3.3 NOISE

INTRODUCTION

This section of the EIR describes the existing noise environment on the project site and in the surrounding area and evaluates the potential for noise impacts associated with implementation of the proposed project. The analysis focuses on the potential for the project to result in impacts on adjacent noise-sensitive uses. Results of the noise monitoring study performed for the proposed project are provided in **Appendix 3.3**. Effects related to aircraft noise were found not to be significant in the Initial Study prepared for the project and included in **Appendix 1.0** and therefore are not included in this analysis.

CHARACTERISTICS OF NOISE

Noise is usually defined as unwanted sound. Noise becomes unwanted when it interferes with normal activities, causes actual physical harm, or has adverse effects on health. The definition of "noise" as unwanted sound implies that it has an adverse effect on people and their environment.

Noise is measured on a logarithmic scale of sound pressure level known as a decibel (dB). The human ear does not respond uniformly to sounds at all frequencies; it is less sensitive to low and high frequencies than to medium frequencies, which correspond with human speech. In response, the A-weighted noise level (or scale) has been developed. It corresponds better with people's subjective judgment of sound levels. This A-weighted sound level is called the "noise level" and is referenced in units of dB(A). Because noise is measured on a logarithmic scale, a doubling of sound energy results in a 3 dB(A) increase in noise levels. However, changes in a noise level of less than 3 dB(A) are not typically noticed by the human ear.[1] A change from 3 to 5 dB(A) may be noticed by some individuals who are extremely sensitive to changes in noise, and a 5.0 dB(A) increase is readily noticeable. The human ear perceives a 10 dB(A) increase in sound level as a doubling of sound. **Figure 3.3-1, Common Noise Levels**, shows typical noise levels for a range of noise sources.

Noise sources occur in two forms: (1) point sources, such as stationary equipment, loudspeakers, or individual motor vehicles; and (2) line sources, such as a roadway with a large number of point sources (motor vehicles). Sound generated by a point source typically diminishes (attenuates) at a rate of 6.0 dB(A) for each doubling of distance from the source to the receptor at acoustically "hard" sites and

1 US Department of Transportation, Federal Highway Administration, *Highway Noise Fundamentals*, (1980) 81.

7.5 dB at acoustically "soft" sites.[2] For example, a 60 dB(A) noise level measured 50 feet from a point source at an acoustically hard site would be 54 dB(A) 100 feet from the source and 48 dB(A) 200 feet from the source. Sound generated by a line source typically attenuates at a rate of 3.0 dB(A) and 4.5 dB(A) per doubling of distance from the source to the receptor for hard and soft sites, respectively.[3] Sound levels can also be attenuated by man-made or natural barriers, as illustrated in **Figure 3.3-2, Noise Attenuation by Barriers and Elevation Differences**.

Solid walls, berms, or elevation differences typically reduce point and line source noise levels by 5.0 to 10.0 dB(A).[4] Sound levels for a source may also be attenuated 3.0 to 5.0 dB(A) by a first row of houses and 1.5 dB(A) for each additional row of houses.[5] Outside to inside noise attenuation provided by typical structures in California is provided **in Table 3.3-1, Typical Outside to Inside Noise Attenuation for Structures in California.**

Table 3.3-1
Typical Outside to Inside Noise Attenuation for Structures in California

Building Type	Noise Reduction - dB(A)	
	Open Windows	Closed Windows
Residences	17	25
Schools	17	25
Churches	20	30
Hospitals/Convalescent Homes	17	25
Offices	17	25
Theaters	20	30
Hotels/Motels	17	25

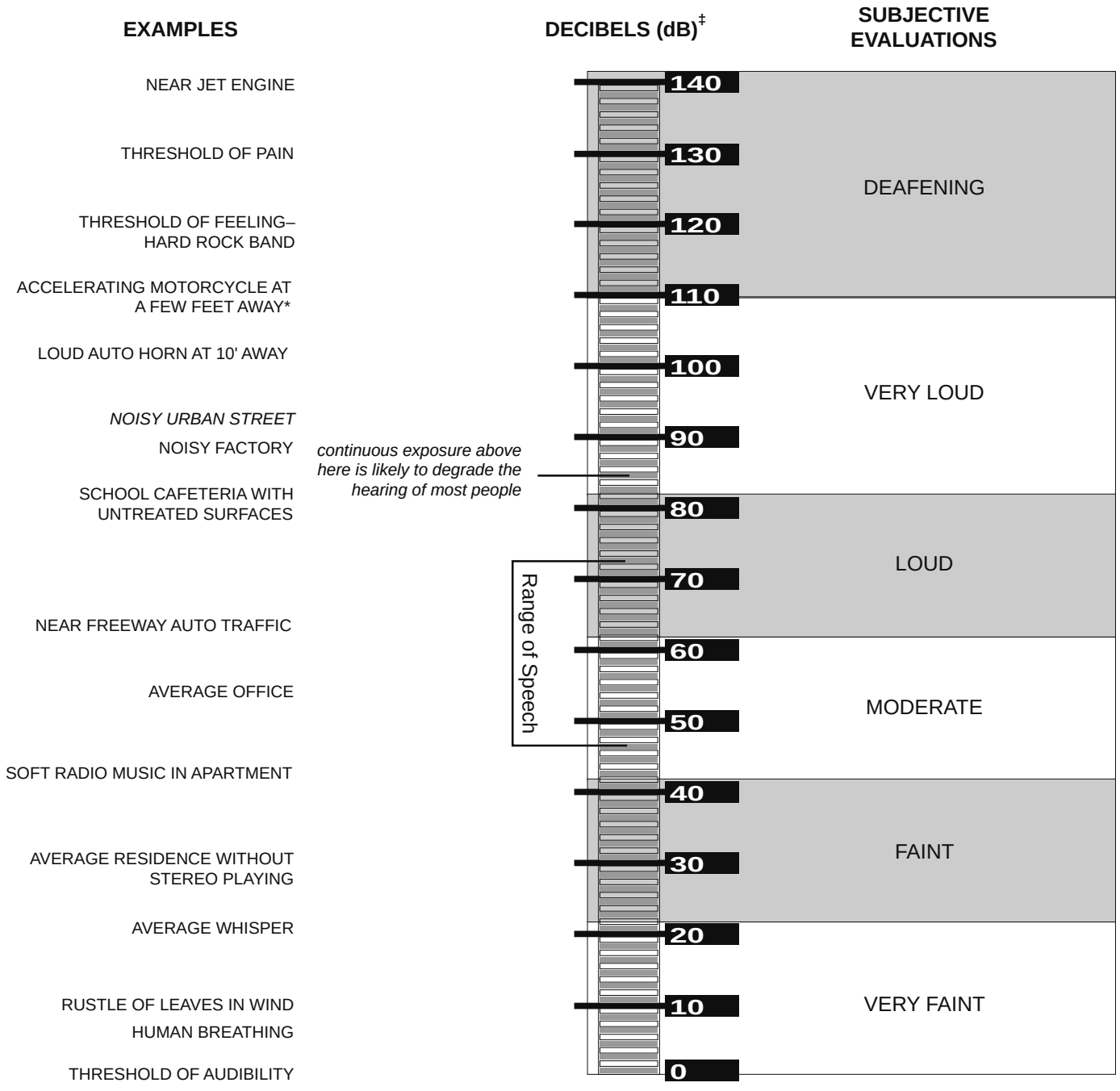
Source: Transportation Research Board, National Research Council, Highway Noise: A Design Guide for Highway Engineers, National Cooperative Highway Research Program Report 117.

2 US Department of Transportation, Federal Highway Administration, *Highway Noise Fundamentals*, 97. A "hard" or reflective site does not provide any excess ground-effect attenuation and is characteristic of asphalt, concrete, and very hard packed soils. An acoustically "soft" or absorptive site is characteristic of normal earth and most ground with vegetation.

3 US Department of Transportation, Federal Highway Administration, *Highway Noise Fundamentals*, 97.

4 US Department of Transportation, Federal Highway Administration, *Highway Noise Fundamentals*, 18.

5 T.M. Barry and J.A. Reagan, *FHWA Highway Traffic Noise Prediction Model* NTIS, FHWA-RD-77-108 (1978) 33.

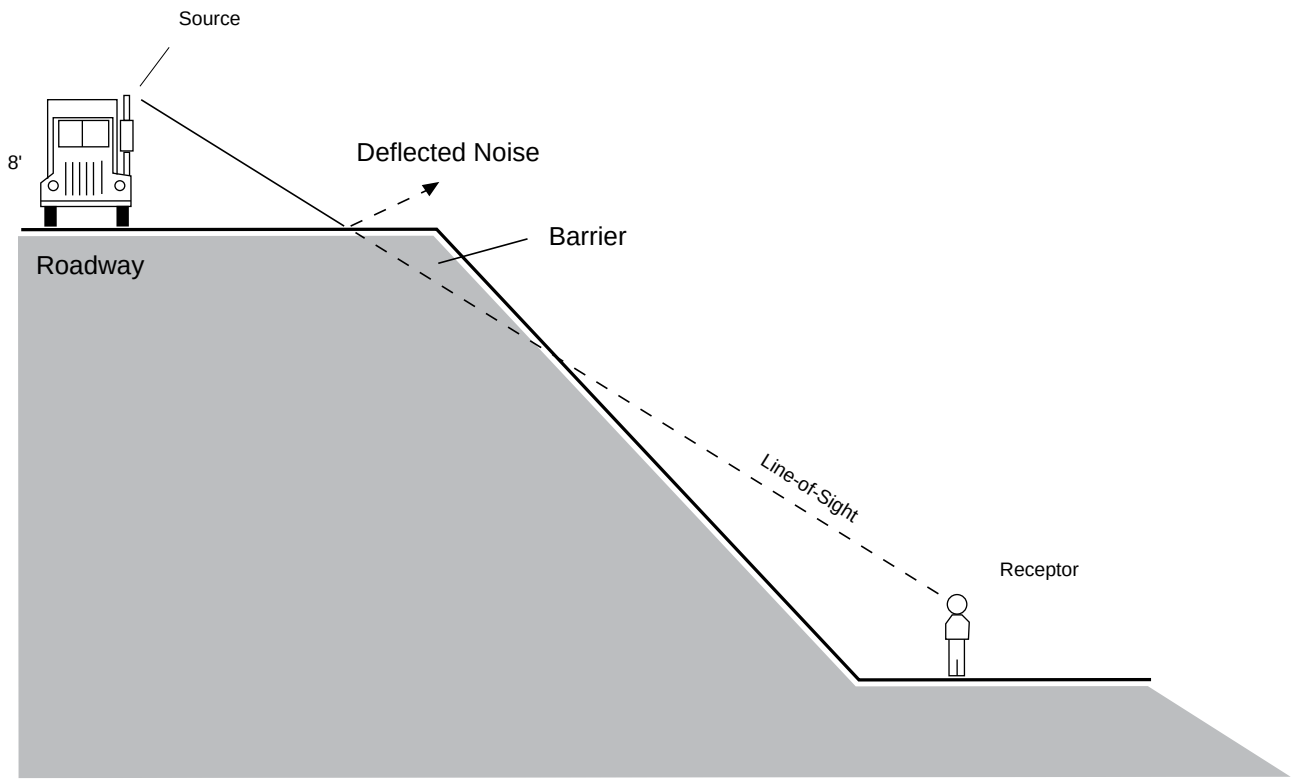


** NOTE: 50' from motorcycle equals noise at about 2000' from a four-engine jet aircraft.*

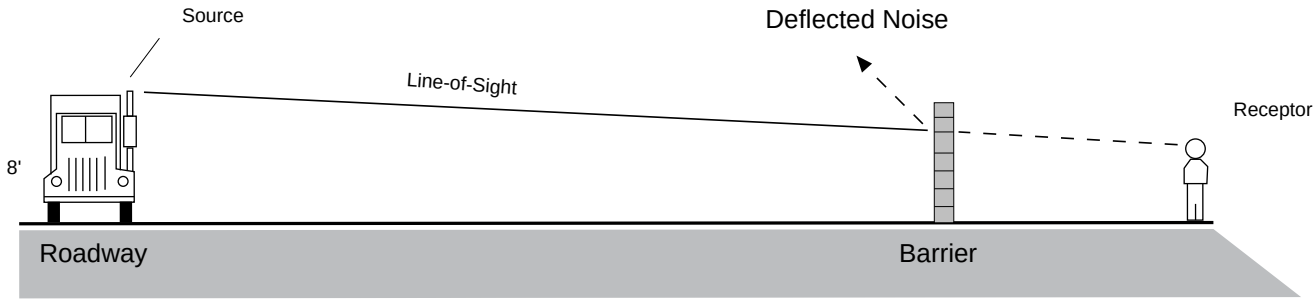
‡ *NOTE: dB are "average" values as measured on the A–scale of a sound–level meter.*

FIGURE **3.3-1**

Common Noise Levels



"Barrier Effect" Resulting from Differences in Elevation.



"Barrier Effect" Resulting from Typical Soundwall.

SOURCE: Impact Sciences, Inc. – June 2012

FIGURE **3.3-2**

Noise Attenuation by Barriers and Elevation Differences

When assessing community reaction to noise, there is need for a scale that averages varying noise exposure over time and quantifies the result in terms of a single number descriptor. Several scales have been developed that address community noise levels:

- Leq, the equivalent energy noise level, is the average acoustic energy content of noise for a stated period of time. Thus, the Leq of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.

- Ldn, the Day-Night Average Level, is a 24-hour average Leq with a 10 dB(A) "weighting" added to noise during the hours of 10:00 PM to 7:00 AM to account for noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dB(A) 24 hour Leq would result in a measurement of 66.4 dB(A) Ldn.

- Lmin, the minimum instantaneous noise level experienced during a given period of time.

- Lmax, the maximum instantaneous noise level experienced during a given period of time.

- CNEL, the Community Noise Equivalent Level, is a 24-hour average Leq with a 10 dB(A) "penalty" added to noise during the hours of 10:00 PM to 7:00 AM., and an additional 5 dB(A) penalty during the hours of 7:00 PM to 10:00 PM to account for noise sensitivity in the evening and nighttime. The logarithmic effect of these additions is that a 60 dB(A) 24-hour Leq would result in a measurement of 66.7 dB(A) CNEL.

The equivalent noise level (Leq) and the Community Noise Equivalent Level (CNEL) are used in the following analysis, as these measurements best reflect the overall change in an area's noise level.

CHARACTERISTICS OF VIBRATION

Vibration consists of waves transmitted through solid material. Groundborne vibration propagates from the source through the ground to adjacent buildings by surface waves. Vibration may be comprised of a single pulse, a series of pulses, or a continuous oscillatory motion. The frequency of a vibrating object describes how rapidly it is oscillating, measured in Hertz (Hz). Most environmental vibrations consist of a composite, or "spectrum" of many frequencies, and are generally classified as broadband or random vibrations. The normal frequency range of most groundborne vibration that can be felt generally starts from a low frequency of less than 1 Hz to a high of about 200 Hz. Vibration is often measured in terms of the peak particle velocity (PPV) in inches per second (in/sec) because it best correlates with human perception.

Vibration energy attenuates as it travels through the ground, causing the vibration amplitude to decrease with distance away from the source. High frequency vibrations reduce much more rapidly than low frequencies, so that in the far-field from a source, the low frequencies tend to dominate. Soil properties

also affect the propagation of vibration. When groundborne vibration interacts with a building, there is usually a ground-to-foundation coupling loss, but the vibration can also be amplified by the structural resonances of the walls and floors. Vibration in buildings is typically perceived as rattling of windows or of items on shelves, or the motion of building surfaces.

Groundborne vibration is generally limited to areas within a few hundred feet of certain types of construction activities, especially pile driving. Road vehicles rarely create enough groundborne vibration to be perceptible to humans unless the road surface is poorly maintained and there are potholes or bumps. If traffic, typically heavy trucks, induces perceptible vibration in buildings, such as window rattling or shaking of small loose items, then it is most likely an effect of low-frequency airborne noise or ground characteristics. Human annoyance by vibration is related to the number and duration of events. The more events or the greater the duration, the more annoying it will be to humans.

EXISTING CONDITIONS

Off-Site Noise Levels

The project site is located at 655 Westminster Drive and is bounded on the north and west by North Arroyo Boulevard, to the south by Westminster Drive (with residential uses beyond) and to the east by open space, government offices and residential uses.

The Arroyo Seco is located to the west, across Arroyo Boulevard. The Arroyo Seco is a deeply cut canyon that links the San Gabriel Mountains and the Los Angeles River and is comprised of three sections, the Upper, Central, and Lower Arroyos. The concrete-lined portion of the arroyo channel passes within approximately 250 feet of the western property boundary, and the unlined portion passes within approximately 140 feet of the northwest property boundary.

The project site is located adjacent to the Lower Arroyo. The Lower Arroyo Seco is an approximately 1.75-mile reach of this corridor bounded by the Colorado Street Bridge near the 134 Freeway to the north, the South Pasadena City limit at San Pascual Stables to the south, and various residential streets and properties that abut the publicly owned Arroyo banks to the east and west.

Noise-sensitive uses surrounding the project site include residential areas to the north and south, with residences located approximately 40 feet south of the project site boundary and multi-family residences located up to 20 feet northeast of the project site.

In order to gauge existing noise levels, noise monitoring was conducted for a 24-hour period at two locations near the proposed project site. These locations are shown in **Figure 3.3-3, Noise Monitoring Locations**. The monitored noise levels are shown in **Table 3.3-2, Existing Ambient Noise Levels**.

Table 3.3-2
Existing Ambient Noise Levels

Location	Noise Level (Leq)
Location 1 – Westminster Drive	66.4
Location 2 – S. Arroyo Boulevard at project driveway	68.3

Sources: Impact Sciences, Inc., 2013

Traffic noise is a significant source of ambient noise in the project area. Average daily trips (ADT) for specific roadway segments based on traffic counts and/or calculated from measured turning movement volumes for selected intersections were collected for the project traffic study (provided in **Appendix 3.4**). Based on existing ADT, existing traffic noise levels were calculated using the Federal Highway Administration (FHWA) Noise Prediction Model. Existing calculated traffic noise levels are shown in **Table 3.3-3, Existing Traffic Noise Levels**.

Table 3.3-3
Existing Traffic Noise Levels

Roadway Segment	Weekday Noise Level (CNEL)	Weekend Noise Level (CNEL)
Arroyo Boulevard north of project site driveway (25′ south of Arroyo)	57.6	57.3
Arroyo Boulevard north of Westminster Drive (25′ east of Arroyo)	57.4	57.2
Arroyo Boulevard south of Westminster Drive (25′ east of Arroyo)	57.4	57.0
Westminster Drive east of Arroyo Boulevard (25′ south of Westminster)	44.5	44.8

Source: Impact Sciences, Inc., 2013.

REGULATORY FRAMEWORK

State

California Code of Regulations

The California Noise Insulation Standards of 1988[6] require that interior noise levels from exterior sources be reduced to 45 dB(A) or less in any habitable room of a multi-residential use facility (e.g., hotels, motels, dormitories, long-term care facilities, and apartment houses and other dwellings, except detached single-family dwellings) with doors and windows closed. Measurements are based on Ldn or CNEL. Where exterior noise levels exceed 60 dB(A) Ldn CNEL, an acoustical analysis is required to show that the proposed construction will reduce interior noise levels to 45 dB(A) Ldn CNEL.

Local

The City of Pasadena Comprehensive General Plan and Municipal Code provide regulations governing land use, which are intended to guide future growth and development within the City. The General Plan is the fundamental planning policy document of the City, providing a blueprint for the identification of the location of land uses, and the basic design and function of circulation, open space, and infrastructure policies as well as public service needs. Zoning is used by the City to regulate where specific uses may be located, and controls the size and types of such uses.

City of Pasadena

General Plan

The Noise Element of the City of Pasadena General Plan provides objectives and policies intended to minimize the exposure of resident, workers, and visitors to excessive noise levels while accommodating the development patterns laid out in the City's Land Use plans. The following objective and policies are provided for in the Noise Element:

Objective 7: The City will minimize the effects of nuisance noise on sensitive land uses as defined in Figure 1 [of the Noise Element] to the degree feasible.

Policy 7b: The City will encourage limitations on construction activities adjacent to sensitive noise receptors as defined in Figure 1 [of the Noise Element].

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6 California Code of Regulations Title 24, Section 3501 et seq.

SOURCE: Impact Sciences, Inc., December 2013

FIGURE **3.3-3**

Noise Monitoring Locations

Policy 7c: The City will encourage construction and landscaping activities that employ techniques to minimize noise.

Policy 7d: The City will enforce noise level restrictions contained in the City of Pasadena Noise Regulations (Chapter 9.36 of the Municipal Code), except during federal, state, or local emergencies (such as power generators required for energy emergencies).

The Noise Element also provides guidelines for noise compatible land uses that specify clearly acceptable, normally acceptable, conditionally acceptable, and normally unacceptable noise levels for a range of land uses within the City. The Noise Element indicates that noise levels up to 70 dB(A) are "normally acceptable" and up to 75 dB(A) are "conditionally acceptable" for residential development. These are shown in **Figure 3.3-4, General Plan Noise Level Guidelines**.

Noise Restrictions Ordinance

The City has jurisdiction over noise regulation, as stated in the City's Municipal Code, Title 9, Chapter 36 Noise Restrictions (Noise Ordinance). The Noise Ordinance is intended to enforce the City's policy to prohibit "unnecessary, excessive, and annoying noises from all sources." The Noise Ordinance generally limits the generation of noise that exceeds the actual measured existing ambient noise level by 5 dB(A) at neighboring properties, with adjustments made for steady audible tones, repeated impulsive noise, and noise occurring for limited periods. Section 9.36.060 sets interior noise level standards for multifamily residential development at 60 dB(A) during daytime hours (7:00 AM to 10:00 PM) and 50 dB(A) during nighttime hours (10:00 PM to 7:00 AM).

The City's noise ordinance includes specific provisions regarding construction noise. Section 9.36.070 of the Municipal Code prohibits the operation of construction equipment and construction activity except from 7:00 AM to 7:00 PM Monday through Friday, and from 8:00 AM to 5:00 PM on Saturday in or within 500 feet of a residential district. Operation of construction equipment is prohibited on Sunday and on defined holidays. Section 9.36.080 of the Municipal Code prohibits the operation of powered construction equipment that generates a noise level of 85 dB(A) when measured at 100 feet.

Vibration

Federal Criteria

The Federal Transit Administration (FTA) has published guidelines for assessing the impacts of ground-borne vibration associated with construction activities, which have been applied by other

jurisdictions to other types of projects. The FTA measure of the threshold of architectural damage for non-engineered timber and mason buildings (e.g., residential units) is 0.2 in/sec PPV.[7] The threshold of perception of vibration is 0.01 in/sec PPV.

There are no FHWA standards for traffic-related vibrations. The FHWA position is that highway traffic and construction vibrations pose no threat to buildings and structures.[8]

California Department of Transportation

There are no state standards for traffic-related vibrations. Caltrans position is that highway traffic and construction vibrations generally pose no threat to buildings and structures.[9] For continuous (or steady-state) vibrations; however, Caltrans considers the architectural damage risk level to be somewhere between 0.2 and 2.0 in/sec.[10]

ENVIRONMENTAL IMPACTS

Thresholds of Significance

The following thresholds of significance were developed in accordance with *California Environmental Quality Act (CEQA) Guidelines*, specifically, Appendix G, as well as based on the proposed project. The following standards were used to evaluate the potential for noise impacts that may result from implementation of the proposed project:

- Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies (see **General Plan** and **Noise Restriction Ordinance** discussions above)
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project

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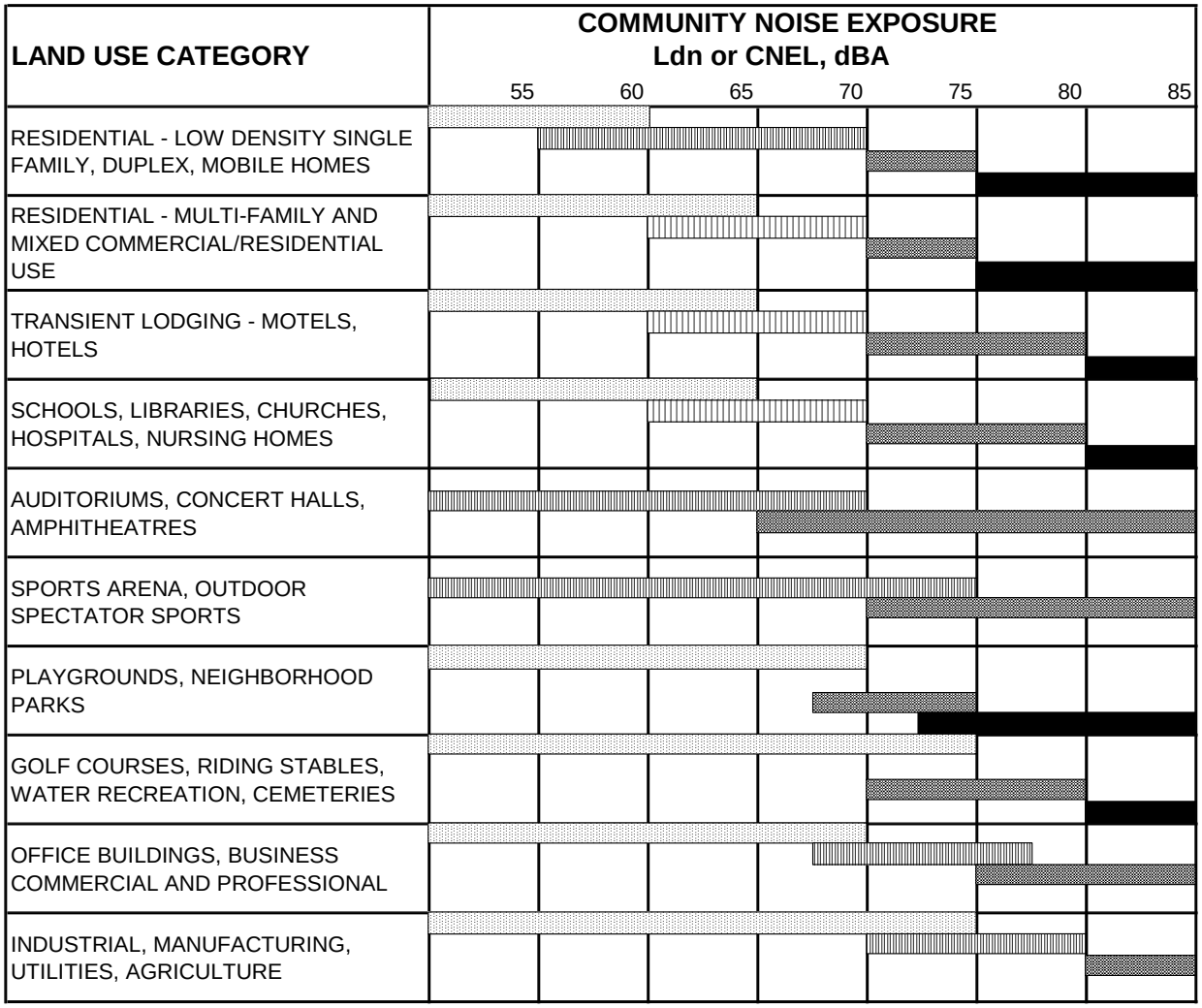
7 Federal Transit Administration, Office of Planning and Environment, *Transit Noise and Vibration Impact Assessment*, (2006) 12–13.

8 California Department of Transportation, *Transportation Related Earthborne Vibrations (Caltrans Experiences)*, Technical Advisory, Vibration, (2002) 10.

9 California DOT, *Transportation Related Earthborne Vibrations*, Vibration, (2002), 10.

10 California DOT, *Transportation Related Earthborne Vibrations*, Vibration, (2002), 12.



CLEARLY 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
If new construction or development proceeds, an analysis of the noise reduction requirements should be made and needed noise insulation features included in the design.

NORMALLY ACCEPTABLE
New construction or development should be undertaken after an 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 not be undertaken, unless it can be demonstrated that an interior level of 45 dBA can be achieved.

** Please note that these guidelines are general and may not apply to specific sites.*

Source: California General Plan Guidelines, 1998, as modified by the City of Pasadena, 2002.

SOURCE: City of Pasadena, June 2012

FIGURE **3.3-4**

General Plan Noise Level Guidelines

Methodology

The analysis of the existing and future noise environments presented in this noise impact analysis is based on technical reports, noise prediction modeling, and empirical observations. Noise levels for some stationary activities were estimated based on available technical reports and literature.

Noise modeling procedures involved calculating existing and future vehicular noise levels along individual roadway segments in the vicinity of the project site. This task was accomplished using the Federal Highway Administration Highway Noise Prediction Model (FHWA-RD-77-108). The model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, and site environmental conditions. The average vehicle noise rates (energy rates) utilized in the FHWA Model have been modified to reflect average vehicle noise rates identified for California by the California Department of Transportation (Caltrans).[11]

The Caltrans data show that California automobile noise is 0.8 to 1.0 dB(A) higher than national levels, and that medium- and heavy-truck noise is 0.3 to 3.0 dB(A) lower than national levels.[12] Traffic volumes used as data inputs in the noise prediction model were provided by the project traffic engineer in **Section 3.4, Traffic**, of this EIR.

Analysis in this section addresses the existing and future noise environments on and off the proposed project site.

The assessment of off-site noise levels focuses on how on-site activities and increased traffic levels would impact existing land uses near the project site. This section specifically focuses on impacts to existing noise-sensitive uses, or those uses that would be most sensitive to an increase in noise levels. Noise levels were modeled with and without project traffic to determine those locations at which the project (via increased traffic) may have an impact on existing noise-sensitive uses.

Impacts Analysis

Each applicable threshold of significance is listed below followed by analysis of the significance of any potential impacts and the identification of mitigation measures that would lessen or avoid potential impacts. Finally, the significance of potential impacts after implementation of all identified mitigation measures is presented.

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11 Rudolf W. Hendriks, *California Vehicle Noise Emission Levels* (Sacramento, California: California Department of Transportation, January 1987), NTIS, FHWA/CA/TL-87/03.

12 Hendriks, *California Vehicle Noise Emission Levels*, January 1987, NTIS, FHWA/CA/TL-87/03.

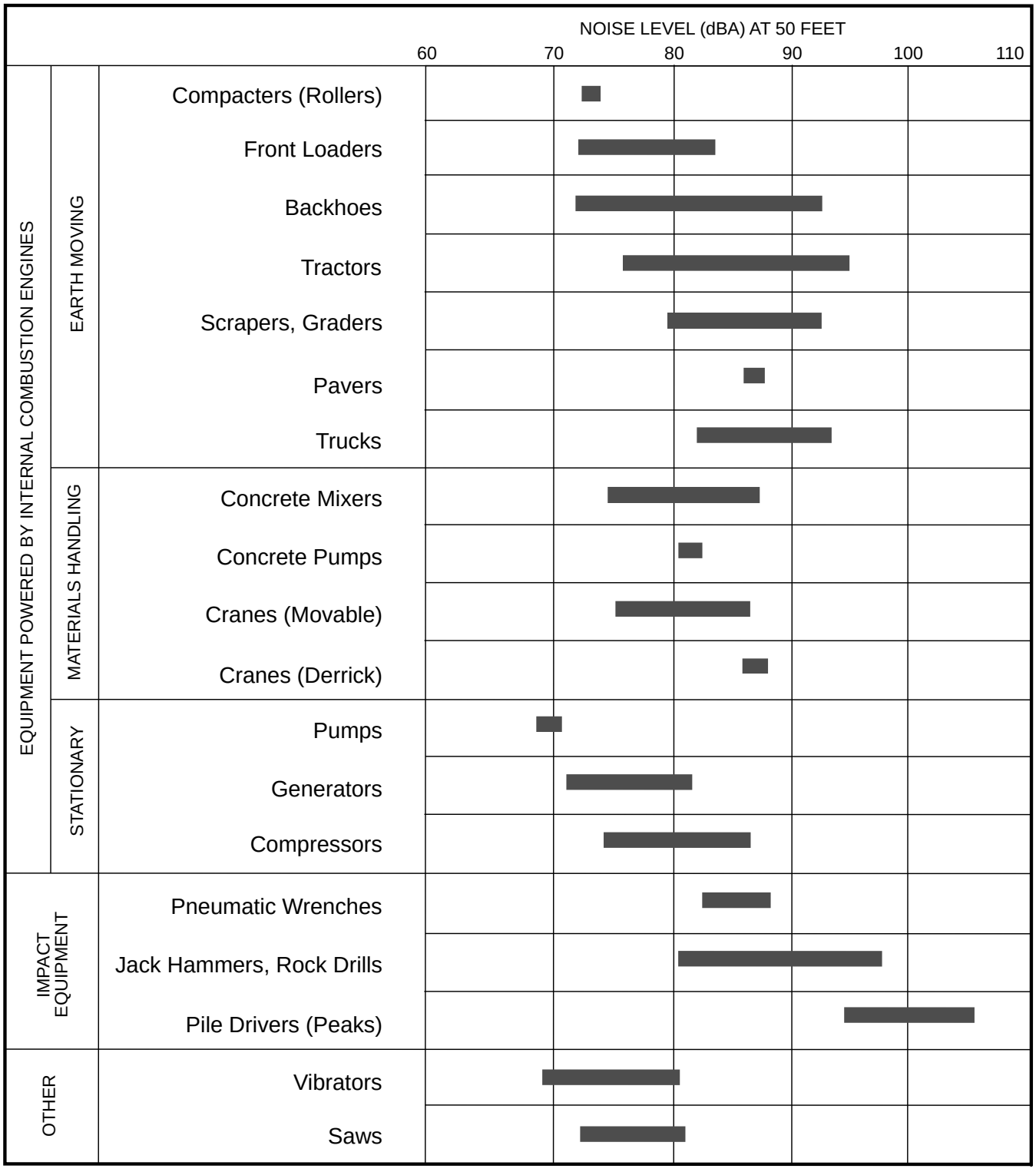
Threshold 3.3.1 **Would the project expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?**

Construction

Project development activities would primarily include site preparation (demolition, site clearance, grading, and excavation), and the construction of internal roadways, driveways, and structures. Site preparation typically involves the use of heavy equipment, such as scrapers, tractors, loaders, concrete mixers, cranes, etc. Trucks would be used to import and export soil, deliver equipment and building materials, and to haul away waste materials. Smaller equipment, such as jackhammers, pneumatic tools, saws, and hammers would also be used throughout the site during the construction phases.

In general, the first and noisiest stage of project buildout is site preparation. The highest noise levels during this phase would be associated with the operation of heavy-duty trucks, scrapers, graders, backhoes, and front-end loaders. When construction equipment is operating, noise levels can range from 73 to 96 dB(A) at a distance of 50 feet from individual pieces of equipment. Later phases of construction include foundation pours and parking lot construction.

Primary noise sources include heavy concrete trucks and mixers, pneumatic drills, and other equipment associated with demolition of structures and minor grading. At 50 feet from the source, noise levels in the 73 to 96 dB(A) range are common; for example, graders and scrapers produce 85 and 89 dB(A), respectively, at 50 feet. The latter stages of construction also include interior and exterior building construction, and site cleanup. Much of this would be accomplished through "sweat equity" and through Habitat for Humanity's volunteer programs. Primary noise sources associated with these activities include hammering, diesel generators, compressors, and light truck traffic. Noise levels are typically in the 60 to 80 dB(A) range at a distance of 50 feet. The final stages typically involve the use of trucks, landscape rollers, and compactors, with noise levels in the 65 to 75 dB(A) range. **Figure 3.3-5, Noise Levels of Typical Construction Equipment**, shows typical noise levels (dB(A)) for construction equipment at 50 feet of distance.



Note: Based on limited available data samples.

SOURCE: United States Environmental Protection Agency, 1971, "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances," NTID 300-1.

FIGURE **3.3-5**

Noise Levels of Typical Construction Equipment

As discussed above, Section 9.36.070 of the Municipal Code prohibits the operation of construction equipment and construction activity except from 7:00 AM to 7:00 PM Monday through Friday, and from 8:00 AM to 5:00 PM on Saturday. Operation of construction equipment is prohibited on Sunday and on defined holidays. Section 9.36.080 of the Municipal Code prohibits the operation of powered construction equipment that generates a noise level of 85 dB(A) when measured at 100 feet. Compliance with these requirements would reduce the noise level experienced at nearby sensitive receptors. As illustrated in **Table 3.3-4, Projected Ambient Noise Levels During Construction**, construction-related noise impacts could elevate ambient noise levels to over 80 dB(A) Leq for short periods during heavy construction periods when scrapers, dozers, jack hammers, and similar non-impact equipment are used for demolition, grading, construction, and related activities. However, because operation of power equipment would not exceed the City's threshold of 85 dB(A) when measured at 100 feet, construction noise would be considered a less than significant impact.

Table 3.3-4
Projected Ambient Noise Levels During Construction

Location	Existing Noise Level (Leq)	Projected Noise Level (Leq)	Construction Noise Impact
Location 1 – Westminster Drive	66.4	83.1	16.7
Location 2 – S. Arroyo Boulevard at project driveway	68.3	83.1	14.8

Sources: Impact Sciences, Inc., 2013

Operation

Operational impacts of the proposed project would be considered significant if they cause ambient noise levels measured at nearby sensitive receptors to rise to the "normally unacceptable" or "clearly unacceptable" category set by the State of California (70 dB(A)), or result in a 5 dB(A) or more increase in noise level.

Based on the traffic study prepared for the proposed project, sound levels for existing traffic volumes with and without the project, and future traffic volumes with the project have been estimated. **Table 3.3-5, Existing Plus Project Traffic Noise Levels**, provides noise levels based on projected traffic increases in the project vicinity.

Table 3.3-5
Existing Plus Project Traffic Noise Levels

Roadway Segment	Existing Weekday Noise Level	Weekday Noise Level With Project	Existing Weekend Noise Level	Weekend Noise Level With Project
Arroyo Boulevard north of project site driveway (25 feet south of Arroyo)	57.6	57.6	57.3	57.4
Arroyo Boulevard north of Westminster Drive (25 feet east of Arroyo)	57.4	57.5	57.2	57.4
Arroyo Boulevard south of Westminster Drive (25 feet east of Arroyo)	57.4	57.4	57.0	57.2
Westminster Drive east of Arroyo Boulevard (25 feet south of Westminster)	44.5	46.5	44.8	46.7

Source: Impact Sciences, Inc., 2013.

As shown in **Table 3.3-5**, increased traffic volumes along Arroyo Boulevard would be minimal ranging from an increase of 0 to 0.2 dB(A). On Westminster Drive east of Arroyo Boulevard, modeled traffic noise would increase by 2.0 dB(A) on weekdays and 1.9 dB(A) on weekends. As projected ambient noise levels along study roadway segments would neither increase more than 5 dB(A) nor rise to the "normally unacceptable" category of 70 dB(A), therefore none of the expected increases would be considered significant.

The proposed project would replace the existing vacant Desiderio US Army Reserve Center (USARC) with residential development and a neighborhood park. While this change in land use would represent an increase in noise generated on the project site (compared to current conditions), the proposed project would not be expected to generate substantial amounts of noise as a result of occupancy of the proposed dwelling units or use of the park. Typical noise sources from both the residential uses and the park would include people talking, car doors slamming, and dogs barking. Additional noise sources associated with the park may include children playing and other noises typical of neighborhood parks. Such activities generate low levels of noise. For example, parking lot noises (e.g., car doors slamming) generate approximately 50 dB(A) of noise at 50 feet of distance, while daytime use of the park could generate 50 to 60 dB(A) of intermittent noise at 50 feet. While some of these noise sources would be no more than 30 feet from existing sensitive receptors, such as a surface parking lot at the north portion of the project site that would be adjacent to existing multi-family residential buildings to the northeast; the bulk of outdoor park and recreation activities would be located more than 160 feet away from adjacent residents to the northeast, and over 60 feet from existing homes south of Westminster Drive to the south. When combined with the soft surfaces between the parking lot and the adjacent homes and noise attenuation from

windows themselves, noise levels would attenuate well below the City's indoor thresholds of 60 dB(A) during daytime hours (7:00 AM to 10:00 PM) for multifamily residential development. As the park would generally be in use during the day, no significant nighttime noise is expected from the parks and parking lots that would exceed the City's 50 dB(A) standard for indoor noise during nighttime hours (10:00 PM to 7:00 AM). Therefore, these activities would not cause an exceedance of the City's exterior or interior noise standards for residential uses.

Conclusion

Implementation of the proposed project would not cause temporary exceedances of the City's noise level standards during project construction at existing residential development. This would be considered a less than significant impact. Operation of the project would increase noise due to traffic on roads that provide access to the project site. However, as discussed above, these noise level increases would neither increase current ambient noise levels more than 5 dB(A) nor rise to the "normally unacceptable" category of 70 dB(A). Operational uses on the project site (the residential and park uses) would not increase noise levels that would result in an exceedance of the City's exterior or interior noise standards. Nevertheless, the following "best practices" mitigation measures are recommended to be included in the project as a condition of approval to further minimize noise impacts during construction.

As impacts would be less than significant, no mitigation measures are required. However, the following conditions are recommended to be included in the project as a Condition of Project Approval:

- When demolition or construction operations occur within 100 feet of occupied residential areas, the construction contractor(s) shall implement appropriate best management practice (BMP) noise reduction measures:
  - Two weeks prior to the commencement of demolition or construction, notification shall be provided to surrounding land uses within 1,000 feet of a project site disclosing the construction schedule, including the various types of activities that would be occurring throughout the duration of the construction period.
  - Ensure that construction equipment is properly muffled according to industry standards and in good working condition.
  - Place noise-generating construction equipment and locate construction staging areas away from sensitive uses, where feasible.
  - Schedule high noise-producing construction activities between the hours of 8:00 AM and 5:00 PM to minimize disruption to sensitive uses.
  - Place noise blankets around stationary construction noise sources.

- Construction-related equipment, including heavy-duty equipment, motor vehicles, and portable equipment, shall be turned off when not in use for more than 30 minutes.

- Construction hours, allowable workdays, and the phone number of the job superintendent shall be clearly posted at all construction entrances to allow for surrounding owners and residents to contact the job superintendent. If the job superintendent receives a complaint, the superintendent shall investigate, take appropriate corrective action, and report the action taken to the reporting party.

Residual Impacts: Construction impacts are considered less than significant.

Threshold 3.3.2 Would the project expose persons to or generation of excessive groundborne vibration or groundborne noise levels?

Ground vibrations from construction activities very rarely reach the levels that can damage structures, but they can achieve the audible range and could be felt in buildings very close to the project site. The primary and most intensive vibration source associated with the development of the proposed project would be the use of bulldozers and loaded haul trucks. These types of equipment can create intense noise that can result in ground vibrations.

The result from vibration can range from no perceptible effects at the lowest vibration levels to low rumbling sounds and perceptible vibrations at moderate levels, and to slight structural damage at the highest levels. **Table 3.3-6, Vibration Levels for Construction Equipment**, lists vibration levels of the construction equipment that could be used on the project site and typically produce groundborne vibration. A significant impact would occur, should construction activity cause a PPV of above 0.2 PPV. Existing land uses surrounding the project site primarily consist of residential uses. As discussed under **Threshold 3.3-1**, above, these residential uses would be considered sensitive receptors.

Table 3.3-6
Vibration Levels for Construction Equipment

Equipment	PPV at 25 ft. (in/sec)
Loaded Truck	0.076
Large bulldozer	0.089

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, (2006) 12-9.

Loaded trucks would be used to haul excavated soil from the site and to bring construction materials to the site. Bulldozers would be used to move dirt and materials around the site. As indicated above in **Table 3.3-6,** loaded trucks and large bulldozers are capable of producing vibration levels of

approximately 0.076 and 0.089 PPV, respectively, at 25 feet from the source, which is below the threshold of 0.2 PPV; therefore, these activities would not result in significant vibration impacts to off-site sensitive receptors. Project construction would not require the use of pile drivers or rollers, and therefore the higher vibration levels of such equipment are not included in this analysis.

The proposed construction activities could generate vibration that could potentially impact the Colorado Street Bridge's columns that run through the northern portion of the project site near Arroyo Boulevard. On-site construction-related vibration would not significantly impact the bridge for two reasons. First, construction activities associated with the construction of homes and ancillary structures (which would be expected to generate the most potential for vibration) would occur 100 feet or more from the bridge footings. Given the avoidance of impact pile-driving, vibratory rollers, and other equipment that generates significant vibration, construction activities on the project site would not approach the 0.2 PPV threshold of significance at the Colorado Street Bridge. Second, those on-site construction activities closest to the bridge would be associated with site preparation and grading for passive outdoor uses, such as the meadow, park recreational facilities, and surface parking lot improvements. Construction equipment used for these improvements would generate minimal vibration and would not threaten the structural stability of the on-site bridge columns. Therefore, impacts related to vibration would be less than significant.

Mitigation Measures: No mitigation measures are required.

Residual Impacts: Impacts would be less than significant.

Threshold 3.3.3 Would the project create a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

As shown in **Table 3.3-5**, above, increased traffic volumes would result in increased noise levels in residential neighborhoods adjacent to the project site. The greatest increase in traffic noise would occur on Westminster Drive east of Arroyo Boulevard, where modeled traffic noise would increase by 2.0 dB(A) on weekdays and 1.9 dB(A) on weekends. These noise level increases would neither increase current ambient noise levels more than 5 dB(A) nor rise to the "normally unacceptable" category of 70 dB(A).

As discussed under **Threshold 3.3-1**, the proposed project consists of residential development and a neighborhood park, and would not be expected to generate substantial amounts of noise as a result of occupancy of the proposed dwelling units. Typical noise sources would include people talking, car doors slamming, dogs barking, play activities and other noises typical of residential development and neighborhood parks. As demonstrated under **Threshold 3.3-1**, operational uses associated with the project would not result in an exceedance of the City's noise standards for residential uses. Therefore, the

proposed project would be compatible with existing development in the area and would not result in a substantial permanent increase in ambient noise.

Mitigation Measures: Impacts would be less than significant; no mitigation measures would be required.

Residual Impacts: Impacts would be less than significant.

Threshold 3.3-4 **Would the project create a substantial temporary or periodic increase in ambient noise levels in the project vicinity that would exceed the City's standards?**

The construction of the proposed project would generate temporary noise impacts from demolition, grading, building construction, and related activities that would increase ambient noise levels at adjacent residential development to the northeast and south of the project site. However, as discussed in **Threshold 3.3-1**, such noise increases would be less than the City's construction noise threshold of 85 dB(A) at 100 feet of distance and be considered less than significant.

Periodic increases in noise could be generated by the proposed park uses. Noises such as children playing would be periodic, occurring during daytime hours and often peaking during weekends. As discussed under **Threshold 3.3-1**, these uses would be compatible with existing development in the area and would not cause an exceedance of the City's exterior or interior noise standards for residential uses. Therefore impacts related to temporary or periodic ambient increases in noise would be less than significant.

Mitigation Measures: No mitigation measures are required.

Residual Impacts: Impacts would be less than significant.

CUMULATIVE IMPACTS

The list of cumulative projects is shown in **Section 2.0, Project Description**, of this EIR. Cumulative noise impacts occur when several projects combine to generate substantial additional noise in an area. As discussed above, with implementation of the provided mitigation measures, the proposed project would not cause any significant noise impacts. Since noise attenuates as distance from a project site increases, only projects located near the proposed project site would cause a cumulative impact when combined with the proposed project. The project site is located in an area of the City of Pasadena that is not anticipated to experience a substantial amount of construction activity. As shown in **Figure 2.0-9**, cumulative projects are located in areas that are further from the proposed project site than would allow for a cumulative impact related to noise. Therefore, there would be no cumulative noise impact.

The project would also contribute to cumulative growth in the Pasadena area that would elevate ambient noise levels off-site from increased traffic on local roadways. However, the project site is located on the southwest quadrant of the intersection of the I-210 and SR-134 freeways. Only three pending or approved projects are within 0.25 mile of the proposed project site and likely to contribute traffic volumes to Arroyo Boulevard and Westminster Drive. These include:

- 300 W. Green Street – 39 residential units
- 277 W. Green Street – 33 condominium units; 5,100 sf of commercial
- 367 W. Del Mar Boulevard – four condominium units

These three projects are low vehicle trip generators and would add a minimal number of vehicle trips to study roadways. These trips would marginally increase noise levels above the 2.0 dB(A) increase from the proposed project on weekdays and 1.9 dB(A) on weekends. However, any noise increases due to traffic would be expected to occur on Arroyo Boulevard and not on Westminster Drive which is not a thoroughfare for any of these projects. Any noise level increases would neither increase current ambient noise levels more than 5 dB(A) nor rise to the "normally unacceptable" category of 70 dB(A). Further, the project's contribution to noise increases on Arroyo Boulevard would be 0.2 dB(A) and therefore would not result in a cumulatively considerable increase in traffic noise and impacts would be less than significant.