D. NOISE

SETTING

INTRODUCTION

This section analyzes potential noise impacts caused both during construction and operational phases of the proposed project on the ambient noise environment, as well as the compatibility of proposed project uses with the existing noise environment.

Sound is mechanical energy transmitted by pressure waves through a medium such as air. Noise is defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. Sound pressure level is measured in decibels (dB), with zero dB corresponding roughly to the threshold of human hearing, and 120 dB to 140 dB corresponding to the threshold of pain. Because sound pressure can vary by over one trillion times within the range of human hearing, a logarithmic loudness scale is used to keep sound intensity numbers at a convenient and manageable level.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude (sound power). When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequency spanning 20 Hz to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to low and extremely high frequencies instead of the frequency mid-range. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA).[1] Frequency A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements.

Noise Exposure and Community Noise

An individual's noise exposure is a measure of the noise experienced by the individual over a period of time. A noise level is a measure of noise at a given instant in time. However, noise levels rarely persist consistently over a long period of time. Rather, community noise varies continuously with time with respect to the contributing sound sources of the community noise

[1] All noise levels reported herein reflect A-weighted decibels unless otherwise stated.

environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic and atmospheric conditions. What makes community noise constantly variable throughout a day, besides the slowly changing background noise, is the addition of short duration single event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual.

These successive additions of sound to the community noise environment lead to variations in the community noise level from instant to instant. This requires the measurement of noise exposure to be taken over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

Leq: 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 Leq is the constant sound level which 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).

Lmax: The instantaneous maximum noise level measured during the measurement period of interest.

Lmin: The instantaneous minimum noise level measured during the measurement period of interest.

Lx: The sound level that is equaled or exceeded x percent of a specified time period. The L_{50} represents the median sound level.

DNL: The energy average of the A-weighted sound levels occurring during a 24-hour period, and which 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 dBA to take into account the greater annoyance of nighttime noises.

CNEL: Similar to the DNL, the Community Noise Equivalent Level (CNEL) adds a 5-dBA "penalty" for the evening hours between 7:00 p.m. and 10:00 p.m. in addition to a 10-dBA penalty between the hours of 10:00 p.m. and 7:00 a.m.

Effects of Noise on People

The effects of noise on people can be placed into three categories (see Figure IV.D-1).

- subjective effects of annoyance, nuisance, dissatisfaction;
- interference with activities such as speech, sleep, learning; and
- physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants generally experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction. A wide variation exists in the individual thresholds of annoyance, and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so called "ambient noise" level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur:

- except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- outside of the laboratory, a 3-dBA change is considered a just-perceivable difference;
- a change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and
- a 10-dBA change is subjectively heard as approximately a doubling in loudness, and can cause adverse response.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. The human ear perceives sound in a non-linear fashion, hence the decibel scale was developed. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion, rather they combine logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

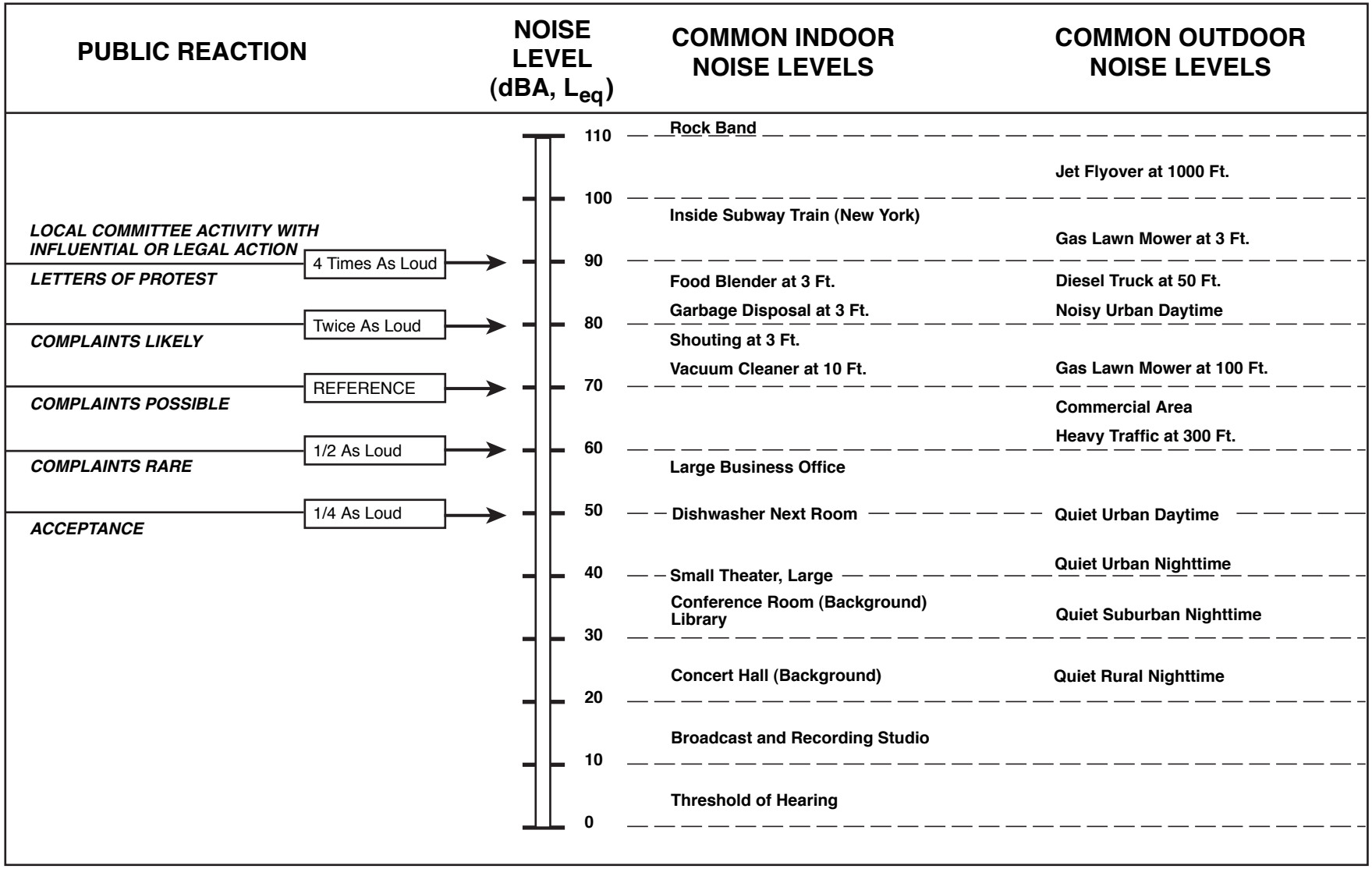
Noise Attenuation

Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate of 6 dBA to 7.5 dBA per doubling of distance from the source, depending on the topography of the area and environmental conditions (i.e., atmospheric conditions and noise barriers, either vegetative or manufactured, etc.). Widely distributed noise, such as a large industrial facility spread over many acres or a street with moving vehicles, would typically attenuate at a lower rate, approximately 4 dBA to 6 dBA.

EXISTING ENVIRONMENT

Noise Sources and Levels

Transportation sources, such as automobiles, trucks, trains, and aircraft, are the principal sources of noise in an urban environment. Along major transportation corridors, noise levels can reach 80 DNL, while along arterial streets, noise levels typically range from 65 to 70 DNL. Industrial



SOURCE: Caltrans Transportation Laboratory Noise Manual, 1982

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Figure IV.D-1
Effects of Noise on People

and commercial equipment and operations also contribute to the ambient noise environment in their vicinities. Noise measurements were conducted at the project site to provide a basis for evaluating potential impacts of the project on the nearest noise-sensitive uses.

The project area is located in the Northgate commercial district immediately north of downtown Oakland, at the south end of the Broadway Auto Row. It includes general and automobile-related commercial/ retail, office uses, medium density residential uses, and indoor recreational facilities (YMCA). Residential uses are interspersed throughout the area.

The primary source of noise in the project area is traffic on the local roadway network. Noise from activities associated with the retail, commercial and business establishments is considered secondary. Transportation related noise dominates the noise environment including vehicular traffic on adjacent streets, Interstate Highways 580 and 980, and general aviation. While distant rail activity is sometimes audible, noise levels generated from these sources have little influence on average daily sound levels (Charles M. Salter Associates, 2003).

Day/ Night Sound Levels (DNL)

Charles Salter Associates (2003) conducted 48-hour long term measurements and several short-term or 'spot' measurements in the vicinity of the project site. The noise measurement locations are shown on Figure IV.D-2. In addition ESA (2004) conducted short-term "spot" measurements at various locations on the site.

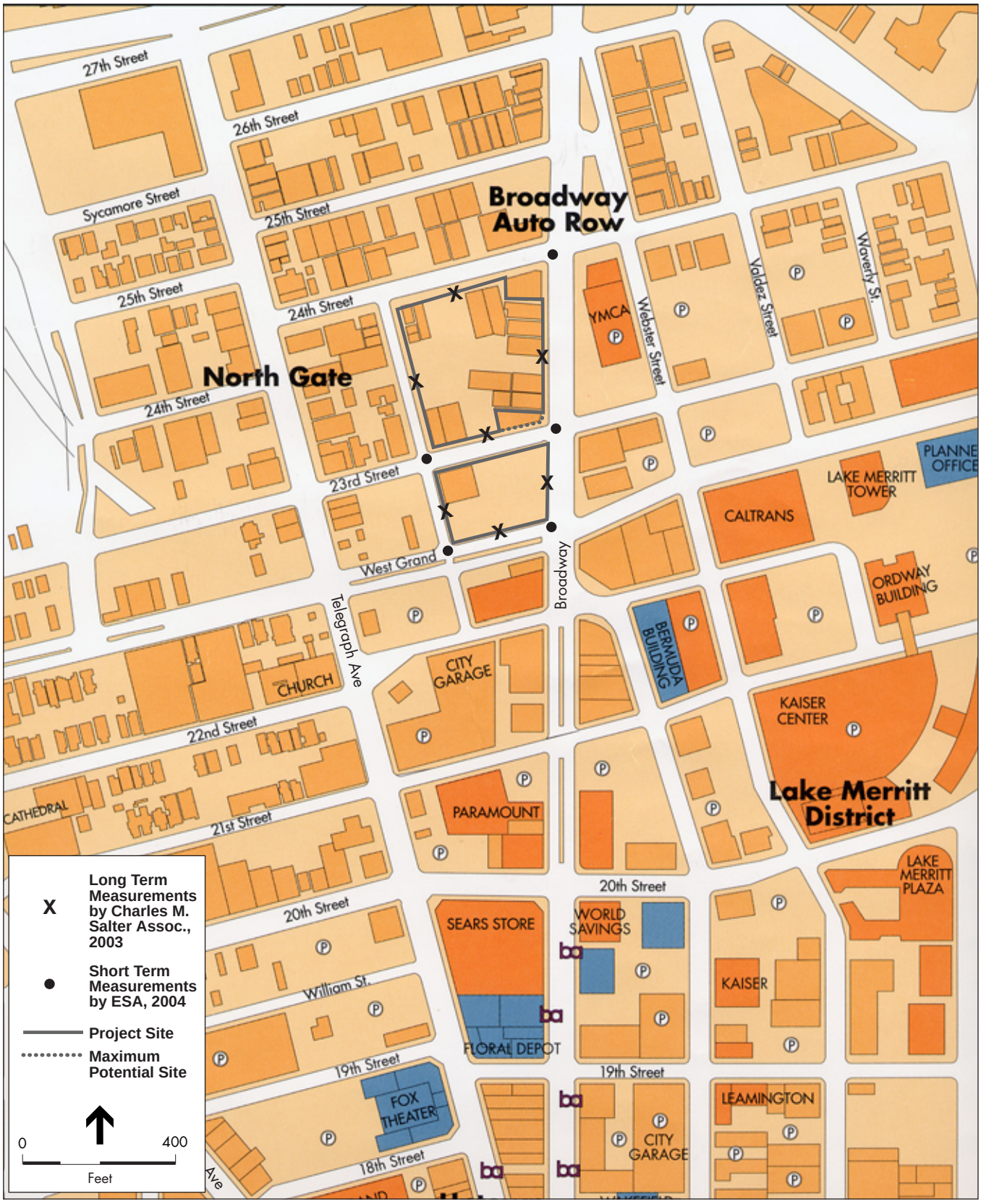
The long term monitors measured noise levels at the site for a period of 48 hours. Noise levels were logged digitally during that time, although individual noise sources are not identifiable in the resulting data. High noise levels typical of a noise urban environment were measured at all monitor locations. The noise levels measured by Charles Salter Associates and ESA are combined and presented as the existing noise environment in Table IV.D-1.

Maximum Noise Levels

Short-term (5-minute) measurements were taken at 5 locations by ESA during the weekday a.m. peak hour along four roadway segments in the vicinity of the project. Noise levels measured at these locations are shown in Table IV.D-1, p. IV.D-7.

SENSITIVE RECEPTORS

Human response to noise varies considerably from one individual to another. Effects of noise at various levels can include interference with sleep, concentration, and communication; physiological and psychological stress; and hearing loss. Given these effects, some land uses are considered more sensitive to ambient noise levels than others. In general, residences, schools, hotels, hospitals, and nursing homes are considered to be the most sensitive to noise. Commercial and industrial uses are considered the least noise-sensitive.



SOURCE: City of Oakland

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Figure IV.D-2
Noise Monitoring Locations

TABLE IV.D-1
EXISTING NOISE ENVIRONMENT

Location	Time Period	Leq (dBA)	Lmax (dBA)	Noise Sources
1. Broadway and West Grand Avenue Facades*	48 hours	68	75	Lmax from motorcycles on Broadway
2. Valley and 24th Street Facades*	48 hours	64	80	Lmax from traffic on 24th Street
3. 23rd Street Façade*	48 hours	63	NA	NA
4. Intersection of Broadway and 24th Street	5 minutes	67.6	75.3	Traffic on Broadway and 24th Street
5. Intersection of Broadway and 23rd Street	5 minutes	67.3	77.4	Traffic on Broadway and 23rd Street
6. Intersection of Valley Street and 23rd Street	5 minutes	60.8	72.4	Traffic on Valley Street and 23rd Street
7. Intersection of West Grand Avenue and Valley Street	5 minutes	65.8	78.9	Traffic on West Grand Avenue and Valley Street
8. Intersection of Broadway and West Grand Avenue	5 minutes	71.7	82.0	Traffic from Broadway and West Grand Avenue

NA = Not Available

Source: Environmental Science Associates. 2004.
*Charles M. Salter Associates, Inc. 2003.

A variety of commercial, retail, and recreational uses surround the project site as well as a children's day care center on West Grand Avenue and multi-family residences on Valley Street and elsewhere in the project vicinity. The project site includes an apartment complex (Casa Blanca Apartments) with 16 residential units that would be demolished as part of the project and, therefore, would not be considered a sensitive receptor, assuming the units are vacated by the start of construction.

REGULATORY SETTING

Federal, state, and local agencies regulate different aspects of environmental noise. Federal and state agencies generally set noise standards for mobile sources such as aircraft and motor vehicles, while regulation of stationary sources is left to local agencies. Local regulation of noise involves implementation of general plan policies and noise ordinance standards. Local general plans identify general principles intended to guide and influence development plans; local noise ordinances establish standards and procedures for addressing specific noise sources and activities. Noise issues relevant to the proposed project are addressed in Title 24 of the California Code of Regulations, City of Oakland General Plan policies and the Oakland noise ordinance standards.

State of California

State regulations include requirements for the construction of new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings that are intended to limit the extent of noise transmitted into habitable spaces. These requirements are collectively known as the California Noise Insulation Standards and are found in California Code of Regulations, Title 24 (known as the Building Standards Administrative Code), Part 2 (known as the California Building Code), Appendix Chapters 12 and 12A. For limiting noise transmitted between adjacent dwelling units, the noise insulation standards specify the extent to which walls, doors, and floor ceiling assemblies must block or absorb sound.

The proposed project includes development of dwelling units required to comply with the standards. For limiting noise from exterior sources, the noise insulation standards set forth an interior standard of 45 dBA, DNL in any habitable room and, where such units are proposed in areas subject to noise levels greater than 60 dBA, DNL demonstrating how dwelling units have been designed to meet this interior standard. If the interior noise level depends upon windows being closed, the design for the structure must also specify a ventilation or air-conditioning system to provide a habitable interior environment. Title 24 standards are enforced through the building permit application process in Oakland, as in most jurisdictions.

Alameda County Airport Land Use Commission and the Federal Aviation Administration (FAA)

The Alameda County Airport Land Use Plan (ALUP) developed by the Airport Land Use Commission of Alameda County has adopted Noise Impact Zones for the Oakland International Airport. Noise Impact Zones are areas where exposure to aircraft noise would be above the levels acceptable as per the state noise guidelines for judging the land use compatibility of a site. Noise Impact Zones ensure that new development in the vicinity of an airport would not be incompatible with existing and projected noise from airport operations. The project site would be located outside the 65-dBA contour for the Oakland International Airport. Hence the site would not be located within the Noise Impact Zone of the Airport.

City of Oakland

The Oakland General Plan contains guidelines for determining the compatibility of various land uses with different noise environments. The Noise Element, last updated in 1974, recognizes that some land uses are more sensitive to ambient noise levels than others, due to the amount of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities typically involved. The City uses state noise guidelines for judging the compatibility between various land uses and their noise environments (City of Oakland, 1997). State noise guidelines are shown in Figure IV.D-3.

"Normally acceptable" is defined as satisfactory for the specific land use, assuming that normal conventional construction is used in buildings. "Conditionally acceptable" means that new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.

Conventional construction, but with closed windows and fresh-air supply systems or air conditioning, will normally suffice. "Normally unacceptable" means that new construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and necessary noise insulation features be included in the design.

The City also regulates noise through enforcement of the noise ordinance, which is found in Section 17.120.050 of the Oakland Planning Code. The noise ordinance regulates only operational noise from stationary sources as cities and counties do not have regulatory authority over noise from mobile sources (transportation noise). Transportation noise is regulated at the state and federal level by noise limits placed on vehicle manufacturers. Table IV.D-2 presents maximum allowable receiving noise standards applicable to long-term exposure for residential and civic land uses. The noise ordinance states that if the measured ambient noise level exceeds the applicable noise level standard in any category, then the stated applicable noise level shall be adjusted so as to equal the ambient noise level. Table IV.D-3 presents noise level standards that apply to temporary exposure to short- and long-term construction noise. In this context, short-term refers to construction activity lasting less than 10 days while long-term refers to construction activity lasting more than 10 days. The construction activity for the proposed project would last longer than 10 days.

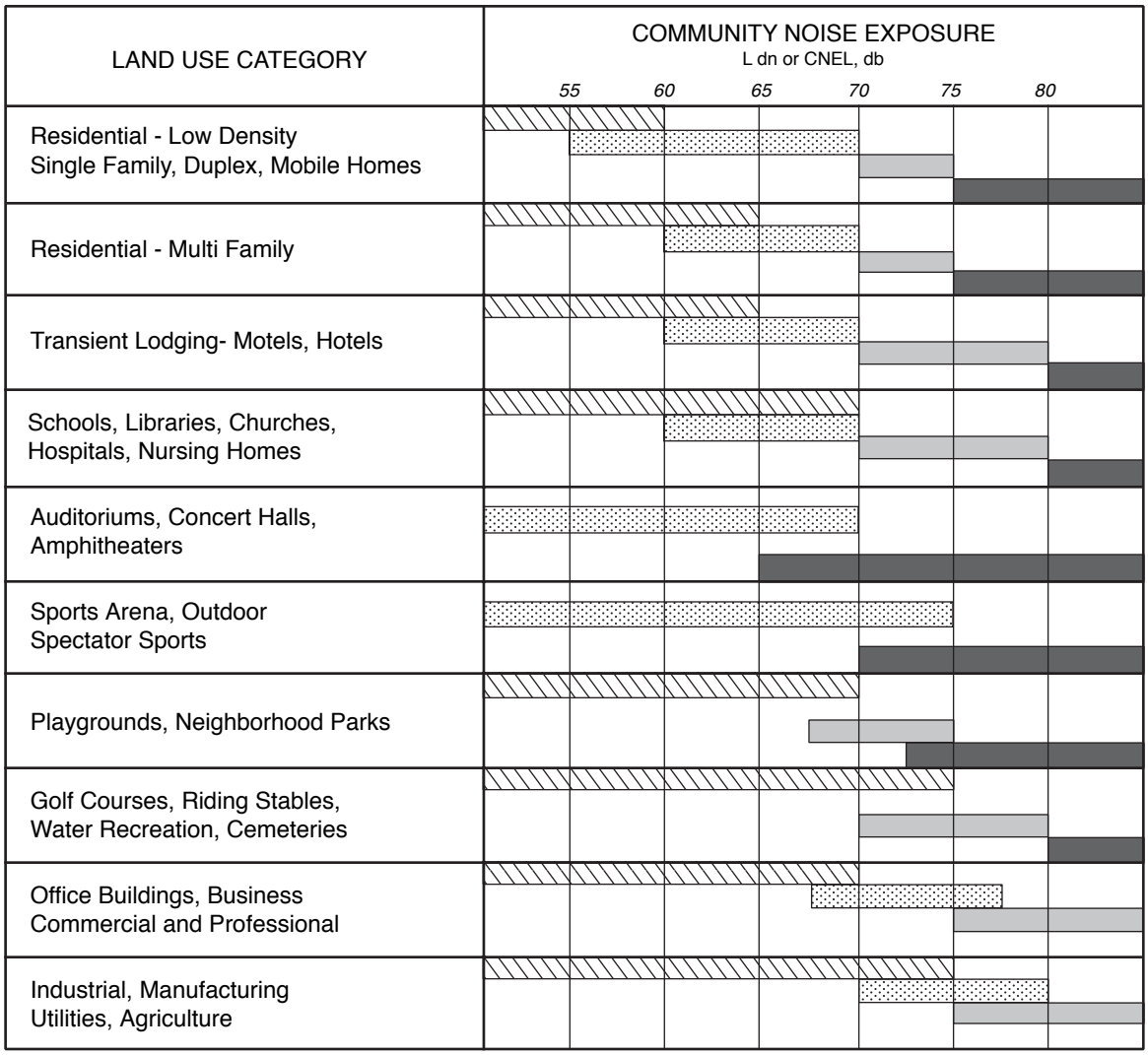
IMPACTS AND MITIGATION MEASURES

The proposed project site is not located within two miles of a public airport, or in the vicinity of a private airstrip. The Metropolitan Oakland International Airport is located approximately eight miles south of the project site, and the San Francisco International Airport is located approximately 21 miles southwest of the project site. Therefore, the project would not expose persons residing at the project site to excessive noise levels as a result of proximity to an airport or landing strip.

SIGNIFICANCE CRITERIA

The City of Oakland considers a project to have a significant impact on the environment if it would:

- Expose persons to or generate noise levels in excess of standards established in the Oakland general plan or applicable standards of other agencies (e.g., Occupational Safety and Health Administration (OSHA));
- Violate the City of Oakland Noise Ordinance regarding operational noise (shown in Table IV.D-2);
- Violate the City of Oakland Noise Ordinance (shown in Table IV.D-3) regarding construction noise, except if an acoustical analysis is performed and all feasible mitigation measures imposed, including the standard City of Oakland measures adopted by the Oakland City Council on January 9, 2001;



INTERPRETATION

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 included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

Normally Unacceptable
New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

Clearly Unacceptable
New construction or development should generally not be undertaken.

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SOURCE: California Office of Planning and Research. 1990, *General Plan Guidelines*.

Figure IV.D-3
State Noise Standards

TABLE IV.D-2
MAXIMUM ALLOWABLE RECEIVING NOISE STANDARDS FOR SPECIFIED LAND USES, dBA

Receiving Land Use	Cumulative Number of Minutes in One-Hour Time Period [a]	Maximum Allowable Noise Level Standards (dBA)	
		Daytime 7:00 a.m. to 10:00 p.m.	Nighttime 10:00 p.m. to 7:00 a.m.
Residential [b], School, Child Care, Health Care, or Nursing Home, and Public Open Space	20	60	45
	10	65	50
	5	70	55
	1	75	60
	0	80	65
		Anytime	
Commercial [c]	20	65	
	10	70	
	5	75	
	1	80	
	0	85	
		Anytime	
Manufacturing, Mining, and Quarrying	20	70	
	10	75	
	5	80	
	1	85	
	0	90	

a The concept of "20 minutes in an hour" is equivalent to the $L_{33.3}$, which is a noise descriptor identifying the noise level exceeded one-third (33.3 percent) of the time. Likewise, "10 minutes in an hour," "5 minutes in an hour," and "1 minute in an hour" are equivalent to the $L_{16.7}$, $L_{8.3}$, and $L_{1.7}$, respectively. L_{max}, or maximum noise level, represents the standard defined in terms of "0 minutes in an hour."

b Residential air conditioning or refrigeration systems have a maximum allowable operational exterior noise level of 50 dBa, or 55 dBa if the unit was installed prior to October 2003 (17.120.050I).[c] Maximum levels shown apply to stationary, commercial refrigeration units and exhaust systems. Mobile, commercial refrigeration units and exhaust systems may not be located within 200 feet of a legally-occupied residential facility, unless the unit or system is within an enclosure which reduces the noise level outside the enclosure to no more than (60) dBA and reduces vibration to a level below the vibration perception threshold set forth in Section 17.120.060 of the Oakland Planning Code (17.120.050J; 17.120.050K)

SOURCE: Oakland Planning Code. 17.120.050. City of Oakland. 2003.

- Generate interior DNL 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; or
- Conflict with state land use compatibility guidelines (Office of Planning and Research, 1998) for all specified land uses for determination of acceptability of noise levels.

TABLE IV.D-3
MAXIMUM ALLOWABLE RECEIVING NOISE STANDARDS FOR TEMPORARY CONSTRUCTION OR DEMOLITION ACTIVITIES, dBA

Operation/Receiving Land Use	Daily 7:00 a.m. to 7:00 p.m.	Weekends 9:00 a.m. to 8:00 p.m.
Short-Term Operation (less than 10 days)		
Residential	80	65
Commercial, Industrial	85	70
Long-Term Operation (more than 10 days)		
Residential	65	55
Commercial, Industrial	70	60

SOURCE: Oakland Planning Code. 17.120.050. City of Oakland. 2003.

Noise from project-related traffic would not be regulated by the local general plan and noise ordinance. Therefore, the significance of increase in noise levels due to project traffic has been evaluated based on the fifth criterion listed above. For long-term operational impacts, such as mechanical noise from stationary sources, Oakland Noise Ordinance standards, as presented in Table IV.D-2, p. IV.D-11, would apply to the proposed project. Therefore, based on the first and second criteria listed above, operational noise from stationary sources that would exceed the values presented in Table IV.D-2 would result in a significant impact to the noise environment. The significance of temporary increases in ambient noise levels is evaluated based on the third criterion listed above. For land use compatibility impacts (noise impacts of the environment on the proposed project occupants), the land use compatibility categories are published in the State of California General Plan Guidelines.

PROJECT IMPACTS

Project Construction Noise

Impact D.1: Construction activities would intermittently and temporarily generate noise levels above existing ambient levels in the project vicinity. (Significant)

Project construction would involve demolition of approximately 105,000 square feet of existing commercial space (approximately 20,000 square feet on Parcel A and 85,000 square feet on Parcel B) and a 16-unit residential building, and involve construction of 475 dwelling units, 40,000 square feet of commercial space, and 675 spaces for vehicle parking. Construction-related activities would temporarily increase ambient noise levels in the project vicinity over the duration of construction. Construction-related noise levels at and near locations on the project site would fluctuate depending on the particular type, number, and duration of use of various pieces of construction equipment. The effect of construction noise would depend upon the level of

construction activity on a given day and the related noise generated by that activity, the distance between construction activities and the nearest noise-sensitive uses, and the existing noise levels at those uses.

Table IV.D-4 shows typical noise levels generated by construction of commercial and residential buildings. As shown in Table IV.D-4, the noisiest phase of construction would be during excavation and exterior finishing, which could generate noise levels of approximately 89 Leq at 50 feet. Erection of the structure and ground clearance activities may also generate a substantial amount of noise. The project would not include pile driving.

Noise from construction activity generally attenuates (decreases) at a rate of 6 dBA to 7.5 dBA per doubling of distance. Construction associated with the project would take place in the immediate vicinity of the multi-family residential units located on Valley Street, across from Parcel B. Conservatively assuming an attenuation of 6 dBA per doubling of distance, construction could generate noise levels of approximately 89 dBA, Leq at these receptors. At noise levels of 85 dBA, normal conversation is extremely difficult. These predicted noise levels would exceed the standards of the Oakland Noise Ordinance, which states that, for residential receptors, the maximum allowable receiving noise for weekday (Monday through Friday, 7:00 a.m. to 7:00 p.m.) construction activity of greater than 10 days duration is 65 dBA. For construction activity of 10 days or less, the residential receiving standard is 80 dBA, however construction activity for the project would occur over a period of more than 10 days. Consequently, the noisiest phases of construction would have the potential to exceed the construction noise standard of the City of Oakland's Noise Ordinance. Therefore, without mitigation, this impact, though temporary, would be considered significant. As construction activities would be likely to occur during daytime hours, construction noise may also be disruptive to local businesses. However, the analysis focuses on impacts to nearest residential uses as they are considered to be more sensitive to noise than are other commercial uses surrounding the project site.

The contractor shall be required to implement the following measures throughout the duration of construction activity, and based on the significance criteria used by the City of Oakland, compliance with the Noise Ordinance is achieved if the following mitigation measures are implemented. As a result, project construction impacts would be considered less than significant.

Mitigation Measure D.1a: The project sponsor shall require construction contractors to limit standard construction activities as required by the City Building Department. Such activities are generally limited to between 7:00 a.m. and 7:00 p.m. Monday through Friday, with pile driving and/or other extreme noise generating activities greater than 90 dBA limited to between 8:00 a.m. and 4:00 p.m. Monday through Friday, with no extreme noise generating activity permitted between 12:30 p.m. and 1:30 p.m. No construction activities shall be allowed on weekends until after the building is enclosed, without prior authorization of the Building Services Division, and no extreme noise generating activities shall be allowed on weekends and holidays.

TABLE IV.D-4

TYPICAL COMMERCIAL CONSTRUCTION NOISE LEVELS

Phase	Noise Level (L_{eq})[a]
Ground Clearing	84
Excavation	89
Foundations	78
Erection	85
Exterior Finishing	89
Pile Driving	90-105

[a] Estimates correspond to a distance of 50 feet from the noisiest piece of equipment associated with a given phase and 200 feet from the other equipment associated with that phase.

SOURCE: U.S. Environmental Protection Agency, *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*, December 1971.

Mitigation Measure D.1b: To reduce daytime noise impacts due to construction, the project sponsor shall require construction contractors to implement the following measures:

- **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).**

- **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; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used where feasible, and this could achieve a reduction of 5 dBA. Quieter procedures shall be used, such as drills rather than impact equipment, whenever feasible.**

- **Stationary noise sources shall be located as far from adjacent receptors as possible, and they shall be muffled and enclosed within temporary sheds, incorporate insulation barriers, or other measures to the extent feasible.**

Mitigation Measure D.1c: To further mitigate potential other extreme noise generating construction impacts, a set of site-specific noise attenuation measures shall be completed under the supervision of a qualified acoustical consultant. Prior to commencing construction, a plan for such measures shall be submitted for review and approval by the

City to ensure that maximum feasible noise attenuation will be achieved. These attenuation measures shall include as many of the following control strategies as feasible:

- **Erect temporary plywood noise barriers around the construction site, particularly along the western boundary along Valley Street to shield the adjacent multi-family residential buildings;**
- **Implement "quiet" pile-driving technology (such as pre-drilling of piles, the use of more than one pile-driver to shorten the total pile-driving duration), where feasible, in consideration of geotechnical and structural requirements and conditions;**[2]
- **Utilize noise control blankets on the building structure as the building is erected to reduce noise emission from the site;**
- **Evaluate the feasibility of noise control at the receivers by temporarily improving the noise reduction capability of adjacent buildings; and**
- **Monitor the effectiveness of noise attenuation measures by taking noise measurements.**

Mitigation Measure D.1d: Prior to the issuance of each building permit, along with the submission of construction documents, the project sponsor shall submit to the City Building Department a list of measures to respond to and track complaints pertaining to construction noise. These measures shall include:

- **A procedure for notifying the City Building Division staff and Oakland Police Department;**
- **A plan for posting signs on-site pertaining to permitted construction days and hours and complaint procedures and who to notify in the event of a problem;**
- **A listing of telephone numbers (during regular construction hours and off-hours);**
- **The designation of an on-site construction complaint manager for the project;**
- **Notification of neighbors within 300 feet of the project construction area at least 30 days in advance of pile-driving or other extreme noise-generating activities about the estimated duration of the activity; and**
- **A preconstruction meeting shall be held with the job inspectors and the general contractor/on-site project manager to confirm that noise mitigation and practices (including construction hours, neighborhood notification, posted signs, etc.) are completed.**

Significance after Mitigation: Less than Significant.

[2] As described, pile-driving is not proposed as part of the project. However, should pile-driving become necessary, this mitigation would become applicable, and no additional analysis or mitigation would be required.

Project Operational Noise

Impact D.2: Noise from project-generated traffic and other operational noise sources such as mechanical equipment, truck loading/unloading, etc., could exceed the Oakland Noise Ordinance standards and affect nearby residential receptors. (Less than Significant)

Operational activities associated with the project that would generate noise include vehicular circulation and operation of mechanical equipment such as heating, ventilation and air conditioning (HVAC) equipment.

Motor vehicle trips generated by proposed residential and commercial uses on the project site would be distributed on the local road network and would increase noise levels along the affected roads. To assess the significance of the increase in traffic noise due to the project, roadside peak-hour noise levels were estimated for existing conditions, existing plus project, 2010 baseline, 2010 with completion of the project, and cumulative (2025) with buildout of the project conditions along those roadways most affected by the project. Noise modeling using Federal Highway Administration's Noise Prediction Model was conducted for traffic on roadway segments of Broadway and West Grand Avenue. Data from the traffic analysis prepared for this EIR was used for analysis. Results of the modeling effort are presented in Table IV.D-5.

As seen from Table IV.D-5, the proposed project would not lead to a 5 dBA or greater increase in noise over the existing total ambient noise level at any of the analyzed roadway segments under any of the analysis scenarios. Because the increase in ambient noise from the addition of project and cumulative traffic would be less than 3 dBA, this increase would barely be perceivable over the baseline total ambient noise level. Therefore, addition of project and cumulative traffic would not result in a significant noise impact.

Once operational, the only other major source of noise would be from the operation of mechanical systems of the project buildings. It is assumed that the majority of the mechanical systems (e.g., ventilation fans, heating equipment) to serve the project buildings would be located within the mechanical equipment wells on the roofs of the buildings. All rooftop mechanical equipment is proposed to be visually and acoustically screened. Any noise generated by operational equipment would be subject to noise ordinance standards shown and footnoted in Table IV.D-2, p. IV.D-11. Provided that the equipment is designed and used in a manner that complies with those standards, the related noise impact to project residences and adjacent land uses would not be significant. The applicable design standard would meet the maximum 45 dBA limit at adjacent sensitive land uses. Also, mechanical equipment for commercial spaces would be operated primarily during the less noise sensitive daytime hours with higher background noise levels. For these reasons, noise from commercial-related mechanical equipment would not be expected to significantly affect the noise environment at nearby land uses.

Additionally, there would be operational noise related to the arrival, departure, and loading/unloading of goods from delivery trucks associated with the project's proposed commercial establishments. This noise would be less than significant, as it would primarily take place during the less noise sensitive daytime hours (typically during daytime working hours).

Also, the presence of intervening structures and distance of the commercial and retail establishments to the existing residential receptors would attenuate these noise levels to a less than significant level.

Mitigation: None required.

Impact D.3: The project would locate noise sensitive multifamily residential uses in a noise environment characterized as "conditionally unacceptable" for such uses by the City of Oakland. (Less than Significant)

The noise levels identified in Table IV.D-1, p. IV.D-7, would be representative of the noise environment on implementation of the project. Based on existing measurements at these locations, the ground-level noise levels are in the "conditionally acceptable" range (between 60 and 70 dBA) for multifamily residential uses (see Figure IV.D-3, p. IV.D-10).

The project's proposed multifamily residences would be subject to Title 24 standards of the California Code of Regulations, which provides an interior standard of DNL 45 dBA in any habitable room and requires an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard. Construction in accordance with Title 24 standards would reduce the impact to a less than significant level. To meet the interior standard of DNL 45 dBA, a noise level reduction (window panes of STC [sound transmission coefficient]) of up 30 dBA would be required from the exterior facades of the buildings. Likely required noise insulation features could include, but would not limited to, double-paned windows, inoperable windows along the southern side of the residential buildings with provision of mechanical ventilation, and air-tight seals around window and doors. Design and construction of these buildings in compliance with the requirements of Title 24 would reduce any significant impacts of land use/noise compatibility to a less than significant level.

Though commercial uses are not subject to the requirements of Title 24, incorporation of standard noise insulation features in the design would minimize potential noise impacts to these on-site commercial uses.

Mitigation: None required.

TABLE IV.D-5
TRAFFIC NOISE INCREASES ALONG LOCAL ROADWAYS IN THE PROJECT AREA

	Noise Level (dBA) at an Average of 25 feet from Roadway Centerline					
Street Segment	**Existing**	**Existing plus Project**	**2010 Baseline**	**2010 plus Project**	**2025 Cumulative**	**Maximum Change**
Broadway between West Grand Ave. and 23rd Street	66.8	66.9	67.4	67.5	67.6	0.8
Broadway between 23rd Street and 24th Street	64.9	64.9	65.5	65.5	65.6	0.7
W. Grand btwn. Telegraph Ave. and Broadway	66.4	66.5	67.8	67.9	68.5	2.1

SOURCE: Environmental Science Associates, 2004.

CUMULATIVE IMPACTS

Impact D.4: The proposed project, together with anticipated future development in the Northgate commercial district area as well as Oakland in general, could result in long-term traffic increases that could cumulatively increase noise levels. (Less than Significant)

Noise from cumulative development in the area would primarily occur from increases in motor vehicle traffic. Cumulative traffic noise levels in the project area were estimated using traffic data prepared for this EIR and are presented in Table IV.D-5. As shown in the table, the addition of project and cumulative traffic would not increase traffic noise levels by greater than 5 dBA along the segments adjacent to the project site. As discussed under Impact D.2, this increase would not be perceivable over the total noise levels that were monitored along these segments. In other words, traffic noise forms one component of the total noise environment. Therefore, cumulative noise increases would be less than significant.

Mitigation: None required.

REFERENCES – Noise

Airport Land Use Commission of Alameda County, *Alameda County Airport Land Use Plan*, July 16, 1986.

Caltrans, Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects, October 1998.

U.S. Department of Transportation, Urban Mass Transportation Administration, Guidance Manual for Transportation, Noise and Vibration Impact Assessment, July 1995.

U.S. Department of Housing and Urban Development, *Noise Assessment Guidelines,* April, 1995.

Negherbon Mixed Use Project. Environmental Noise Assessment. Oakland California. Charles M. Salter Associates, Inc. 2003.