and by at least five dBA during nighttime hours (ten p.m. to seven a.m.). The background sound level for purposes of this section shall be determined as set forth in Section 10.60.060; or*
 2. *Exceeds sixty-five (65) dBA Ldn on residential real property or seventy (70) dBA Ldn on nonresidential real property; or*
 3. *Exceeds seventy-five (75) dBA Lmax on residential real property or eighty (80) dBA Lmax on nonresidential real property.*

B. The following are exempt from the sound level limits of Section 10.60.030(A)...

5. Noise from construction activity, provided that all construction in or adjacent to urban areas shall be limited to the daytime hours between seven a.m. and six p.m., and all construction equipment shall be properly muffled and maintained.

Applicant Proposed Measures

PG&E proposes to implement measures during the design, construction, and operation of the Proposed Project to ensure it would occur with minimal environmental impacts in a manner consistent with applicable rules and regulations. Applicant Proposed Measures (APMs) are considered part of the Proposed Project in the evaluation of environmental impacts. CPUC approval would be based upon PG&E adhering to the Proposed Project as described in this document, including this project description and the APMs, as well as any adopted mitigation measures identified by this Initial Study (see Table 5.12-4).

Table 5.12-4. Applicant Proposed Measures (APMs) Related to Noise

APM Number	Issue Area
Noise	
APM NO-1	Noise Minimization with Portable Barriers. Compressors and other small stationary equipment used during construction will be shielded with portable barriers if located near a residence.
APM NO-2	Noise Minimization with Quiet Equipment. Quiet equipment (for example, equipment that incorporates noise control elements into the design; compressors can be quiet models) will be used during construction whenever possible.
APM NO-3	Noise Minimization through Direction of Exhaust. Equipment exhaust stacks and vents will be directed away from buildings.
APM NO-4	Noise Minimization through Truck Traffic Routing. Truck traffic will be routed away from noise sensitive areas where feasible.
APM NO-5	Noise Disruption Minimization through Residential Notification. In the event that nighttime construction is necessary because of clearance restrictions, affected residents will be notified in advance by mail, personal visit, or door-hanger and informed of the expected work schedule.

5.12.2 Environmental Impacts and Assessment

NOISE		Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:					
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 checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b.	Exposure of persons to or generation of excessive groundborne vibration or groundborne 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.	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

NOISE

Would the project:

f. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

Potentially Significant Impact Less than Significant With Mitigation Incorporated Less than Significant Impact No Impact

Significance criteria established by CEQA Guidelines, Appendix G.

a. Would the project 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 INCORPORATED – CONSTRUCTION. A summary of noise levels of construction equipment likely to be used during project construction is presented in Table 5.12-5. Although the types and numbers of construction equipment near any sensitive noise receptor would vary, Table 5.12-5 suggests that the loudest equipment generally would emit noise in the range of 80 to 85 dBA at a distance of 50 feet.

Table 5.12-5. Typical Construction Equipment Noise Levels.

Equipment Description	Acoustical Usage Factor (%)	Specified L _{max} at 50 feet (dBA)	Calculated L _{eq} at 100 feet (dBA)	Calculated L _{eq} at 1,000 feet (dBA)	Calculated L _{eq} at 2,000 feet (dBA)	Calculated L _{eq} at 4,000 feet (dBA)
All Other Equipment > 5 horsepower	50	85	76	56	50	44
Auger Drill Rig	20	85	72	52	46	40
Backhoe	40	80	70	50	44	38
Crane	16	85	71	51	45	39
Dump Truck	40	84	74	54	48	42
Grader	40	85	75	55	49	43
Pickup Truck	40	55	45	25	19	13
Tractor	40	84	74	54	48	42

Notes:

dBA = A-weighted decibels; L_{eq} = equivalent sound pressure level
Equation to calculate L_{max} at 1,000, 2,000 and 4,000 feet is as follows:
L_{eq}(h) = L_{max} + 10*log(A.U.F.) – 20*log(D/Do)

where:

L_{max} = Maximum noise emission level of equipment based on work cycle at D/Do (decibel).

A.U.F. = Acoustical usage factor, which accounts for the percent time that equipment is in use over the time period of interest (1 hour).

D = Distance from the equipment to the receptor (feet).

Do = Reference distance (generally, 50 feet) at which the L_{max} was measured for the equipment of interest (feet).

Source: FHA 2006

Noise at any specific receptor would be dominated by the closest and loudest equipment. The types and numbers of construction equipment near any specific receptor location would vary over time. The following conservative assumptions were used by the applicant for modeling construction noise (PG&E, 2011):

- One piece of equipment generating a reference noise level of 85 dBA (at 50 feet distance with a 40-percent usage factor) located on the power line route.
- Two pieces of equipment generating reference 85-dBA noise levels located 50 feet farther away on the power line route (100 feet distance with a 40 percent usage factor).

- Two additional pieces of equipment generating reference 85-dBA noise levels located 100 feet farther away on the power line route (200 feet distance with a 40 percent usage factor).

Table 5.12-6 presents construction equipment noise levels at various distances based on this scenario.

The applicant would design the project to be compatible with applicable County noise standards. The proposed construction activities would require the use of heavy equipment and the assembly and installation of structures, including utility poles and towers. Construction activities would be short-term at each pole location (one or two days), temporary, and limited to daytime hours, compatible with the local requirements. The applicant expects that if nighttime construction is necessary to continue work until a safe stopping point is reached or if planned electrical outages (clearances) are scheduled at night, these activities would be infrequent and short-term. Construction would last a total of approximately nine months, with work occurring five days per week. Implementation of APM NO-1, APM NO-2, APM NO-3, APM NO-4, and APM NO-5 would minimize exposure of receptors near construction activities. Construction noise would also be limited through implementation of APM AQ-2, which requires construction crews to limit unnecessary engine idling. Because nighttime construction would not be exempt from Merced County limits, implementation of Mitigation Measure N-1 would be required to ensure that noise levels would not be in excess of standards established in the local general plan or noise ordinance or applicable standards. Construction of the project with implementation of these APMs and the mitigation measure would result in a less-than-significant impact under this criterion.

MM N-1 PG&E Construction Hours. PG&E shall limit grading, scraping, hole augering and pole installation to daylight hours. Exceptions for work outside of these hours shall be allowed for project safety or to take advantage of the limited times when the power line can be taken out of service. If nighttime work is needed because of clearance restrictions on the power line, PG&E shall take appropriate measures to minimize disturbance to local residents through APM NO-5 to inform them of the work schedule and probable inconveniences.

LESS THAN SIGNIFICANT IMPACT – OPERATIONS AND MAINTENANCE. Maintenance activities currently performed on the existing distribution line along the project would continue and include the power line and the co-located or other distribution line along the route. Maintenance activities would typically occur over short timeframes each year and generate minimal noise. As with existing maintenance activities involving noise-generating equipment or vehicles, the applicant proposes to employ properly muffled and maintained equipment to reduce temporary noise impacts, and all activities would be subject to applicable local requirements. The occasional nature of maintenance noise due to implementation of the Proposed Project would not result noise levels in excess of standards established in the local general plan or noise ordinance or applicable standards.

Table 5.12-6. Construction Equipment Noise Levels Versus Distance

Distance from Construction Activity (feet)	L _{eq} Noise Level (dBA)
50	83
100	79
200	74
400	69
800	63
1,600	58
3,200	52
6,400	46

Notes:
dBA = A-weighted decibels; L_{eq} = equivalent sound pressure level
See text narrative preceding this table for the parameters of this noise modeling scenario.
Source: PG&E, 2011.

b. Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

LESS THAN SIGNIFICANT IMPACT – CONSTRUCTION. Construction activities (e.g., ground-disturbing activities, including grading and movement of heavy construction equipment) may generate temporary localized groundborne vibration. Heavy equipment operation is not anticipated to result in excessive groundborne vibration. Groundborne vibration and noise would occur during daytime hours and would be of short-term duration. Because vibration levels exceeding 0.64 in/sec could cause some persons to become annoyed, construction operations could, under some circumstances, temporarily impact persons in buildings within 50 feet of construction equipment. Persons in buildings further than 50 feet away from the construction area would not be impacted by construction vibrations. Project related vibrations would not cause any structural damage. Impacts from vibrations would be temporary (e.g., no more than two or three days at each site) and localized and, therefore, would not be excessive, resulting in a less than significant impact. Although less than significant, implementation of APMs NO-5 and Mitigation Measure N-1 would further reduce noise impacts during construction.

NO IMPACT – OPERATIONS AND MAINTENANCE. Equipment associated with operation and maintenance of the Proposed Project would not produce any groundborne noise or vibration; therefore, operation and maintenance of the project would result in no impact under this criterion.

c. Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

LESS THAN SIGNIFICANT IMPACT – CONSTRUCTION. Permanent increases in ambient noise levels in the project vicinity would not occur. Structure construction would not generate a new or different source of permanent noise.

LESS THAN SIGNIFICANT IMPACT – OPERATIONS AND MAINTENANCE. Maintenance activities would be temporary and are addressed under Criteria (a) and (d).

Corona and audible noise from the corona effect typically becomes a design concern for transmission lines at 230 kV and higher, and is less noticeable or inaudible on lines operated at lower voltages such as this 115 kV power line. Corona noise associated with operation of the Proposed Project would be minimal, at a level below the ambient sound levels in most areas, and the corona noise under foul weather conditions would not result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project. Corona noise is also discussed in Section 5.19 (Corona and Induced Current Effects).

d. Would the project 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 IMPACT – CONSTRUCTION. Construction is targeted to start in April 2013 and estimated to be complete in January 2014. Pole removal and replacement would occur over a few hours at each pole site and construction activities would be short-term at each pole location (one or two days), temporary, and limited to daytime hours, compatible with the local requirements. The applicant expects that if nighttime construction is necessary to continue work until a safe stopping point is reached or if planned electrical outages (clearances) are scheduled at night, these activities would be infrequent and short-term. Construction would last a total of approximately nine months, with work occurring five days per week. Therefore, any increases in ambient noise levels in the project vicinity during construction would be short-term, intermittent, and less than significant. Although less than significant, noise impacts

would be further reduced with the implementation of APMs NO-1 through NO-5, APM AQ-2, and Mitigation Measure N-1 (PG&E Construction Hours).

LESS THAN SIGNIFICANT IMPACT – OPERATIONS AND MAINTENANCE. Maintenance activities currently performed on the distribution lines along the project route would continue and would expand to include the new 115 kV power line. Maintenance activities would typically occur over short timeframes each year and generate minimal noise. As with existing maintenance activities involving noise-generating equipment or vehicles, the applicant proposes to employ properly muffled and maintained equipment to reduce temporary noise impacts, and all activities would be subject to applicable local requirements. Operational activities would not be substantially different from those that occur under existing conditions, and therefore would be unlikely to result in substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing levels. Therefore, this impact would be less than significant under this criterion.

e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

NO IMPACT. Construction, operation, and maintenance of the project would occur only at distances greater than two miles from a public airport; therefore, the project would have no impact under this criterion.

f. For a project within the vicinity of a private air strip, would the project expose people residing or working in the project area to excessive noise levels?

NO IMPACT. No private airstrips are located within two miles of the project; therefore, the project would have no impact under this criterion.

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