3.10 NOISE

3.10.1 Introduction

This section evaluates the potential noise and groundborne vibration impacts resulting from implementation of the Lake Forest Opportunities Study Program (Proposed Project). This includes the potential for the project to cause a substantial temporary and/or permanent increase in ambient noise levels within or around the Project Area, or expose people to excessive noise levels. The purpose of this analysis is to evaluate the Proposed Project in order to ensure that new mechanical equipment is located and designed appropriately from a noise perspective and to evaluate the noise and vibration impacts of the Proposed Project on the surrounding community. The Project Area is located adjacent to the former MCAS El Toro, and was subject to the planning guidelines of the Airport Environs Land Use Plan (AELUP) developed by the Orange County Airport Land Use Commission (ALUC), which governed land uses surrounding existing airports within Orange County. However, the MCAS El Toro has been closed since July 1999, and the AELUP's planning and land use guidelines pertaining to the base and its immediate surrounding area were rescinded by the ALUC on July 21, 2005.

Data used in the preparation of this section were taken from various sources, including measuring and modeling existing and future noise levels at the Project Area and in the surrounding area. Full bibliographic entries for all reference materials are provided in Section 3.10.9 (References) of this section.

No comments with respect to noise were received during the NOP comment period for the Proposed Project.

Fundamentals of Sound and Environmental Noise

Sound is technically described in terms of amplitude (loudness) and frequency (pitch). The standard unit of sound amplitude measurement is the decibel (dB). The decibel scale is a logarithmic scale that describes the physical intensity of the pressure vibrations that make up any sound. The pitch of the sound is related to the frequency of the pressure vibration. Since the human ear is not equally sensitive to a given sound level at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) provides this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

Noise, on the other hand, is typically defined as unwanted sound. A typical noise environment consists of a base of steady "background" noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this background noise is the sound from individual local sources. These can vary from an occasional aircraft or train passing by to virtually continuous noise from, for example, traffic on a major highway. Table 3.10-1 (Representative Environmental Noise Levels) lists representative noise levels for the environment.

Table 3.10-1 Representative Environmental Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	—110—	Rock Band
Jet Fly-over at 100 feet		
	—100—	Pile Driver at 50 feet
Gas Lawnmower at 3 feet		
	—90—	
		Food Blender at 3 feet
Diesel Truck going 50 mph at 50 feet	—80—	Garbage Disposal at 3 feet
Noisy Urban Area during Daytime		
Gas Lawnmower at 100 feet	—70—	Vacuum Cleaner at 10 feet
Commercial Area		Normal Speech at 3 feet
Heavy Traffic at 300 feet	—60—	
		Large Business Office
Quiet Urban Area during Daytime	—50—	Dishwasher in Next Room
Quiet Urban Area during Nighttime	—40—	Theater, Large Conference Room (background)
Quiet Suburban Area during Nighttime		
	—30—	Library
Quiet Rural Area during Nighttime		Bedroom at Night, Concert Hall (background)
	—20—	
		Broadcast/Recording Studio
	—10—	
Lowest Threshold of Human Hearing	—0—	Lowest Threshold of Human Hearing

SOURCE: California Department of Transportation 1998

Several rating scales have been developed to analyze the adverse effect of community noise on people. Since environmental noise fluctuates over time, these scales consider that the effect of noise upon people is largely dependent upon the total acoustical energy content of the noise, as well as the time of day when the noise occurs. Those that are applicable to this analysis are as follows:

- **L_{eq}**, the equivalent energy noise level, is the average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} 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.
- **L_{dn}**, the Day-Night Average Level, is a 24-hour average L_{eq} with a 10 dBA "weighting" added to noise during the hours of 10:00 P.M. to 7:00 A.M. to account for noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24 hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
- **CNEL**, the Community Noise Equivalent Level, is a 24-hour average L_{eq} with a 10 dBA "weighting" added to noise during the hours of 10:00 P.M. to 7:00 A.M. and an additional 5 dBA weighting during the hours of 7:00 P.M. to 10:00 P.M. to account for noise sensitivity in the evening

and nighttime. The logarithmic effect of these additions is that a 60 dBA 24 hour L_{eq} would result in a measurement of 66.7 dBA CNEL.

- **L_{min}**, the minimum instantaneous noise level experienced during a given period of time.
- **L_{max}**, the maximum instantaneous noise level experienced during a given period of time.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day, night, or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA. Examples of low daytime levels are isolated, natural settings that can provide noise levels as low as 20 dBA and quiet, suburban, residential streets that can provide noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with more noisy urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA).

When evaluating changes in 24-hour community noise levels, a difference of 3 dBA CNEL is a barely perceptible increase to most people. A 5 dBA CNEL increase is readily noticeable, while a difference of 10 dBA CNEL would be perceived as a doubling of loudness.

Noise levels from a particular source decline as distance to the receptor increases. Other factors, such as the weather and reflecting or shielding, also help intensify or reduce the noise level at any given location. A commonly used rule of thumb for roadway noise is that for every doubling of distance from the source, the noise level is reduced by about 3 dBA at acoustically "hard" locations (i.e., the area between the noise source and the receptor is nearly complete asphalt, concrete, hard-packed soil, or other solid materials) and 4.5 dBA at acoustically "soft" locations (i.e., the area between the source and receptor is normal earth or has vegetation, including grass). Noise from stationary or point sources is reduced by about 6 to 7.5 dBA for every doubling of distance at acoustically hard and soft locations, respectively. Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. The manner in which older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units is generally 30 dBA or more.

Fundamentals of Environmental Groundborne Vibration

Vibration is sound radiated through the ground. The rumbling sound caused by the vibration of room surfaces is called groundborne noise. The ground motion caused by vibration is measured as particle velocity in inches per second and, in the U.S., is referenced as vibration decibels (VdB).

The background vibration velocity level in residential and educational areas is usually around 50 VdB. The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels for many people. Most perceptible indoor vibration is caused by sources within

buildings, such as operation of mechanical equipment, movement of people, or the slamming of doors. Typical outdoor sources of perceptible groundborne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the groundborne vibration from traffic is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings.

The general human response to different levels of groundborne vibration velocity levels is described in Table 3.10-2 (Human Response to Different Levels of Groundborne Vibration).

Table 3.10-2 Human Response to Different Levels of Groundborne Vibration

Vibration Velocity Level	*Human Reaction*
65 VdB	Approximate threshold of perception for many people.
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find that transportation-related vibration at this level is unacceptable.
85 VdB	Vibration acceptable only if there are an infrequent number of events per day.

FSOURCE: Federal Railroad Administration 1998

3.10.2 Environmental Setting

Existing Ambient Daytime Noise Levels

Existing daytime noise levels were monitored at 11 locations in the City of Lake Forest and one location in the City of Mission Viejo adjacent to the City of Lake Forest on November 30, 2004, in order to identify representative noise levels for existing land uses. The noise levels were measured using a Larson-Davis Model 814 precision sound level meter, which satisfies the American National Standards Institute (ANSI) for general environmental noise measurement instrumentation. The measured noise levels are presented in Table 3.10-3. Locations where noise was monitored are shown in Figure 3.10-1. Although other noise sources occur in the City, vehicular traffic is the primary source of noise at the locations monitored in the City. Each noise measurement was taken for a period of 15 minutes to obtain representative noise levels at each location. Please see Section 3.10.4, Methodology, for further information on the methodology used for this analysis.

Existing Roadway Noise Levels

Existing 24-hour roadway noise levels have been calculated for the roadway links around the City. This task was accomplished using the Federal Highway Administration Highway Noise Prediction Model (FHWA-RD-77-108) and traffic volumes from the Traffic Impact Study prepared for the project (included as Appendix H). 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 Caltrans. The Caltrans data show that California

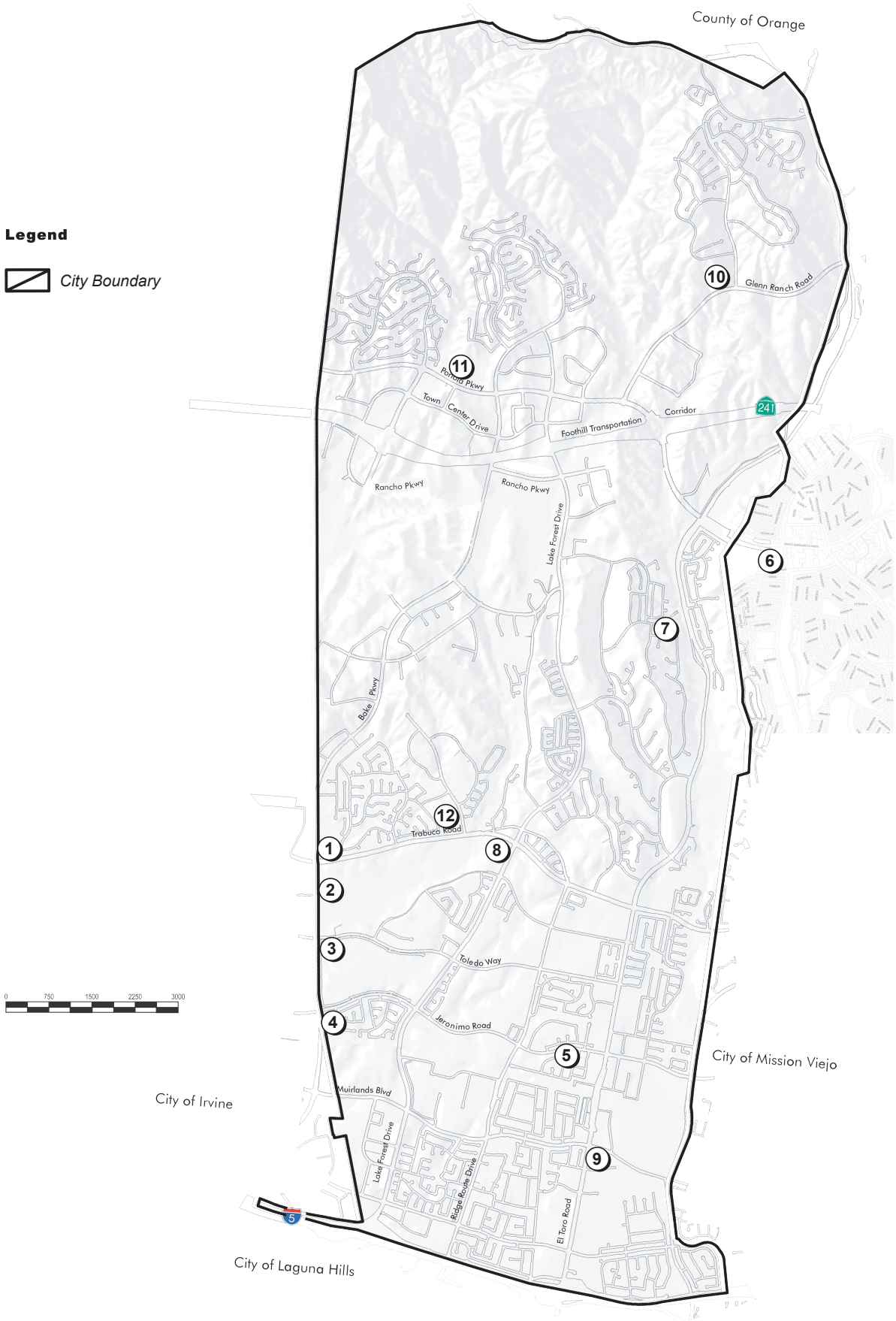

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FIGURE **3.10-1**

Noise Monitoring Locations

***Sources*:** City of Lake Forest; EIP Associates, 2005

City of Lake Forest

EIP ASSOCIATES

Table 3.10-3 Existing On-Site Noise Levels

	Location	Primary Noise Sources	Noise Level Statistics		
			L_{eq} (dBA)	L_{min} (dBA)	L_{max}(dBA)
1.	Intersection of Bake Pkwy/Trabuco Rd.	Traffic, heavy trucks	73.9	60.4	89.9
2.	Intersection of Bake Pkwy/Calle Entrada	Traffic, heavy trucks	74.7	50.0	85.4
3.	Intersection of Bake Pkwy/Toledo Rd.	Traffic, heavy trucks	73.7	54.4	91.3
4.	Intersection of Bake Pkwy/Jeronimo Rd.	Traffic, heavy trucks	74.4	57.4	86.0
5.	Serrano Intermediate School (Jeronimo Rd.)	Traffic	72.2	48.7	84.1
6.	Trabuco Hills High School (Los Alisos/Mustang Run)	Traffic	67.6	55.0	82.3
7.	Normandale Heights (Normandale/Countryside)	Traffic	64.8	39.9	75.2
8.	Intersection of Trabuco/Lake Forest	Traffic, heavy trucks	73.1	60.8	89.3
9.	Freedom Village (El Toro Rd.)	Traffic	71.7	59.5	80.9
10.	Intersection of Glenn Ranch/Saddleback Ranch	Traffic	68.9	54.9	84.6
11.	Whiting Ranch Wilderness Park (Portola Pkwy./Market Pl.)	Traffic	67.9	53.9	80.3
12.	Serrano Highlands (Trabuco Rd./Peachwood)	Traffic	69.3	57.3	81.7

SOURCE: Noise monitoring conducted by EIP Associates, November 30, 2004

automobile noise is 0.8 to 1.0 dBA higher than national levels and that medium and heavy truck noise is 0.3 to 3.0 dBA lower than national levels. The calculated noise levels are presented in Table 3.10-4. These roadway noise levels include traffic associated with the existing operations and services occurring around the Project Area, including residences, schools, industrial, and commercial uses.

Table 3.10-4 Existing Roadway Noise Levels

Roadway Segment	Reference CNEL at 100 Feet [a]	Distance to Noise Contour [b]		
		70 CNEL	65 CNEL	60 CNEL
Glenn Ranch/Portola to Glenn Ranch/El Toro Rd.	63.0	—[2]	64	202
Portola/Alton to Portola/Bake Pkwy	62.9	—	61	194
Portola/Bake Pkwy to Portola/Lake Forest Dr.	66.1	—	127	403
Portola/Lake Forest Dr. to Portola/Glenn Ranch	68.1	64	203	642
Portola/Glenn Ranch to Portola/SR-241	67.2	—	165	522
Santa Margarita/SR-241 to Santa Margarita/El Toro Rd.	66.5	—	142	448
Alton/Portola to Alton/SR-241	59.5	—	—	90
Bake Pkwy/Portola to Bake Pkwy/SR-241	64.6	—	91	287
Lake Forest Dr./Portola to Lake Forest Dr./SR-241	62.6	—	57	181
SR-241/Alton to SR-241 West	72.3	169	536	1,693
SR-241/Alton to SR-241/Lake Forest Dr.	71.8	150	474	1,498
SR-241/Lake Forest Dr. to SR-241/Portola	70.8	120	380	1,200
SR-241/Santa Margarita to SR-241 East	71.2	133	419	1,326
Alton/SR-241 to Alton south	53.4	—	—	—
Lake Forest Dr./SR-241 to Lake Forest Dr./Rancho	64.4	—	87	276
Rancho West to Rancho/Bake Pkwy.	53.3	—	—	—
Rancho/Bake Pkwy to Rancho/Lake Forest Dr.	58.7	—	—	74
Bake Pkwy/Rancho to Bake Pkwy/Commercentre	67.2	52	165	521

Table 3.10-4 Existing Roadway Noise Levels

Roadway Segment	Reference CNEL at 100 Feet [a]	Distance to Noise Contour [b]		
		70 CNEL	65 CNEL	60 CNEL
Bake Pkwy/Commercentre to Bake Pkwy/Trabuco Rd.	67.9	62	197	622
Lake Forest Dr./Rancho to Lake Forest Dr./Trabuco Rd.	66.9	49	156	492
El Toro Rd./Santa Margarita to El Toro Rd./Trabuco Rd.	67.3	—	170	537
Trabuco Rd./Bake Pkwy. To Trabuco Rd./Lake Forest Dr.	65.4	—	109	343
Trabuco Rd./Lake Forest Dr. to Trabuco Rd./Ridge Route	66.5	—	142	448
Trabuco Rd./Ridge Route to Trabuco Rd./El Toro Rd.	67.1	—	160	507
Trabuco Rd./El Toro Rd. to Trabuco Rd. east	65.2	—	105	333
Bake Pkwy./Trabuco Rd. to Bake Pkwy./Toledo	68.6	72	226	716
Lake Forest Dr./Trabuco Rd. to Lake Forest Dr./Toledo	67.2	—	165	522
Ridge Route/Trabuco Rd. to Ridge Route/Toledo	59.3	—	—	85
El Toro Rd./Trabuco Rd. to El Toro Rd./Toledo	67.3	—	170	537
Toledo/Bake Pkwy. To Toledo/Lake Forest Dr.	57.3	—	—	53
Toledo/Lake Forest Dr. to Toledo/Ridge Route	58.0	—	—	64
Toledo/Ridge Route to Toledo/El Toro Rd.	58.0	—	—	64
Bake Pkwy./Toledo to Bake Pkwy./Jeronimo	68.9	78	245	776
Lake Forest Dr./Toledo to Lake Forest Dr./Jeronimo	66.8	—	151	477
Ridge Route/Toledo to Ridge Route/Jeronimo	59.3	—	—	85
El Toro Rd./Toledo to El Toro Rd./Jeronimo	67.4	—	175	552
Los Alisos/Trabuco Rd. to Los Alisos/Jeronimo	66.9	—	156	492
Jeronimo/Bake Pkwy. To Jeronimo/Lake Forest Dr.	60.3	—	—	106
Jeronimo/Lake Forest Dr. to Jeronimo/Ridge Route	61.7	—	47	149
Jeronimo/Ridge Route to Jeronimo/El Toro Rd.	61.4	—	—	138
Jeronimo/El Toro Rd. to Jeronimo/Los Alisos	63.9	—	77	244
Lake Forest Dr./Jeronimo to Lake Forest Dr./Muirlands	67.1	—	160	507
Ridge Route/Jeronimo to Ridge Route/Muirlands	60.3	—	—	106
El Toro Rd./Jeronimo to El Toro Rd./Muirlands	67.8	60	189	597
Los Alisos/Jeronimo to Los Alisos/Muirlands	66.9	—	156	492
Muirlands/Bake Pkwy. To Muirlands/Lake Forest Dr.	61.7	—	47	149
Muirlands/Lake Forest Dr. to Muirlands/Ridge Route	63.3	—	67	212
Muirlands/Ridge Route to Muirlands/El Toro Rd.	63.5	—	71	223
Muirlands/El Toro Rd. to Muirlands/Los Alisos	63.3	—	67	212
Lake Forest Dr./Muirlands to Lake Forest Dr./Rockfield	67.4	—	175	552
Ridge Route/Muirlands to Ridge Route/Rockfield	59.8	—	—	96
El Toro Rd./Muirlands to El Toro Rd./Rockfield	68.0	63	198	627
Los Alisos/Muirlands to Los Alisos/Rockfield	66.8	—	151	477
Rockfield/Bake Pkwy. To Rockfield/Lake Forest Dr.	62.8	—	60	191
Rockfield/Lake Forest Dr. to Rockfield/Ridge Route	62.8	—	60	191
Rockfield/Ridge Route to Rockfield/El Toro Rd.	62.8	—	60	191
Rockfield/El Toro Rd. to Rockfield/Los Alisos	62.6	—	57	181
Lake Forest Dr./Rockfield to Lake Forest Dr./I-5	69.4	88	278	880

Table 3.10-4 Existing Roadway Noise Levels

Roadway Segment	Reference CNEL at 100 Feet [a]	Distance to Noise Contour [b]		
		70 CNEL	65 CNEL	60 CNEL
El Toro Rd./Rockfield to El Toro Rd./I-5	69.1	81	255	806
Los Alisos/Rockfield to Los Alisos/I-5	66.1	—	128	405
I-5/Lake Forest Dr. to I-5/El Toro Rd.	87.7	5,890	18,625	58,898
I-5/El Toro Rd. to I-5/Los Alisos	83.0	1,993	6,304	19,934

SOURCE: EIP Associates 2005 (calculation data and results are provided in Appendix H)

[a] Distances are in feet from roadway centerline. The identified noise level at 100 feet from the roadway centerline is for reference purposes only as a point from which to calculate the noise contour distances. It does not reflect an actual building location or potential impact location.

[b] Noise contour is located within the roadway lanes.

Existing Vibration Environment

Aside from seismic events, the greatest regular sources of groundborne vibration within the City are roadway truck and bus traffic. These trucks and buses typically generate groundborne vibration velocity levels of around 63 VdB. These levels could reach 72 VdB where trucks and buses pass over bumps in the road.

3.10.3 Planning and Regulatory Framework

Federal

There are no federal noise requirements or regulations that bear directly on local actions of the City of Lake Forest. However, there are federal regulations that influence the audible landscape, especially for projects where federal funding is involved. The Federal Highway Administration (FHWA) requires abatement of highway traffic noise for highway projects through rules in the Code of Federal Regulations (23 CFR Part 772), and the Federal Transit Administration (FTA) and Federal Railroad Administration (FRA) each recommend thorough noise and vibration assessments through comprehensive guidelines for any mass transit or high-speed railroad projects that would pass by residential areas. For housing constructed with assistance from the U.S. Department of Housing and Urban Development, minimum noise insulation standards must be achieved (24 CFR Part 51, Subpart B).

State

The State of California, Governor's Office of Planning and Research has published recommended guidelines for mobile source noise and land use compatibility. Each jurisdiction is required to consider these guidelines when developing its General Plan noise element and determining the acceptable noise levels within its community.

Title 24 of the California Code of Regulations establishes California Noise Insulation Standards, which identify an interior noise standard of 45 dBA CNEL for new multi-family residential units. This standard would apply to all new townhomes, condominiums, apartments, hotels, and motels developed within the Planning Area.

Local

City of Lake Forest Municipal Code

The Lake Forest Municipal Code has adopted Sections 4-6-1 through 4-6-13 and Section 4-6-15 of the Orange County Code as its Noise Control Ordinance, which provides limitations on loud and unnecessary noises. Chapter 11.16 of the Lake Forest Municipal Code addresses generally disturbing noise and regulates noise that could be caused by community development. Construction noise during nighttime hours is restricted if it would disturb residences. Section 11.16.020 of the Lake Forest Municipal Code identifies interior and exterior noise limits as in acceptable ranges that apply to all residential property within the City. These noise limits are shown in Table 3.10-5.

Table 3.10-5 Exterior Noise Limits for Residential Property

Time Period	*Noise Level (dBA)*	
	Exterior	*Interior*
Night: 10:00 P.M.–7:00 A.M.	50	45
Day: 7:00 A.M.–10:00 P.M.	55	55

SOURCE: Lake Forest Municipal Code Section 11.16.020

Section 11.16.020 (former County Code Section 4-6-7(e)) of the City of Lake Forest Municipal Code also allows construction-related noise to exceed the standards identified in Table 3.10-5, provided that construction only occurs between the hours of 7 A.M. and 8 P.M. on Monday through Saturday. No construction-related noise in excess of standards is permitted between the hours of 8 P.M. and 7 A.M. on Monday through Saturday and is prohibited on Sundays or federal holidays.

City of 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 3.10-6 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.

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.

Table 3.10-6 Interior and Exterior Noise Standards

Land Use	Noise Standards [a]	
	Interior [bc]	Exterior
Residential—Single family, multifamily, duplex, mobile home	CNEL 45 dB	CNEL 65 dB [d]
Residential—Transient lodging, hotels, motels, nursing homes, hospitals	CNEL 45 dB	CNEL 65 dB [d]
Private offices, church sanctuaries, libraries, board rooms, conference rooms, theaters, auditoriums, concert halls, meeting halls, etc.	L_{eq}(12) 45 dBA [b,f]	—
Schools	L_{eq}(12) 45 dBA	L_{eq}(12) 67 dBA [e]
General offices, reception, clerical, etc.	L_{eq}(12) 50 dBA	—
Bank lobby, retail store, restaurant, typing pool, etc.	L_{eq}(12) 50 dBA	—
Manufacturing, kitchen, warehousing, etc.	L_{eq}(12) 50 dBA	—
Parks, playgrounds	—	CNEL 65 dB [e]
Golf courses, outdoor spectator sports, amusement parks	—	CNEL 70 dB [e]

SOURCE: J.J. Van Houten & Associates 1994

[a] CNEL = Community Noise Equivalent Level.
L_{eq}(12) = The A-weighted equivalent sound level averaged over a 12-hour period (usually the hours of operation).

[b] Noise standards with windows closed. Mechanical ventilation shall be provided per UBC requirements to provide a habitable environment.

[c] Indoor environment excluding bathrooms, toilets, closets and corridors.

[d] 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.

[e] Outdoor environment limited to playground areas, picnic areas, and other areas or frequent human use.

[f] 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.

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 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.

Consistency Analysis

The Proposed Project would be subject to all applicable provisions of the City of Lake Forest General Plan and Municipal Code to control noise levels during construction and operation. However, noise contour limits included in the Lake Forest General Plan Noise Element will be revised where applicable to allow development in previously restricted and undeveloped areas prior to approval of the Proposed Project. The Proposed Project will be inconsistent with current noise contour limits, but will comply with the revised Lake Forest General Plan. Compliance with City standards would ensure consistency with these adopted documents.

3.10.4 Methodology

The analysis in this section focuses on the nature and magnitude of the change in the noise environment associated with implementation of the Proposed Project. The net increase in project-related noise levels generated by these activities and other sources have been quantitatively estimated and compared to the applicable noise standards and thresholds of significance.

Construction noise levels were estimated by data published by the U.S. Environmental Protection Agency (U.S. EPA). Potential noise levels are identified for on- and off-site locations that are sensitive to noise, including residences.

Roadway noise levels have been calculated for various locations around the City. The noise levels were calculated using the FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels and traffic volumes from the City of Lake Forest Vacant Land Opportunities Study Phase III Traffic Study (July 2005).

While a programmatic level of analysis is provided in this EIR, the project-level evaluation of construction-related and ambient noise levels associated with each new development that would occur as a result of the implementation of the Proposed Project ~~sh~~would be required through mitigation measures in this section of the Program EIR to evaluate whether noise and vibration thresholds would be violated.

3.10.5 Thresholds of Significance

The City of Lake Forest has developed thresholds of significance related to noise. Based on the City's thresholds, the Proposed Project would result in significant impacts related to noise if it would:

- Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Expose persons to or generate excessive groundborne vibration or groundborne noise levels;
- Cause a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or,
- Cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.
- Expose people residing or working in the Project Area to excessive noise levels from a project located within an airport land use plan

The CEQA Guidelines do not define the levels at which temporary and permanent increases in ambient noise are considered "substantial." As discussed previously in this section, a noise level increase of 3 dBA is barely perceptible to most people, a 5 dBA increase is readily noticeable, and a difference of 10 dBA would be perceived as a doubling of loudness. Based on this information, the following thresholds would apply to the construction and operational characteristics of the Proposed Project:

- Less than 3 dBA: not discernable: not significant
- 3 dBA or greater: significant, if the noise increase would meet or exceed the City's 65 dBA CNEL noise level standard at sensitive land uses
- 5 dBA or greater: significant

The Noise Ordinance for the City of Lake Forest set limits on the level and duration of time a stationary noise source may impact a residential area. 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 the City of Lake Forest Noise Ordinance.

In addition, the CEQA Guidelines do not define the levels at which groundborne vibration or groundborne noise is considered "excessive." For the purpose of this analysis, groundborne vibration impacts associated with human annoyance would be significant if the Proposed Project exceeds 85 VdB, which is the vibration level that is considered by the FTA to be acceptable only if there are an infrequent number of events per day (as described in Table 3.10-2).

3.10.6 Impacts

CEQA requires that the Proposed Project's potential environmental impacts be compared to on-the-ground conditions in the Project Area at the time the Notice of Preparation is issued or at the time the analysis of such impacts is commenced. Such on-the-ground conditions are considered, and often referred to as, the environmental or CEQA "baseline." Thus, the following section analyzes the Proposed Project's potential environmental impacts on baseline conditions. However, it should be noted that the land under consideration for the Proposed Project, while currently undeveloped, would not necessarily remain undeveloped. Most sites within the Project Area are subject to existing development agreements or entitlements and, in the absence of the Proposed Project, would in the future likely be developed with approximately 9.8 million square feet of industrial and commercial space under the existing General Plan. Given this, the analysis of alternatives to the Proposed Project in Chapter 4 of this EIR, under the "No Project/Reasonably Foreseeable Development" alternative, analyzes the potential environmental impacts associated with buildout of the existing General Plan. That analysis includes a comparison of the impacts of buildout of the existing General Plan with the potential environmental impacts of the Proposed Project.

Impact 3.10-1 **Construction activities associated with the Proposed Project would not generate noise levels that exceed the standards established in the City of Lake Forest Noise Regulations.**

Significance Level: **Less than significant**

The Proposed Project has the potential to result in events that may exceed permitted noise levels. The primary sources of noise associated with the Proposed Project would be construction activities and

project-related traffic volumes. Secondary sources increased human activity throughout the sites. Noise limits for sensitive uses are shown in Table 3.10-5.

Implementation of the Proposed Project would require the use of heavy equipment for site excavation, installation of utilities, site grading, paving, and building fabrication. Construction activities would also involve the use of smaller power tools, generators, and other sources of noise. During each stage of construction there would be a different mix of equipment operating, and noise levels would vary based on the amount of equipment in operation and the location of the activity.

The EPA has compiled data regarding the noise generating characteristics of specific types of construction equipment and typical construction activities. These data are presented in Table 3.10-7 (Noise Ranges of Typical Construction Equipment) and Table 3.10-8 (Typical Outdoor Construction Noise Levels). These noise levels would diminish rapidly with distance from the construction site at a rate of approximately 6 dBA per doubling of distance. For example, a noise level of 86 dBA measured at 50 feet from the noise source to the receptor would reduce to 80 dBA at 100 feet from the source to the receptor, and reduce by another 6 dBA to 74 dBA at 200 feet from the source to the receptor.

Table 3.10-7 Noise Ranges of Typical Construction Equipment

Equipment	*Noise Levels in dBA L_{eq} at 50 Feet* [a]
Front Loader	73 to 86
Trucks	82 to 95
Cranes (moveable)	75 to 88
Cranes (derrick)	86 to 89
Vibrator	68 to 82
Saws	72 to 82
Pneumatic Impact Equipment	83 to 88
Jackhammers	81 to 98
Pumps	68 to 72
Generators	71 to 83
Compressors	75 to 87
Concrete Mixers	75 to 88
Concrete Pumps	81 to 85
Back Hoe	73 to 95
Pile Driving (peaks)	95 to 107
Tractor	77 to 98
Scraper/Grader	80 to 93
Paver	85 to 88

SOURCE: U.S. EPA 1971

[a] Machinery equipped with noise control devices or other noise-reducing design features does not generate the same level of noise emissions as that shown in this table.

Table 3.10-8 Typical Outdoor Construction Noise Levels		
Construction Phase	*Noise Levels at 50 Feet(dBA L_{eq})*	*Noise Levels at 50 Feet with Mufflers (dBA L_{eq})*
Ground Clearing	84	82
Excavation, Grading	89	86
Foundations	78	77
Structural	85	83
Finishing	89	86
SOURCE: U.S. EPA 1971		

Noise that would be experienced by sensitive uses due to implementation of the Proposed Project is determined at their property lines. While the nearest sensitive uses vary from site to site and as specific development plans have not yet been determined at individual sites, for the purpose of this analysis it is assumed that sensitive receptors could be as close as 50 feet from where construction would take place. Sensitive receptors in the project vicinity could experience noise levels up to 86 dBA L_{eq} as a result of construction activities, or as high as 107 dBA L_{eq} in the event that pile drivers are used. The City of Lake Forest Municipal Code Section 11.16.020 (former County Code Section4-6-7(e)) allows for noise resulting from construction activities to be exempt from noise limits established in the Code. In accordance with the Noise Ordinance, construction activities would also be limited to the hours of 7:00 A.M. and 8:00 P.M. on Monday through Saturday, and is prohibited on Sundays and federal holidays. As construction would not occur except during the times permitted in the Noise Ordinance, and as the Section 11.16.020 of the Municipal Code allows construction noise in excess of standards to occur between these hours, the Proposed Project would not violate established standards. In the event that construction would need to take place at a time that construction noise would not be exempt from the Municipal Code per Section 11.16.020, project applicant(s) may apply for a variance to the Health Officer per Section 11.16.020 of the Municipal Code. To apply for a variance, project applicant(s) would be required to set forth all actions taken to comply with the provisions of the Municipal Code, the reasons why immediate compliance cannot be achieved, a proposed method of achieving compliance, and a proposed time schedule for its accomplishment. A separate application would need to be filed for each noise source, provided, however, that several mobile sources under common ownership or several fixed sources on a single property may be combined into one application. This impact would be less than significant.

Impact 3.10-2 Construction activities associated with the Proposed Project could result in the exposure of persons to excessive groundborne vibration or groundborne noise levels.

Significance Level: Less than significant with mitigation

Construction-related vibration has two potential impacts. First, vibration at high enough levels can result in human annoyance. Second, groundborne vibration can potentially damage the foundations and exteriors of historic structures. However, since no historic structures exist in the vicinity of the Project Area, there would be no impact. Groundborne vibration that can cause this kind of damage is typically limited to impact equipment, especially pile drivers. Construction activities that would occur under the Proposed Project have the potential to generate low levels of groundborne vibration. Table 3.10-9

(Vibration Source Levels for Construction Equipment) identifies various vibration velocity levels for the types of construction equipment that would operate within the City during construction.

Table 3.10-9 Vibration Source Levels for Construction Equipment

Equipment	Approximate VdB			
	25 Feet	50 Feet	75 Feet	100 Feet
Large Bulldozer	87	81	77	75
Loaded Trucks	86	80	76	74
Jackhammer	79	73	69	67
Small Bulldozer	58	52	48	46

SOURCE: Federal Railroad Administration 1998

In addition to the construction equipment shown in Table 3.10-9, vibration that would be experienced from the use of impact pile-drivers could reach as high as 112 VdB at a distance of 25 feet (HMMH 1995). The groundborne vibration generated during construction activities would primarily impact existing sensitive uses (e.g., residences, schools, and hospitals) that are located adjacent to or within the vicinity of specific projects. These sensitive uses could sometimes be located as close as 25 feet to the construction site or as far as several hundred feet away. Based on the information presented in Table 3.10-9, vibration levels could reach up to 87 VdB at sensitive uses located within 25 feet of construction. For sensitive uses that are located at or within 25 feet of potential project construction sites, sensitive receptors (e.g., residents, school children, and hospital patients) at these locations may experience vibration levels during construction activities that exceed the FTA's vibration impact threshold of 85 VdB for human annoyance. So long as construction occurs more than 50 feet from sensitive receptors, the impact associated with groundborne vibration generated by the equipment would be below 85 VdB and thus would be less than significant. However, as specific site plans or constructions schedules are unknown at this time, it may be possible that construction activities could occur as close as 25 feet from sensitive receptors. This would result in these sensitive receptors experiencing vibration impacts above the threshold of 85 VdB, in which case this impact would be potentially significant. In an effort to minimize the vibration levels experienced by sensitive uses located near these future construction sites in the Project Area, MM 3.10-1 shall be implemented to require the operation of vibration-generating equipment to be located as far away from vibration-sensitive sites as possible. While implementation of MM 3.10-1 may reduce the magnitude of groundborne vibration levels experienced by nearby sensitive receptors, the possibility exists that these vibration levels may not be reduced to a level below the FTA's 85 VdB threshold. At the general plan and zoning level of analysis, this causes a potentially significant impact. However, the development of detailed, site-specific information during the future review of individual development projects in the Project Area will allow a timely determination of which, if any, projects would expose sensitive receptors to excessive groundborne vibration or groundborne noise levels. Therefore, given the potential for a significant impact, MM 3.10-2 shall require further CEQA review with the submittal of each area plan or tentative map for the Proposed Project, reducing this potential impact at the program stage to a less-than-significant level.

Impact 3.10-3 **Construction activities associated with the Proposed Project would not result in the exposure of structures to excessive groundborne vibration or groundborne noise levels.**

Significance Level: No impact

There are no sensitive or fragile structures existing within the vicinity of the future project construction sites in the Proposed Project. While vibration from construction activities are not expected to exceed the 100 VdB threshold for fragile buildings or the 95 VdB threshold for extremely fragile buildings during grading or construction activities, pile driving at a construction site could generate vibration levels as high as 112 VdB when measured from 25 feet away. This would exceed the thresholds for fragile and extremely fragile structures. However, because there are no sensitive or fragile structures within the vicinity of the future project construction sites in the Project Area, there would be no impact.

Impact 3.10-4 **Year 2030 general plan buildout conditions, including the Proposed Project, would generate increased local traffic volumes that could result in a substantial permanent increase in ambient noise levels in the project vicinity above existing levels.**

Significance Level: ~~**Less than significant with mitigation**~~ **Significant Unmitigated Cumulative Impact**

Future noise levels within the City would continue to be dominated by vehicular traffic on the adjacent roadways. Other sources of noise would include new stationary sources (such as rooftop heating, ventilation, and air conditioning equipment) and increased human activity throughout the City.

Locations in the vicinity of the project sites within the Project Area could experience slight changes in noise levels as a result of an increase in the on-site population due to the potential development of residential and commercial development on currently vacant land and resulting increase in motor vehicle trips. Existing traffic noise levels are identified in Table 3.10-4. Noise levels associated with traffic generated from Year 2030 general plan buildout, including the Proposed Project, are calculated at the selected locations along the study-area roadway segments within the City of Lake Forest using traffic data from the City of Lake Forest Vacant Land Opportunities Phase III Traffic Study (included in Appendix I). As stated in Section 3.10.5, a 3.0 dBA CNEL increase is considered substantial. Table 3.10-10 (Proposed Project Traffic Noise Impacts to Existing Conditions) presents the future average daily noise levels associated with these roadways under Year 2030 buildout and compares them to existing conditions.

Table 3.10-10 Traffic Noise Impacts for Year 2030 General Plan Buildout, including Proposed Project Compared to Existing Conditions

Roadway Segment	Noise Levels in dBA CNEL at 100 feet				
	Existing Conditions	Year 2030 With Project Traffic Volumes	Increase	Significance Threshold[1]	Exceeds Significance Threshold?
Glenn Ranch/Portola to Glenn Ranch/El Toro Rd.	63.0	65.0	2.0	3.0	No
Portola/Alton to Portola/Bake Pkwy	62.9	66.7	3.8	3.0	Yes [2]
Portola/Bake Pkwy to Portola/Lake Forest Dr.	66.1	67.3	1.2	3.0	No
Portola/Lake Forest Dr. to Portola/Glenn Ranch	68.1	69.0	0.9	3.0	No
Portola/Glenn Ranch to Portola/SR241	67.2	67.3	0.1	3.0	No
Santa Margarita/SR-241 to Santa Margarita/El Toro Rd.	66.5	69.5	3.0	3.0	Yes [2]
Alton/Portola to Alton/SR-241	59.5	62.9	3.4	5.0	No
Bake Pkwy/Portola to Bake Pkwy/SR-241	64.6	63.9	-0.7	5.0	No
Lake Forest Dr./Portola to Lake Forest Dr./SR-241	62.6	62.6	0.0	5.0	No
SR-241/Alton to SR-241 West	72.3	74.6	2.3	3.0	No
SR-241/Alton to SR-241/Lake Forest Dr.	71.8	75.2	3.4	3.0	Yes [2]
SR-241/Lake Forest Dr. to SR-241/Portola	70.8	74.5	3.7	3.0	Yes [2]
SR-241/Santa Margarita to SR-241 East	71.2	74.6	3.4	3.0	Yes[2]
Alton/SR-241 to Alton south	53.4	64.9	11.5	5.0	Yes
Lake Forest Dr./SR-241 to Lake Forest Dr./Rancho	64.4	64.7	0.3	5.0	No
Rancho West to Rancho/Bake Pkwy.	53.3	60.7	7.4	5.0	Yes
Rancho/Bake Pkwy to Rancho/Lake Forest Dr.	58.7	63.7	5.0	5.0	Yes[2]
Bake Pkwy/Rancho to Bake Pkwy/Commercentre	67.2	66.8	-0.4	3.0	No
Bake Pkwy/Commercentre to Bake Pkwy/Trabuco Rd.	67.9	67.3	-0.6	3.0	No
Lake Forest Dr./Rancho to Lake Forest Dr./Trabuco Rd.	66.9	67.5	0.6	3.0	No
El Toro Rd./Santa Margarita to El Toro Rd./Trabuco Rd.	67.3	68.1	0.8	3.0	No
Trabuco Rd./Bake Pkwy. to Trabuco Rd./Lake Forest Dr.	65.4	66.1	0.7	3.0	No
Trabuco Rd./Lake Forest Dr. to Trabuco Rd./Ridge Route	66.5	67.3	0.8	3.0	No
Trabuco Rd./Ridge Route to Trabuco Rd./El Toro Rd.	67.1	67.8	0.7	3.0	No
Trabuco Rd./El Toro Rd. to Trabuco Rd. east	65.2	65.8	0.6	3.0	No

Table 3.10-10 Traffic Noise Impacts for Year 2030 General Plan Buildout, including Proposed Project Compared to Existing Conditions

Roadway Segment	Noise Levels in dBA CNEL at 100 feet				
	Existing Conditions	Year 2030 With Project Traffic Volumes	Increase	Significance Threshold[1]	Exceeds Significance Threshold?
Bake Pkwy./Trabuco Rd. to Bake Pkwy./Toledo	68.6	68.9	0.3	3.0	No
Lake Forest Dr./Trabuco Rd. to Lake Forest Dr./Toledo	67.2	67.8	0.6	3.0	No
Ridge Route/Trabuco Rd. to Ridge Route/Toledo	59.3	59.8	0.5	5.0	No
El Toro Rd./Trabuco Rd. to El Toro Rd./Toledo	67.3	68.6	1.3	3.0	No
Toledo/Bake Pkwy. to Toledo/Lake Forest Dr.	57.3	58.0	0.7	5.0	No
Toledo/Lake Forest Dr. to Toledo/Ridge Route	58.0	58.7	0.7	5.0	No
Toledo/Ridge Route to Toledo/El Toro Rd.	58.0	59.3	1.3	5.0	No
Bake Pkwy./Toledo to Bake Pkwy./Jeronimo	68.9	69.1	0.2	3.0	No
Lake Forest Dr./Toledo to Lake Forest Dr./Jeronimo	66.8	67.5	0.7	3.0	No
Ridge Route/Toledo to Ridge Route/Jeronimo	59.3	59.3	0.0	5.0	No
El Toro Rd./Toledo to El Toro Rd./Jeronimo	67.4	68.6	1.2	3.0	No
Los Alisos/Trabuco Rd. to Los Alisos/Jeronimo	66.9	67.9	1.0	3.0	No
Jeronimo/Bake Pkwy. to Jeronimo/Lake Forest Dr.	60.3	61.1	0.8	5.0	No
Jeronimo/Lake Forest Dr. to Jeronimo/Ridge Route	61.7	62.3	0.6	5.0	No
Jeronimo/Ridge Route to Jeronimo/El Toro Rd.	61.4	62.0	0.6	5.0	No
Jeronimo/El Toro Rd. to Jeronimo/Los Alisos	63.9	64.9	1.0	5.0	No
Lake Forest Dr./Jeronimo to Lake Forest Dr./Muirlands	67.1	67.6	0.5	3.0	No
Ridge Route/Jeronimo to Ridge Route/Muirlands	60.3	61.1	0.8	5.0	No
El Toro Rd./Jeronimo to El Toro Rd./Muirlands	67.8	68.8	1.0	3.0	No
Los Alisos/Jeronimo to Los Alisos/Muirlands	66.9	67.6	1.0	3.0	No
Muirlands/Bake Pkwy. to Muirlands/Lake Forest Dr.	61.7	63.3	1.6	5.0	No
Muirlands/Lake Forest Dr. to Muirlands/Ridge Route	63.3	64.4	1.1	5.0	No
Muirlands/Ridge Route to Muirlands/El Toro Rd.	63.5	64.7	1.2	5.0	No

Table 3.10-10 Traffic Noise Impacts for Year 2030 General Plan Buildout, including Proposed Project Compared to Existing Conditions

Roadway Segment	Noise Levels in dBA CNEL at 100 feet				
	Existing Conditions	Year 2030 With Project Traffic Volumes	Increase	Significance Threshold[1]	Exceeds Significance Threshold?
Muirlands/El Toro Rd. to Muirlands/Los Alisos	63.3	65.0	1.7	3.0	No
Lake Forest Dr./Muirlands to Lake Forest Dr./Rockfield	67.4	68.4	1.0	3.0	No
Ridge Route/Muirlands to Ridge Route/Rockfield	59.8	61.4	1.6	5.0	No
El Toro Rd./Muirlands to El Toro Rd./Rockfield	68.0	68.8	0.8	3.0	No
Los Alisos/Muirlands to Los Alisos/Rockfield	66.8	67.2	0.4	3.0	No
Rockfield/Bake Pkwy. to Rockfield/Lake Forest Dr.	62.8	64.1	1.3	5.0	No
Rockfield/Lake Forest Dr. to Rockfield/Ridge Route	62.8	64.1	1.3	5.0	No
Rockfield/Ridge Route to Rockfield/El Toro Rd.	62.8	64.6	1.8	5.0	No
Rockfield/El Toro Rd. to Rockfield/Los Alisos	62.6	63.3	0.7	5.0	No
Lake Forest Dr./Rockfield to Lake Forest Dr./I-5	69.4	70.2	0.8	3.0	No
El Toro Rd./Rockfield to El Toro Rd./I-5	69.1	69.4	0.3	3.0	No
Los Alisos/Rockfield to Los Alisos/I-5	66.1	66.7	0.6	3.0	No
I-5/Lake Forest Dr. to I-5/El Toro Rd.	87.7	88.8	1.1	3.0	No
I-5/El Toro Rd. to I-5/Los Alisos	83.0	84.0	1.0	3.0	No

SOURCE: EIP Associates 2005 (calculation data and results are provided in Appendix H)

[1]. As described in Section 3.10.5 (Thresholds of Significance), the significance threshold is 3 dBA if the noise increase would meet or exceed the City's 65 dBA CNEL noise level standard at sensitive land uses. However, if the noise levels remain below the City's 65 dBA CNEL noise level standard at sensitive land uses, then an increase in noise between 3 dBA and 5 dBA would be noticeable, but would not be considered to be significant.

[2]. Although a significant increase in ambient noise over existing conditions is experienced at this roadway segment, this roadway segment would not be located adjacent to any existing or proposed sensitive uses.

As shown in Table 3.10-10, eight roadway segments are expected to experience a significant increase over existing conditions, with a maximum increase of 11.5 dBA CNEL, which is considered an audible and substantial increase to most people and would exceed the identified thresholds of significance. However, it should be noted that five of these eight roadway segments would not be located adjacent to any existing or proposed sensitive uses. Nonetheless, the three remaining roadway segments (SR-241/Alton to SR-241/Lake Forest Drive, Alton/SR-241 to Alton South, and Rancho West to Rancho/Bake Parkway) would potentially be located adjacent to sensitive uses and thus could expose these uses to a substantial increase in ambient noise resulting from increased traffic volumes from Year 2030 general plan buildout conditions, including the Proposed Project. At the general plan and zoning level of analysis, this causes a potentially significant impact. While it is clear that the Proposed Project will contribute to a significant cumulative impact (see discussion in Chapter 5, Section 5.22), whether or not

significant impacts will occur will be subject to tiered environmental review as project-level discretionary approvals are considered by the City. The development of detailed, site-specific information during the future review of individual development projects in the Project Area will allow a timely determination of which, if any, projects would expose sensitive receptors to a substantial increase in ambient noise resulting from increased traffic volumes. Therefore, given the potential for a significant impact, MM 3.10-2 shall require further CEQA review with the submittal of each area plan or tentative map for the Proposed Project, reducing this potential impact at the program stage to a less-than-significant level.

Impact 3.10-5 Implementation of the Proposed Project could add new stationary sources of noise and cause a substantial permanent increase in ambient noise levels.

Significance Level: Less than significant with mitigation

New stationary sources of noise, such as rooftop heating, ventilation, and air conditioning (HVAC) equipment, would be installed within the City as part of the Proposed Project. The type of HVAC equipment currently installed on new commercial and office buildings within the City generates noise levels that average around 66 dBA L_{eq} on the air inlet side and 62 dBA L_{eq} on the other sides when measured at 50 feet from the source. New HVAC equipment for the Proposed Project could generate noise levels that average between 57 to 72 dBA CNEL at 50 feet when the equipment is operating constantly for 24 hours. Because existing noise levels within the City currently average 64.8 to 74.7 dBA, the combination of ambient noise and the equipment noise levels of up to than 72 dBA could result in ambient noise reaching levels up to 72.6 dBA CNEL in areas with noise as low as 64.8 dBA at nearby receptors. This would be expected to cause a substantial permanent increase in noise levels above the identified thresholds of significance. This impact would be a potentially significant impact.

With implementation of MM 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.

Impact 3.10-6 Construction activities associated with the Proposed Project would not result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity.

Significance Level: Less than significant with City and Municipal Code requirements

As discussed in Impact 3.10-1, construction activities associated with the Proposed Project could reach above 86 dBA L_{eq} at the property line of sensitive receptors in the vicinity of the project sites within the Project Area. These construction activities would represent a substantial temporary or periodic increase in ambient noise levels since the project sites within the Project Area such as the IRWD site, the Portola Center site, and the Pacific Heritage site are vacant, undeveloped, or agricultural with few to no structures or roads. As discussed previously in Section 3.10.5 (Thresholds of Significance), this EIR assumes that an increase of 5.0 dBA or greater over ambient noise levels is substantial and significant. As shown in Table 3.10-3, the highest existing daytime ambient noise level monitored in the Project Area was 74.7 dBA L_{eq} at the intersection of Bake Parkway and Calle Entrada. As such, the noise generated by construction activities for the Proposed Project could result in a temporary increase in ambient noise

levels of over 5 dBA at the existing noise-sensitive uses adjacent to the project sites located within the Project Area. However, the construction activities would only occur during the permitted hours designated in the City of Lake Forest's Municipal Code Section 11.16.020 (former County Code Section 4-6-7(e)), and thus would not occur during recognized sleep hours for residences or on days that residents are most sensitive to exterior noise. As such, while the physical impact from an increase in ambient noise levels could occur from the construction activities associated with the Proposed Project, an adverse effect on the nearby residents would not occur. Therefore, this impact would be less than significant.

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 those 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 will be 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) will be required to apply for a variance with the Health Office pursuant to Section 11.16.030 (former County Code Section 4-6-12) of the Municipal Code. Compliance with the above requirements would minimize impacts associated with a temporary or periodic increase in ambient noise as a result of construction activities.

Therefore, impact associated with substantial temporary or periodic increases in ambient noise levels in the project vicinity would be less than significant.

Impact 3.10-7 **The Proposed Project is not located within an airport land use plan and would not expose people residing or working in the Project Area to excessive noise levels.**

Significance Level: No impact

The Project Area is located adjacent to the former MCAS El Toro facility. Although the Proposed Project site was subject to the land use and planning guidelines of the AELUP, which were developed by the ALUC to govern land uses surrounding the existing airports within Orange County, the ALUC rescinded the AELUP on July 21, 2005. The MCAS El Toro has been closed since July 1999, and, therefore, no aircraft flights operate from this base. As such, the Project Area no longer serves as navigable airspace for the base and the development proposed in the Project Area under the Proposed Project would not be subject to excessive noise levels associated with aircraft operation. Thus, there would be no impact.

3.10.7 Mitigation Measures

The following mitigation measures are designed to eliminate or reduce to a level of less than significant those significant impacts to Noise that are caused by the Proposed Project and that are capable of being feasibly eliminated or reduced to a level of less than significant.

MM 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: 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.*

MM 3.10-2 *Prior to the issuance of a Site Development Permit and/or Use Permit for site-specific developments within the Project Area, the City shall conduct a tiered site-specific analysis under CEQA to determine whether the individual project will expose sensitive receptors to either a substantial increase in ambient noise resulting from increased traffic volumes generated by that project or excessive groundborne vibration or groundborne noise levels. Where significant impacts are identified, appropriate mitigation shall be required.*

MM 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 a building permit, the applicant shall submit plans for shielding of all HVAC equipment to provide noise attenuation that will reduce noise from HVAC systems to 65 dBA or less when measured at 50 feet from the noise source.*

3.10.8 Summary of Impacts

Table 3.10-11 summarizes the potential long-term adverse impacts of the Proposed Project to noise in the Project Area, and identifies the significance of those impacts after any applicable mitigation measures.

Table 3.10-11 Summary of Impacts

Impact	Threshold	Significance
3.10-1	Construction activities associated with the Proposed Project would not generate noise levels that exceed the standards established in the City of Lake Forest Noise Regulations.	Less than significant
3.10-2	Construction activities associated with the Proposed Project could result in the exposure of persons to excessive groundborne vibration or groundborne noise levels.	Less than significant with mitigation
3.10-3	Construction activities associated with the Proposed Project would not result in the exposure of structures to excessive groundborne vibration or groundborne noise levels.	No impact
3.10-4	Year 2030 general plan buildout conditions, including the Proposed Project, would generate increased local traffic volumes that could result in a substantial permanent increase in ambient noise levels in the project vicinity above existing levels.	~~Less than significant with mitigation~~ Significant Unmitigated Cumulative Impact
3.10-5	Implementation of the Proposed Project could add new stationary sources of noise and cause a substantial permanent increase in ambient noise levels.	Less than significant with mitigation
3.10-6	Construction activities associated with the Proposed Project would not result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity.	Less than significant with compliance with City and Municipal Code requirements
3.10-7	The Proposed Project is not located within an airport land use plan and would not expose people residing or working in the Project Area to excessive noise levels.	No impact

3.10.9 References

Austin-Foust Associates, Inc. April 2005. *Draft City of Lake Forest Vacant Land Opportunities Phase III Traffic Study*.

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

Harris Miller Miller & Hanson Inc. 1995. *Transit Noise and Vibration Impact Assessment, Final Report,* April.

Hendriks, Rudolf W. 1987. *California Vehicle Noise Emission Levels (FHWA/CA/TL-87/03)*.

J.J. Van Houten & Associates. 1994. Safety and Noise Element. *City of Lake Forest General Plan*, 21 June.

Lake Forest, City of. 1995. Municipal Code Section 11.16.020.

Orange County Airport Land Use Commission. 1995. *Airport Environs Land Use Plan*. Amended: 16 November.

Seattle Popular Monorail Authority and United States Coast Guard. 2004. *Seattle Monorail Project Green Line, Final Environmental Impact Statement*, 10 March.

U.S. Department of Transportation. 1980a. *Federal Highway Administration. Highway Noise Fundamentals*.

———. Federal Highway Administration. 1980b. *Highway Noise Mitigation*.

———. 1998. Federal Railroad Administration. *High Speed Ground Transportation Noise and Vibration Impact Assessment*.

U.S. Environmental Protection Agency. 1971. *Noise from Construction Equipment and Operations, Building Equipment and Home Appliances (PB 206717)*.