D.11 Noise and Vibration

This section addresses the Proposed Project and alternatives as they would cause noise and vibration. Section D.11.1 provides a description of the environmental setting, and the applicable noise ordinances and limitations are introduced in Section D.11.2. An analysis of the Proposed Project impacts is in Section D.11.3, and the noise and vibration impacts related to alternatives are in Sections D.11.4 through D.11.6.

D.11.1 Environmental Setting for the Proposed Project

General Characteristics of Community Noise

To describe environmental noise and to assess impacts on areas sensitive to community noise, a frequency weighting measure that simulates human perception is customarily used. The frequency weighting scale known as A-weighting best reflects the human ear's reduced sensitivity to low frequencies and correlates well with human perceptions of the annoying aspects of noise. The A-weighted decibel scale (dBA) is cited in most noise criteria. Decibels are logarithmic units that conveniently compare the wide range of sound intensities to which the human ear is sensitive. Figure D.11-1 illustrates typical ranges of common sounds heard in the community noise environment.

The community noise environment and the consequences of human activities cause noise levels to be widely variable over time. 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 for any desired duration, which includes all of the time-varying sound energy in the measurement period, usually one hour. The L_{dn}, or day-night average sound level, is equal to the 24-hour equivalent sound level (in dBA) with a 10 dBA penalty applied to nighttime sounds occurring between 10:00 p.m. and 7:00 a.m.

Community noise levels are usually closely related to the intensity of nearby human activity. Figure D.11-2 illustrates the typical noise levels of varying types of land use. Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. In wilderness areas, the L_{dn} noise levels can be below 35 dBA. In small towns or wooded and lightly used residential areas, the L_{dn} is more likely to be around 50 or 60 dBA. Levels around 75 dBA are more common in busy urban areas (e.g., downtown San Francisco), 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.

The 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 that are subject to nighttime noise are often considered objectionable because of the likelihood of disrupting sleep. Noise levels above 45 dBA at night can result in the onset of sleep interference effects. At 70 dBA, sleep interference effects become considerable (U.S. EPA, 1974).

Noise Environment in the Project Area

A wide range of noise sources occur in the project area, mainly due to the wide range of land uses that are traversed by the alignment. Ambient noise levels tend to be lowest in the recreational and open areas and away from the highways and industrial or commercial uses of the suburban areas. Noise levels in the region are the highest near major transportation facilities, especially the interstate highways and the San Francisco International Airport, and in industrial and commercial areas. Ambient noise levels were monitored by PG&E at eight locations in the project area. The results of PG&E's noise survey are shown in Table D.11-1.

For areas not included in the noise survey, the ambient noise levels are either described qualitatively or are estimated using traffic volumes from Caltrans. Caltrans Traffic Operations Data (Caltrans, 2003) is used in this analysis with California Vehicle Noise Emission Factors (Caltrans, 1998) to estimate existing ambient noise levels at receptors near Interstate 280.

Noise sensitive receptors are facilities or areas (e.g., residential areas, hospitals, schools, etc.) where excessive noise may convey annoyance. Noise sensitive receptors are throughout the region. Single-family and multi-family homes are common in numerous areas adjacent to the proposed alignment. Schools, religious facilities, hospitals, and parks are also present near the alignment. The land use section of this report identifies these sensitive uses when they are near the alignment. Open space areas are only considered noise sensitive if they are used for recreation.

Table D.11-1. Noise Measurement Results (dBA)

Location	Average (L_{eq})	Minimum (L_{eq})	Maximum (L_{eq})	Day-Night (L_{dn})
Transmission Lines				
Hillsborough, Skyline/Chateau Drive	75	65	93	78
San Bruno, San Bruno Avenue	64	57	82	68
South San Francisco, Junipero Serra	68	57	94	72
Colma, Hillside Boulevard	70	69	79	76
Daly City, Guadalupe Canyon Parkway	81	80	83	84
Substations, Transition Structure				
Jefferson Substation	75	65	93	78
Transition Structure	64	57	82	68
Martin Substation	72	55	90	78

Source: PG&E, 2002, Table 15-1.

D.11.1.1 Jefferson Substation to Ralston Substation

Ambient Noise Levels. Noise measurements taken by PG&E show 24-hour average levels at Jefferson Substation to be around 78 L_{dn} (see Table D.11-1). These levels are dominated by traffic on Interstate 280 (I-280), with lower levels of noise being generated by substation operations and by traffic and recreational use on Cañada Road. Approximately 111,000 vehicles travel this portion of I-280 daily. Any receptor located within 350 feet of the freeway centerline, having an unobstructed line-of-sight to the traffic, may be exposed to existing traffic noise levels over 70 L_{dn}. Residences not exposed to highway noise would probably have existing noise conditions typical of quiet suburbs, about 60 L_{dn} or less.

Figure D.11-1. Typical Range of Common Sounds Heard in the Environment

CLICK HERE TO VIEW

Figure D.11-2. Outdoor Day/Night Sound Levels in Different Areas

CLICK HERE TO VIEW

Sensitive Receptors. Residences in the City of San Mateo that are adjacent to the project alignment, are buffered by varying amounts of open space. In the vicinity of the Highlands and Baywood Park Areas and Lexington Avenue, about 60 homes are approximately 200 feet from the proposed alignment. The Hillcrest Juvenile Home is approximately 200 to 400 feet from the project alignment and two potential cable pulling sites. Recreational uses along Cañada Road are adjacent to some portions of the project alignment and near two to four potential cable pulling sites.

D.11.1.2 Ralston Substation to Carolands Substation

Ambient Noise Levels. Noise levels are dominated by traffic on I-280. Any receptor located within 350 feet of the freeway centerline, having an unobstructed line-of-sight to the traffic, may be exposed to existing traffic noise levels over 70 L_{dn}. Further from the freeway, the suburban noise levels are probably 60 L_{dn} or less.

Sensitive Receptors. Residences in the Town of Hillsborough are adjacent to the project alignment, buffered by varying amounts of open space in the vicinity of Pilarcitos Court, Lakeview Drive, and Black Mountain Road, about 30 homes are approximately 200 feet from the alignment. Approximately six of these homes are immediately adjacent (within 50 feet) to the project alignment and a potential cable pulling site.

D.11.1.3 Carolands Substation to Transition Station

Ambient Noise Levels. Noise measurements taken by PG&E along Skyline Boulevard in the Town of Hillsborough show 24-hour average levels to be around 78 L_{dn} (see Table D.11-1). These levels are dominated by traffic on I-280, with lower levels of noise caused by traffic on Skyline Boulevard. Other noise in the area is generated by use of recreational facilities. Approximately 122,000 vehicles travel this portion of I-280 daily. Any receptor located within 375 feet of the freeway centerline, having an unobstructed line-of-sight to the traffic, may be exposed to existing traffic noise levels over 75 L_{dn}. As shown on Table D.11-1, noise levels recorded at the location of the proposed transition station were around 68 L_{dn}.

Sensitive Receptors. Residences in the Town of Hillsborough and the City of Burlingame that are adjacent to the project alignment are buffered by varying amounts of open space. Approximately three homes are immediately adjacent (within 50 feet) to the project near the Carolands Substation in Hillsborough. In the vicinity of Skyview Drive and Loma Vista Drive, about 30 homes are approximately 200 feet from the alignment. The project alignment is separated by I-280 and Skyline Boulevard from residences in the Cities of Millbrae and San Bruno. Recreational uses surround the proposed alignment in this area, including the Crystal Springs Golf Course and the trails east of San Andreas Lake (see Section D.9, Recreation).

D.11.1.4 Underground Segment

Ambient Noise Levels. Noise measurements taken by PG&E along the underground segments within San Bruno, South San Francisco, Colma, and Daly City reflect existing urban activity levels (see Table D.11-1). They are highly variable depending on the exact orientation of the monitoring equipment with the noise sources and any potential obstructions. The highly developed surroundings provide numerous opportunities (e.g., fences and intervening structures) for shielding receptors from noise sources. The levels are discussed in further detail below.

Sensitive Receptors. Noise-sensitive land uses surround the proposed alignment in each of the cities that it traverses. Although the underground transmission line would be constructed in the established right-of-way of many streets and the Bay Area Rapid Transit (BART) system, numerous homes, schools, parks, and cemeteries are adjacent to the streets and BART. Residential neighborhoods in these cities are generally medium-to-high-density. The noise-sensitive receptors are discussed in further detail below.

Vibration-sensitive land uses, such as high-precision manufacturing facilities or research facilities with optical and electron microscopes, may exist along the underground segment. PG&E conducted a survey of land uses along the proposed underground segment by consulting with the applicable planning staffs. Although the survey did not reveal any land uses that would be especially sensitive to ground-borne vibration, this analysis assumes that properties sensitive to ground-borne vibration could be encountered.

San Bruno Avenue

Ambient Noise Levels. Table D.11-1 shows that the existing noise levels along San Bruno Avenue are approximately 68 L_{dn}. Away from busy streets, typical suburban and urban noise levels between 60 and 70 L_{dn} are expected.

Sensitive Receptors. Medium and high-density residences are located along the proposed underground route in San Bruno Avenue. About 100 homes are located within roughly 200 feet to the north and south of San Bruno Avenue in the project area.

BART ROW

Ambient Noise Levels. No ambient noise measurements were provided for locations along the BART ROW. Typical suburban and urban noise levels between 60 and 70 L_{dn} are expected.

Sensitive Receptors. Medium and high-density residences are located along the BART ROW. In San Bruno, about 40 homes are within 200 feet of the right-of-way. The South San Francisco High School, Orange Memorial Park, and numerous high-density residences are along the proposed right-of-way in South San Francisco.

Colma to Martin Substation

Ambient Noise Levels. Table D.11-1 shows that the existing noise levels along Hillside Boulevard in Colma and Guadalupe Canyon Parkway, in Daly City, are around 76 and 84 L_{dn} respectively. Away from busy streets, typical suburban and urban noise levels between 60 and 70 L_{dn} are expected.

Sensitive Receptors. The El Camino High School in South San Francisco is within 100 feet of the Proposed Project alignment. In Daly City, the Pollicita Middle School and the John F. Kennedy Elementary School are each within 200 feet of the alignment. Numerous cemeteries are also adjacent to the alignment. Medium and high-density residences are located along many of the narrow streets of Colma and Daly City, within 100 feet of the proposed alignment. This includes approximately 80 row-homes along Hoffman and Orange Streets in Daly City. At the Martin Substation, the nearest residences are 150 feet from the property line of the station, across Geneva Avenue.

D.11.2 Applicable Regulations, Plans, and Standards

Regulating environmental noise is generally the responsibility of local governments. U.S. EPA once published guidelines on recommended maximum noise levels to protect public health and welfare (U.S. EPA, 1974), 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, 1998). The following summarizes the federal and State recommendations and the local requirements.

Federal and State Standards

There are no federal noise standards that directly regulate environmental noise. Table D.11-2 provides a summary of recommended noise levels for protecting public health and welfare with an adequate margin of safety. With regard to noise exposure and workers, the federal Occupational Safety and Health Administration (OSHA) establishes regulations to safeguard the hearing of workers exposed to occupational noise (29 CFR Section 1910.95, Code of Federal Regulations).

Table D.11-2. Examples of Protective Noise Levels Recommended by U.S. EPA

Effect	Maximum Level	Exterior or Interior Area
Hearing loss	$L_{eq}(24) < 70$ dB	All areas.
Outdoor activity interference and annoyance	$L_{dn} < 55$ 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.
	$L_{eq}(24) < 55$ dB	Outdoor areas where people spend limited amounts of time, such as schoolyards, playgrounds, etc.
Indoor activity interference and annoyance	$L_{dn} < 45$ dB	Indoor residential areas.
	$L_{eq}(24) < 45$ 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.

$L_{eq}(24)$ = Represents the sound energy averaged over a 24-hour period.

L_{dn} = Represents the L_{eq} with a 10 dB nighttime penalty.

The State of California requires each local government to perform noise surveys and implement a noise element as part of their general plan. Table D.11-3 shows the State guidelines for evaluating the compatibility of various land uses as a function of noise exposure.

Local Noise Ordinances and Policies

Each local government aims to protect its residents from intrusive noise. Many communities specifically restrict disturbing noises at night. Refer to Table D.11-4 for a summary of the local noise ordinance requirements in the project area.

Ground-borne vibration is not commonly regulated by local municipalities, except as it might cause a nuisance or annoyance. Ground-borne vibration that is perceptible by humans may be above the levels that would adversely affect high precision equipment, but may also be below the levels that could cause damage to nearby structures. As such, if ground-borne vibration is felt by people in residences, it does not necessarily mean that the integrity of the structure is being compromised. Vibration that is perceptible by people in nearby buildings would qualify as a nuisance and may be limited by broad prohibitions of local ordinances.

Table D.11-3. Land Use Compatibility for Community Noise Environment

LAND USE CATEGORY	COMMUNITY NOISE EXPOSURE – L_{dn} or CNEL (db)						
	50	55	60	65	70	75	80
Residential - Low Density Single Family, Duplex, Mobile Home							
Residential - Multi-Family							
Transient Lodging - Motel. Hotel							
Schools, Libraries, Churches, Hospitals, Nursing Homes							
Auditorium, Concert Hall, Amphitheaters							
Sports Arena, Outdoor Spectator Sports							
Playgrounds, Neighborhood Parks							
Golf Courses, Riding Stables, Water Recreation, Cemeteries							
Office Buildings, Business Commercial and Professional							
Industrial, Manufacturing, Utilities, Agriculture							

	Normally Acceptable Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
	Conditionally Acceptable New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design.
	Normally Unacceptable New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.
	Clearly Unacceptable New construction or development generally should not be undertaken.

Source: State of California General Plan Guidelines, Office of Planning and Research, November 1998.

Table D.11-4. Summary of Local Noise Ordinance Requirements.

Jurisdiction	Policies of the General Plan, Noise Element	Municipal Code
San Mateo County	• Strive toward an environment for all residents of San Mateo County which is free from unnecessary, annoying, and injurious noise. • Reduce noise impacts through noise/land use compatibility and noise mitigation. • Promote protection of noise sensitive land uses and noise reduction in quiet areas and noise impact areas. • Give priority to reducing noise at the source rather than at the receiver.	• No requirements for construction noise.
City of San Mateo	• Establishes normally acceptable sound levels for sensitive receptors (e.g., residential, schools, libraries, and hospitals, normally acceptable at 50-59 dBA L_{dn}, and conditionally acceptable at 60-70 dBA L_{dn}).	• Generally prohibits nuisances. (Municipal Code, Section 10.04.010.)
City of Brisbane	• Minimize the intrusion of unwarranted and intrusive noise on community life. • Community Noise Equivalent Level (CNEL) of 65 dB represents a noise level at which noise insulation features are generally required.	• Prohibits, in a single family residential zoning district, noise levels more than 10 dB above the local ambient for a cumulative period of more than 15 minutes in any hour. • Prohibits, in a multi-family residential zoning district, noise levels more than 10 dB above the local ambient, 3 feet from any wall, floor, or ceiling inside any dwelling unit. (Municipal Code 8.28.030.)
City of South San Francisco	• Protect public health and welfare by eliminating or minimizing the effects of existing noise problems and by preventing increased noise levels in the future. • Prohibits industrial development that will result in noise levels of 60 dBA CNEL at areas zoned for noise sensitive uses.	• Limits noise levels in single-family or duplex residential areas to 60 dBA between the hours of 7 a.m. and 10 p.m. and 50 dBA between 10 p.m. and 7 a.m. • Construction activities, which are authorized by a valid city permit, are allowed on weekdays between 8 a.m. and 8 p.m. and on Saturdays between 9 a.m. and 8 p.m. Any single piece of equipment is limited to a noise level of 90 dB at a distance of 25 feet.
City of San Bruno	• Noise levels for relevant land uses (e.g., residential, schools, libraries, churches, and hospitals) should be less than 65 dBA CNEL. • Industrial land uses are limited to less than 75 dB CNEL.	• Limit sound levels in residential zones between 10 p.m. and 7 a.m. to 45 dBA and between 7 a.m. and 10 p.m. to 60 dBA. However, during the daytime period the ambient base level may be exceeded by 20 dBA for a period not to exceed 30 minutes during any 24-hour period. • Construction-generated noise is limited to 85 dBA between 7 a.m. and 10 p.m., as measured at 100 feet. (Municipal Code Section 6.16.303)
Town of Colma	• Establishes normally acceptable sound levels for sensitive receptors (e.g., residential, schools, libraries, and hospitals normally acceptable below 60 dBA L_{dn}, and conditionally acceptable below 70 dBA L_{dn}).	• No noise ordinance, but generally prohibits disturbing the peace, which prohibits loud and unreasonable noise. (California Penal Code Section 415.)
City of Millbrae	• Aims to protect the City's existing neighborhoods and commercial areas, and assure that new development is done appropriately. • Establishes normally acceptable sound levels for sensitive receptors (e.g., residential, schools, libraries, and hospitals below 60 dBA L_{dn}, and conditionally acceptable below 75 dBA L_{dn}). The acceptable level for industrial, manufacturing, and utilities land uses is less than 70 dBA L_{dn}.	• No noise ordinance, but generally prohibits disturbing the peace, which prohibits loud and unreasonable noise. (California Penal Code Section 415.)
Town of Hillsborough	• Minimize noise levels through the town and to mitigate, wherever possible, the effects of noise in order to provide a safe and healthy environment consistent with residential land uses. • The noise standard is consistent limits exterior sound levels of up to 60 dBA L_{dn} for residential and other sensitive-receptor land uses.	• Prohibits excessive, unnecessary, and unreasonable noises from any and all sources. • Construction activities may be conducted pursuant to a valid building permit issued by the town, so long as the activities do not produce noise levels above 100 dBA outside the property plane.
City of Daly City	• Defines normally acceptable noise levels for relevant land uses (e.g., residential and single family) at 60 dBA CNEL. Other sensitive receptors (e.g., schools, libraries, churches, and hospitals) are limited to 65 dBA CNEL for normally acceptable noise levels. • States that construction noises are regulated through the environmental review process by the Engineering and Planning Divisions. Typically, construction activities are limited to the daytime hours, 8 a.m. to 5 p.m., and prohibited on weekends and holidays.	• Prohibits disturbing the peace beyond property boundaries between the hours of 10 p.m. and 6 a.m. (Municipal Code Chapter 9.22)
City of Burlingame	• Aims to exclude and prohibit all annoying, excessive and unnecessary noises from all sources which are subject to its regulatory, administrative and police powers. • Suggested outdoor noise levels consistent with this policy are: Public, quasi-public, and residential land uses – 60 dBA CNEL; Passively used open spaces – 45 dBA CNEL; Commercial – 65 dBA CNEL; and Industrial – 75 dBA CNEL.	• Prohibits loud, unnecessary or unusual noise which disturbs the peace and quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person or normal sensitiveness residing in the area.

Source: PG&E, 2002, Section 15.2.

D.11.3 Environmental Impacts and Mitigation Measures for the Proposed Project

D.11.3.1 Significance Criteria

Significance of noise impacts depends on whether the project would increase noise levels above the existing ambient levels by introducing new sources of noise. Noise impacts would be considered significant if the project would 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.
- Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels.
- A substantial permanent increase in ambient noise levels (more than five dBA) in the project vicinity above levels existing without the project.
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

No especially vibration-sensitive land uses (e.g., high-precision manufacturing facilities or research facilities with optical and electron microscopes) were found during surveys of the project area. As such, the significance threshold for construction-related ground-borne vibration depends on whether a nuisance or annoyance could occur.

D.11.3.2 Applicant Proposed Measures

PG&E has committed to implementing one Applicant Proposed Measure (APM), presented in Table D.11-5, to reduce noise impacts associated with construction. Implementation of this measure will be monitored by the CPUC during construction.

Table D.11-5. Applicant Proposed Measures – Noise and Vibration

APM	Description
APM 15.1	The following noise-suppression techniques will be employed to minimize the impact of temporary construction noise on nearby sensitive receptors: • Install portable barriers to shield compressors and other small stationary equipment where necessary. • Use "quiet" equipment (i.e., equipment designed with noise-control elements). • Direct equipment exhaust stacks and vents away from buildings, when feasible. • Route truck traffic away from noise-sensitive areas, where feasible. • Coordinate with applicable municipalities regarding all substation construction activities in residential areas. • Install sound barriers for pile driving activity. • Limit pickup trucks and other small equipment to an idling time of five minutes, observe a common-sense approach to vehicle use, and encourage workers to shut off vehicle engines whenever possible. (Note: larger vehicles, such as large diesel vehicles, require extended warmup times after startup. Some equipment will remain running when required for repetitive tasks or to power other equipment.)

Source: PG&E, 2002

D.11.3.3 230 kV/60 kV Overhead Transmission Line

Impacts During Construction

Construction of the project would require short-term use of cranes, augers, compressors, air tampers, generators, trucks, and other equipment. Helicopters would also be needed to transport construction materials, remove and install new towers, and to string the conductors for the overhead line. Night work could be necessary to cross I-280. Construction of foundations for new towers would require use of a drill rig or large auger at most tower locations. Pile driving would be needed only at the San Mateo and Martin Substations (discussed separately in Section D.11.3.6). During the anticipated 13 months necessary to construct the overhead transmission line, transition station, and substation modifications, concurrent activity would be necessary with two to six crews at separate locations. Transmission line work would be widely distributed along the 14.7-mile corridor between the Jefferson Substation and San Bruno. Typical noise levels at 50 feet for the types of construction equipment that would be used are listed in Table D.11-6.

Table D.11-6. Typical Noise Levels of Construction Equipment

Equipment Type	Range of Noise Level (dBA at 50 ft.)
Earthmoving	
Front loaders	72-84
Backhoes	72-93
Tractors, Dozers	76-96
Scrapers, Graders	80-93
Pavers	86-88
Trucks	82-94
Materials Handling	
Concrete mixers/millers	75-88
Concrete pumps/spreaders	81-83
Cranes (movable)	75-86
Cranes (derrick)	86-88
Stationary	
Pumps	69-71
Generators	71-82
Compressors	74-86
Drill Rigs	70-85
Project-Specific	
Helicopters (in flight, at 150 feet)	92- 95
Pile Drivers	90-101

Source: PG&E, 2002, Table 15-2.

Construction activities within the project right-of-way, staging areas, and substations would create both intermittent and continuous noises. Examples of intermittent construction noise would be the noise from passing trucks, loading operations, or moments of drilling, and continuous noise would be sustained by idling equipment or pumps and generators that operate at constant speeds. The maximum intermittent construction noise levels would range from 84 to 96 dBA at 50 feet during earthmoving for road construction or up to about 95 dBA during helicopter operations for installing the line or certain structures. Continuous noise levels from construction would be lower because most equipment would not be operated steadily. At 50 feet, continuous noise levels would range up to about 77 dBA. At 100 feet, these levels would range up to 71 dBA, and at 200 feet, 65 dBA. These levels would diminish over additional distance and could be reduced further by intervening structures. For overhead transmission line work, no sources of ground-borne vibration would be expected to affect receptors outside of the work area. The duration of work at each location would be temporary, extending from four to 12 weeks.

Construction would also cause noise off-site, primarily from commuting workers and from trucks and helicopters needed to bring materials to the construction sites. Workers would likely meet at various staging areas and then travel to the construction site in crews. Haul trucks would make trips to bring poles, conductor line, and other materials to the construction sites and remove excavated material and waste. The peak noise levels associated with passing trucks and commuting worker vehicles would be approximately 75 dBA at 50 feet.

Impact N-1: Construction Activities Would Temporarily Increase Local Noise Levels

Construction noise could substantially, but temporarily, increase ambient noise levels in the vicinity of the overhead line work, including tower locations and access routes. Residences in the vicinity of construction work are exposed to ambient noise levels that range up to and over 70 L_{dn}, depending on their exposure to major existing noise sources, such as Highway I-280. For residences that are not currently exposed to high levels of highway noise, existing noise levels are probably closer to 60 L_{dn}. Construction work within 200 feet of such residences would cause 65 dBA, a noticeable increase in the ambient noise levels.

Night work, if needed because of safety or traffic issues and approved by local jurisdictions, would likely expose nearby residences to noise levels in excess of locally established standards. The municipalities along the route of the overhead line each have ordinances limiting noise that would be disruptive or cause a nuisance. The Federal Aviation Administration could require homes near helicopter activity to be temporarily vacated for safety reasons. This would help to minimize exposure of residents to helicopter noise. Helicopter operations or other work needed to cross the highways at night would likely cause annoyance to residences that remain occupied in the vicinity. Without additional measures, construction noise nuisances would be a potentially significant impact.

As shown in Section D.11.3.2, PG&E proposes to implement APM 15.1 to reduce the impact of construction noise on sensitive receptors. Section D.2, Land Use, also recommends mitigation measures that would be useful in reducing the noise impacts during construction (see Mitigation Measures L-4a and L-4b which would provide adviance notice of the construction schedule to nearby residents and provide a public liaison). Implementing APM 15.1 and Mitigation Measures L-4a and L-4b would reduce this short-term noise impact to a level that is less than significant (Class II).

Mitigation Measure for Impact N-1

Implementation of APM 15.1 and Land Use Mitigation Measures L-4a and L-4b would reduce construction noise impacts to less than significant levels (Class II).

Impact N-2: Ground-Borne Vibration Could Cause a Temporary Nuisance During Construction

Vibration levels from heavy equipment transport, grading, tamping, and/or pile-driving activities may be perceptible to residents or workers in nearby commercial areas and business parks in structures immediately adjacent to the construction work. The peak vibration levels from pile driving activities at 50 feet would likely be perceptible for the brief moment of impact; other construction activities, such as a heavy truck passing over large potholes or bumps, could also produce perceptible vibration within about 50 feet. Although the detectability of ground-borne vibration is highly dependent on the soil type at the construction site, the type of equipment used, and the structure of the receptor, construction could cause annoyance for a sensitive receptor within about 50 feet of construction work. This impact could occur during construction of the project, including the overhead line, underground line, or substation work.

Implementing previously identified measures (APM 15.1 and Mitigation Measures L-4a and L-4b) for managing noise nuisances would provide advance notice of the construction schedule to nearby property owners. With these measures, nuisances from vibration would be avoided, and this temporary impact would be reduced to a level that is less than significant (Class II).

Mitigation Measure for Impact N-2

Implementation of APM 15.1 and Land Use Mitigation Measures L-4a and L-4b would reduce ground-borne vibration impacts during construction to less than significant levels (Class II).

Jefferson Substation to Ralston Substation

Construction of work for this portion of the overhead line would adversely affect about 60 homes approximately 200 feet from the alignment between Milepost 5.2 and 6.6 in San Mateo and the Hillcrest Juvenile Home (within 200 to 400 feet) just southeast of the Ralston Substation. Recreational uses along Cañada Road are also adjacent to some portions of the project alignment and near two to four potential cable pulling sites. APM 15.1 and Mitigation Measures L-4a and L-4b would be appropriate for reducing the potentially significant impact of construction noise (Impact N-1) to less than significant levels (Class II).

Ralston Substation to Carolands Substation

Construction of this portion of the overhead line would adversely affect about 30 homes within 200 feet of the proposed route in Hillsborough between Milepost 6.9 and 8.8. Approximately six of these homes are immediately adjacent (within 50 feet) to the project alignment and a potential cable pulling site. APM 15.1 and Mitigation Measures L-4a and L-4b would be appropriate for reducing the potentially significant impact of construction noise (Impact N-1) to less than significant levels (Class II).

Carolands Substation to Transition Station

Work for this portion of the overhead line would adversely affect approximately three homes within 50 feet of the Carolands Substation in Hillsborough, about 30 homes within 200 feet of the route between Milepost 10.0 and 10.7 in Burlingame, and recreational uses within 50 feet of the route including the Crystal Springs Golf Course and the trails east of San Andreas Lake. APM 15.1 and Mitigation Measures L-4a and L-4b would be appropriate for reducing the potentially significant impact of construction noise (Impact N-1) to less than significant levels (Class II).

Operational Impacts

The permanent noise sources that would occur with operation of the project are limited to the corona effect of the overhead transmission line and routine inspection and maintenance of the line.

Impact N-3: Corona Noise from Operation of the Overhead Transmission Line

Audible power line noise would be generated from corona discharge, which is usually experienced as a random crackling or hissing sound. Corona is the breakdown of air very near conductors and occurs when the electric field is locally intensified by irregularities on the conductor surface such as scratches or water drops. Corona, as an issue for transmission lines, is more significant for extra-high voltage lines of 345 kV or above but will also occur on lower voltage lines during rain or fog conditions. The physical manifestations of corona include a crackling or hissing noise and very small amounts of light. Besides the nuisance aspects of corona, it also results in undesirable power loss over a transmission line. Therefore the design of transmission lines incorporates specific conductor and equipment designs to limit or eliminate corona.

The highest noise level generated by the 230 kV line during fair weather conditions would be below the ambient noise level at ground level. During rain or fog, however, the highest noise level at the edge of the right-of-way of the Proposed Project would be around 46 dBA at the closest sensitive receptor. This would not be above the ambient noise levels in the project area, and it would not be in excess of standards in the local general plans or noise ordinances. As such, corona noise would be a less than significant impact (Class III).

Impact N-4: Noise from Inspection and Maintenance Activities

Routine inspection and maintenance of the transmission lines would be accomplished with either ground access or occasional helicopter fly-over. This would cause short-term or intermittent increases in noise along the route of the inspection or maintenance. No increases in frequency of inspections or maintenance are expected as a result of the Proposed Project in the overhead section, beyond the inspections and maintenance that is currently required. As such, the noise impact from these activities would be less than significant (Class III).

D.11.3.4 Transition Station

Construction of the transition station would be a temporary source of noise or vibration similar to that described in Section D.11.3.3 above (Impacts N-1 and N-2). The equipment needed to complete the work would include trucks and cranes. The nearest sensitive receptor is approximately 400 feet from the proposed transition station site at the northwest corner of Glenview Drive and San Bruno Avenue, a distance sufficient to avoid potential construction noise or vibration impacts. Therefore, impacts would be less than significant (Class III).

After construction of the transition station is complete, there would be no source of noise at the transition station other than potential corona noise, as described in Section D.11.3.3 above (Impact N-3). Similar to the overhead portion of the line, inspection or maintenance would cause occasional noise from trucks and small work crews (Impact N-4). Because inspection or maintenance would be infrequent, operation of the transition station would cause a less than significant noise impact (Class III).

D.11.3.5 230 kV Underground Transmission Line

Impacts During Construction

Work on the underground segments of the line would require short-term use of backhoes, boring equipment, dump trucks, mobile cranes, haul trucks, and street sweepers. Night work would probably be necessary in several areas where daytime traffic cannot be rerouted. During the anticipated 12 months necessary to construct the 12.4-mile underground line, concurrent activity would be necessary with up to 15 separate crews at different locations. The noise levels of the necessary equipment are included in Table D.11-6, above.

As with the overhead portion of the line, the maximum intermittent construction noise levels would range up to 96 dBA at 50 feet during earthmoving activities. At 50 feet, continuous noise levels would range up to about 77 dBA. At 100 feet, these levels would range up to 71 dBA, and at 200 feet, 65 dBA. These levels would diminish over additional distance and could be reduced further by intervening structures.

Similar to impacts identified for construction of the overhead line and transition station, construction noise for the underground segments could substantially, but temporarily, increase ambient noise levels in the vicinity of the work (Impact N-1). Residences in the vicinity of the proposed underground route are exposed to varying ambient noise levels, depending on their exposure to busy traffic corridors. Residences, schools, and parks along the BART ROW and some lightly traveled streets experience relatively quiet existing conditions, around 60 L_{dn}. Construction work within 200 feet of such receptors would cause noise levels approximately 65 dBA, a noticeable increase over ambient conditions.

Night work would increase the likelihood of exposing residences to noise levels in excess of locally established standards. The municipalities along the route of the underground line each have ordinances prohibiting nighttime construction. Therefore, after hours work can only be conducted when the work is coordinated with the local municipality. The need to avoid daytime traffic impacts would therefore result in a potentially significant noise impact.

Implementation of APM 15.1 and Mitigation Measures L-4a and L-4b to provide advance notice of the construction schedule to residents and provide a public liaison, would reduce the temporary construction noise impact (Impact N-1) to a level that is less than significant (Class II).

The impact of ground-borne vibration during construction (previously identified, Section D.11.3.3, Impact N-2) could occur along the underground line and would warrant implementation of APM 15.1 and Mitigation Measures L-4a and L-4b. With these measures, property owners that may be conducting vibration-sensitive work would be able to coordinate the construction schedule with the public liaison. This would reduce the potential impact of vibration from construction to a level that is less than significant (Class II).

San Bruno Avenue

Construction of this portion of the underground line would adversely affect about 100 medium and high-density residences along San Bruno Avenue that are approximately 200 feet from the proposed alignment. Implementation of APM 15.1 and Mitigation Measures L-4a and L-4b to provide advance notice of the construction schedule to residents and provide a public liaison, would reduce the temporary construction noise impact (Impact N-1) to a level that is less than significant (Class II).

BART ROW

Construction of this portion of the underground line would adversely affect about 40 medium and high-density residences in San Bruno within 200 feet of the project ROW. It would also affect more numerous, high-density residences are along the right-of-way in South San Francisco, the South San Francisco High School, and Orange Memorial Park (all within 200 feet of the route). Implementation of APM 15.1 and Mitigation Measures L-4a and L-4b to provide advance notice of the construction schedule to residents and provide a public liaison, would reduce the temporary construction noise impact (Impact N-1) to a level that is less than significant (Class II).

Colma to Martin Substation

Construction of this portion of the underground line would adversely affect the El Camino High School in South San Francisco which is within 100 feet of the proposed underground route, the Pollicita Middle School and John F. Kennedy Elementary School in Daly City that are both within 200 feet of the underground route, and many medium and high-density residences in Colma and Daly City that are within 100 feet of the underground route. The portions of numerous cemeteries closest to the alignment

could also be affected by temporarily increased noise. Implementation of APM 15.1 and Mitigation Measures L-4a and L-4b to provide advance notice of the construction schedule to residents and provide a public liaison, would reduce the temporary construction noise impact (Impact N-1) to a level that is less than significant (Class II).

Operational Impacts

The permanent noise sources that would occur with operation of the underground transmission line are limited to routine inspection and maintenance. Similar to the overhead portion of the line and the transition station, inspection or maintenance would cause occasional noise (Section D.11.3.3, Impact N-4). Because inspection or maintenance would be infrequent, operation of the underground line would cause a less than significant noise impact (Class III).

Inspection and maintenance impacts would be essentially the same from alternative to alternative, so they will not be discussed further under the alternative routes.

D.11.3.6 Substations, Switchyards, and Taps

Construction of modifications to the substations would be a temporary source of noise or vibration similar to that described in Section D.11.3.3 above (Impacts N-1 and N-2). The equipment needed to complete the work would include various trucks, concrete mixers, cranes, and welders for structure fabrication. Pile drivers would be used to install the series line reactors at the Martin Substation and San Mateo Substation.

The impact of construction-related noise (Impact N-1) describes the effects of work related to substation modifications. APM 15.1 and Mitigation Measures L-4a and L-4b would be required to reduce a potentially significant impact (Impact N-1) to levels that are less than significant (Class II). For locations where unique construction activities would be necessary, namely pile driving at the Martin and San Mateo Substations, the construction impacts are discussed separately below. Work at the other substations, switchyards, and taps would not require activities different from those associated with overhead line work. The potential noise impact (Impact N-1) associated with construction of these facilities would also result in less than significant impacts with implementation of APM 15.1 and Mitigation Measures L-4a and L-4b (Class II).

The impact of ground-borne vibration during construction (previously identified, Section D.11.3.3, Impact N-2) could occur during substation work and would warrant implementation of APM 15.1 and Mitigation Measures L-4a and L-4b to avoid a temporary nuisance.

Martin Substation

Modification of the Martin Substation would require use of earth-moving equipment, pile drivers, trucks, and cranes. The duration of pile driving at Martin would be approximately two weeks. Residences along Geneva Avenue would be approximately 180 feet from pile driving, and as such would be exposed to intermittent noise levels around 90 dBA. Implementation of APM 15.1 and Mitigation Measures L-4a and L-4b for Impact N-1 would reduce the impact of temporary noise at the San Mateo Substation to a less than significant level.

Operational Impacts

The permanent noise sources that could occur with operation of the substations, switchyards, and taps would include new power transformers or converters and any activity for routine inspection and maintenance. Because visits for routine inspection and maintenance would be infrequent, no significant noise increase would occur. Additional noise produced at the substations may be generated by activation of circuit breakers, which would create an occasional instantaneous sound in the range of 70 to 90 dBA.

No increases of ambient noise levels are expected at the Jefferson Substation, Ralston Substation, Hillsdale Junction Substation, Carolands Substation, Monta Visa Substation, and San Mateo Substation, because the proposed modifications would include no new continuous noise-generating equipment. Because new equipment could change operational noise levels at the Martin Substation, the impacts at that location are discussed below.

Impact N-5: Noise from Operation of the Martin Substation with Modifications

Modifications to the Martin Substation would include three new 230/115 kV transformers with breakers. The new transformers would be located near the center of the yard. Sensitive receptors are located along Geneva Avenue to the north of the substation, approximately 150 feet from the station property boundary. The existing noise levels at these residences are elevated by noise from the existing substation and traffic noise, which combine to cause existing conditions over 70 dBA. The Applicant's noise survey indicates the noise level without the project in this area is approximately 78 dBA L_{dn} (see Table D.11-1, above). New transformers at the substation would increase the existing noise levels and could violate local noise ordinances. The Martin Substation is located in the City of Brisbane, but is adjacent to residences in Daly City, across Geneva Avenue.

Transformer noise contains pure-tone or "hum" components. This tonal quality is typically the most offensive characteristic of transformer noise. The U.S. EPA recommends adding a 5 dB penalty to pure-tone noise levels to account for the increased sensitivity of people to noise containing pure tones (U.S. EPA, 1974). This penalty would "normalize" the predicted noise level for its offensive nature.

PG&E used a computer model to predict the noise levels associated with the transformers in operation, before and after the proposed substation modifications. For these simulations, a worst-case scenario was assumed; full load, daytime transformer operation with all cooling fans operational in the daytime and cooling fans turned off between 10:00 p.m. and 7:00 a.m.. The results found that the project would cause substation noise to increase approximately 1 dBA, to 60 dBA L_{dn} at the nearest residence. Because the transformers would emit pure-tone noise, or "hum", a 5 dB penalty would be appropriate to normalize the project-related sound level. Correcting for the pure-tone, the impact of existing and proposed substation noise at the residences would be approximately 65 L_{dn}.

The Noise Compatibility Guidelines of the Daly City General Plan illustrate that 60 dBA L_{dn} is the highest noise level that would be considered normally acceptable for residential uses. The guideline in Brisbane is less restrictive, allowing levels up to 65 dBA L_{dn} (see Table D.11-4). As a result of background traffic noise and the existing operations at the Martin Substation, the existing conditions are over 70 dBA. These noise levels would be considered by both Daly City and Brisbane to be above the normally-acceptable levels. Although the project would contribute to the currently-elevated noise conditions, the existing levels would not be noticeably changed by the project.

The project noise levels would occur in a setting that is currently dominated by traffic noise over 70 dBA L_{dn}. Because of the noise of the existing conditions, operation of the new equipment at the Martin

Station would not noticeably increase the ambient noise levels over those existing without the project. Because the noise levels would not increase substantially, the impact would be less than significant (Class III).

D.11.4 Southern Area Alternatives

The noise and vibration impacts for the Southern and Northern Area Alternative alignments and substation work would be similar in nature to those of the Proposed Project. Localized short-term construction noise would occur in the same manner as the Proposed Project. Alternative route segments tend to reduce impacts at certain sensitive receptors while increasing impacts for others. Implementation of APM 15.1 and Mitigation Measures L-4a and L-4b for Impacts N-1 and N-2 would reduce potentially significant noise and vibration impacts during the construction phase of the project to a level that would be less than significant (Class II).

Operational noise impacts for all alternatives (Impacts N-3, N-4, and N-5) would be essentially the same for each alternative. Operational noise impacts would be less than significant (Class III) and would not require mitigation.

D.11.4.1 PG&E Route Option 1B – Underground

Environmental Setting

Section D.11.1 describes the general noise environment along this alternative route segment because it would be near that of the Proposed Project. The PG&E Route Option 1B Alternative would be located west of I-280, with a substantial distance (generally 1,500 feet or more) between it and the residential neighborhoods in San Mateo. South of the Carolands Substation the alignment would shift to the east side of I-280. Although it would avoid the Crystal Springs Golf Course, at least 50 additional single-family residences in Hillsborough and Burlingame would be within 200 feet of this alternative alignment, along Skyline Boulevard south of Trousdale Drive. Single-family residences, the Franklin Elementary School, and Mills-Peninsula Hospital are along this alignment on Trousdale Drive, and numerous hotels exist along the northern portion of this route segment on El Camino Real in Millbrae and San Bruno.

Environmental Impacts and Mitigation Measures

Much of this route would be a greater distance away from all sensitive receptors in the San Mateo Highlands, and it would be substantially farther from homes in Hillsborough south of Golf Course Road compared to the Proposed Project. This option however, would increase the amount of underground work in close proximity of recreational uses along Cañada Road and Skyline Boulevard and would bring underground work close to receptors north of Golf Course Road in Hillsborough and residences in Burlingame along Skyline Boulevard and Trousdale Drive. This would also bring construction activity close to Franklin Elementary School and the Mills-Peninsula Hospital on Trousdale Drive. Additional sensitive land uses would be affected in Millbrae and San Bruno along El Camino Real compared to the Proposed Project.

Work related to tower structures and overhead construction would be entirely avoided, but would be replaced by underground work that could take longer. Impacts N-1 and N-2 would be temporary, but would adversely affect the recreational uses along Cañada Road and receptors in Hillsborough, Burlingame, and Millbrae. Implementation of the APM 15.1 and Mitigation Measures L-4a and L-4b

would reduce potentially significant noise and vibration impacts during the construction phase to a level that would be less than significant (Class II).

Comparison to Proposed Route Segment

Compared to the Proposed Project, Route Option 1B would cause a much longer duration of construction for the underground work. Because the underground work would occur near an increased number of residences, hotels, and other sensitive uses in Hillsborough, Burlingame, Millbrae, and San Bruno, this route segment would be more likely to cause adverse noise or vibration impacts during construction.

D.11.4.2 Partial Underground Alternative

Environmental Setting

Section D.11.1 describes the general the general noise environment along this alternative route segment because it would follow much of right-of-way of the Proposed Project. The Partial Underground Alternative would involve an underground segment that would cross through the San Mateo Highlands and Hillsborough between the Ralston and Carolands Substations. About 30 homes are approximately 200 feet from the underground portion of this segment.

Environmental Impacts and Mitigation Measures

This option would increase the amount of underground work in close proximity of residences in the San Mateo Highlands and in Hillsborough. In these areas, work related to tower structures and overhead construction would be entirely avoided, but would be replaced by underground work that could take longer. Impacts N-1 and N-2 would be temporary, but would adversely affect the residences in the San Mateo Highlands and Hillsborough areas. Implementation of the APM 15.1 and Mitigation Measures L-4a and L-4b would reduce potentially significant noise and vibration impacts during the construction phase of the project to a level that would be less than significant (Class II).

Comparison to Proposed Route Segment

Compared to the Proposed Project, the Partial Underground Alternative would cause a longer duration of construction for the underground work in the San Mateo Highlands and Hillsborough. Because underground work would occur near an increased number of residences, this route segment would be more likely to cause adverse noise or vibration impacts during construction.

D.11.5 Northern Area Alternatives

D.11.5.1 West of Skyline Transition Station

Environmental Setting of the Alternative Transition Station

Section D.11.1 describes the general noise environment for this alternative as well as the Proposed Project. The West of Skyline alternative transition station location would be more isolated from noise-sensitive land uses than the proposed location of the transition station. Multi-family apartments are located about 500 feet northeast of the site and a school is about 1,000 feet away.

Environmental Impacts and Mitigation Measures for the Alternative Transition Station

Alternatives that would locate the transition station west of Skyline Boulevard would alter the location of localized noise impacts during construction of the transition station, but not the actual construction activity. Because the construction activity would be about 500 feet from any noise-sensitive land use, construction noise impacts would be adverse but less than significant (Class III).

Comparison to Proposed Transition Station

Compared to the Proposed Project, construction of the West of Skyline transition station would be less likely to cause a nuisance because the transition station would be located further from residences.

West of Skyline Transition Station with Proposed Underground Route

Environmental Setting

Section D.11.1 describes the general noise environment for this alternative route as well as the Proposed Project because this route would meet the route of the Proposed Project on San Bruno Avenue. Table D.11-1 shows the monitored noise levels along San Bruno Avenue.

Environmental Impacts and Mitigation Measures

Impacts identified for the Proposed Project along San Bruno Avenue would continue without change under this alternative route. Implementation of APM 15.1 and Mitigation Measures L-4a and L-4b would reduce potentially significant noise and vibration impacts during the construction phase of this route option to a level that would be less than significant (Class II).

Comparison to Proposed Route Segment

Noise or vibration impacts for this route segment would be identical to those identified for the Proposed Project.

West of Skyline Transition Station with Sneath Lane Underground Route

Environmental Setting

Section D.11.1 describes the general noise environment for this alternative route because it would traverse the similar land uses as the Proposed Project. The Sneath Lane Underground Route would travel adjacent to a single-family residential neighborhood along Skyline Boulevard in San Bruno. The land uses along Sneath Lane also include single-family homes with commercial development, office buildings, and the Golden Gate National Cemetery.

Environmental Impacts and Mitigation Measures

Construction noise or vibration could adversely affect residential areas within 200 feet of work in Skyline Boulevard or Sneath Lane. Noise from work for the Sneath Lane Underground Route would also temporarily affect the Golden Gate National Cemetery. Implementation of APM 15.1 and Mitigation Measures L-4a and L-4b would reduce potentially significant noise and vibration impacts during the construction phase of this route option to a level that would be less than significant (Class II).

Comparison to Proposed Route Segment

Compared to the Proposed Project, construction noise and vibration impacts would be similar in nature to those described for the Proposed Project. Instead of affecting residential uses along San Bruno Avenue, residential uses along Skyline Boulevard and Sneath Lane would be affected.

West of Skyline Transition Station with Westborough Boulevard Underground Route

Environmental Setting

Section D.11.1 describes the general noise environment for this alternative route because it would traverse the similar land uses as the Proposed Project. The Westborough Boulevard Underground Route would travel adjacent to single-family residences along Skyline Boulevard in San Bruno, and it would pass the Westborough Middle School and Westborough Park, both on the north side of Westborough. Additionally, single-family homes are 200 to 300 feet north of Westborough.

Environmental Impacts and Mitigation Measures

Construction noise or vibration could adversely affect residential areas within 200 feet of work in Skyline Boulevard or Westborough Boulevard. Work for the Westborough Boulevard underground route would also temporarily affect the Westborough High School and Sellick Park in South San Francisco. Implementation of APM 15.1 and Mitigation Measures L-4a and L-4b would reduce potentially significant noise and vibration impacts during the construction phase of this route option to a level that would be less than significant (Class II).

Comparison to Proposed Route Segment

Compared to the Proposed Project, construction noise and vibration impacts would be similar in nature to those described for the Proposed Project. Instead of affecting residential uses along San Bruno Avenue, residential uses along Skyline Boulevard and Westborough Boulevard, the Westborough Middle School, and Sellick Park would be affected.

D.11.5.2 Sneath Lane Transition Station

Environmental Setting of the Alternative Transition Station

Section D.11.1 describes the general noise environment for this alternative as well as the Proposed Project. The Sneath Lane alternative transition station would be at the Sneath Lane Substation. This location is more isolated from noise-sensitive land uses than the proposed location of the transition station. A church is situated to the south of the Sneath Lane transition station site, with a residential neighborhood extending to the west.

Environmental Impacts and Mitigation Measures for the Alternative Transition Station

Alternatives that would locate the transition station at the Sneath Lane Substation would alter the location of localized noise impacts during construction, but not the actual construction activity. Because the construction activity would be at least 200 feet from any noise-sensitive land use, construction noise impacts would be adverse but less than significant (Class III).

Comparison to Proposed Transition Station

Compared to the Proposed Project, construction of the Sneath Lane transition station would be less likely to cause a nuisance because the transition station would be located further from residences.

Sneath Lane Transition Station with Proposed Underground Route

Environmental Setting

Section D.11.1 describes the general noise environment for this alternative route as well as the Proposed Project. This route alternative would travel from Sneath Lane to meet the route of the Proposed Project on San Bruno Avenue. Along Skyline Boulevard, the route would travel adjacent to single-family residences. Table D.11-1 shows the monitored noise levels along San Bruno Avenue.

Environmental Impacts and Mitigation Measures

Impacts identified for the Proposed Project along San Bruno Avenue would continue without change under this alternative route. Underground work would also adversely affect residences along Skyline Boulevard, north of San Bruno Avenue. Implementation of APM 15.1 and Mitigation Measures L-4a and L-4b would reduce potentially significant noise and vibration impacts during the construction phase of this route option to a level that would be less than significant (Class II).

Comparison to Proposed Route Segment

Compared to the Proposed Project, construction noise and vibration impacts would be similar in nature to those described for the Proposed Project, except additional residences along Skyline Boulevard would be affected.

Sneath Lane Transition Station with Sneath Lane Underground Route

Environmental Setting

Section D.11.1 describes the general noise environment for this alternative route because it would traverse the similar land uses as the Proposed Project. This route would travel adjacent to single-family homes, commercial development, office buildings, and the Golden Gate National Cemetery on Sneath Lane.

Environmental Impacts and Mitigation Measures

Construction noise or vibration could adversely affect residential areas within 200 feet of work in Sneath Lane. Noise from work for the Sneath Lane Underground Route would also temporarily affect the Golden Gate National Cemetery. Implementation of APM 15.1 and Mitigation Measures L-4a and L-4b would reduce potentially significant noise and vibration impacts during the construction phase of this route option to a level that would be less than significant (Class II).

Comparison to Proposed Route Segment

Compared to the Proposed Project, construction noise and vibration impacts would be similar in nature to those described for the Proposed Project. Instead of affecting residential uses along San Bruno Avenue, residential uses and the national cemetery along Sneath Lane would be affected.

Sneath Lane Transition Station with Westborough Boulevard Underground

Environmental Setting

Section D.11.1 describes the general noise environment for this alternative route because it would traverse the similar land uses as the Proposed Project. The Westborough Boulevard Underground Route would travel adjacent to single-family residences along Skyline Boulevard in San Bruno, and it would pass the Westborough Middle School and Westborough Park, both on the north side of Westborough. Additionally, single-family homes are 200 to 300 feet north of Westborough.

Environmental Impacts and Mitigation Measures

Construction noise or vibration could adversely affect residential areas within 200 feet of work in Skyline Boulevard or Westborough Boulevard. Work for the Westborough Boulevard Underground Route would also temporarily affect the Westborough High School and Sellick Park in South San Francisco. Implementation of APM 15.1 and Mitigation Measures L-4a and L-4b would reduce potentially significant noise and vibration impacts during the construction phase of this route option to a level that would be less than significant (Class II).

Comparison to Proposed Route Segment

Compared to the Proposed Project, construction noise and vibration impacts would be similar in nature to those described for the Proposed Project. Instead of affecting residential uses along San Bruno Avenue, residential uses along Skyline Boulevard and Westborough Boulevard, the Westborough Middle School, and Sellick Park would be affected.

D.11.5.3 Cherry Avenue Alternative

Environmental Setting

Section D.11.1 describes the general noise environment for this alternative as well as the Proposed Project because similar land uses would be encountered. The northern portion of Cherry Avenue is lined with multi-family residences.

Environmental Impacts and Mitigation Measures

This alternative would not change the amount of underground work, but it would somewhat increase the number of residential properties exposed to construction noise in San Bruno, while avoiding commercial uses that are not as sensitive to noise. Implementation of APM 15.1 and Mitigation Measures L-4a and L-4b would reduce potentially significant noise and vibration impacts during the construction phase to a level that would be less than significant (Class II).

Comparison to Proposed Route Segment

Compared to the Proposed Project, construction would adversely affect a greater number of homes in the multi-family residences and the Commodore Park along Cherry Avenue, which could increase the likelihood of a nuisance.

D.11.5.4 PG&E Route Option 4B – East Market Street

Environmental Setting

Section D.11.1 describes the general noise environment for this alternative as well as the Proposed Project because similar land uses would be encountered. Route Option 4B would pass the Colma Elementary School, the Pollicita Middle School, Susan B. Anthony High School, and single-family homes on East Market Street. Table D.11-1 shows the monitored noise levels along Hillside Boulevard in Colma.

Environmental Impacts and Mitigation Measures

This alternative would not change the amount of underground construction, but it would somewhat reduce the amount of work near high-density residences in Daly City. Implementation of APM 15.1 and Mitigation Measures L-4a and L-4b would reduce potentially significant noise and vibration impacts during the construction phase to a level that would be less than significant (Class II).

Comparison to Proposed Route Segment

Construction noise or vibration could temporarily, but adversely, affect the residential uses and schools on East Market Street, while avoiding impacts to approximately 80 densely-developed residences along Hoffman and Orange Streets. Because a high number of high-density homes could be avoided, this alternative could reduce the likelihood of a nuisance.

D.11.5.5 Junipero Serra Alternative

Environmental Setting

Section D.11.1 describes the general noise environment for this alternative as well as the Proposed Project because similar land uses would be encountered. The Junipero Serra Alternative would travel adjacent to single-family residences along Skyline Boulevard in San Bruno, and it would pass the Westborough Middle School and Westborough Park, both on the north side of Westborough Boulevard. Additionally, single-family homes are 200 to 300 feet north of Westborough. Commercial and community-serving land uses, along with cemeteries, are adjacent to this alternative route as it would travel along Junipero Serra Boulevard, Serramonte Boulevard, and El Camino Real. Table D.11-1 shows the monitored noise levels along Junipero Serra Boulevard.

Environmental Impacts and Mitigation Measures

This alternative would not change the amount of underground work, but it would somewhat reduce the amount of work near sensitive receptors in San Bruno and South San Francisco. Implementation of APM 15.1 and Mitigation Measures L-4a and L-4b would reduce potentially significant noise and vibration impacts during the construction phase to a level that would be less than significant (Class II).

Comparison to Proposed Route Segment

Compared to the Proposed Project, construction noise or vibration could temporarily, but adversely, affect mainly some residential uses along Westborough Boulevard, the Westborough Middle School, and Westborough Park in South San Francisco, while avoiding impacts to many more high-density residences in South San Francisco, the South San Francisco High School, and Orange Memorial Park.

By avoiding high-density residential areas in South San Francisco, this alternative could reduce the likelihood of a nuisance.

D.11.5.6 Modified Existing 230 kV Underground ROW

Environmental Setting

Section D.11.1 describes the general noise environment in northern San Mateo County. This alternative would traverse many similar land uses as the Proposed Project, including one residential area in San Bruno and many commercial areas. This alternative also passes a wide range of industrial uses.

Environmental Impacts and Mitigation Measures

This alternative would not substantially change the amount of underground work, but it would essentially eliminate the amount of work near sensitive receptors in South San Francisco, Colma, and Daly City. Implementation of APM 15.1 and Mitigation Measures L-4a and L-4b would reduce potentially significant noise and vibration impacts during the construction phase of the project to a level that would be less than significant (Class II).

Comparison to Proposed Route Segment

Compared to the Proposed Project, construction noise or vibration could temporarily, but adversely, affect some additional residential uses in San Bruno, east of El Camino Real, while avoiding impacts to many more high-density residences in South San Francisco, the South San Francisco High School, Orange Memorial Park, and residences and schools in Colma and Daly City. By avoiding the residential areas of South San Francisco, Colma, and Daly City, this alternative would substantially reduce the likelihood of a nuisance.

D.11.6 Environmental Impacts of the No Project Alternative

Under the No Project Alternative, the Proposed Project would not be constructed, eliminating the noise impacts discussed in Section D.11.3. Because some transmission projects would continue regardless of the proposed project, the No Project Alternative would not change noise impacts from such transmission improvements. The No Project scenario includes installing new generation capacity in the City and County of San Francisco or elsewhere to compensate for existing transmission system limitations and anticipated loads. New generation would need to comply with local noise ordinances and the CEC licensing process, which would be likely to reduce noise impacts to a less than significant level. Other possible scenarios under the No Project Alternative (such as conservation or curtailment of electrical service) would not result in any new noise impact.

D.11.7 Mitigation Monitoring, Compliance, and Reporting Table

Table D.11-7 presents the Mitigation Monitoring Table for noise. This analysis identifies no additional mitigation beyond APM 15.1 and mitigation measures in Section D.2, Land Use.

Table D.11-7. Mitigation Monitoring Program – Noise

Impact	Mitigation Measure or APM	Location	Monitoring / Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
N-1: Construction of overhead transmission line would temporarily increase local noise levels (Class II).	**APM 15.1**: The following noise-suppression techniques will be employed to minimize the impact of temporary construction noise on nearby sensitive receptors: • Install portable barriers to shield compressors and other small stationary equipment where necessary. • Use "quiet" equipment (i.e., equipment designed with noise-control elements). • Direct equipment exhaust stacks and vents away from buildings, when feasible. • Route truck traffic away from noise-sensitive areas, where feasible. • Coordinate with applicable municipalities regarding all substation construction activities in residential areas. • Install sound barriers for pile driving activity. • Limit pickup trucks and other small equipment to an idling time of five minutes, observe a common-sense approach to vehicle use, and encourage workers to shut off vehicle engines whenever possible. (Note: larger vehicles, such as large diesel vehicles, require extended warmup times after startup. Some equipment will remain running when required for repetitive tasks or to power other equipment.) **L-4a** and **L-4b** (see Land Use)	Entire project site.	See Mitigation Measures L-4a and L-4b. Inspect activities for noise control according to APM 15.1.	Inspection.	CPUC	During Construction
N-2: Ground-borne vibration could cause a temporary nuisance during construction (Class II).	Implement Mitigation Measures **L-4a** and **L-4b** along with **APM 15.1**.	Entire project site.	See Mitigation Measures L-4a and L-4b. Inspect activities for noise control according to APM 15.1.	Inspection.	CPUC	During Construction