

## 8.0 NOISE

This chapter describes noise in the project area. Project and regulatory settings provide a context for analyzing the effects of the project. The information presented in this section was compiled largely from information provided by the CALFED Bay-Delta Program Final Programmatic EIS/EIR (Chapter 5, Physical Environment) and the City of Novato General Plan, as well as the Federal Aviation Administration (FAA) (<http://www.faa.gov/region/aea/noise/measure.htm>). References to other documents are provided as appropriate.

### 8.1 AFFECTED ENVIRONMENT

#### 8.1.1 Noise Exposure and Community Noise

Noise is often defined as unwanted sound, and thus is a subjective reaction to characteristics of a physical phenomenon. Researchers have generally agreed that A-weighted sound pressure levels (sound levels) are very well correlated with community reaction to noise. Sound levels can be plotted in units of A-weighted decibels (dB), a logarithmic measure of the magnitude of a sound as the average person hears it. The "A-weighting" accounts for the fact that humans do not hear low frequencies and high frequencies as well as they hear middle frequencies, and it corrects for the relative efficiency of the human ear at the different frequencies. A logarithmic measure is used in order to cover efficiently the wide range of sound magnitudes encountered daily.

Table 8-1 provides examples of A-weighted maximum sound levels associated with common noise sources and gives a relative sense of how noise from different types of sources might compare.

Table 8-1 Typical A-Weighted Maximum Sound Levels of Common Noise Sources

Decibels	Description
130	Threshold of pain
120	Jet aircraft take-off at 100 feet
110	Riveting machine at operators position
100	Shot-gun at 200 feet
90	Bulldozer at 50 feet
80	Diesel locomotive at 300 feet
70	Commercial jet aircraft interior during flight
60	Normal conversation speech at 5-10 feet
50	Open office background level
40	Background level within a residence
30	soft whisper at 2 feet
20	Interior of recording studio

Source: Bolt, Beranek and Newman 1971.

Maximum sound levels and sound exposure levels measure individual sound events that may occur only once, or may occur several times during the day in a neighborhood. The number of times these events occur is important in measuring the noise environment. However, studies have shown that human response to noise involves both the maximum level and its duration, so the maximum sound level alone is not sufficient to evaluate the effect of noise on people.

One factor that is important in "measuring" a sound environment is the occurrence of sound events during nighttime. People are normally more sensitive to intrusive sound events at night, and the background sound levels are normally lower at night because of decreased human activity. Therefore a "penalty" may be added to sound levels which occur during night hours, to include these factors. By convention, a 10 dB penalty is added to sound levels occurring between 10:00 p.m. and 7:00 a.m. the following morning. This 10 dB penalty means that one nighttime sound event is equivalent to 10 daytime events of the same level. The 24-hour average sound level, including this 10 dB penalty, is known as the day-night average sound level (abbreviated  $L_{dn}$ ). Extensive research has found that day-night average sound level correlates very well with community annoyance from most environmental noise sources.

$L_{dn}$  and other commonly used noise descriptors are summarized below:

- $L_{eq}$ : The equivalent sound level is used to describe noise over a specified period of time, typically one hour, in terms of a single numerical value. The  $L_{eq}$  is the constant sound level that would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).
- $L_{dn}$ : The day-night average sound level is a 24-hour A-weighted noise exposure level that accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night ("penalizing" nighttime noises). Noise between 10:00 p.m. and 7:00 a.m. is weighted (penalized) by adding 10 dB to take into account the general annoyance of nighttime noises.
- CNEL The Community Noise Equivalent Level, or CNEL, is defined as the 24-hour average noise level with noise occurring during evening hours (7:00 p.m. to 10:00 p.m.) weighted by a factor of three times, and nighttime hours (10:00 p.m. to 7:00 a.m.) weighted by a factor of 10 times. The CNEL is similar to the  $L_{dn}$ , except that the CNEL has the additional evening (7:00 p.m. to 10:00 p.m.) weighting factor.

For the most part, the CNEL and  $L_{dn}$  are used interchangeably. Both the CNEL and  $L_{dn}$  descriptors represent a 24-hour average noise level. The  $L_{dn}$  descriptor is generally used for evaluating traffic noise levels. For traffic noise levels and community noise levels, the CNEL and  $L_{dn}$  generally agree within 0.5 dB to 1 dB.

In adopting a threshold criterion for noise impact, one must keep several important factors in mind. First, a day-night average sound level below 65 dB does not mean that no one is annoyed by that level of noise from transportation or construction sources.

Activities which may be disrupted by noise events (study, conversation, listening to music, watching TV, solitude, etc.): beliefs that such noise could be better controlled; attitudes toward the noise maker, and personal fears regarding the source of the noise, are all important factors in people's perception of annoyance. Additionally, a small percentage of people are simply more sensitive to noise than most other people, while a small percentage are little annoyed even at high noise levels. A time-average measure of noise impact, such as day-night average sound level, is also criticized because people feel that they are annoyed by individual sound events, rather than some "fictitious" average level. Clearly, people are bothered by individual noise events, but their sense of annoyance increases with the number of those noise events, and those which occur at night.

The combination of these factors causes different people to interpret sounds as "unwanted" noise in different ways. A measure of noise impact, such as  $L_{dn}$ , provides a reliable indicator of overall community response, but does not tell how any single individual will respond. As a result, there is probably no minimum level of transportation noise at which no one is annoyed.

Nevertheless,  $L_{dn}$  remains the best single measure for assessing the effects of noise on communities, and allows a standardized and effective means for measuring transportation noise. General guidelines for noise compatibility identify day-night average sound levels between 55 and 65 dB as "moderate exposure" and as generally acceptable for residential use. Above an  $L_{dn}$  of 65 dB, these guidelines identify the noise impact as "significant", and this designation is currently a factor in decisions to provide federal funds for mitigation projects. Any compatibility guideline, such as a  $L_{dn}$  of 65 dB, must represent a balance between that level which is most desirable to protect communities and that which can be achieved with cost-effective mitigation measures and available technology (<http://www.faa.gov/region/aea/noise/measure.htm>).

### **8.1.2 Existing Noise Conditions in the Project Area**

Existing sources of noise in the project area include the Bahia residential community, directly to the west of the project, and Gness Field (also known as the Marin County Airport) a general aviation airport that serves primarily small civilian aircraft and is located 2 miles northwest of the project. Existing noise at the Bahia community is typical of a suburban residential community. On the average 371 airplanes land or take off from Gness Field per day. However, only a small percentage of these aircraft pass over the project site; the number being determined by wind conditions.

Sensitive noise receptors in the project area include the Bahia residents and nesting birds at the project site or immediately adjacent to the site. Bahia residents are apt to be more sensitive to new noise sources because they have specifically chosen to live in a more rural suburban environment, on the outskirts of the City of Novato and adjacent to large open space areas, perhaps partially to escape the noise of a more urban environment.

### 8.1.2 Regulatory Setting

Noise standards under the CALFED Bay-Delta Program, from which the Bahia Marsh Restoration project is tiered, are shown in Table 8-2.

Table 8-2 CALFED  $L_{dn}$  Standards (according to population density)

Location	Person/mile <sup>2</sup>	$L_{dn}$
Rural		
Undeveloped	8	$\leq 35$
Partially developed	23	$\leq 40$
Suburban		
Quiet	77	$< 45$
Normal	230	$\leq 50$
Urban		
Normal	770	$\leq 55$
Noisy	2,300	$\leq 60$
Very noisy	7,700	$\leq 65$

According to the City of Novato General Plan, standards for a Novato residential area are  $<60$ - $65$  dB  $L_{dn}$  for residential areas and  $<80$  dB  $L_{dn}$  for neighborhood parks. Further, the City of Novato directs the following considerations be taken into account when using the City General Plan's Noise and Land Use Compatibility Standards:

1. The standard for maximum outdoor noise levels in residential areas is an  $L_{dn}$  of 60 dB. This standard is applied where outdoor use is a major consideration, such as backyards in single family housing developments and recreation areas in multifamily developments. This standard should not be applied to outdoor areas such as small decks and balconies typically associated with multifamily residential developments, which can have a higher standard of 65  $L_{dn}$ ;
2. The maximum acceptable interior noise level in new residential development required by the State of California Noise Insulation Standards is an  $L_{dn}$  of 45 dB. This standard continues to be applied to all residential development in Novato;
3. The Noise and Land Use Compatibility Standards should be reviewed in relation to the specific source of noise. These standards are based on measurement systems which average noise over a 24-hour period and do not take into account single-event noise sources. Different noise sources yielding the same composite noise exposure do not necessarily create the same environment. Additional standards may be applied on a case-by-case basis where supported by acoustical analysis to mitigate the effects of single-event noise sources.

### 8.2 CRITERIA FOR DETERMINING SIGNIFICANCE OF EFFECTS

Criteria based on the *CEQA Guidelines* and standards from CALFED and the City of Novato discussed above, as well as professional judgment, were used to determine the significance of noise impacts. The project would have a significant impact on noise if it would:

- 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;
- Expose persons to or generate excessive groundborne vibration or groundborne noise levels;
- Create a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- Create a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project; or
- 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, expose people residing or working in the project area to excessive noise levels.

### **8.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Noise impacts from the proposed project would be limited to the approximately 2 to 6-week construction period. Sources of direct, short-term noise impacts from construction would include the following:

- Heavy equipment operation (Proposed Project and Alternatives 1 and 2)
- Truck traffic along major access and haul routes associated with hauling fill material from East Bahia to Central Bahia (Proposed Project and Alternative 1 only)

Since project noise impacts are anticipated to be minor and short-term, no formal noise analysis was conducted for the project. Instead, a qualitative analysis of construction-related noise impacts was performed by comparing this project to the type of construction projects likely to produce noise that could exceed established standards or otherwise significantly impact sensitive noise receptors in the area.

### **8.4 CONSTRUCTION PHASE NOISE IMPACTS**

#### **8.4.1 Proposed Project**

Under the proposed project, construction equipment would extract approximately 23,000 cubic yards (cy) of fill materials from the East Bahia peninsulas. Trucks would transport this material to the Central Peninsula of East Bahia and to Central Bahia for use as fill material. These activities and the resulting noise impacts from operation of construction equipment and transportation of fill material; would occur over a period of approximately 2 to 6 weeks.

#### **Noise Impact-1: Construction-related truck traffic noise on Albatross Drive and Topaz Drive during construction.**

A total of 1,150 round-trips are estimated to occur within four 40-hour work weeks, or approximately 7 truck round trips per hour. (See Traffic Section 6.3.1 for additional explanation of these assumptions.) This truck traffic could cause an exceedance of the CALFED and City of Novato noise standards at residences along Albatross and Topaz or adjacent to these streets. In addition, noise could be generated by truck engine braking (“jake braking”) on the return trip downhill from West Bahia along Topaz Drive.

Significance: Significant, but short-term (four weeks estimated)

**Mitigation A for Noise Impact-1: Restrict truck traffic to the hours between 9am and 6pm.**

This mitigation would lower the  $L_{dn}$  by confining construction-related truck traffic to daytime work hours.

Post-mitigation significance. Less than significant.

**Mitigation B for Noise Impact-1: Instruct the drivers not to use engine braking on Topaz Drive.**

Post-mitigation significance. Less significant

**Noise Impact-2: Construction-related noise from operation of heavy equipment**

Noise would be generated by the use of extraction shovels, dredges, and other associated earth removal equipment.

Significance: Significant, but short-term

**Mitigation A for Noise Impact-2: Locate staging and stockpile areas, and supply and construction vehicle routes as far away from sensitive receptors as possible.**

**Mitigation B for Noise Impact-2: Establish and enforce construction site and haul road speed limits.**

**Mitigation C for Noise Impact-2: Restrict the use of bells, whistles, alarms, and horns to safety warning purposes.**

**Mitigation D for Noise Impact-2: Equip all construction vehicles and equipment with appropriate mufflers and air inlet silencers.**

**Mitigation E for Noise Impact-2: Restrict hours of construction to daylight hours.**

**Mitigation F for Noise Impact-2: Locate equipment as far from sensitive receptors as possible.**

Post-mitigation significance. Less than significant.

## 8.4.2 No Project Alternative

This alternative does not involve any construction impacts; therefore, it would not produce noise impacts from truck hauling and vehicle/heavy equipment operation.

## 8.4.3 Alternative 1 (Reduced Fill Removal from East Bahia)

Under Alternative 1, approximately 11,000 cy of fill materials excavated from the East Bahia peninsulas would be transported to the Central Peninsula of East Bahia and to Central Bahia for use as fill material (a 50% reduction of material from the Proposed Project).

### **Noise Impact-1: Construction-related truck traffic noise on Albatross Drive and Topaz Drive during construction.**

A total of 575 round-trips are estimated to occur within two 40-hour work weeks, or approximately 7 truck round trips per hour. (See Traffic section 6.3.3 for additional explanation of these assumptions.) This alternative would reduce the number of weeks required for hauling fill through the Bahia community from four weeks (Proposed Project) to two, thereby reducing the length of time residents would be exposed to this construction noise. However, during those two weeks, exceedances of the CALFED and City of Novato noise standards at residences along Albatross and Topaz or adjacent to these streets are still possible. Proposed mitigation is the same as for the Proposed Project.

Significance: Significant, but short-term (two weeks estimated)

### **Mitigation A for Noise Impact-1: Restrict truck traffic to the hours between 9am and 6pm.**

This mitigation would lower the  $L_{dn}$  by confining construction-related truck traffic to daytime work hours.

Post-mitigation significance. Less than significant.

### **Mitigation B for Noise Impact-1: Instruct the drivers not to use engine braking on Topaz Drive.**

Post-mitigation significance. Less than significant

### **Noise Impact-2: Construction-related noise from operation of heavy equipment**

Noise would be generated by the use of extraction shovels, dredges, and other associated earth removal equipment. This impact would be the same under this alternative and the Proposed Project and proposed mitigation is also the same.

Significance: Significant, but short-term

**Mitigation A for Noise Impact-2: Locate staging and stockpile areas, and supply and construction vehicle routes as far away from sensitive receptors as possible.**

**Mitigation B for Noise Impact-2: Establish and enforce construction site and haul road speed limits.**

**Mitigation C for Noise Impact-2: Restrict the use of bells, whistles, alarms, and horns to safety warning purposes.**

**Mitigation D for Noise Impact-2: Equip all construction vehicles and equipment with appropriate mufflers and air inlet silencers.**

**Mitigation E for Noise Impact-2: Restrict hours of construction to daylight hours.**

**Mitigation F for Noise Impact-2: Locate equipment as far from sensitive receptors as possible.**

Post-mitigation significance. Less than significant.

#### **8.4.4 Alternative 2 (No Fill Removal from East Bahia)**

Under Alternative 2, all material excavated from the East Bahia peninsulas (approximately 23,000 cy as in the Proposed Project) would remain in East Bahia and would be used to restore tidal marsh, creating seasonal wetlands, and raise the elevation of the uplands by compacting the fill on site. This alternative would eliminate noise impacts to Bahia residents from trucking fill material from East Bahia through the community to Central Bahia. However, there would still be short-term construction noise impacts from earth-moving activities in East Bahia and construction would most likely be concentrated in this part of the project site for a longer time (up to 6 weeks approximately).

##### **Noise Impact-2: Construction-related noise from operation of heavy equipment.**

Noise would be generated by the use of extraction shovels, dredges, and other associated earth removal equipment. This alternative would extensive earth-moving in East Bahia and careful placement and grading of excavated fill material. Construction activities in the East Bahia may therefore require more time than under the Proposed Project or Alternative 1. Since the Bahia residential community is closest to East Bahia and is most impacted by noise in this area, this noise impact may actually be greater under this alternative than under the Proposed Project or Alternative 1. Nevertheless, the impact remains short-term and can be mitigated to less than significant by implementing the same measures proposed for the Proposed Project and Alternative 1.

Significance: Significant, but short-term (approximately 6 weeks)

**Mitigation A for Noise Impact-2: Locate staging and stockpile areas, and supply and construction vehicle routes as far away from sensitive receptors as possible.**

**Mitigation B for Noise Impact-2: Establish and enforce construction site and haul road speed limits.**

**Mitigation C for Noise Impact-2: Restrict the use of bells, whistles, alarms, and horns to safety warning purposes.**

**Mitigation D for Noise Impact-2: Equip all construction vehicles and equipment with appropriate mufflers and air inlet silencers.**

**Mitigation E for Noise Impact-2: Restrict hours of construction to daylight hours.**

**Mitigation F for Noise Impact-2: Locate equipment as far from sensitive receptors as possible.**

Post-mitigation significance. Less than significant.