

## 3.12 Noise

Table 3.12-1 Noise Checklist

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. Exposure of persons to or generation of excessive 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 type="checkbox"/>	<input checked="" 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 checked="" type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

### 3.12.1 Setting

#### Noise Fundamentals

Human response to noise varies depending on the person and the setting and activity in which the person is engaged while exposed to environmental noise. Certain land use types are more sensitive to noise exposure. Noise-sensitive receptors can be defined as locations where noise may interfere with people's primary activities. These locations, or receptors, include places where people sleep, such as residences and hospitals as well as schools, libraries, parks, recreation areas, business offices, and places of worship during hours of operation or primary use.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear is able to discern 1-decibel (dB) changes in sound levels when exposed to steady, single-frequency tones in the mid-frequency (1,000–8,000 Hertz [Hz]) range. However, it is widely accepted that in typical real-world environments, people are able to begin to detect sound level increases of 3 dB. Whereas a 10-dB increase is generally perceived as a doubling of loudness, a doubling of sound energy (i.e., doubling the volume of traffic on a highway or two pieces of the same model of construction equipment versus one) will produce a 3-dB change and would generally be perceived as detectable. A five-dB change, however, is generally considered to be a substantially noticeable change above the existing noise environment.

To account for the fact that human hearing does not process all frequencies equally, an A-weighting (dBA) scale was developed. Depending on the specific frequency value, the dBA scale deviates from the "linear" dB scale.

To characterize the average ambient noise environment in a given area, noise level descriptors are commonly used. The Leq, or Sound Equivalent Level, is generally used to characterize the average sound energy that occurs during a relatively short period of time, such as an hour. Two other descriptors, the Ldn (Day-Night Level) and CNEL (Community Noise Equivalent Level), would be used for an entire 24-hour period. The value of the Ldn and CNEL are generally within one dB of each other and, therefore, will be used interchangeably in this analysis. Both the Ldn and CNEL noise metric descriptors place a stronger emphasis on noise that occurs during nighttime hours (10 p.m. to 7 a.m.) by applying a 10-dB “penalty” to those hours, with the difference being that the CNEL also applies a 5-dB “penalty” to the evening hours of 7 p.m. to 10 p.m.

### **Existing Conditions**

The project spans three counties (Butte, Yuba, and Sutter) and the project alignment extends just over 40 miles. Primary noise sources within the project vicinity include traffic on local two-lane roads; traffic from California Highways 20, 70, and 65; train activity along Union Pacific railroad tracks; and aircraft flyovers to and from Beale Air Force Base in Yuba County, the Yuba County Airport, the Sutter County Airport, and Siller Bros Inc. Aviation (a private airstrip).

Existing ambient sound levels in the project area are typical of a rural environment, where sound levels typically range from 40 to 60 dBA during the day and 20 to 45 dBA at night. Ambient levels within more densely populated areas, such as Marysville, closer to highways, or under the flight paths of aircraft would be relatively higher.

### **Regulatory Setting**

Federal, state, and local bodies of government establish regulations and guidance to control excessive noise and reduce disturbance due to noise to a level that is acceptable within their jurisdiction. While federal and state laws regulate transportation noise, establish “normally” and “conditionally” acceptable exterior noise limits based on land-use type, and establish maximum acceptable interior noise limits for residences, federal and state provisions do not regulate noise from temporary construction activities. This type of noise is generally regulated at the local or county level.

### ***Yuba County***

The goals of the noise element of the Yuba County General Plan (Yuba County 1980) are to identify existing and potential noise sources within the community, identify strategies to minimize residents’ exposure to noise, and mitigate noise impacts to the extent feasible. Beyond characterizing existing noise sources in the community, these goals are achieved by setting provisions for acceptable noise exposure to areas within the county, based on their land use. The Yuba County noise ordinance is the primary enforcement tool for the operation of locally regulated noise sources, such as mechanical equipment and construction activity, and is set forth in Chapter 8.20 in the Yuba County Code (Yuba County 1980).

Goals and policies of the Yuba County noise ordinance related to environmental noise are as follows:

**Goal NOI-YB-1:** To control unnecessary, excessive, and annoying noise.

**Policy NOI-YB-1:** Prohibit such noise generated from or by all sources subject to its police power as specified in Chapter 8.20. To this end, the County has identified exterior noise exposure standards, which are shown in Table 3.12-2.

Table 3.12-2 Yuba County Noise Level Standards

Zone Permitted	Time	Sound Level	Maximum Noise Level
Multi-Family Residential	10 p.m. to 7 a.m.	45	55
	7 p.m. to 10 p.m.	50	60
	7 a.m. to 7 p.m.	55	65
Multi-Family Residential	10 p.m. to 7 a.m.	50	60
	7 a.m. to 10 p.m.	55	65
Commercial	10 p.m. to 7 a.m.	55	65
	7 a.m. to 10 p.m.	60	70
M1 (General Industrial Zone)	Anytime	65	75
M2 (Extractive Industrial Zone)	Anytime	70	80

Source: Yuba County Noise Ordinance (Yuba County Code, Chapter 8.20)

Section 8.20.310 pertains to construction noise. The ordinance states that it is unlawful to operate equipment within a 500-foot radius of a residential zone between the hours of 10 p.m. to 7 a.m. (nighttime hours) “in such a manner that a reasonable person of normal sensitiveness residing in the area is caused discomfort or annoyance unless a permit has been duly obtained.”

Section 8.20.710 explains the procedural process by which a project applicant may apply to the Department of Planning and Building Services for an exemption authorized by permit when immediate compliance is impractical or unreasonable (providing the project does not exceed 6 months).

### ***City of Marysville Municipal Code***

Because Marysville is an incorporated city, it has established separate provisions that relate to noise regulation. Chapter 9.09 of the Marysville Municipal Code (City of Marysville 1991) lays forth procedural provisions for police response to loud and unreasonable noise. However, noise level standards are not set and noise due to construction activity is not addressed.

### ***Sutter County***

The goal of the noise element of the Sutter County General Plan (Sutter County 1996) is to protect county residences from the harmful effects of exposure to excessive noise. The policy stated to implement this goal is to not allow development of new noise-sensitive land uses where the existing ambient level due to noise sources would exceed acceptable limits as set forth by the County. Sutter County has not adopted a noise ordinance, and noise due to construction activity is not addressed.

### ***Butte County***

The goals of the noise element of the Butte County General Plan (Butte County 1977) are to secure and maintain an environment free from annoying noise, to provide information concerning the community noise environment, and to make noise a consideration in the on-going planning process and the development of ordinances relating thereto. Butte County has not adopted a noise ordinance, and noise due to construction activity is not addressed.

## Applicant Proposed Measures

The applicant has incorporated the following applicant proposed measures (APMs) into the project to minimize or avoid impacts on noise. See Chapter 1.0 for a full description of each APM that the applicant has incorporated into the project to avoid or minimize impacts on all resource areas.

**APM NOISE-1:** Employ Noise-Reducing Construction Practices During Temporary Reconstruction Activities

### 3.12.2 Environmental Impacts and Mitigation Measures

*a. Would the project expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?*

*LESS THAN SIGNIFICANT.* No additional pieces of operational equipment are proposed at the substations along the transmission line, and the transmission lines that would replace existing ones are of the same voltage. Therefore, there would be no impact from operation of the project under this criterion. High noise levels associated with the use of equipment, including helicopters, for construction of the project would result in short-term temporary impacts. As discussed under item “d” below, however, construction impacts under this criterion would be less than significant.

*b. Would the project expose persons to or generate excessive groundborne vibration or groundborne noise levels?*

*LESS THAN SIGNIFICANT.* The level of groundborne vibration that could reach sensitive receptors depends on the distance to the receptor, the type of equipment creating vibration, and the soil conditions surrounding the construction site. Ground vibration from construction equipment could be perceptible to receptors in the immediate vicinity of the construction activity. For example, the tamping of ground surfaces, the passing of heavy trucks on uneven surfaces, and the excavation of vaults and/or trenches could each create perceptible vibration in the immediate vicinity of the activity. Impacts from construction-related groundborne vibration would be short-term and confined to the immediate area surrounding the activity (not likely to exceed approximately 25 feet). No major work at the substations would be done as a part of the project. Minor relay replacement or setting changes may be required. All work would be within the existing substation control buildings. Therefore, impacts under this criterion would be less than significant.

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

*NO IMPACT.* No additional pieces of operational equipment are proposed at the substations along the transmission line, and the transmission lines that would replace existing ones are of the same voltage. Because no new operational noise sources would be associated with the proposed project, no substantial permanent increase in ambient noise levels would occur due to its implementation. Therefore, there would be no impact under this criterion.

**d. Would the project cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?**

*LESS THAN SIGNIFICANT.* Construction noise associated with the replacement of existing steel towers, construction of temporary access roads, and limited improvements to permanent access roads would represent a short-term impact on ambient noise levels.

Proposed pieces of construction equipment and the typical dBA noise levels associated with their use (as measured at 50 feet) are presented in Table 3.12-3. Assuming a scenario under which multiple pieces of the loudest equipment (excluding helicopter operations) are used, reasonable upper-bound noise levels (based on distance to nearest receptor) due to construction activities were predicted using methods recommended by the Federal Transit Administration (FTA 2006). Table 3.12-4 summarizes the results of this analysis.

**Table 3.12-3 Proposed Construction Equipment Types and Typical Noise Emission Levels**

Equipment	Typical Noise Level 50 Feet from source (dBA)
Backhoe	78
Concrete mixer truck <sup>2</sup>	76
Crane	81
Pick-up truck	55
Dump truck	76
Equipment/tool van <sup>1</sup>	55
Dozer	82
Water truck <sup>2</sup>	76
Grader	85
Rock transport <sup>2</sup>	76
Roller	80
Hole auger	84
Line truck and trailer <sup>1</sup>	55

Source: FHWA 2006

Notes:

<sup>1</sup> Based on noise level for pick-up truck

<sup>2</sup> Based on noise level for dump truck

**Table 3.12-4 Predicted Construction-Related (Non-Helicopter) Upper Bound Noise Levels Along the Project Route**

Distance Between Source and Receiver (feet)	Geometric Attenuation (dB)	Ground Effect Attenuation (dB)	Calculated Lmax Sound Level (dBA)	Calculated Leq Sound Level (dBA)
50	0	0	89	85
100	-6	-2	81	77
200	-12	-4	74	70
300	-16	-5	69	65
400	-18	-6	66	62
500	-20	-6	63	59
600	-22	-7	61	57
700	-23	-7	59	55
800	-24	-7	58	54
900	-25	-8	56	52
1000	-26	-8	55	51
1200	-28	-9	53	49

Table 3.12-4 Predicted Construction-Related (Non-Helicopter) Upper Bound Noise Levels Along the Project Route

Distance Between Source and Receiver (feet)	Geometric Attenuation (dB)	Ground Effect Attenuation (dB)	Calculated Lmax Sound Level (dBA)	Calculated Leq Sound Level (dBA)
1400	-29	-9	51	47
1600	-30	-9	50	46
1800	-31	-10	49	45
2000	-32	-10	47	43
2500	-34	-10	45	41
3000	-36	-11	43	39

Source: Calculations based on data from FTA 2006.

Note: This calculation does not include the effects, if any, of local shielding from walls, topography, or other barriers that may further reduce noise levels.

As described in Chapter 1.0, Background Information, helicopters may be used to install poles and replace transmission towers when the use of cranes is not feasible. A large single-rotor helicopter such as the Bell 214 produces a maximum sound level of about 79 dBA at a distance of 500 feet under level flight conditions (Nelson 1987). This corresponds to a sound level of about 93 dBA at 100 feet. A small single-rotor helicopter such as the Hughes 500 produces a maximum sound level of 75 dBA at a distance of 500 feet under level flight conditions (Nelson 1987). This corresponds to a sound level of about 89 dBA at 100 feet. Helicopters could produce noise in the range of 89 to 93 dBA in the vicinity of residences that are located as close as 100 feet to helicopter staging areas. Noise from helicopters operating above pole installation locations could be as close as about 250 feet to residences. At this distance helicopter noise levels could be in the range of about 83 to 87 dBA.

With land-based construction activities located as close as 25 feet to noise-sensitive receptors, land-based construction noise levels could be as high as 91 dBA at these locations. This analysis indicates that there is potential for construction noise from both land-based construction activities and helicopter activities to exceed the Yuba County daytime noise standard of 55 dBA and to result in a substantial temporary increase in noise.

Nighttime construction (construction between 7:00 pm and 7:00 am) is also proposed as part of the project (Section 1.8.5.8). To limit potential noise impacts, nighttime work would only be undertaken between June and October and would not be undertaken in *urban areas* (Section 1.8.5.8). In addition, the only construction activities that would occur at night would be those required to raise towers, and the majority of construction staging activities, including onsite and offsite vehicle movement, would occur during the day.

APM NOISE-1 would reduce impacts from both day and nighttime construction. While it may not be feasible in all cases to reduce noise to a level that is in compliance with applicable noise standards, given the very short duration of construction activity at any one location, impacts under this criterion would be less than significant with the implementation of APM NOISE-1.

*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?*

*LESS THAN SIGNIFICANT.* Beale Air Force Base is located approximately 3.5 miles from the proposed project route; the Yuba County Airport is approximately 0.75 miles from the proposed route; and Sutter County Airport is approximately 3 miles from the proposed route. Although noise from aircraft operations

could occur along the proposed project route during construction, the temporary nature of construction work would limit the amount of noise exposure that workers along the proposed route would experience. In addition, it is assumed that workers would use noise safety gear during construction of the project. Therefore, impacts would be less than significant under this criterion. Impacts from helicopter use for construction of the project are discussed above under item “d.”

*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?*

*LESS THAN SIGNIFICANT.* Siller Bros Inc. Aviation, a private airstrip, is located within 2 miles of the proposed project route. However, due to the distance between the project route and the airport, infrequent flights at the airport, and light aircraft that take off and land there, people residing or working along the project route would not be exposed to excessive noise levels. Therefore, people residing or working along the project route would not be exposed to excessive noise levels from air traffic, and impacts would be less than significant under this criterion. Impacts from helicopter use for construction of the project are discussed above under item “d.”

## References

Butte County. 1977. Butte County General Plan.

City of Marysville. 1991. Marysville City Municipal Code, Chapter 9.09.

FHWA (Federal Highway Administration). 2006. FHWA Roadway Construction Noise Model User’s Guide. Washington, D.C.

FTA (Federal Transit Administration). 2006. Transit Noise and Vibration Impact Assessment. Washington, D.C.

Nelson, P. M. 1987. Transportation Noise Reference Book. London: Butterworths & Co.

Sutter County. 1996. Sutter County General Plan, Section 8: Noise.

Yuba County. 1980. Yuba County General Plan, Noise Element.

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