

## Introduction

This chapter addresses noise impacts associated with the proposed project. Background information on environmental acoustics, including definitions of terms commonly used in noise analysis, is provided in Appendix E. The following are brief definitions of acoustical terminology used in this chapter:

- *Sound*—A vibratory disturbance created by a vibrating object which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism such as the human ear or a microphone.
- *Noise*—Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
- *Decibel (dB)*—A unitless measure of sound on a logarithmic scale that indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micro-Pascals.
- *A-Weighted Decibel (dBA)*—An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
- *Equivalent Sound Level ( $L_{eq}$ )*—The equivalent steady state sound or vibration level that, in a stated period of time, would contain the same acoustical or vibration energy.
- *Day-Night Level ( $L_{dn}$ )*—The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring during the period from 10 p.m. to 7 a.m.
- *Community Noise Equivalent Level (CNEL)*—The energy average of the A-weighted sound levels occurring during a 24-hour period with 5 dB added to the A-weighted sound levels occurring during the period from 7:00 p.m. to 10:00 p.m. and 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.

$L_{dn}$  and CNEL values rarely differ by more than 1 dB. As a matter of practice,  $L_{dn}$  and CNEL values are considered to be equivalent and are treated as such in this assessment. In general, human sound perception is such that a change in sound level of 3 dB is just noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving sound level.

# Setting

## Environmental Setting

### Noise-Sensitive Land Uses

Noise-sensitive land uses are generally defined as locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Noise-sensitive land uses typically include residences, hospitals, schools, guest lodging, libraries, and certain types of passive recreational uses. Sensitive land uses in the project area include:

- Best Western Inn at the corner of 2nd Street and Washington Street (1 block, or approximately 300 feet, from the project site);
- Jack London Inn on Embarcadero between Franklin Street and Broadway (1 block, or approximately 300 feet, from the project site);
- Waterfront Plaza Hotel on the water at the base of Broadway (2 blocks, or approximately 500–600 feet, from the project site);
- Ten residential loft units at 373 4th Street “Pocket Building Lofts” between Franklin Street and Webster Street (3 blocks, or approximately 500 feet, from the project site); and
- The proposed project is also a sensitive receptor with the residential land uses proposed.

### Existing Noise Sources

The predominant source of noise in the project vicinity is motor-vehicle traveling on local streets and on I-880, located 2 blocks from the project site. Additionally, trucks and forklifts loading and unloading produce on Franklin Street and Webster Street between Embarcadero and 4th Street represent a major noise source in the morning from 2 a.m. to about 11 a.m. when the produce market is in operation. Sources of minor noise primarily relate to activities associated with existing surrounding development (loading and unloading activities, parking cars, pedestrian activities, loud automobile and portable stereos). Additionally, the railroad tracks, which are used by freight and passenger trains daily, are located one block from the project site. In general, average travel speeds on local streets in the project vicinity are relatively low because of traffic signal controls at most intersections. However, lower noise levels resulting from reduced travel speeds are generally offset by the noise generated by vehicles accelerating (from a stop) at these signalized intersections.

In order to determine typical morning and afternoon noise levels, short-term sound level measurements were taken in the project area on Thursday November 1, 2001 (3:00 – 4:30 p.m.) and Friday November 2, 2001 (7:45 – 9:00 a.m.).

Measurements were taken on city sidewalks using a Larson-Davis Model 700 sound-level meter set to slow meter response. The calibration of the sound level meter was checked before and after the measurement. Class 2 cloud cover conditions (lightly overcast, sun obscured 20–80% of the time) were present during the 11/1/01 afternoon measurement period. Class 3 cloud cover conditions existed (i.e., sunny with the sun essentially unobscured 80% of the time) during the 11/2/01 morning measurement period. Winds were slight, typically less than 1–2 mph and the temperatures was 65–70°F. Table 3F-1 summarizes the short-term noise measurements.

**Table 3F-1** Summary of Noise Monitoring Results

Location	Start Time	Duration (minutes)	Sound Level (Leq- dBA)	L <sub>10</sub>	L <sub>50</sub>	L <sub>90</sub>
3rd/Broadway, NW corner	8:27 a.m.	15	69.8	73.5	66.5	61.5
Same	3:00 p.m.	15	67.2	69.5	64.5	61.0
3rd/Broadway 50' S of SW corner	8:08 a.m.	15	66.3	70.0	62.5	58.0
Same	3:20 p.m.	15	67.7	70.5	64.0	61.0
3rd/Franklin, NW corner	7:45 a.m.	15	68.8	71.0	65.5	61.5
Same	3:40 p.m.	15	65.9	68.5	63.5	58.0
2nd/Broadway, SW corner	8:48 a.m.	15	68.9	72.5	64.5	60.0
Same	4:02 p.m.	15	69.3	73.5	64.5	61.0

Note: Equivalent sound levels ( $L_{eq}$ ) are used to develop single-value descriptions of average sound exposure over various periods of time. L10 is the A-weighted sound level that is exceeded 10% of the measurement period, L50 is the level exceeded 50% of the period, and so on. L50 is the median sound level measured during the measurement period. L90, the sound level exceeded 90% of the time, excludes high localized sound levels produced by nearby sources such as single car passages or bird chirps. L90 is often used to represent the background sound level. L50 is also used to provide a less conservative assessment of the background sound level. Appendix F provides detailed background information on acoustics.

## Regulatory Setting

### Noise Standards and Planning Guidelines

Noise exposure standards usually are implemented at either the receiver or source, and generally fall into two categories: (1) receiver-based noise compatibility guidelines for various land uses; and (2) ordinance limits for non-transportation-related noise. Local jurisdictions are preempted from regulating noise generation from sources such as cars, trucks, trains, and airplanes, so the City implements noise controls through receiver-based noise compatibility guidelines and through its noise ordinance.

The City's adopted noise compatibility guidelines identify allowable exposures for various land uses of noise emanating from transportation sources, even if the sources themselves cannot be regulated. Activities regulated by the City's noise ordinance may include such sources as mechanical equipment, amplified sounds, or hours of heavy equipment operation. Standards in local noise ordinances may be in the form of quantitative noise performance levels (as they are in the Oakland noise ordinance), or they may simply be a qualitative prohibition against creating a nuisance. Numerical standards are generally preferred because compliance is easier to document using objective, rather than subjective standards (e.g., nuisance), standards.

In California, cities and counties are required to adopt noise elements as part of their general plans. The purpose of a noise element is to establish a land use pattern that minimizes the exposure of residents to excessive noise. The City of Oakland General Plan Noise Element provides planning guidance related to noise.

## City of Oakland General Plan Noise Element Compatibility Guidelines

The City of Oakland General Plan Noise Element guidelines recognize the variable sensitivity of certain activities to noise and establish noise exposure criteria defining acceptable noise levels. The City uses land use compatibility noise guidelines developed by the State of California, presented in Figure 3F-1. For multi-family residential uses, state guidelines indicate that noise levels up to 65 dBA ( $L_{dn}$  or CNEL) are normally acceptable, and up to 70 dBA are conditionally acceptable with the incorporation of conventional construction methods to reduce noise, such as insulation and fresh air supply systems. For office/commercial uses, state guidelines indicate that noise levels up to 70 dBA ( $L_{dn}$  or CNEL) are considered normally acceptable, and up to 78 dBA are conditionally acceptable.

*Normally acceptable* is defined as satisfactory for the specified land use, assuming that normal conventional construction is used in buildings. Under most of these land use categories, overlapping ranges of acceptability and unacceptability are presented, leaving some ambiguity in areas where noise levels fall within the overlapping range. For purposes of this analysis, the most conservative interpretation is followed where noise levels fall within this range (i.e., if a noise level falls within the overlapping range for normally and conditionally acceptable, it is identified as conditionally acceptable).

## City of Oakland Noise Ordinance

Section 17.120.050 of the Oakland Planning Code specifies maximum allowable noise levels for various land uses; these standards are presented Table 3F-2. The first set of standards applies to long-term noise exposure for specific land uses,

whereas the second set of standards applies to temporary exposure to short- and long-term construction noise. Standards also indicate that, in areas where the existing ambient noise level exceeds the applicable noise level standard, the existing ambient noise level becomes the applicable standard.

## California Noise Insulation Standards

The California Building Code contains requirements, collectively known as California Noise Insulation Standards, for construction of new multi-family dwellings. These requirements are intended to limit the extent of noise transmitted into habitable spaces. For limiting noise transmitted between adjacent dwelling units, the standards specify the extent to which walls, doors, and floor-ceiling assemblies must block or absorb sound. For limiting noise from exterior sources, the standards set forth an interior standard of 45 dBA (CNEL or  $L_{dn}$ ) in any habitable room with all doors and windows closed. In addition, the standards require preparation of an acoustical analysis demonstrating the manner in which dwelling units have been designed to meet this interior standard, where such units are proposed in areas with noise levels greater than 60 dBA (CNEL or  $L_{dn}$ ).

## Impacts and Mitigation Measures

### Methodology

CEQA requires the significance of noise impacts to be determined for proposed projects. The process of assessing the significance of noise impacts associated with the proposed project involved establishing thresholds at which significant impacts are considered to occur at noise-sensitive land uses (see “Thresholds of Significance,” below). Next, noise levels associated with project-related activities were predicted and compared to the significance thresholds. Where predicted that a noise level would exceed a threshold, the predicted impacts were considered to be significant. Details on assumptions and methods used to predict noise levels are discussed under each impact.

### Thresholds of Significance

Thresholds of significance for noise and vibration impacts have been established for this assessment based on the CEQA environmental checklist found in Appendix G of the State CEQA Guidelines and on noise standards found in the City of Oakland General Plan and Municipal Code.

The project would have a significant impact on the environment if it would:

- Expose persons to or generate noise levels in excess of standards established in the General Plan or applicable standards of other agencies (e.g., OSHA);
- Violate the City of Oakland Noise Ordinance (Oakland Planning Code Section 17.120.050) regarding operational noise (Table 3F-2A);
- Violate the City of Oakland Noise Ordinance (Oakland Planning Code Section 17.120.050) regarding construction noise, except if an acoustical analysis is performed and all feasible mitigation measures imposed, including the Comprehensive Construction Noise Requirements adopted by the Oakland City Council on January 16, 2001;
- Violates the City of Oakland Noise Ordinance (Oakland Planning Code Section 8.18.020) regarding nuisance of persistent construction-related noise;
- Create a vibration which is perceptible without instruments by the average person at or beyond any lot line containing vibration-causing activities not associated with motor vehicles, trains, and temporary construction or demolition work, except activities located within the (a) M-40 zone or (b) M-30 zone more than 400 feet from any legally occupied residential property (Oakland Planning Code Section 17.120.060);
- Generate interior Ldn or CNEL greater than 45 dBA for multi-family dwellings, hotels, motels, dormitories and long-term care facilities (and may be extended by local legislative action to include single family dwellings) per California Noise Insulation Standards (CCR Part 2, Title 24);
- Result in a 5 dBA permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- Conflicts with state land use compatibility guidelines (Office of Planning and Research 1998) for all specified land uses for determination of acceptability of noise;
- Be 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, and would expose people residing or working in the project area to excessive noise levels; and/or
- Be located within the vicinity of a private airstrip, and would expose people residing or working in the project area to excessive noise levels.

## Impacts of the Proposed Project

### **Impact 3F-1: Exposure of existing noise-sensitive land uses to noise from construction activities (Potentially Significant)**

Construction activities associated with the proposed project could intermittently generate high noise levels at sensitive land uses close to the construction site. Within 3 blocks of the project site are 3 hotels and 10 residential loft units. Construction activities associated with the proposed project would include

grading and earthmoving, hauling materials, and building structures. Hotels and residences and businesses near the project site would be exposed to construction noise.

Table 3F-3 summarizes noise levels produced by construction equipment that is commonly used on construction projects. As indicated, equipment involved in construction typically generates noise levels ranging from 80 dB to 96 dB at a distance of 50 feet. Noise produced by construction equipment is reduced over distance at a rate of about 6 dB per doubling of distance, plus any additional attenuation from intervening barriers. Heavy trucks, scrapers and pile driving would generally be the noisiest construction sources operating on the project site. Assuming that a heavy truck and a scraper are operating at the same time in one location, the combined sound level would be 92 dBA at 50 feet. The estimated sound level at various distances for construction-related noise has been calculated and is presented in Table 3F-4.

**Table 3F-3. Construction Equipment Noise**

Type of Equipment	Maximum Level, dBA at 50 feet
Scrapers	89
Bulldozers	85
Heavy Trucks	88
Backhoe	80
Pneumatic Tools	85
Concrete Pump	82
Pile Driver	96

Source: Federal Highway Administration 1995.

**Table 3F-4. Estimated Noise Reduction with Distance from Active Construction Equipment**

Distance	DBA
50	92
100	86
200	80
400	74
800	68
1600	62
3200	56

Impacts from construction noise are considered significant because noise-sensitive land uses near the project site could be exposed to construction noise in excess of City ordinance standards for non-transportation sources or substantial increases in noise (i.e., more than 5 dBA above existing noise levels). Pile driving may also be a source of significant noise impacts, depending on the specific types of pile-driving equipment used. The estimated sound level at various distances for pile-driving related noise has been calculated and is presented in Table 3F-5.

**Table 3F-5. Estimated Noise Reduction with Distance from Active Pile-Driving Equipment**

Distance	DBA
50	96
100	90
200	84
400	78
800	72
1600	66
3200	60

As part of the environmental review for this project, an acoustical analysis was performed which included (1) taking existing noise measurements; (2) evaluating the site's suitability for alternative construction techniques to reduce noise (i.e., alternatives to pile driving); (3) reviewing relevant noise literature, the site, adjacent sites, existing conditions, and proposed construction methods/schedule to assess impacts and mitigation measures; and (4) reviewing other proposed projects in the vicinity to evaluate the potential for cumulative impacts. Those results are presented in Appendix E of this EIR for additional information.

In addition, existing sensitive receptors are located 1–3 blocks from the project site. A city block is equivalent to a width of about 200 feet and a length of about 300 feet. The closest sensitive receptors, the Jack London Inn and the Best Western Inn, would be about 250–300 feet from the project site, and the pile-driving noise level would be about 80 dBA outside these buildings, or inside, if the windows are open. With the windows closed, the noise level would be about 15-20 dBA less.

Implementation of the Mitigation Measures 3F-1 and 3F-2 would reduce this impact to a less-than-significant level.

#### **Mitigation Measure 3F-1: Employ noise-reducing construction practices for pile driving**

To reduce pile-driving construction noise impacts, construction contractors shall implement the following measures:

- a. Pile driving or other extreme noise generating activity (90 dBA or above) shall be limited to between 8:00 a.m. to 4:00 p.m., Monday through Friday, with no pile driving or other extreme noise generating activity permitted between 12:30 and 1:30 p.m., or other mid-day hour as established and noticed. Pile driving or other extreme noise generating activity is prohibited on Sundays and holidays. Pile driving on Saturdays will be evaluated on a case by case basis, with criteria including the proximity of residential uses and a survey of residents and businesses preferences for whether Saturday activity is acceptable if the overall duration of the pile driving is shortened.
- b. To further mitigate potential pile-driving and/or other extreme noise generating construction impacts, site-specific noise attenuation measures

shall be further developed and then implemented under the supervision of a qualified acoustical consultant. This Plan shall be based on the final design of the project. A preliminary review found that specific control strategies are limited due to the small size of the site and close proximity of surrounding buildings. This plan shall be submitted for review and approval by the City to ensure that maximum feasible noise attenuation is achieved. The following measures are likely to be feasible if pile driving is used:

- 1) “Quiet” pile driving technology shall be used where feasible, considering geotechnical, structural requirements, and other conditions.
- 2) Temporary plywood noise barriers shall be used, where feasible, around the entire construction site;
- 3) Noise control blankets shall be used, where feasible, on the proposed building structure as it is erected to reduce noise emission from the site;
- 4) The feasibility of temporarily improving the noise reduction capability of adjacent or nearby buildings, by the use of sound blankets for example, shall be implemented if found feasible and acceptable to adjacent users;
- 5) The effectiveness of noise attenuation shall be evaluated by taking noise measurements during construction; and
- 6) At least 30 days written notice to surrounding residents and businesses (minimum of 300 foot radius) shall be provided of proposed pile driving activity and its estimated duration.

**Mitigation Measure 3F-2: Employ standard noise-reducing construction practices.**

To reduce construction noise impacts, construction contractors shall implement the following measures:

- a. Posted signs at the construction site will include permitted construction days and hours, a day and evening contact number for the job site and a day and evening contact number for the City in the event of problems.
- b. On as-needed basis, a rotating stand-by system for building inspection staff to respond to complaints during off-hours and weekends will be established. The staff will be available by pager.
- c. An on-site complaint and enforcement manager will be designated to respond to and track complaints.
- d. A pre-construction meeting with the job inspectors and the general contractor/on-site project manager will be held, to confirm that noise mitigation measures and practices are completed prior to the issuance of a building permit (including construction hours, neighborhood notification, posted signs, etc.).

- e. Construction hours will be limited to be between 7:00 a.m. to 7:00 p.m., Monday through Friday and on weekends after the building is enclosed. Saturday construction activity prior to the building being enclosed shall be evaluated on a case by case basis, with criteria including the proximity of residential uses and a survey of residents preferences for whether Saturday activity is acceptable if the overall duration of construction is shortened.
- f. Equipment and trucks used for project construction shall utilize the best available noise control techniques (e.g. improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures, and acoustically attenuating shields, or shrouds) wherever feasible.
- g. Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for project construction shall be hydraulically or electrically powered wherever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. However where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used. External jackets on the tools themselves shall be used, where feasible. Quieter procedures, such as drills instead of impact equipment, shall be used where feasible.
- h. Stationary noise sources shall be located as far from sensitive receptors as possible, and they shall be muffled and enclosed within temporary sheds, or insulation barriers or other measures shall be incorporated to the extent feasible.

With implementation of all feasible mitigation measures described above, the construction noise would be less than significant.

### **Impact 3F-2: Exposure of noise-sensitive land uses to increased traffic noise (Less than Significant)**

Table 3F-6 summarizes predicted traffic-noise levels along roadways in the project area. The Federal Highway Administration (FHWA) Traffic Noise Prediction Model (FHWA-RD-77-108) and traffic data provided by the traffic consultant were used to assess traffic noise under existing conditions, future conditions without the project, and future conditions with the project (see Chapter 3C and Appendix C). Noise-sensitive land uses are located along these roadways. The table provides the following comparisons:

- future no-project conditions to existing conditions,
- future with-project conditions to existing conditions, and
- future with-project conditions to future no-project conditions.

The comparison of future no-project conditions to existing conditions gives an indication of the increase in traffic noise associated with background growth. The comparison between with-project conditions and existing conditions gives an indication of the cumulative increase in noise associated with the project and

background growth. The comparison between future with-project and future no-project conditions gives an indication of the noise increase directly associated with the proposed project.

Although existing noise levels at the project site are in excess of 60  $L_{dn}$  (see Table 3F-1), the project-related increases in noise relative to future no-project conditions are less than 3 dB. With-project increases in noise relative to existing conditions are less than 5 dB. This impact is therefore considered less than significant. No mitigation measure is required.

### **Impact 3F-3: Exposure of onsite, noise-sensitive land uses to increased traffic noise (Potentially Significant)**

Residential uses are proposed as part of the mixed use for the proposed project. Existing noise levels at the site are in excess of 60  $L_{dn}$  for both the future no-project and future with-project conditions because ( $L_{eq}$ ) noise levels are in excess. Therefore, this impact is considered significant. Implementation of the Mitigation Measure 3F-3 would reduce this impact to a less-than-significant level.

#### **Mitigation Measure 3F-3: Comply with the California Building Code.**

The project applicant will comply with the California Noise Insulation Standards by implementing the following measures:

- a. As part of the final building plans submitted for the Building Permit, the project applicant shall incorporate special acoustical treatment in the building design to reduce interior noise in occupied dwelling units to 45  $L_{dn}$  or less. Treatments may include, but are not limited to, use of acoustically rated windows, specialized building materials and construction methods and construction of windows. If windows must be closed to achieve this decibel rating, the dwelling units will be provided with forced fresh-air ventilation.
- b. The project applicant will retain a qualified acoustical consultant to evaluate and recommend specific acoustical and building layout treatments to reduce noise at outdoor activity areas to 60  $L_{dn}$  or the ambient noise level, whichever is greater pursuant to the City of Oakland Noise Ordinance. Treatments could include, but are not limited to, placement of primary building structures or other noise barriers between outdoor activity areas and major roadways in the area.
- c. As part of the building permit application, the project applicant will specify and confirm the specific treatments to be incorporated into the project design to achieve the exterior and interior standards. The project applicant will incorporate the recommended acoustical treatments into the project design and construction of the building and prepare a report demonstrating that exterior and interior goals of 60  $L_{dn}$  and 45  $L_{dn}$  have been achieved.

**Impact 3F-4: Exposure to cumulative noise levels as a result of long-term traffic increases resulting from the proposed project together with anticipated future development in the Jack London District, as well as Oakland in general (Less than Significant)**

Noise from cumulative development in the area would primarily occur from increases in vehicle traffic. Cumulative noise levels were included within the analysis of Impacts 3F-2 and 3F-3. Because the project contribution to cumulative roadway volumes is minimal (i.e., less than 3 dBA) the project's contribution to the cumulative roadside noise environment is not cumulatively considerable. Therefore, this impact is considered less-than-significant and no mitigation is required.

**Impact 3F-5: The proposed project together with concurrent development in the Jack London District as well as Oakland in general could result in a cumulative increase in short-term construction noise levels (Less than Significant)**

Other simultaneous projects, such as 426 Alice Street, could be under construction at the same time as the proposed project. However, this like any other concurrent construction projects are subject to the same noise limitations under the Noise Ordinance as the proposed project. Consequently, after accounting for attenuation with distance, cumulative noise increases at a given receptor would be less than double the sound energy from the proposed project and would not constitute a significant (greater than 5dBA) cumulative increase to noise levels. No mitigation is required.

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*Decibel (dB)*.....1

*A-Weighted Decibel (dBA)*.....1

*Equivalent Sound Level ( $L_{eq}$ )*.....1

*Day-Night Level ( $L_{dn}$ )*.....1

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