Chapter 12—Noise

12.1 Introduction

This chapter addresses the existing noise environment, the potential noise impacts from project construction and operation, and proposed mitigation measures. With implementation of the mitigation measures described in Section 12.4, all noise-related impacts from project construction and operation will be reduced to less than significant levels. A glossary of acoustical terms is provided at the end of this chapter.

12.1.1 Methodology

Evaluation of potential noise impacts from the project included reviewing relevant city noise standards, characterizing the existing noise environment, and projecting noise from constructing and operating substations and transmission lines. Noise survey data contain averages of multiple measurements taken at various points along the North Area and South Area transmission line routes and are representative of noise levels along the length of each route. Noise measurements were also taken at the substation sites.

12.2 Existing Conditions

12.2.1 Local Noise Policies

Alameda County

The Noise Element of the Alameda County Ordinance Code has established noise standards for residential and public institutional land uses. The maximum A-weighted decibel level (dBA) is 65 for a 1-hour period during the daytime and 60 dBA during nighttime hours (10 p.m. to 7 a.m.). For commercial properties, noise level standards are a maximum of 80 dBA and 75 dBA for daytime and nighttime, respectively. The provisions of the Alameda County Noise Element limit noise sources associated with construction between 7 a.m. and 7 p.m. on weekdays and between 8 a.m. and 5 p.m. on weekends.

Contra Costa County

Contra Costa County does not have a noise ordinance. Noise complaints within the County are addressed as "noise complaints" and are handled through the peace disturbance sections of the County Police Code. For industrial land uses within the County, the normally acceptable noise level is as high as 75 dBA, and the conditionally acceptable range is as high as 80 dBA. For low-density residential land uses, the normally acceptable noise level is up to 60 dBA and the conditionally acceptable range is up to 70 dBA.

City of Pleasanton

The Noise Element of the City of Pleasanton's General Plan limits noise exposure to 60 dBA for residential land uses. Noise limits for commercial or industrial property adjacent to residential zones cannot exceed the residential noise standard at the property plane between

the residential district and the commercial district. There are no provisions in the Noise Ordinance explicitly related to construction noise or vibration.

Transformer noise is known to contain pure tone or "hum" components. This tonal quality is typically the most offensive characteristic of transformer noise. While a 5 dB penalty (added to the measured value) is sometimes applied to account for the increased sensitivity of people to noise containing pure tones, no penalty is imposed for pure tone components in the local noise ordinances.

12.2.2 Existing Noise Environment

Sensitive Receptors

Noise-sensitive receptors are those facilities or activities (such as residential areas, hospitals, schools, performance spaces, offices) for which excessive noise may cause annoyance or loss of business (for example, commercial activities with heavy telephone use for which a quiet environment is required).

Transmission Lines

Measurements were taken at six sites along the North Area route and at five sites along the South Area route during both weekend and weekday periods in March and April 1999. All acoustic measurements were taken for multiple 24-hour periods and produced hourly average noise data (L_{eq}). Noise measurements were obtained using a calibrated microphone and sound-level meter, in conjunction with a digital audio tape recorder. Noise measurements are shown in Table 12-1. The nearest receptor to the Phase 1 North Area route is a residence located approximately 100 feet from the proposed transmission line. The nearest receptors to the Phase 2 North Area route are residences located approximately 100 yards away. The nearest residences to the South Area route are those along the underground portion of the project, approximately 300 from the proposed transmission line.

Substation and Transition Structure Sites

Dublin and North Livermore Substations

The proposed North Livermore and Dublin Substations are located in predominately rural, undeveloped settings. A total of six measurements were taken to characterize the noise levels at these sites. The measurements were collected, when possible, at positions along property lines closest to sensitive receptors. The closest sensitive receptor, a residence in the vicinity of the North Livermore Substation, is located 192 yards east of the site. At the Dublin Substation, the nearest receptor is a residence located 600 yards south of the site.

Vineyard Substation

The existing Vineyard Substation is located in Pleasanton in a light industrial area. The site is bordered on the south by a residential area, on the north by an industrial complex, and on the east and west by commercial properties. Two noise measurements were taken, one at the eastern property line and one at the southern property line of the substation. Sensitive receptors are located 350 yards south and 300 yards east of the substation.

Transition Structure

The proposed transition structure will be located in a rural setting. One measurement was taken at a position determined to be representative of noise levels in the area. There are no sensitive receptors within 1 mile of the transition structure.

Noise Survey Results

Table 12-1 summarizes the noise survey results in terms of average energy equivalent level (L_{eq}), minimum L_{eq}, maximum L_{eq}, and L_{50}, a statistical descriptor in which noise level is exceeded 50 percent of the time. The L_{eq} is the equivalent noise level (average) over the given time frame.

TABLE 12-1
Noise Measurement Results (A-Weighted Decibels [dBA])

Location	Average (L_{eq})	Minimum (L_{eq})	Maximum (L_{eq})	Average (L_{50})
Transmission Lines				
North Area—Phase 1	67	32	72	59
North Area—Phase 2	50	32	63	47
South Area	50	34	58	47
Substations—Transition Structure				
Vineyard (existing)	68	43	79	68
North Livermore	62	45	68	53
Dublin	47	29	57	40
Transition Structure	50	34	58	47

12.3 Potential Impacts

12.3.1 Significance Criteria

Operational noise impacts from project components would be considered significant if the transmission line or substation generated noise levels that exceeded the following criteria:

- L_{dn} 65 dBA or L_{eq} 60 dBA (nighttime) in Pleasanton and other areas of Alameda County.
- Those sound levels which can be considered public nuisances in parts of Contra Costa County.

In addition, based Appendix G of the revised CEQA Guidelines, a project may be deemed to have a significant effect on the environment if it would increase substantially the ambient noise levels of adjoining areas. A change in noise level of less than 3 dBA is barely perceptible to the human ear. An increase in noise environment of 5 dBA or greater constitutes a significant noise impact.

12.3.2 Construction

Local agencies typically do not set noise level limits for construction activities occurring during allowed hours (usually between 7 a.m. and 6 p.m.). They require that construction contractors use available noise suppression devices and techniques to minimize disturbance to nearby businesses and residences. In Alameda County, under Section 3-107.905 of the county ordinance code, operators may file an application for a variance to be absolved from strict compliance of noise.

Significance criteria for construction-related noise activities are not established because of the temporary nature of noise generated from construction activities. The following construction noise specifications are often used for projects.

> In residential areas, construction noise from stationary noise sources that generate repetitive or long-term noise lasting more than 3 hours would be significant if the equivalent noise level, L_{eq}, measured over any 30-minute period exceeds 65 dBA at a distance of 200 feet or at the nearest sensitive receptor. In commercial areas, such sources should not exceed 70 dBA at a distance of 200 feet or at the nearest sensitive receptor. (Nelson, 1982)

Noise Levels

Construction of 230 kV transmission lines will require cranes, augers, compressors, air tampers, generators, trucks, and other equipment. Generators will not be operated at night. Helicopters will be used in some areas to transport construction materials and to string the conductors. Typical noise levels for this equipment (at 50 feet from the source) are listed in Table 12-2.

TABLE 12-2
Typical Noise Levels of Construction Equipment

Equipment	Range of Noise Level (dBA) at 50 feet
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	75-88
Concrete pumps	81-83
Cranes (movable)	75-86
Cranes (derrick)	86-88
Forklifts	76-82
Stationary	
Pumps	69-71
Generators	71-82
Compressors	74-86
Drill rigs	70-85
Impact	
Pneumatic tools	83-88
Jack hammers and rock drills	81-98
Compactors	84-90

Source: Adapted from Magrab (1975) by Wilson, Ihrig & Associates, Inc. (WIA, 1986).

Transmission Lines

Impact 12.1. North Area—Phase 1. Two types of noise are associated with construction activities: intermittent and continuous. The maximum intermittent construction noise levels range from 80 to 88 dBA at 50 feet for supporting structure assembly operations, and 84 to 90 dBA during tamping operations. Helicopter noise levels are expected to range from 92 to 95 dBA at 150 feet from the helicopter (WIA, 1986).

The continuous noise levels from construction activities at 50 feet would range from 70 to 77 dBA. At 100 feet, the continuous noise levels would be 64 to 73 dBA. At 200 feet, the noise levels would be 58 to 70 dBA. While this would constitute a temporary and less than significant noise impact to nearby residents, with implementation of Mitigation Measure 12.1 noise levels would be further reduced.

Impact 12.2. North Area—Phase 2. Noise impacts from construction along the Phase 2 route would be similar to those identified for Phase 1 of the North Area route. Therefore, with implementation of Mitigation Measure 12.1, impacts would be less than significant.

Impact 12.3. South Area. Noise impacts due to construction along the overhead portion of the South Area route will be similar to those identified for Phase 1 of the North Area route. Therefore, with implementation of Mitigation Measure 12.1, impacts would be less than significant.

Construction noise during underground activities may be disruptive to businesses, schools, and residences along the route. The noise levels will vary depending on the type of activity and equipment used. The estimated continuous noise from construction would range from 69 to 85 dBA at 300 feet (the distance to most residences) and would last approximately 2 weeks. While this would constitute a short-term noise impact to nearby residents, construction noise is temporary and would be a less than significant impact with implementation of Mitigation Measure 12.1.

Substations

Impact 12.4. Dublin and North Livermore Substations. Construction of the substations will involve use of earth-moving equipment, trucks, and cranes. The noise levels will vary with the type of activity and the actual equipment being used. The potential continuous noise from these activities could be as high as 65 dBA (at 192 feet, the distance to the nearest receptor). However, with implementation of Mitigation Measure 12.1, impacts would be less than significant.

Impact 12.5. Vineyard Substation. During installation of additional facilities at the Vineyard Substation, neighboring mobile home park residences immediately south of the substation would be exposed to noise levels up to 71 dBA. This constitutes a temporary noise impact to these residents. While noise levels during construction of the substation could affect the closest residents, construction-related noise is temporary and would be a less than significant impact with implementation of Mitigation Measure 12.1.

12.3.3 Operation

Table 12-3 identifies the distance from proposed project components to the nearest sensitive receptor and the increase in noise levels (dBA) that would result from operation of the

project. In each case, the contribution of operations is computed as the additive effects of the operational noise and the minimum ambient noise levels as determined from field monitoring.

TABLE 12-3
Project Noise Contribution During Operations (A-Weighted Decibels [dBA])

	Nearest Sensitive Receptors (Yards)				Contribution to Background During Operation (dBA)			
Location	**North**	**South**	**East**	**West**	**North**	**South**	**East**	**West**
Transmission Line Routes								
North Area—Phase 1	100	100	285	200	0	0	0	0
North Area—Phase 2	<880	100	400	<880	0	0	0	0
South Area	50	50	50	50	0	0	0	0
Substations								
Vineyard (existing)	>880	350	300	>880	0	3	4	0
North Livermore	>1760	192	>1760	>1760	0	2	0	0
Dublin	>1760	600	>1760	>1760	0	4	0	0

Impact 12.6. North Area Phases 1 and 2 and South Area Transmission Lines. Audible transmission line noise is generated from corona discharge, which is experienced as a random crackling or hissing sound. Corona discharge occurs with high voltages. Particles such as dust or water droplets that come into contact with a conductor tend to increase corona discharge. The potential for noise from corona discharge is greater during wet weather. The sound generated by 230 kV lines during adverse weather conditions such as fog or rain are generally expected to be 30 to 40 dBA at 100 feet from the outer conductor, but could be as high as 45 dBA at 250 feet. Therefore, transmission line noise could be as high as 45 dBA in adverse weather conditions at the closest sensitive receptor. This would be a less than significant impact because applicable noise standards would not be exceeded.

Impact 12.7. Dublin and North Livermore Substations. Three banks of essentially equal sized transformers are planned for these substations. The three transformers (230/21 kV and 45 MVA) are planned to be located near the perimeter of the site. The transformers are specified by the manufacturer to meet an 81 dBA noise level under full load (with fans on) operating conditions. At 60 percent load (with fans off), the transformers are specified to meet 78 dBA. Actual manufacturer's test results have shown noise levels 6 dBA quieter than the noise specifications. (Altshuler, 1999)

To predict the noise levels of the new substations, the CYMAUDI 2 noise propagation model was used. This model is designed to compute noise levels generated outdoors by large power apparatus such as power transformers and converters. A worst-case scenario was modeled using full load, daytime operating conditions with all cooling fans operational. The noise profiles are generic for the substation design and are independent of location as long as the terrain and building locations are constant from one substation site to another.

The noise level from the substation transformers is predicted to be 51 dBA at the nearest receptor to the North Livermore Substation and 43 dBA at the nearest receptor to the Dublin Substation, an increase of 2 and 4 dBA, respectively, over existing conditions (see Figure 12-1). These noise levels are well within the city and county goals and these increases would be a less than significant impact.

Impact 12.8. Vineyard Substation. A noise level of 53 dBA, an increase of 3 dBA, is expected at the neighboring mobile home park located approximately 350 yards south of the Vineyard Substation (see Figure 12-2). However, increases of 3 dBA are barely perceptible to the human ear. The noise level increase would be a less than significant impact.

Impact 12.9. Transition Structure. The transition structure will not contain any noise generating components. Occasional maintenance activities will generate some intermittent noise at these sites but it will not be significant because the nearest residence is over 1 mile from the structure. Impacts would be less than significant**.**

12.4 Mitigation Measures

Construction

Mitigation Measure 12.1 Construction. The following noise suppression techniques will be employed to minimize the impact of temporary construction noise on nearby sensitive receptors.

- Compressors and other small stationary equipment will be shielded with portable barriers.
- "Quiet" equipment (that is, equipment that incorporates noise control elements into the design; compressors and jackhammers have "quiet" models) will be used during construction.
- Equipment exhaust stacks / vents will be directed away from buildings.
- Truck traffic will be routed away from noise-sensitive areas where feasible.
- Temporary sound barriers or sound curtains will be employed if the other noise reduction methods are not effective or possible, or if sensitive receptors will be exposed to construction noise for more than 1 day.

Operation

Because significant impacts from the operation of the project have not been identified, mitigation measures are not required.

Insert Figure 12-1 Dublin and North Livermore Substations Isophonic Distributions (dBA) (Even Page)

Insert Figure 12-2 Vineyard Substation Isophonic Distribution (dBA)

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12.5 References

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