



5.8 Noise



5.8 NOISE

The purpose of this section is to evaluate noise source impacts on-site and to surrounding land uses as a result of implementation of the proposed project. This section evaluates short-term construction-related impacts, as well as future buildout conditions. Mitigation measures are also recommended to avoid or lessen the project's noise impacts. Information in this section is based on the *Environmental Noise Assessment for the Portola Center Project*, prepared by Dudek, dated January 31, 2013 (refer to [Appendix 11.7, *Noise Assessment*](#)).

5.8.1 EXISTING SETTING

NOISE SCALES AND DEFINITIONS

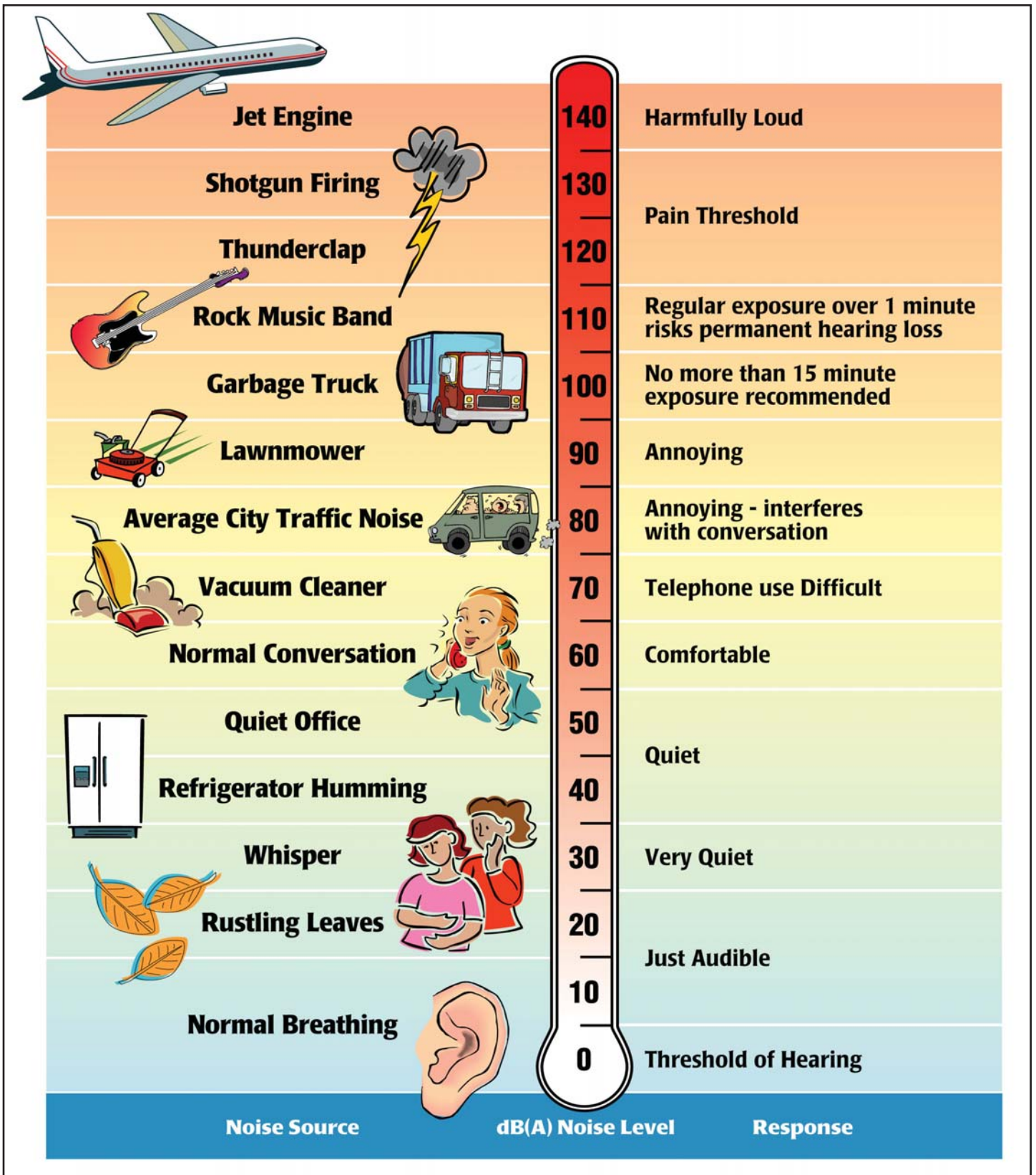
Sound is described in terms of the loudness (amplitude) of the sound and frequency (pitch) of the sound. The standard unit of measurement of the loudness of sound is the decibel (dB). Since the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

Decibels are based on the logarithmic scale. The logarithmic scale compresses the wide range in sound pressure levels to a more usable range of numbers in a manner similar to the Richter scale used to measure earthquakes. In terms of human response to noise, a sound 10 dBA higher than another is judged to be twice as loud, and 20 dBA higher four times as loud, and so forth. Everyday sounds normally range from 30 dBA (very quiet) to 100 dBA (very loud). Examples of various sound levels in different environments are illustrated on [Exhibit 5.8-1, *Sound Levels and Human Response*](#).

Many methods have been developed for evaluating community noise to account for, among other things:

- The variation of noise levels over time;
- The influence of periodic individual loud events; and
- The community response to changes in the community noise environment.

Numerous methods have been developed to measure sound over a period of time; refer to [Table 5.8-1, *Noise Descriptors*](#).



Source: Melville C. Branch and R. Dale Beland, *Outdoor Noise in the Metropolitan Environment*, 1970.
 Environmental Protection Agency, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (EPA/ONAC 550/9-74-004), March 1974.



**Table 5.8-1
Noise Descriptors**

Term	Definition
Decibel (dB)	The unit for measuring the volume of sound equal to 10 times the logarithm (base 10) of the ratio of the pressure of a measured sound to a reference pressure (20 micropascals).
A-Weighted Decibel (dBA)	A sound measurement scale that adjusts the pressure of individual frequencies according to human sensitivities. The scale accounts for the fact that the region of highest sensitivity for the human ear is between 2,000 and 4,000 cycles per second (hertz).
Equivalent Sound Level (L_{eq})	The sound level containing the same total energy as a time varying signal over a given time period. The L_{eq} is the value that expresses the time averaged total energy of a fluctuating sound level.
Maximum Sound Level (L_{max})	The highest individual sound level (dBA) occurring over a given time period.
Minimum Sound Level (L_{min})	The lowest individual sound level (dBA) occurring over a given time period.
Community Noise Equivalent Level (CNEL)	A rating of community noise exposure to all sources of sound that differentiates between daytime, evening, and nighttime noise exposure. These adjustments are +5 dBA for the evening, 7:00 PM to 10:00 PM, and +10 dBA for the night, 10:00 PM to 7:00 AM.
Day/Night Average (L_{dn})	The L_{dn} is a measure of the 24-hour average noise level at a given location. It was adopted by the U.S. Environmental Protection Agency (EPA) for developing criteria for the evaluation of community noise exposure. It is based on a measure of the average noise level over a given time period called the L_{eq} . The L_{dn} is calculated by averaging the L_{eq} 's for each hour of the day at a given location after penalizing the "sleeping hours" (defined as 10:00 PM to 7:00 AM) by 10 dBA to account for the increased sensitivity of people to noises that occur at night.
Exceedance Level (L_n)	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% (L_{01} , L_{10} , L_{50} , L_{90} , respectively) of the time during the measurement period.
Source: Cyril M. Harris, <i>Handbook of Noise Control</i> , dated 1979.	



HEALTH EFFECTS OF NOISE

Human response to sound is highly individualized. Annoyance is the most common issue regarding community noise. However, many factors influence people's response to noise. The factors can include the character of the noise, the variability of the sound level, the presence of tones or impulses, and the time of day of the occurrence. Additionally, non-acoustical factors, such as the person's opinion of the noise source, the ability to adapt to the noise, the attitude towards the source and those associated with it, and the predictability of the noise, all influence people's response. As such, response to noise varies widely from one person to another and with any particular noise, individual responses will range from "not annoyed" to "highly annoyed."

The effects of noise are often only transitory, but adverse effects can be cumulative with prolonged or repeated exposure. The effects of noise on the community can be organized into six broad categories:

- Noise-Induced Hearing Loss;
- Interference with Communication;
- Effects of Noise on Sleep;
- Effects on Performance and Behavior;
- Extra-Auditory Health Effects; and
- Annoyance.

According to the United States Public Health Service, nearly ten million of the estimated 21 million Americans with hearing impairments owe their losses to noise exposure. Noise can mask important sounds and disrupt communication between individuals in a variety of settings. This process can cause anything from a slight irritation to a serious safety hazard, depending on the circumstance. Noise can disrupt face-to-face communication and telephone communication, and the enjoyment of music and television in the home. It can also disrupt effective communication between teachers and pupils in schools, and can cause fatigue and vocal strain in those who need to communicate in spite of the noise.

Interference with communication has proved to be one of the most important components of noise-related annoyance. Noise-induced sleep interference is one of the critical components of community annoyance. Sound level, frequency distribution, duration, repetition, and variability can make it difficult to fall asleep and may cause momentary shifts in the natural sleep pattern, or level of sleep. It can produce short-term adverse effects on mood changes and job performance, with the possibility of more serious effects on health if it continues over long periods. Noise can cause adverse effects on task performance and behavior at work, and non-occupational and social settings. These effects are the subject of some controversy, since the presence and degree of effects depends on a variety of intervening variables. Most research in this area has focused mainly on occupational settings, where noise levels must be sufficiently high and the task sufficiently complex for effects on performance to occur.

Annoyance can be viewed as the expression of negative feelings resulting from interference with activities, as well as the disruption of one's peace of mind and the enjoyment of one's environment. Field evaluations of community annoyance are useful for predicting the consequences of planned



actions involving highways, airports, road traffic, railroads, or other noise sources. The consequences of noise-induced annoyance are privately held dissatisfaction, publicly expressed complaints to authorities, and potential adverse health effects, as discussed above. In a study conducted by the United States Department of Transportation, the effects of annoyance to the community were quantified. In areas where noise levels were consistently above 60 dBA CNEL, approximately nine percent of the community is highly annoyed. When levels exceed 65 dBA CNEL, that percentage rises to 15 percent. Although evidence for the various effects of noise have differing levels of certainty, it is clear that noise can affect human health. Most of the effects are, to a varying degree, stress related.

GROUND-BORNE VIBRATION

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. The peak particle velocity (PPV) or the root mean square (RMS) velocity is usually used to describe vibration amplitudes. PPV is defined as the maximum instantaneous peak or vibration signal, while RMS is defined as the square root of the average of the squared amplitude of the signal. PPV is typically used for evaluating potential building damage, whereas RMS is typically more suitable for evaluating human response. Typically, ground-borne vibration, generated by man-made activities, attenuates rapidly with distance from the source of vibration. Man-made vibration issues are therefore usually confined to short distances (i.e., 500 feet or less) from the source.

Both construction and operation of development projects can generate ground-borne vibration. In general, demolition of structures preceding construction generates the highest vibrations. Construction equipment such as vibratory compactors or rollers, pile drivers, and pavement breakers can generate perceptible vibration during construction activities. Heavy trucks can also generate ground-borne vibrations that vary depending on vehicle type, weight, and pavement conditions.

SENSITIVE RECEPTORS

Human response to noise varies widely depending on the type of noise, time of day, and sensitivity of the receptor. The effects of noise on humans can range from temporary or permanent hearing loss to mild stress and annoyance due to such things as speech interference and sleep deprivation. Prolonged stress, regardless of the cause, is known to contribute to a variety of health disorders. Noise, or the lack thereof, is a factor in the aesthetic perception of some settings, particularly those with religious or cultural significance. Certain land uses are particularly sensitive to noise, including schools, hospitals, rest homes, long-term medical and mental care facilities, and parks and recreation areas. Residential areas are also considered noise sensitive, especially during the nighttime hours.

Sensitive receptors in the project vicinity include residential uses adjacent to the north of the project site. Additional existing sensitive receptors located in the project vicinity include single and multi-family residential homes, schools, parks, and places of worship. Sensitive receptors are depicted below in [Table 5.8-2, *Sensitive Receptors*](#).



**Table 5.8-2
 Sensitive Receptors**

Type	Name	Distance from Project Site (feet)	Direction from Project Site
Residential	Residential Uses	50	North
		2,500	South
		1,200	East
		2,800	West
Schools	Portola Hills Elementary School	1,400	North
	Hillside Montessori School	1,300	East
	St. Michaels Abbey Preparatory School	4,400	North
Places of Worship	Saddleback Church	4,200	South
	Church of Jesus Christ Latter Day Saints	4,900	East
Parks	Foothill Ranch Community Park	2,800	West
	Concourse Park	4,300	North
	Altissima Park	4,900	East
	Pinecrest Park	4,000	South

Source: Google Earth, 2013.

AMBIENT NOISE MEASUREMENTS

In order to quantify existing ambient noise levels in the project area, Dudek conducted noise measurements on September 25, 2012 between the hours of 11:00 a.m. and 11:54 a.m.; refer to [Table 5.8-3, *Noise Measurements*](#). The noise measurement sites were representative of typical existing noise exposure within and immediately adjacent to the project site; refer to [Exhibit 5.8-2, *Noise Measurement Locations*](#). Two noise measurement locations were selected at the project site. Site 1 was at the north side of Glenn Ranch Road. Site 2 was along the west side of Saddleback Ranch Road. As shown in [Table 5.8-4](#), the measured average noise levels were 69 dB at Site 1 and 67 dB at Site 2. The primary noise source at Sites 1 and 2 was the traffic along the adjacent roads.

**Table 5.8-3
 Noise Measurements**

Measurement Location Number	Location	Leq (dBA)	L _{min} (dBA)	L _{max} (dBA)	Cars	Medium Trucks	Heavy Trucks	Time
1	Along north side of Glenn Ranch Road, approximately 50 feet from the center line	69	34	84	151	1	0	11:00 a.m. to 11:20 a.m.
2	Along west side of Saddleback Ranch Road, approximately 50 feet from the center line	67	37	75	193	1	0	11:34 a.m. to 11:54 a.m.

Source: Dudek, *Environmental Noise Assessment for the Portola Center Project*, January 31, 2011.



Source: Dudek, *Environmental Noise Assessment for the Portola Center Project*, January 31, 2013.

Note: The project's Tentative Tract Maps have been refined through the planning process since creation of this exhibit.

Refinements to the Tentative Tract Maps do not affect the environmental analysis, findings, or effectiveness of the mitigation measures contained in this SEIR.

NOT TO SCALE



06/13 • JN 10-107644 (130079)



This page intentionally left blank.



Noise monitoring equipment used for the ambient noise survey consisted of a Larson-Davis Laboratories Model 700 integrating sound level meter. The sound level meter was calibrated before and after the measurements, and the measurements were conducted with the microphone positioned approximately 5 feet aboveground. The monitoring equipment complies with applicable requirements of the American National Standards Institute (ANSI) for Type I (precision) sound level meters. The results of the field measurements are indicated in [Appendix 11.7, *Noise Assessment*](#).

MOBILE SOURCES

Traffic along Glenn Ranch Road and Saddleback Ranch Road are the primary noise sources in the immediate vicinity of the site. Background noise includes distant traffic and occasional distant aircraft noise. Glenn Ranch Road has existing traffic volumes of 6,200 to 13,700 average daily trips (ADT), and Saddleback Ranch Road has existing traffic volumes of 13,200 ADT. The existing noise levels along Glenn Ranch Road ranges from approximately 68 dB to 71 dB at a distance of 50 feet from the center line of the road. The noise level depends on the ADT adjacent to the road segment. The noise level is approximately 67 dB CNEL at a distance of 50 feet from the center line of Saddleback Ranch Road.

STATIONARY NOISE SOURCES

The project area consists of residential and park uses served by a grid system of arterial and collector streets. The primary sources of stationary noise in the project vicinity are urban-related activities (e.g., parking areas, conversations, and recreational areas). The noise associated with these sources may represent a single-event or a continuous occurrence.

5.8.2 REGULATORY SETTING

This section summarizes the laws, ordinances, regulations, and standards that are applicable to the project. Regulatory requirements related to environmental noise are typically promulgated at the local level. However, Federal and State agencies provide standards and guidelines to the local jurisdictions.

STATE OF CALIFORNIA GUIDELINES

California Environmental Quality Act

CEQA was enacted in 1970 and requires that all known environmental effects of a project be analyzed, including environmental noise impacts. Under CEQA, a project has a potentially significant impact if the project exposes people to noise levels in excess of standards established in the local general plan or noise ordinance. Additionally, under CEQA, a project has a potentially significant impact if the project creates a substantial increase in the ambient noise levels in the project vicinity above levels existing without the project. If a project has a potentially significant impact, mitigation measures must be considered. If mitigation measures to reduce the impact to less than significant levels are not feasible due to economic, social, environmental, legal or other conditions, the most feasible mitigation measures must be considered.



CITY OF LAKE FOREST

Lake Forest Noise Ordinance

The City of Lake Forest Noise Ordinance is designed to protect people from non-transportation noise sources such as music, construction activity, machinery and pumps, and air conditioners. Enforcement of the ordinance ensures adjacent properties are not exposed to excessive noise from stationary sources. Enforcing the Noise Ordinance includes requiring proposed development projects to show compliance with the ordinance, and requiring construction activity to comply with established work schedule limits. Table 5.8-4, *City of Lake Forest Exterior Noise Standards*, depicts the City's noise standards that apply to all residential properties. Following this table are a summary of noise level adjustments that may be made to the noise level limits depending on the period of time the noise occurs during any hour.

Table 5.8-4
City of Lake Forest Exterior Noise Standards

Noise Level	Time Period
55 dB	7:00 a.m. – 10:00 p.m.
50 dB	10:00 p.m. – 7:00 a.m.

Source: City of Lake Forest, *City of Lake Forest Municipal Code, Title 11 Peace and Safety, Division 2, Chapter 11.16 Noise Control*, June 2010.

It shall be unlawful for any person at any location to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, when the foregoing causes the noise level:

1. The noise standard for a cumulative period of more than 30 minutes in any hour; or
2. The noise standard plus 4 dB for a cumulative period of more than 15 minutes in any hour;
or
3. The noise standard plus 10 dB for a cumulative period of more than 5 minutes in any hour;
or
4. The noise standard plus 15 dB for a cumulative period of more than 1 minute in any hour;
or
5. The noise standard plus 20 dB for any period of time.

Chapter 11.16 (Noise Control) of the City's Municipal Code limits construction and grading activities to the hours of 7:00 a.m. and 8:00 p.m., Monday through Saturday. Construction is not allowed at any time on Sunday or a Federal holiday.



Lake Forest General Plan Noise Element

The California Government Code requires that a noise element be included in the general plan of each county and City in the state. The Safety and Noise Element of the City of Lake Forest General Plan is intended to identify sources of noise and provide objectives and policies that ensure that noise from various sources does not create an unacceptable noise environment. It is a tool that City planners use to achieve and maintain compatible land uses with environmental noise levels. Table 5.8-5, Interior and Exterior Noise Standards, shows the interior and exterior noise standards as shown in the City of Lake Forest General Plan Safety and Noise Element. The Safety and Noise Element identifies community noise exposure standards as acceptable in the range of 45 dBA for interior daytime noise in residential and other noise sensitive uses and up to 65 dBA for exterior daytime noise for sensitive uses, including residential uses and hospitals.

**Table 5.8-5
 Interior and Exterior Noise Standards**

Land Use	Noise Standards ¹	
	Interior ^{2,3}	Exterior
Residential—Single family, multifamily, duplex, mobile home	CNEL 45 dB	CNEL 65 dB 4
Residential—Transient lodging, hotels, motels, nursing homes, hospitals	CNEL 45 dB	CNEL 65 dB 4
Private offices, church sanctuaries, libraries, board rooms, conference rooms, theaters, auditoriums, concert halls, meeting halls, etc.	Leq(12) 45 dBA 2, 6	--
Schools	Leq(12) 45 dBA	Leq(12) 67 dBA 5
General offices, reception, clerical, etc.	Leq(12) 50 dBA	--
Bank lobby, retail store, restaurant, typing pool, etc.	Leq(12) 50 dBA	--
Manufacturing, kitchen, warehousing, etc.	Leq(12) 50 dBA	
Parks, playgrounds	--	CNEL 65 dB 5
Golf courses, outdoor spectator sports, amusement parks	--	CNEL 70 dB 5
Notes:		
1. CNEL = Community Noise Equivalent Level; Leq(12) = The A-weighted equivalent sound level averaged over a 12-hour period (usually the hours of operation).		
2. Noise standards with windows closed. Mechanical ventilation shall be provided per the Uniform Building Code (UBC) requirements to provide a habitable environment.		
3. Indoor environment excluding bathrooms, toilets, closets and corridors.		
4. Outdoor environment limited to rear yard single family homes, multifamily patios and balconies (with a depth of 6 feet or more) and common recreation areas.		
5. Outdoor environment limited to playground areas, picnic areas, and other areas of frequent human use.		
6. Religious institutions (Churches, temples, and other places of worship) of a small size (occupancy of 100 persons or less) may occupy existing buildings within areas of exterior noise levels ranging from 65 to 75 dB CNEL without providing additional noise insulation for the building.		
Source: City of Lake Forest, <i>Lake Forest General Plan Safety and Noise Element</i> , June 21, 1994.		

Goals from the Noise Element that are relevant to the proposed project are as follows:

Goal 5.0 Consideration of the effects of noise in land use planning.

Policy 5.1 Utilize noise/land use compatibility standards as a guide for future planning and development decisions.



Policy 5.2 Provide noise control measures, such as berms, walls, and sound attenuating construction in areas of new construction or rehabilitation.

Goal 6.0 Reduction in the impact of transportation-related noise.

Policy 6.1 Reduce noise impacts to sensitive land uses from transportation noise sources.

Goal 7.0 Reduction in non-transportation noise impacts.

Policy 7.1 Minimize the impacts of noise-producing land uses and activities on noise-sensitive land uses.

In addition, the City of Lake Forest General Plan includes noise contour limits that restrict where sensitive uses may be placed within the City. Due to the historical aircraft flight patterns from the former Marine Corps Air Station (MCAS) El Toro and resultant noise from the aircraft, restrictions were initially placed on a large swath of land (“Project Area”) in the heart of present-day Lake Forest and included in the General Plan. The Project Area is the area formerly encumbered by the 65 dBA CNEL contours, which restricted the development of noise-sensitive land uses in the Project Area due to aircraft flight patterns at the former MCAS El Toro. However, as part of an amendment to the City’s General Plan in 2000, the 65 dBA CNEL contours in the project area for the MCAS El Toro have since been eliminated from the City General Plan.

5.8.3 IMPACT THRESHOLDS AND SIGNIFICANCE CRITERIA

Appendix G, of the *CEQA Guidelines* contains analysis guidelines related to the assessment of noise impacts. These guidelines have been utilized as thresholds of significance for this analysis. As stated in Appendix G, a project would create a significant environmental impact if it would:

- Expose persons to, or generate, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies (refer to Impact Statement N-1);
- Expose persons to or generate excessive ground borne vibration or ground borne noise levels (refer to Impact Statement N-2);
- Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project (refer to Impact Statements N-3 and N-4);
- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project (refer to Impact Statement N-1);
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or



working in the project area to excessive noise levels (refer to Section 8.0, *Effects Found Not To Be Significant*); and

- For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels (refer to Section 8.0, *Effects Found Not To Be Significant*).

CITY OF LAKE FOREST NOISE THRESHOLDS

Traffic Noise

A proposed project would normally have a significant offsite traffic noise impact if both of the following criteria are met:

- Project traffic will cause a noise level increase of 3dB or more on a roadway segment adjacent to a noise sensitive land use. Noise sensitive land uses include the following: residential (single-family, multi-family, duplex, mobile home); transient lodging hotels; motels; nursing homes; hospitals; parks, playgrounds and recreation areas; and schools.
- The resulting “future with project” noise level exceeds the noise standard for sensitive land uses as identified in the City of Lake Forest General Plan (refer to Table 3-1 in Section 3.3, Applicable Noise Standards).

Stationary Noise

The project would normally have a significant noise impact if it would:

- Exceed the stationary source noise criteria for the City of Lake Forest as identified in Table 3-2 in Section 3.3, City of Lake Forest Noise Ordinance.

5.8.4 OVERVIEW OF OSA PEIR NOISE ANALYSIS

The OSA PEIR determined that construction activities associated with development in the OSA would not generate noise levels that exceed the standards established in the City of Lake Forest Noise Regulations. Impacts associated with substantial temporary or periodic increases in ambient noise levels in the project vicinity would be less than significant with compliance with City and Municipal Code requirements. City requirements include requiring advance notice of construction activities to off-site constituents that are affected by project construction. Code requirements include limits on construction activities to only be conducted between the hours of 7:00 a.m. and 8:00 p.m. on Monday through Saturday. Code requirements also state that construction activities shall not occur on Sundays or federal holidays. In the event that project construction is required to occur between the hours of 8:00 p.m. and 7:00 a.m. on Monday through Saturday, on Sundays, or on federal holidays, the project applicant(s) would be required to apply for a variance with the Health Office pursuant to Section 11.16.030 of the Municipal Code. The OSA PEIR determined that compliance with the above requirements would reduce temporary construction noise levels to a less than significant level.



As there are no fragile structures within the vicinity of the future project construction sites in the OSA, the OSA PEIR determined that future construction would not expose structures to excessive groundborne vibration or groundborne noise levels. However, analysis of construction activities associated with the OSA determined that potential impacts could result in the exposure of persons to excessive groundborne vibration or groundborne noise levels. Therefore, OSA PEIR Mitigation Measure 3.10-1, which requires the operation of vibration-generating equipment to be located as far away from vibration-sensitive sites as possible. Additionally, OSA PEIR Mitigation Measure 3.10-2 requires further CEQA review with the submittal of each area plan or tentative map within the OSA. OSA PEIR Mitigation Measure 3.10-2 would reduce this potential impact at the program stage to a less than significant level.

The OSA PEIR determined that development within the OSA would result in a significant unmitigated cumulative impact from the increased local traffic noise. Given the potential for a significant impact, OSA PEIR Mitigation Measure 3.10-2 requires further CEQA review with the submittal of each area plan or tentative map for the OSA. Implementation of OSA PEIR Mitigation Measure 3.10-2 was determined to reduce this potential impact at the program stage to a less than significant level.

The OSA PEIR determined that implementation of the OSA could add new stationary sources of noise (i.e., heating, ventilation, and air conditioning [HVAC] equipment) and cause a substantial permanent increase in ambient noise levels. OSA PEIR Mitigation Measure 3.10-3 requires shielding of all HVAC equipment and to attenuate noise from HVAC systems to 65 dBA or less at 50 feet. With implementation of OSA PEIR Mitigation Measure 3.10-3, impacts associated with a permanent increase in ambient noise levels resulting from stationary sources would be reduced to a less than significant level.

5.8.5 IMPACTS AND MITIGATION MEASURES

SHORT-TERM CONSTRUCTION NOISE IMPACTS

N-1 GRADING AND CONSTRUCTION WITHIN THE AREA WOULD NOT RESULT IN SIGNIFICANT TEMPORARY NOISE IMPACTS TO NEARBY NOISE SENSITIVE RECEIVERS.

Impact Analysis: The OSA PEIR (page 3.10-4) determined that construction activities associated with development in the OSA would not generate noise levels that exceed the standards established in the City of Lake Forest Noise Regulations. Impacts associated with substantial temporary or periodic increases in ambient noise levels in the project vicinity would be less than significant with compliance with City and Municipal Code requirements. The OSA PEIR determined that compliance with the above requirements would reduce temporary construction noise levels to a less than significant level. Construction noise impacts associated with the proposed Portola Center project are discussed below.

Development activities for the project construction would generally involve the following activities: (1) site preparation/grading, (2) building construction, and (3) paving. Construction equipment anticipated for project development includes only standard equipment that would be employed for



any routine construction project of this scale; construction equipment with substantially higher noise and vibration generation characteristics (i.e., pile drivers, rock drills, blasting equipment, etc.) would not be used. Construction noise is difficult to quantify because of the many variables involved including the size of equipment used, percentage of time and number of pieces of equipment that would actually operate on the site. However, maximum construction noise levels at 50 feet would typically range from approximately 75 to 85 dB for the type of equipment anticipated to be used for construction of the project. The range of maximum noise levels associated with various pieces of construction equipment is depicted in Table 5.8-6, Construction Equipment Noise Emission Levels.

**Table 5.8-6
Construction Equipment Noise Emission Levels**

Equipment	Typical Sound Level (dB) 50 feet from Source
Air Compressor	81
Backhoe	80
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generator	81
Grader	85
Impact Wrench	85
Jack Hammer	88
Loader	85
Paver	89
Pile-driver (Impact)	101
Pile-driver (Sonic)	96
Pneumatic Tool	85
Pump	76
Rail Saw	90
Rock Drill	98
Roller	74
Saw	76
Scraper	89
Truck	88
Source: Federal Transit Administration, <i>Traffic Noise and Vibration Assessment</i> , May 2006.	

The closest existing residences to the construction area are the residences located at the northern property boundary along Millwood Road and Malabar Road, Sorano Cove, Totila Way, and Sassetta Way. Grading and construction activities would occur approximately seven or more feet from the existing multifamily buildings along Sorano Cove, Totila Way and Sassetta Way. The construction of a manufactured slope and other improvements in the northeast corner of the site near the La Quinta stub street offsite would also involve grading and construction activities within approximately 15 feet of existing residences. In all other areas, grading activities would not occur any closer than approximately 40 feet from existing residences. Based on the types of grading



equipment operating as close as seven feet to the nearest residences, the construction noise is anticipated to generate maximum noise levels of up to approximately 102 dB at the adjacent residences. This noise level could intermittently occur for a few days when construction equipment is operating immediately adjacent to the residential properties. The remainder of the time the construction noise level would be much less because the equipment would be working in a large area farther away from the existing residences. When the construction equipment is operating, the existing residences could be disturbed by the activities.

Construction activities associated with development of the project have the potential to adversely affect adjacent noise-sensitive uses. As such, noise levels are considered to represent a potentially significant impact. Standard Conditions of Approval N1 and N2 would minimize impacts from construction noise by requiring mufflers on equipment engines and limitations on construction hours. Additionally, Mitigation Measure N-1 would reduce construction noise by limiting equipment idling, stockpiling and staging vehicles away from noise sensitive uses, and constructing temporary noise barriers. With implementation of Standard Conditions N1 and N2, Mitigation Measure N-1, and compliance with Section 11.16 of the City's Municipal Code, construction related impacts would be less than significant.

Standard Conditions of Approval:

- N1 Prior to the issuance of a grading permit, the applicant shall produce written evidence, or other evidence deemed reasonably acceptable by the Director of Development Services, that all construction vehicles or equipment, fixed or mobile, operated within 1,000 feet of any residential dwelling unit shall be equipped with properly operating and maintained mufflers.
- N2 Grading and construction, construction activities shall be prohibited between the hours of 7:00 p.m. and 7:00 a.m. Monday through Friday; 6:00 p.m. and 8:00 a.m. Saturday; and at any time on Sunday or a federal holiday.

Applicable OSA Mitigation Measures: No OSA Mitigation Measures are applicable to this topical area.

Additional Mitigation Measures:

- N-1 Prior to issuance of grading permits, the project shall submit a plan that demonstrates, to the satisfaction of the Lake Forest Development Services Department, that the project complies with the following:
- Construction noise reduction methods such as shutting off idling equipment, maximizing the distance between construction equipment staging areas and occupied residential areas, and use of electric air compressors and similar power tools, rather than diesel equipment, shall be used where feasible. Unattended construction vehicles shall not idle for more than 5 minutes when located within 300 feet from residential properties.



- Noise attenuation measures, which may include, but are not limited to, temporary noise barriers or noise blankets around stationary construction noise sources, are implemented where feasible.
- During construction, stationary construction equipment shall be placed such that emitted noise is directed away from or shielded from sensitive noise receivers where feasible.
- During construction, stockpiling and vehicle staging areas shall be located as far as practical from noise sensitive receptors.
- Construction hours, allowable workdays, and the phone number of the job superintendent shall be clearly posted at all construction entrances to allow surrounding property owners and residents to contact the job superintendent if necessary. In the event the City receives a complaint, appropriate corrective actions shall be implemented.
- Two weeks prior to the commencement of construction, notification must be provided to surrounding land uses within 300 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. This notification shall give a contact phone number for any questions or complaints. All complaints shall be responded to in a method deemed satisfactory by the City of Lake Forest.

Level of Significance: Less Than Significant With Mitigation Incorporated.

VIBRATION IMPACTS

N-2 PROJECT IMPLEMENTATION WOULD NOT RESULT IN SIGNIFICANT VIBRATION IMPACTS TO NEARBY SENSITIVE RECEPTORS.

Impact Analysis: The OSA PEIR (page 3.10-16) determined that future construction would not expose structures to excessive groundborne vibration or groundbourne noise levels. However, construction activities associated with the OSA could result in the exposure of persons to excessive groundborne vibration (page 3.10-15). Therefore, OSA PEIR Mitigation Measure 3.10-1 is required to ensure vibration-generating equipment is located as far away from vibration-sensitive sites as possible. Additionally, OSA PEIR Mitigation Measure 3.10-2 requires further CEQA review with the submittal of each area plan or tentative map within the OSA. The OSA PEIR determined that OSA PEIR Mitigation Measure 3.10-2 would reduce this potential impact at the program stage to a less than significant level. Vibration impacts associated with the proposed Portola Center project are discussed below.



Short-Term (Construction) Impacts

The heavier pieces of construction equipment used at this site would include bulldozers, graders, loaded trucks, water trucks and pavers. Ground-borne vibration information related to construction activities has been collected by the California Department of Transportation (Caltrans). Information from Caltrans indicates that continuous vibrations with a peak particle velocity of approximately 0.1 inches/second begin to annoy people.¹ However, according to the American Society of Civil Engineers (ASCE), this annoyance threshold is approximately half of the magnitude which is typically used for protection of “fragile buildings.”² The ASCE recommends the use of a 0.2 inches/second particle velocity to ensure the avoidance of damage to older existing structures in the project vicinity.

Ground-borne vibration is typically attenuated over short distances. The closest residential buildings to the construction area would be the multifamily homes along Sorano Cove, Totila Way, and Sassetta Way located at the northern boundary of the site approximately 7 feet or more from the grading and construction area. Heavier pieces of construction equipment such as large bulldozers and loaded trucks would have peak particle velocities of approximately 0.60 or less at a distance of 7 feet.³ At these distances, the peak particle velocity would be above 0.1 inches/second, the level of vibration which is considered to be perceivable by a sensitive receptor. The peak particle velocity at this distance would also be above the recommended 0.2 inches/second recommended by the ASCE to ensure the avoidance of damage to older existing structures. As a result, ground-borne vibration from grading activities would be considered a potentially significant impact.

OSA PEIR Mitigation Measure 3.10-1 would require the project to use lighter-weight grading equipment and static compaction equipment (e.g., a sheep’s foot) in any areas that are within 25 feet or less of existing homes or residential buildings immediately adjacent to the project site. Prior to commencement of grading activities within 25 feet of these structures, the project would conduct a video survey of the building foundations and install vibration monitoring equipment inside the property boundary of the complex along the project site boundary.

With the incorporation of OSA PEIR Mitigation Measure 3.10-1, no buildings adjacent to the project site would be anticipated to be damaged from the ground-borne vibration created during site preparation activities and this vibration impact would be less than significant. As it relates to other construction activities that would create excessive vibration, the greatest sources of ground vibration from construction are associated with pile driving, rock drills, and blasting, none of which are proposed for project development. Therefore, other construction activities are not anticipated to result in continuous vibration levels that typically annoy people, and the vibration impact would be less than significant.

¹ California Department of Transportation (Caltrans), *Transportation Related Earthborne Vibrations*, January 23, 2004.

² American Society of Civil Engineers (ASCE), *Journal of Construction Division, Vibrations During Construction Operations*, September 1974.

³ Federal Transit Administration (FTA), *Transit Noise and Vibration Impact Assessment*, 2006.



Long-Term (Operational) Impacts

The project is not located within the vicinity of any railroad tracks, or any other use capable of producing groundborne vibration. Additionally, as the project would allow the development of residential uses, parks, neighborhood commercial uses, and neighborhood facilities, the project would not result in any operational groundborne vibration impacts. No impact would occur in this regard.

Standard Conditions of Approval: Refer to Standard Conditions of Approval N1 and N2.

Applicable OSA Mitigation Measures:

- 3.10-1 ~~A condition of approval shall be placed on all Site Development Permit and/or Use Permit approvals for site-specific developments, which states Prior to issuance of grading permits, the project shall submit a plan that demonstrates, to the satisfaction of the Lake Forest Development Services Department:~~ Construction staging areas and operation of earth moving equipment on a project site shall be located more than 25 feet away from sensitive receptors (such as residences, schools, hospitals). If equipment will be operated within 25 feet of any sensitive receptor, the applicant shall prepare a construction plan which quantifies the anticipated vibration levels associated with the construction (in VdB) and the length of time the construction is to occur, and documents efforts to minimize impacts associated with groundborne vibration.

Additional Mitigation Measures: No additional mitigation measures are required.

Level of Significance: Less Than Significant With Mitigation Incorporated.

LONG-TERM (MOBILE) NOISE IMPACTS

N-3 TRAFFIC GENERATED BY THE PROPOSED PROJECT WOULD NOT SIGNIFICANTLY CONTRIBUTE TO EXISTING TRAFFIC NOISE IN THE AREA OR EXCEED THE CITY'S ESTABLISHED STANDARDS.

Impact Analysis: The OSA PEIR (page 3.10-20) determined that development within the OSA would result in a significant unmitigated cumulative impact from the increased local traffic noise. Therefore, OSA PEIR Mitigation Measure 3.10-2 requires further CEQA review with the submittal of each area plan or tentative map for the OSA. Implementation of OSA PEIR Mitigation Measure 3.10-2 was determined to reduce this potential impact at the program stage to a less than significant level. Mobile source noise impacts associated with the proposed Portola Center project are discussed below.

Off-Site Noise Conditions

Based on the *Portola Center Project Traffic Impact Study* prepared by Wilson and Company (dated January 2013), the project would generate a net increase of approximately 10,400 ADT and would increase traffic along several existing roads in the area including Glenn Ranch Road, Saddleback



Ranch Road, El Toro Road and Portola Parkway. In accordance with the City of Lake Forest CEQA Significance Thresholds Guide, traffic-generated noise impacts along these roadways would be significant if they exceed a 3 dB CNEL increase above an already noisy existing condition (i.e., 65 dB CNEL) at existing residences or other noise-sensitive land uses. As identified in the City of Lake Forest General Plan Noise Element, the City’s conditionally acceptable noise level for residences is 65 dB CNEL; therefore, this threshold is utilized. A 3 dB increase is generally considered to be the point of change in environmental noise that can just be detected by the human ear.

The noise level increases associated with the Year 2015 conditions are depicted in Table 5.8-7, 2015 Off-Site Traffic Noise Level Increase. With the project, the Year 2015 traffic noise would generate a noise level increase of 1 dB CNEL or less along Glenn Ranch Road and less than 1 dB CNEL along the other nearby roads as compared to without the project. Therefore, the additional project traffic volume along the adjacent roads would not substantially increase the existing noise level in the project vicinity and the traffic noise level increase is considered less than significant.

**Table 5.8-7
2015 Off-Site Traffic Noise Level Increase**

Street (Segment)	Future Year 2015 ADT	Future Year 2015 with Project ADT	Noise Level Increase (CNEL)
Glenn Ranch Road			
West of Saddleback Ranch Road	22,000	27,000	1
East of Saddleback Ranch Road	8,000	9,000	1
Saddleback Ranch Road			
North of Glenn Ranch Road	14,000	15,500	<1
El Toro Road			
South of Glenn Ranch Road	16,000	17,000	<1
North of Portola Parkway	15,000	15,000	0
Portola Parkway			
Lake Forest Drive to Glenn Ranch Road	40,000	43,000	<1
Glenn Ranch Road to I-5	29,000	30,000	<1
I-5 to El Toro Road	41,000	42,000	<1
El Toro Road to Los Alisos Boulevard	38,000	39,000	<1

Source: Dudek, *Environmental Noise Assessment for the Portola Center Project*, January 31, 2013.

The noise level increases associated with the Year 2030 conditions are depicted in Table 5.8-8, 2030 Off-Site Traffic Noise Level Increase. With the project, the Year 2030 traffic noise would generate a noise level increase of 1 dB CNEL or less along Glenn Ranch Road and less than 1 dB CNEL along the other nearby roads as compared to without the project. Therefore, the additional project traffic volume along the adjacent roads would not substantially increase the existing noise level in the project vicinity and the traffic noise level increase is considered less than significant.



**Table 5.8-8
2030 Off-Site Traffic Noise Level Increase**

Street (Segment)	Future Year 2015 ADT	Future Year 2015 with Project ADT	Noise Level Increase (CNEL)
Glenn Ranch Road			
West of Saddleback Ranch Road	25,000	30,000	1
East of Saddleback Ranch Road	11,000	12,000	<1
Saddleback Ranch Road			
North of Glenn Ranch Road	13,200	14,700	<1
El Toro Road			
South of Glenn Ranch Road	24,000	24,000	0
North of Portola Parkway	20,000	21,000	<1
Portola Parkway			
Lake Forest Drive to Glenn Ranch Road	47,000	50,000	<1
Glenn Ranch Road to I-5	35,000	36,000	<1
I-5 to El Toro Road	55,000	55,000	0
El Toro Road to Los Alisos Boulevard	47,000	47,000	0
Source: Dudek, <i>Environmental Noise Assessment for the Portola Center Project</i> , January 31, 2013.			

On-Site Noise Conditions

Exterior Noise Levels

Glenn Ranch Road is projected to have a Year 2030 traffic volume of 12,000 ADT between Saddleback Back Ranch Road and El Toro Road and 30,000 ADT between Portola Parkway and Saddleback Ranch Road. Saddleback Ranch Road is projected to have a Year 2030 traffic volume of 14,700 ADT between Glenn Ranch Road and Millwood Road. ADT volumes were divided by 10 to estimate hourly segment volumes along these roadways, and these hourly segment volumes were utilized in the model. The locations of modeled receptors are shown in [Exhibit 5.8-3, *Noise Modeling Receptors*](#). The conversion of hourly L_{eq} to CNEL is based on the hourly traffic counts for the adjacent roads as provided in the project-specific traffic report prepared by Wilson and Company (dated January 2013). The 24-hour traffic counts indicate that approximately 75 percent of the daily traffic volume occurs during the daytime hours, 15 percent during the evening hours and 10 percent during the nighttime hours.

The first floor unmitigated noise level would range from 62 to approximately 69 dB CNEL. Noise levels associated with each receptor are shown in [Table 5.8-9, *Exterior Traffic Noise Levels at Modeled Receptors*](#). The noise level would exceed the City's noise guideline by up to 4 dB at some of the lots adjacent to both Glenn Ranch Road and Saddleback Ranch Road. The City of Lake Forest General Plan Noise Element establishes that noise levels in excess of 65 dB CNEL would result in a significant noise impact if not mitigated. Mitigation Measure N-2 requires exterior noise impacts to be mitigated by constructing 6-foot high noise barriers (i.e., sound walls or berms) at the homes adjacent to Glenn Ranch Road and Saddleback Ranch Road, as depicted in [Exhibit 5.8-4, *Noise Barrier Heights and Locations*](#). With inclusion of these sound walls required in Mitigation Measure N-2, noise levels would be decreased to a less than significant level (65 dB CNEL or less at all first floor exterior receptors), as shown above in [Table 5.8-9](#).



Table 5.8-9
Exterior Traffic Noise Levels at Modeled Receptors

Receptor	First Floor Noise Level (db CNEL) Unmitigated ¹	First Floor Noise Level (dB CNEL) Mitigated	Second Floor Noise Level (dB CNEL) Unmitigated
R1	62	51	--
R2	65	53	--
R3	66	54	--
R4	67	56	--
R5	68	56	--
R6	69	58	--
R7	69	57	--
R8	69	57	--
R9	69	57	--
R10	69	56	--
R11	69	64	--
R12	68	53	--
R13	63	49	--
R14	65	49	--
R15	65	51	--
R16	66	53	--
R17	66	54	--
R18	66	55	--
R19	67	55	--
R20	67	55	--
R21	68	58	--
R22	68	61	--
R23	65	63	--
R24	64	63	--
R25	65	63	--
R26	66	60	--
R27	65	60	--
R28	62	60	--
R29	59	56	--
R30	66	60	--
R31	67	60	--
R32	67	63	--
R33	64	64	--
R34	62	61	--
R35	62	60	--
R36	62	60	--
R37	61	60	--
R38	62	61	--
R39	64	63	--
R40	66	63	--
MF1	64	62	63
MF2	64	61	63
MF3	64	62	63
MF4	64	62	63
MF5	63	61	62
Park	63	62	--
Mixed Use	65	63	64

Notes:

1. Bold text indicates a potential exceedance of the City's criteria.

Source: Dudek, *Environmental Noise Assessment for the Portola Center Project*, January 31, 2013.



Modeling Receptor

- Single Family Residential
- Multi-Family Residential
- Park
- Mixed Use
- Project Boundary

Source: Dudek, *Environmental Noise Assessment for the Portola Center Project*, January 31, 2013.

Note: The project's Tentative Tract Maps have been refined through the planning process since creation of this exhibit.

Refinements to the Tentative Tract Maps do not affect the environmental analysis, findings, or effectiveness of the mitigation measures contained in this SEIR.

NOT TO SCALE



06/13 • JN 10-107644 (130079)



This page intentionally left blank.



Source: Dudek, *Environmental Noise Assessment for the Portola Center Project*, January 31, 2013.

Note: The project's Tentative Tract Maps have been refined through the planning process since creation of this exhibit.

Refinements to the Tentative Tract Maps do not affect the environmental analysis, findings, or effectiveness of the mitigation measures contained in this SEIR.

NOT TO SCALE



06/13 • JN 10-107644 (130079)



This page intentionally left blank.



Interior Noise Levels

The City requires that interior noise levels not exceed a CNEL of 45 dB. Typically, with the windows open, and using standard California construction materials and methods, building shells provide approximately 15 dB of noise reduction. Therefore, residences exposed to an exterior CNEL greater than 60 dB could result in an interior CNEL greater than 45 dB. The estimated interior noise level would exceed 45 dB CNEL at a majority of the single family lots and multi-family buildings adjacent to Glenn Ranch Road and Saddleback Ranch Road. Thus, single family lots and multi-family buildings adjacent to Glenn Ranch Road and Saddleback Ranch Road have the potential to experience interior noise levels that would exceed the City's thresholds. Actual interior noise levels cannot be determined at this time as the residential site plans have not been developed yet. Interior noise levels depend on several variables, including building materials (e.g., construction and window type, etc.), distance from the source, and intervening topography. Therefore, Mitigation Measure N-3 would be required to ensure that homes along Glenn Ranch Road and Saddleback Ranch Road would not experience interior noise levels exceed 45 dB once site plans are available. To mitigate the interior noise impact, the homes and multifamily buildings would most likely require air-conditioning and/or mechanical ventilation and possibly sound-rated windows.

Standard Conditions of Approval: No Standard Conditions of Approval are applicable to this topic area.

Applicable OSA Mitigation Measures: No OSA Mitigation Measures are applicable to this topical area.

Additional Mitigation Measures:

- N-2 Prior to issuance of certificates of occupancy, the applicant shall demonstrate that noise barriers up to six feet in height (i.e., sound walls or berms) have been installed along the homes adjacent to Glenn Ranch Road and Saddleback Ranch Road, as depicted in SEIR Exhibit 5.8-4, *Noise Barrier Heights and Locations*. Noise barriers must have a surface density of at least 3.5 pounds per square foot, and have no openings or cracks. The walls may be constructed of five-eighth inch thick acrylic glass, any masonry material, an earthen berm or a combination of these materials.
- N-3 Prior to issuance of building permits, an interior noise study shall be developed for the homes and multi-family buildings adjacent to, and with a direct line-of-sight of, Glenn Ranch Road and Saddleback Ranch Road to ensure that the interior CNEL would not exceed 45 dB. To mitigate the interior noise impact, the homes and multifamily buildings would most likely require air-conditioning and/or mechanical ventilation and possibly sound-rated windows.

Level of Significance: Less Than Significant With Mitigation Incorporated.



LONG-TERM (STATIONARY) NOISE IMPACTS

N-4 THE PROPOSED PROJECT WOULD NOT RESULT IN A SIGNIFICANT INCREASE IN LONG-TERM STATIONARY AMBIENT NOISE LEVELS.

Impact Analysis: The OSA PEIR (page 3.10-20) determined that implementation of the OSA could add new stationary sources of noise (i.e., heating, ventilation, and air conditioning [HVAC] equipment) and cause a substantial permanent increase in ambient noise levels. OSA PEIR Mitigation Measure 3.10-3 requires shielding of all HVAC equipment and to attenuate noise from HVAC systems to 65 dBA or less at 50 feet. With implementation of OSA PEIR Mitigation Measure 3.10-3, the OSA PEIR determined that impacts associated with a permanent increase in ambient noise levels resulting from stationary sources would be reduced to a less than significant level. Stationary source noise impacts associated with the proposed Portola Center project are discussed below.

It should be noted that the analysis below considers the worst-case impacts associated with long-term noise and addresses both existing off-site sensitive receptors as well as proposed on-site sensitive receptors. The long-term noise analysis is based on noise levels at the closest sensitive receptors. In some instances, the closest sensitive receptors would be the existing residences located approximately 50 feet north of the project site. In other instances, the closest sensitive receptors would be future on-site residences, which would also be approximately 50 feet away from potential stationary noise sources.

Outdoor Recreation Areas

Neighborhood parks are intended for active recreational purposes. Each neighborhood park would include typical park improvements, as well as specific recreational components such as athletic fields and/or courts, spectator seating, picnic amenities, and play lots. The Portola Center Area Plan depicts conceptual amenities for each of the six planned neighborhood parks. Noise levels at the smaller neighborhood parks would be 63 dB without mitigation and would, therefore, not exceed the 65 dB threshold established by the City for outdoor recreation areas such as parks. Additionally, a 5.0-acre public Neighborhood Park is proposed at the southwestern portion of the site. The final design of the park would be reviewed under the City's park planning process and would be consistent with the requirements of the Portola Center Development Agreement.

At any one location, the hourly average sound level associated with recreational noise is difficult to predict due to many variables. These factors include the number of players and spectators, the location of people and the amount and level of conversation and cheering. However, to determine the approximate noise levels that would be generated at the ball fields and predict potential noise impacts, noise measurements were conducted at several existing recreational parks including Stagecoach Park in Carlsbad, Cardiff Sports Park in Encinitas, and Vista National Little League in Vista. The proposed project would have similar ball fields as these facilities. The results of these measurements indicate that ball field activities (including use of a PA system) generate a one-hour average noise level of approximately 55 to 65 dB at a distance of 50 feet from the stands and/or spectator areas.



The final locations of stands and spectator areas have not been determined. Therefore, as a worst-case assumption, the stands and spectator areas are assumed to be located adjacent to the closest residences to the athletic fields. Thus, the closest residences are assumed to be located approximately 35 feet from stand or spectator areas. The sports activities would generate a one-hour average noise level of approximately 68 dB at the closest residence. The noise level would be 68 dB CNEL at these residences assuming that games are played continuously on all the fields between the hours of 7:00 a.m. and 10:00 p.m. This noise level would exceed the City's General Plan Noise Element 65 dB CNEL noise criterion.

Therefore, Mitigation Measure N-4 would be required to reduce outdoor recreational area noise impacts. Mitigation Measure N-4 requires a 150-foot buffer between all stands and general spectator areas and the closest residential property line. Alternatively, a noise barrier would be required to reduce noise impacts. Mitigation Measure N-4 also prohibits use of the parks between the hours of 10:00 p.m. and 7:00 a.m. With implementation of Mitigation Measure N-4, outdoor recreational noise impacts would be reduced to a less than significant level.

Commercial Property Outdoor Mechanical Equipment

Outdoor mechanical equipment such as heating, ventilating, and air conditioning (HVAC) equipment could be mounted on roofs or at the ground level of the commercial property building. Mechanical equipment plans are not currently available. The noise levels generated by this equipment would vary, but typically range from approximately 45 dB to 55 dB at a distance of 50 feet. A site plan for the commercial property has not been prepared; however, the multifamily land use would be located immediately east of the commercial property. If unmitigated, the mechanical equipment could generate noise levels in excess of the City's Noise Ordinance limits resulting in a significant noise impact. OSA PEIR Mitigation Measure 3.10-3 requires shielding of all HVAC equipment to provide noise attenuation to reduce noise from HVAC systems to 65 dBA or less at 50 feet. Additionally, Mitigation Measure N-5 would be required to identify any noise control measures necessary to comply with the City's Noise Ordinance requirements.

Standard Conditions of Approval: No Standard Conditions of Approval are applicable to this topic area.

Applicable OSA Mitigation Measures:

3.10-3 ~~A condition of approval shall be placed on all Site Development Permit and/or Use Permit approvals for site-specific developments, which states~~ Prior to issuance of building permits, the project shall submit a plan or other satisfactory documentation that demonstrates, to the satisfaction of the Lake Forest Development Services Department: ~~prior to issuance of a building permit, the applicant shall submit plans for~~ shielding of all HVAC equipment to provide noise attenuation ~~with~~ will reduce noise from HVAC systems to 65 dBA or less when measured 50 feet from the noise source.

Additional Mitigation Measures:

N-4 Prior to issuance of building permits, the Applicant shall demonstrate that all stands and general spectator areas shall be located a minimum of 150 feet from the closest



residential property line. Alternatively, noise barriers (e.g., sound walls or berms) up to six feet in height above the finished grade shall be constructed along the western boundaries of all lots with a direct line-of-sight to the proposed 5-acre public Neighborhood Park. The noise barriers, such as solid walls or noise-rated glass, shall be located along the line of sight between the residential outdoor activity areas (i.e., rear yards) and the spectator areas in the park. The parks shall not be used between the hours of 10:00 p.m. and 7:00 a.m.

- N-5 Prior to issuance of building permits, a noise assessment shall be prepared for the commercial property outdoor mechanical equipment. The noise assessment shall identify any noise control measures necessary to comply with the City's Noise Ordinance requirements.

Level of Significance: Less Than Significant With Mitigation Incorporated.

5.8.6 CUMULATIVE IMPACTS

Table 4-1, *Cumulative Projects List*, identifies the related projects and other possible development in the area determined as having the potential to interact with the proposed project to the extent that a significant cumulative effect may occur. The following discussions are included per topic area to determine whether a significant cumulative effect would occur.

SHORT-TERM CONSTRUCTION NOISE IMPACTS

- **GRADING AND CONSTRUCTION WITHIN THE AREA COMBINED WITH OTHER RELATED CUMULATIVE PROJECTS WOULD NOT RESULT IN SIGNIFICANT SHORT-TERM NOISE IMPACTS TO NEARBY NOISE SENSITIVE RECEIVERS, FOLLOWING IMPLEMENTATION OF MITIGATION MEASURES.**

Impact Analysis: Construction activities associated with the proposed project and cumulative projects may overlap, resulting in construction noise in the area. However, as analyzed above, construction noise impacts primarily affect the areas immediately adjacent to the construction site and would be mitigated to a less than significant level. Additionally, the proposed project would comply with the City's Municipal Code limitations on allowable hours of construction and would implement Standard Conditions of Approval N1 and N2 and Mitigation Measure N-1 to reduce construction noise impacts to less than significant levels. The construction activities associated with the cumulative development projects would also be required to comply with local municipal code limitations on allowable hours of construction and would incorporate mitigation measures to reduce construction noise pursuant to CEQA provisions. Therefore, the project's contribution to cumulative noise impacts would be less than significant.

Standard Conditions of Approval: Refer to Standard Conditions of Approval N1 and N2.

Applicable OSA Mitigation Measures: No OSA Mitigation Measures are applicable to this topical area.



Additional Mitigation Measures: Refer to Mitigation Measure N-1.

Level of Significance: Less Than Significant With Mitigation Incorporated.

VIBRATION IMPACTS

- **PROJECT IMPLEMENTATION COMBINED WITH OTHER RELATED CUMULATIVE PROJECTS WOULD NOT RESULT IN SIGNIFICANT VIBRATION IMPACTS TO NEARBY SENSITIVE RECEPTORS.**

Impact Analysis: As stated above, construction activities associated with the proposed project and cumulative projects may overlap. Despite the potential for overlap, groundborne vibration generated at the project site during construction would be required to mitigate impacts to a less than significant. There would be no vibration impacts associated with operations at the project site. Therefore, vibration impacts of the proposed project would not be cumulatively considerable. Further, the cumulative development projects would be required to implement any required mitigation measures that may be prescribed pursuant to CEQA provisions. Therefore, the project's contribution to cumulative vibration impacts would be less than significant.

Standard Conditions of Approval: Refer to Standard Conditions of Approval N1 and N2.

Applicable OSA Mitigation Measures: Refer to OSA PEIR Mitigation Measure 3.10-1.

Additional Mitigation Measures: No additional mitigation measures are required.

Level of Significance: Less Than Significant With Mitigation Incorporated.

LONG-TERM (MOBILE) NOISE IMPACTS

- **TRAFFIC GENERATED BY THE PROPOSED PROJECT COMBINED WITH OTHER RELATED CUMULATIVE PROJECTS WOULD NOT SIGNIFICANTLY CONTRIBUTE TO EXISTING TRAFFIC NOISE IN THE AREA OR EXCEED THE CITY'S ESTABLISHED STANDARDS.**

Impact Analysis: As described above, project traffic impacts would be 1 dB or less along adjacent roadways. Therefore, the increase in noise associated with cumulative traffic would not be cumulatively considerable and is less than significant. Additionally, the project would mitigate on-site mobile source noise impacts to a less than significant level. Therefore, the proposed project would not result in long-term mobile noise impacts based on project generated traffic as well as cumulative and incremental noise levels. Therefore, the proposed project, in combination with cumulative background traffic noise levels, would result in a less than significant cumulative impact in this regard.

Standard Conditions of Approval: No Standard Conditions of Approval are applicable to this topical area.



Applicable OSA Mitigation Measures: No OSA Mitigation Measures are applicable to this topical area.

Additional Mitigation Measures: Refer to Mitigation Measures N-2 and N-3.

Level of Significance: Less Than Significant With Mitigation Incorporated.

LONG-TERM (STATIONARY) NOISE IMPACTS

- **THE PROPOSED PROJECT COMBINED WITH OTHER RELATED CUMULATIVE PROJECTS WOULD NOT RESULT IN A SIGNIFICANT INCREASE IN LONG-TERM STATIONARY AMBIENT NOISE LEVELS.**

Impact Analysis: Although related cumulative projects have been identified within the project study area, the noise generated by stationary equipment on-site cannot be quantified due to the speculative nature of conceptual nature of each development. However, each cumulative project would require separate discretionary approval and CEQA assessment, which would address potential noise impacts and identify necessary attenuation measures, where appropriate. Additionally, as noise dissipates as it travels away from its source, noise impacts from stationary sources would be limited to each of the respective sites and their vicinities. As no other project sites are located within the immediate vicinity of the proposed project that would involve stationary noise sources, the project would not contribute to a cumulative stationary noise impact and impacts would be less than significant.

As noted above, with the implementation of mitigation, the proposed project would not result in significant stationary noise impacts. The proposed project would not result in stationary long-term equipment that would significantly affect surrounding sensitive receptors. Thus, the proposed project and identified cumulative projects are not anticipated to result in a significant cumulative impact.

Standard Conditions of Approval: No Standard Conditions of Approval are applicable to this topical area.

Applicable OSA Mitigation Measures: Refer to OSA PEIR Mitigation Measure 3.10-3.

Additional Mitigation Measures: Refer to Mitigation Measures N-4 and N-5.

Level of Significance: Less Than Significant With Mitigation Incorporated.

5.8.7 SIGNIFICANT UNAVOIDABLE IMPACTS

No unavoidable significant impacts related to noise impacts have been identified in this section.