4.9 NOISE

This section evaluates on- and off-campus noise impacts associated with implementation of the 2007 LRDP, including the potential for LRDP implementation to expose sensitive receptors to substantial permanent and temporary increases in noise levels (e.g., traffic noise along roadways, long-term operational noise from new stationary sources, short-term construction noise), aircraft noise levels, and ground-borne vibration. Information in this section is based on a noise technical report prepared by Kimley-Horn Associates included as Appendix D of this EIR.

4.9.1 ENVIRONMENTAL SETTING

4.9.1.1 FUNDAMENTALS OF ENVIRONMENTAL NOISE

The human response to environmental noise is subjective and varies considerably from individual to individual. The effects of noise can range from interference with sleep, concentration, and communication, to hearing loss with exposure at the highest levels. Although uncertain, the human health effects caused by increased environmental noise are suspected to be substantial.

Sound is technically described in terms of amplitude (loudness) and frequency (pitch). At undesirable levels, pitch is generally an annoyance, while loudness can affect the ability to hear. The quality, referred to as pitch, is a function of the number of complete vibrations, or individual sound waves, striking our ears per unit of time. As this number (measured in cycles per second) increases, a rising pitch is heard and a deepening pitch is heard with a decrease. Loudness is a function of the amount of energy in a sound wave. This energy is, in turn, a function of sound pressure. The human ear is tuned to receive sound that is within a specific intensity range. Sound below that range is inaudible, while sound above that range can become painful and damaging to the ear.

The standard unit of sound amplitude measurement is the decibel (dB). Because 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 decibel scale adjusted for A-weighting (dBA) provides this compensation by organizing frequencies in a manner approximating the sensitivity of the human ear. Over the audible range of pitch, the human ear is less sensitive to low frequencies and very high-pitched sound and is more sensitive to mid-frequency sounds. However, the human ear does not typically notice changes in noise level of less than three dBA. Some individuals who are extremely sensitive to changes in noise may notice changes from three to five dBA. A five dBA increase is readily noticeable and is the typical threshold that would cause a change in community reaction. An increase of 10 dBA would be perceived by people as a doubling of loudness. A doubling of traffic flow on any given roadway would cause a noise increase of approximately three dBA.

The decibel level of a sound decreases (or attenuates) exponentially as the distance from the source of that sound increases. For a single point source such as a piece of mechanical equipment, the sound level normally decreases by about six dBA for each doubling of distance from the source. Sound that originates from a linear, or “line” source such as a heavily traveled traffic corridor, attenuates by approximately three dBA per doubling of distance, provided that the surrounding environment is “hard” (i.e., streets, concrete areas, etc.). Noise from less heavily traveled roadways in “soft” environments (i.e., vegetation) attenuates more rapidly, at about 4.5 dBA for each doubling of distance. Other factors that typically affect sound propagation in an outdoor environment are structural barriers and atmospheric conditions.

Community noise usually consists of a base of steady "ambient" noise that is the sum of many distant and indistinguishable noise sources, plus, superimposed on the distant background noise, the sound from individual local sources. These individual sources can vary from an occasional aircraft or train passing by to virtually continuous noise from, for example, traffic on a major thoroughfare.

A number of noise descriptors are used to analyze the adverse effect of community noise on people. To account for the varying nature of environmental noise, these descriptors consider that the potential effect of noise upon people is largely dependent upon the total acoustical energy content of the noise, the context of the noise occurrence, and the time of day when the noise occurs. Common noise descriptors include the following:

- ***Leq—***the equivalent energy noise level, is the average acoustic energy content of noise, measured during a prescribed period, typically one hour. Thus, the Leq of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during the exposure period. Leq values do not include a penalty for noise that might occur at night.
- ***Ldn***—the Day-Night Average Sound Level (also abbreviated as DNL), is a 24-hour-average Leq with a 10 dBA "penalty" added to noise occurring during the hours of 10:00 p.m. to 7:00 a.m. to account for the greater nocturnal noise sensitivity of people.
- ***CNEL***—the Community Noise Equivalent Level, is also a 24-hour-average Leq with no "penalty" added to noise during the daytime hours between 7:00 a.m. and 7:00 p.m., a "penalty" of five dB added to evening noise occurring between 7:00 p.m. and 10:00 p.m., and a "penalty" of 10 dB added to nighttime noise occurring between 10:00 p.m. and 7:00 a.m.

Other noise descriptors (or metrics) give information on the range of instantaneous noise levels experienced over time. Examples include:

- ***Lmax***—the highest energy noise level experienced during a given period, usually a single event such as an aircraft overflight.
- ***Lmin***—is the lowest energy noise level experienced during a given period during a complete lull in activity.
- ***Ln values (centiles)***—indicate noise levels that were exceeded "n" percent of the time during a specified period. For instance, L50 is the noise level that was exceeded for a cumulative 50 percent of the time during a measurement period (e.g., 30 cumulative minutes during an hour measurement period).

Community noise environments are typically represented by noise levels measured for brief periods throughout the day and night, or during a 24-hour period (i.e., by DNL/Ldn or CNEL). The one-hour period is especially useful for characterizing noise caused by short-term events, such as operation of construction equipment or concert noise (i.e., with Leq). Community noise levels are generally perceived as quiet when the Ldn is below 50 dBA, moderate in the 50 to 60 dBA Ldn range, and loud above 60 dBA Ldn. Urban residential areas are usually above 65 dBA Ldn. Along major thoroughfares, roadside noise levels are typically between 65 and 75 dBA Ldn.

The primary effect of noise on human health and welfare due to interference with activity comes from its effect on speech communication (EPA 1971). According to the U.S. Environmental Protection Agency (EPA), the level for the protection of speech communication is a Leq of 45 dBA within a residence to provide for 100 percent speech intelligibility. The EPA, the U.S. Department of Housing and Urban Development (HUD), and the Federal Aviation Administration (FAA) have determined that sound levels up to 45 dBA Ldn (or CNEL) are acceptable within residential buildings. The EPA also identified an indoor Ldn of 45 dBA as necessary to protect against sleep disturbance.

Based on national averages, approximately 25 dBA of noise reduction can be expected with the windows closed on a typically constructed residential structure. However, the actual interior noise level within a residence depends on the sound transmission loss qualities of the construction material and surface area of each element such as walls, windows, and doors. Other factors include the type of construction (brick, stucco, etc.), interior furnishings, orientation of the room relative to the noise source, and the manner in which the residence is ventilated. Assuming a very conservative structural noise insulation of 20 dBA for a typical residence in the Irvine area, this corresponds to an outdoor CNEL of 65 dBA to provide for 100 percent speech intelligibility and the minimization of sleep disturbance indoors with the windows closed.

4.9.1.2 FUNDAMENTALS OF ENVIRONMENTAL VIBRATION

Vibration is defined as any oscillatory motion induced in a structure or mechanical device as a direct result of some type of input excitation. Vibration consists of waves transmitted through solid material. There are several types of wave motion in solids, unlike in air, including compressional, shear, torsional, and bending. The solid medium can be excited by forces, moments, or pressure fields. This leads to the terminology of “structure-borne/ground-borne” vibration.

Ground-borne vibration propagates from the source through the ground to adjacent buildings by surface waves. Vibration may be comprised of a single pulse, a series of pulses, or a continuous oscillatory motion. The frequency of a vibrating object describes how rapidly it is oscillating, measured in Hz. Most environmental vibrations consist of a composite, or “spectrum” of many frequencies, and are generally classified as broadband or random vibrations. The normal frequency range of most ground-borne vibration that can be felt generally starts from a low frequency of less than 1 Hz to a high of about 200 Hz.

Vibration energy spreads out as it travels through the ground, causing the vibration amplitude to decrease with distance away from the source. Soil properties also affect the propagation of vibration. When ground-borne vibration interacts with a building there is usually a ground-to-foundation coupling loss, but the vibration can also be amplified by the structural resonances of the walls and floors. Vibration in buildings is typically perceived as rattling of windows or items on shelves or the motion of building surfaces. The vibration of building surfaces can also be radiated as sound and heard as a low-frequency rumbling noise, known as ground-borne noise.

Ambient and source vibration information for this study are expressed in terms of the peak particle velocity (PPV) in inches per second (in/sec) that correlates best with human perception. The particle velocity is the velocity of the soil particles resulting from a disturbance. Agencies such as California Department of Transportation (Caltrans) use the PPV descriptor because it correlates well with damage or complaints. Caltrans estimates that a "safe" level of a single vibrational event for typical structures is 2 in/sec and 0.2 in/sec for continuous vibrations. However, 0.08 in/sec is the recommended upper level for continuous vibrations for historic buildings or buildings in poor condition. Caltrans also estimates that the threshold of perception is approximately 0.006 in/sec and the level at which continuous vibrations begins to annoy people is approximately 0.010 in/sec.

4.9.1.3 EXISTING NOISE CONDITIONS

Many land uses are considered sensitive to noise and may be subject to stress and/or significant interference from noise as shown in Table 4.9-1. Noise-sensitive land uses include residential dwellings, transient lodging, dormitories, hospitals, educational facilities, and libraries. Industrial and commercial land uses are generally not considered sensitive to noise.

Sensitive receptors at UCI include faculty, staff and student housing, libraries, classrooms, and child care centers, found throughout the campus. The main existing student residential areas on the campus are located east of East Peltason Drive and north of Anteater Drive. There are three other existing student residential areas on the campus: Mesa Court Housing located north of Mesa Road and west of West Peltason Drive; Campus Village Housing located west of Bison Avenue and east of West Peltason Drive; and Middle Earth Housing located west of East Peltason Drive and south of Pereira Drive. The existing faculty/staff housing area on the campus is located south of Anteater Drive surrounded by California Avenue, Gabrielino Drive, and Los Trancos Drive. In addition, there are many off-campus apartment complexes located north of Campus Drive. The majority of the academic and support facilities are located within the Peltason Drive circle (Figure 3-6).

The following provides a discussion of the noise environment in and adjacent to the UCI campus. It is evident in reviewing the noise data below that UCI is subject to noise levels typical of those that are encountered in an urban environment. The discussion below is divided into transportation noise sources, including vehicular traffic and periodic aircraft overflights, stationary noise sources, such as mechanical equipment, and construction noise sources, as well as a discussion of existing noise levels.

Existing Noise Levels

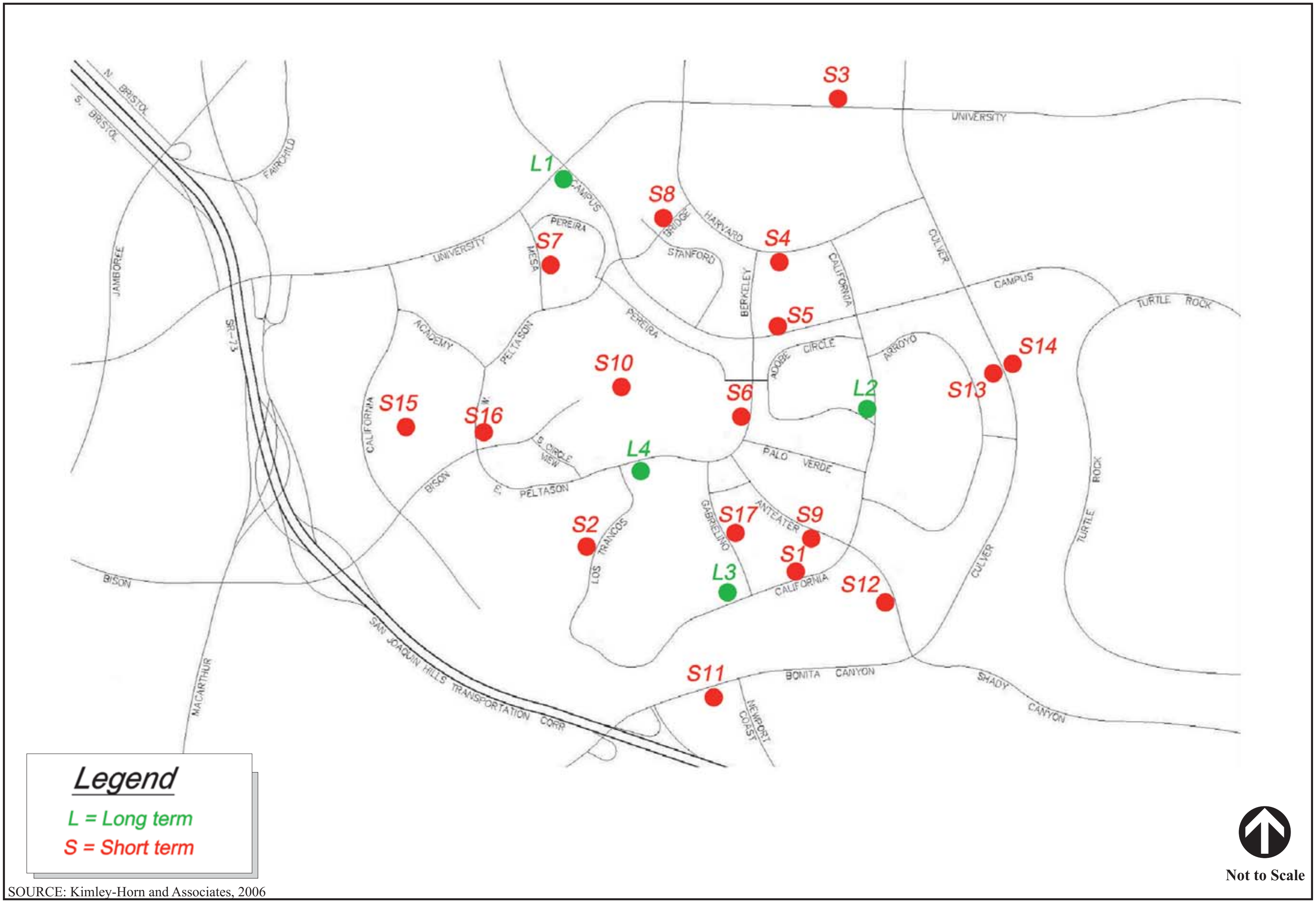
An ambient sound level survey was conducted from September 25-27, 2006, during academic session, to quantify the noise environment on and off campus. The measurement locations were selected to be representative of the noise-sensitive land uses in the study area, as described above. Seventeen one-hour noise measurements were conducted at noise-sensitive areas throughout the University, in Aldrich Park, and at the location of the proposed satellite utilities plant in the Health Sciences complex. The measurements were taken during the daytime (7:00 a.m. to 7:00 p.m.) period. Four 24-hour noise measurements were also conducted at the existing residential areas on campus.

The results of these measurements are summarized in Tables 4.9-2 and 4.9-3 and correspond to the locations depicted on Figure 4.9-1. The measured sound levels were influenced by vehicular traffic, periodic aircraft overflights, distant construction, and pedestrian passbys. The hourly Leq ranged from approximately 48 dBA to 70 dBA. The CNEL at the long-term measurement locations ranged from approximately 56 dBA to 63 dBA. Additional detail for ambient sound level measurements is found in the Noise Analysis report (Appendix D).

Transportation Noise Sources

Vehicular Traffic

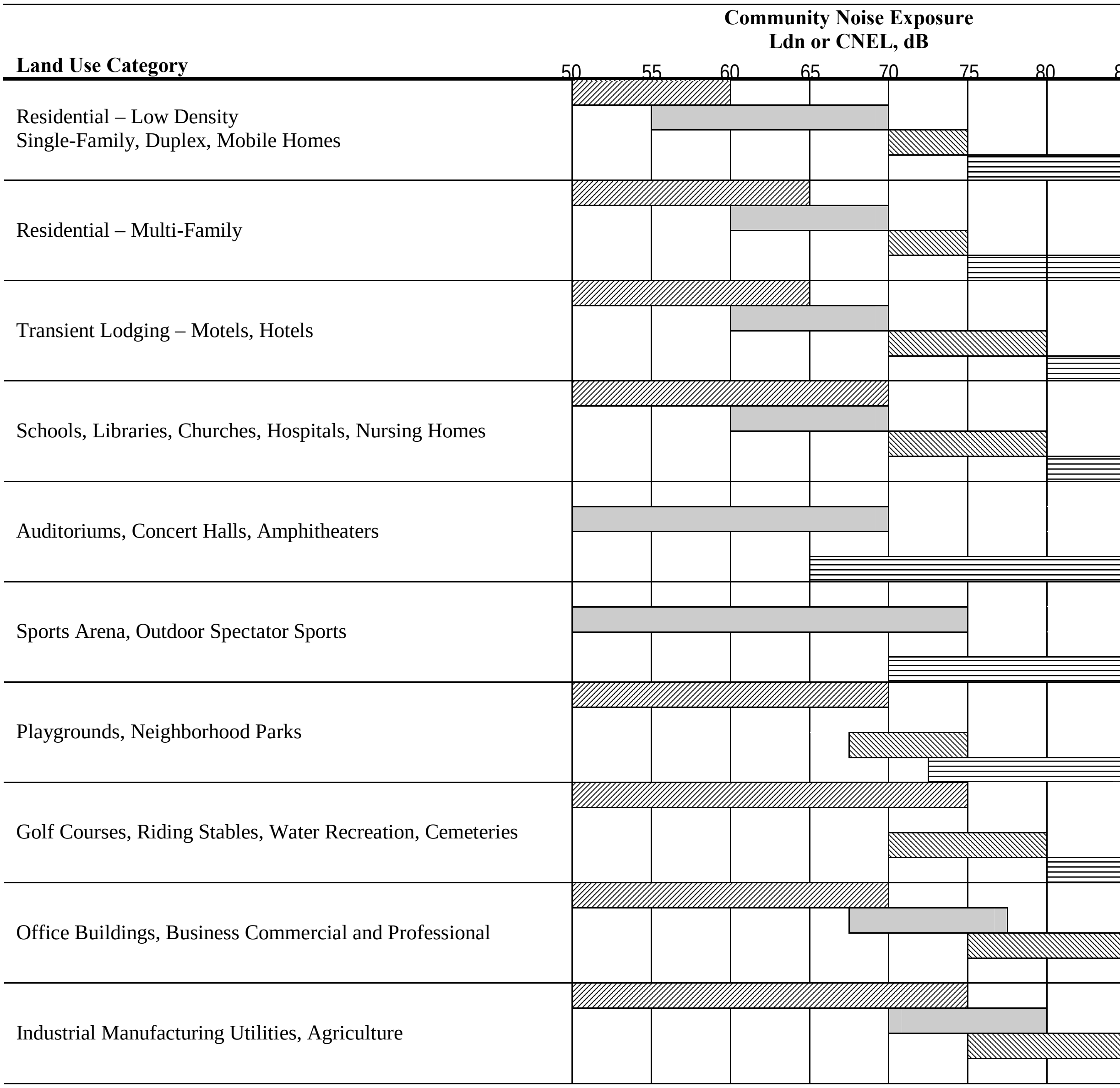
Vehicular traffic noise is the predominant noise source within the campus area and along the surrounding access roads. Major roadways on campus include Peltason Drive, Campus Drive, Bison Avenue, and California Avenue. Major access roadways in the campus vicinity that are adjacent to sensitive residential receptors include University Drive, Harvard Avenue, Culver Drive, Bonita Canyon Road, and SR-73.



SOURCE: Kimley-Horn and Associates, 2006

SOUND LEVEL MEASUREMENT LOCATIONS **FIGURE 4.9-1**

Table 4.9-1. State of California Land Use Compatibility For Community Noise Environment



Interpretation:

Normally Acceptable: Specified land use is satisfactory based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

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

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

Source: State of California Governor's Office of Planning and Research, General Plan Guidelines, 1990.

Table 4.9-2. Existing Short-Term Ambient Sound Level Measurements (dBA)

Location	Noise Source	L_{eq}	L_{min}	L_{max}	L_{10}	L_{50}	L_{90}
California Ave. (West of Twain St.)	Traffic on California Avenue	54.8	39.2	77.5	58.8	44.9	41.8
Los Trancos Dr. (at Vista Bonita Dr.)	Traffic on Los Trancos Drive and Vista Bonita Drive, pedestrian passbys, distant aircraft	55.8	40.0	78.9	59.0	46.2	41.8
University Dr. (West of Culver Dr.)	Traffic on University Drive	70.5	47.2	80.3	75.0	68.0	55.5
Harvard Ave. (East of Berkeley)	Traffic on Harvard Avenue, nearby maintenance facility	63.5	47.2	78.8	66.9	59.8	50.2
Campus Dr. (East of E. Peltason Dr.)	Traffic on Campus Drive	66.4	46.6	80.8	70.5	62.2	52.0
E. Peltason Dr. (South of Pereira Dr.)	Traffic on E. Peltason Drive, pedestrian passbys	65.1	45.2	84.1	68.9	60.5	50.3
Mesa Rd. (East of University Dr.)	Traffic on Mesa Road, nearby maintenance building	61.9	48.4	75.3	65.9	58.3	51.3
Bridge Rd. (North of Stanford Ave.)	Traffic on Bridge Road	57.5	43.2	71.5	60.3	52.8	45.7
Anteater Dr. (North of California Ave.)	Traffic on Anteater Drive, distant construction, pedestrian passbys.	56.6	42.0	70.8	61.9	48.5	43.9
Aldrich Park	Pedestrian passbys, skateboarders	48.5	44.7	63.6	49.9	46.8	45.5
Bonita Canyon Rd. (West of Newport Coast Dr.)	Traffic on Bonita Canyon Road, maintenance worker passbys.	64.5	47	77.8	68.8	60.9	54.9
Anteater Dr. (South of California Ave.)	Traffic on Anteater Drive, pedestrian/bicycle passbys.	55.5	41.3	73.2	60.2	46.3	43
West of Culver Dr. (South of Campus Dr.)	Traffic on Culver Drive, nearby construction	69.0	46.4	81.1	73.0	66.8	49.4
East of Culver Dr. (South of Campus Dr.)	Aircraft, pedestrian passbys	59.7	44.8	72.7	62.8	56.9	47.5
East of Irvine Hall (Proposed Satellite Plant Location)	Traffic on California Avenue, pedestrian passbys	53.6	47.4	68.2	55.4	51.5	49.9
W. Peltason Dr. (West of Bison Ave.)	Traffic on W. Peltason Drive, nearby construction	62.9	50.5	78.7	66.3	60.9	53.9
Gabrielino Dr. (at Vista Bonita Dr.)	Traffic on Gabrielino Drive, construction vehicle passbys, nearby construction	60.5	40.1	81.4	58.2	48.0	43.9

Table 4.9-3. Summary of Existing Long-Term Ambient Sound Level Measurements (dBA)

Location	Average Leq	CNEL
University Drive at Campus Drive (Mesa Court Housing)	59.5	62.2
California Avenue at Adobe Circle Road	58.3	62.3
California Avenue; 53 Urey Court Residence	53.2	56.1
East Peltason Drive; 95 Schubert Court Residence	58.1	63.1

On-campus parking lots are also a source of traffic noise. A summary of existing traffic noise levels along roadways adjacent to and surrounding the UCI campus is available in Table 4.9-4. As shown, noise levels along many roadways in the project vicinity exceed 65 dBA CNEL.

Aviation. The UCI campus is located approximately 1.5 miles southeast of John Wayne Airport. General aircraft and helicopter overflights originating from John Wayne Airport were observed during the noise measurements; however, the airport's 60 CNEL contour does not extend to the campus. According to FAA guidelines, residential and public land uses in the vicinity of airports are considered compatible with airport noise guidelines if the noise level from aviation operations is less than 65 dBA CNEL. Two Marine Corps Air Stations (MCAS), El Toro MCAS and Tustin MCAS were located within 5 and 3 miles of UCI, respectively, but both facilities closed in 1999 and no longer generate noise from aviation operations.

Stationary Noise Sources

Stationary noise sources on campus include the Central Plant, electrical substation, major heating/ventilation/air conditioning (HVAC) systems, institutional operations, emergency generators, and parking structures**.** These sources may generate significant noise levels and may be of concern if they are located within close proximity to noise sensitive receptors such as residences, dormitories, classrooms and libraries. In addition, noise from fixed sources may disrupt communication and normal routine if constructed near less sensitive receptors such as offices, if not appropriately mitigated.

Construction Noise Sources

Construction activity occurs throughout the campus and generates noise that is audible at nearby land uses. Construction noise levels vary depending on the distance between the activity and receptors, and the type of equipment used, how it is operated, how well the equipment is maintained, and how many projects are under construction at one time. Figure 4.9-2 illustrates sound levels from typical construction equipment. Sound levels from typical construction activity typically range from 60 to 90 dBA at 50 feet from the source (EPA 1971).

4.9.1.4 EXISTING VIBRATION CONDITIONS

The typical issues associated with ground-borne vibration are human annoyance and structural damage. In addition, vibration-sensitive instruments and operations that are often used at UCI can also be disrupted by vibration. Ground-borne vibration on, and within the vicinity of the campus, originates from construction activities, vehicular traffic, and stationary noise sources. Of these three sources, vibration levels from vehicular traffic and stationary noise sources are typically considered less than the 0.2 in/sec threshold for causing architectural damage to conventional sensitive structures (refer to Section 4.9.3.1 below). For example, safe levels of vibration for sensitive structures, such as historical buildings and ancient ruins, have been measured at 0.08 in/sec at approximately 16 feet from the nearest travel lane of a freeway (Federal Transit Administration, 1995).

Ground-borne vibration levels from construction activities depend on the type of soil and the energy generating capability of the construction equipment. Clay soils provide resistance to vibration and, therefore, generate higher vibration levels near the source than for sandy soils. However, vibration in clay soils tends to drop-off more rapidly with distance as compared to sandy soils. Vibration levels from construction equipment vary with the source type and specific equipment used. Typical intensities of vibration from operation of construction equipment are presented in Figure 4.9-3. The intensities are based on data recorded on the ground surface or in residences or relatively small commercial buildings.

Generally, the building construction-type and its physical condition determine the level of vibration a structure can withstand before damage occurs. As indicated in Section 4.9.3.1 below, a safety level of 2.0 in/sec is recommended for residential structures. According to Caltrans, the highest measured vibration level during highway construction was 2.88 in/sec at 10 feet from a pavement breaker. Other construction activities and equipment, such as D-8 and D-9 Caterpillars, earthmovers, and trucks have not exceeded 0.10 in/sec at 10 feet. According to Caltrans, damage is possible when pile driving occurs at 25 feet or less from any structure. Damage may also occur within 50 feet of a building in poor condition or a building previously damaged by an earthquake. According to the Federal Transit Authority (FTA) *Transit Noise and Vibration Impact Assessment* (FTA Manual) (1995), the typical vibration level of impact pile driving is 0.644 in/sec at 25 feet, with an upper range of 1.518 in/sec at 25 feet.

4.9.2 REGULATORY FRAMEWORK

As discussed below, various federal and state agencies set guidelines for noise and vibration. Local agencies typically derive noise and vibration regulations from those guidelines and enforce noise ordinances within their jurisdiction.

4.9.2.1 FEDERAL

Noise

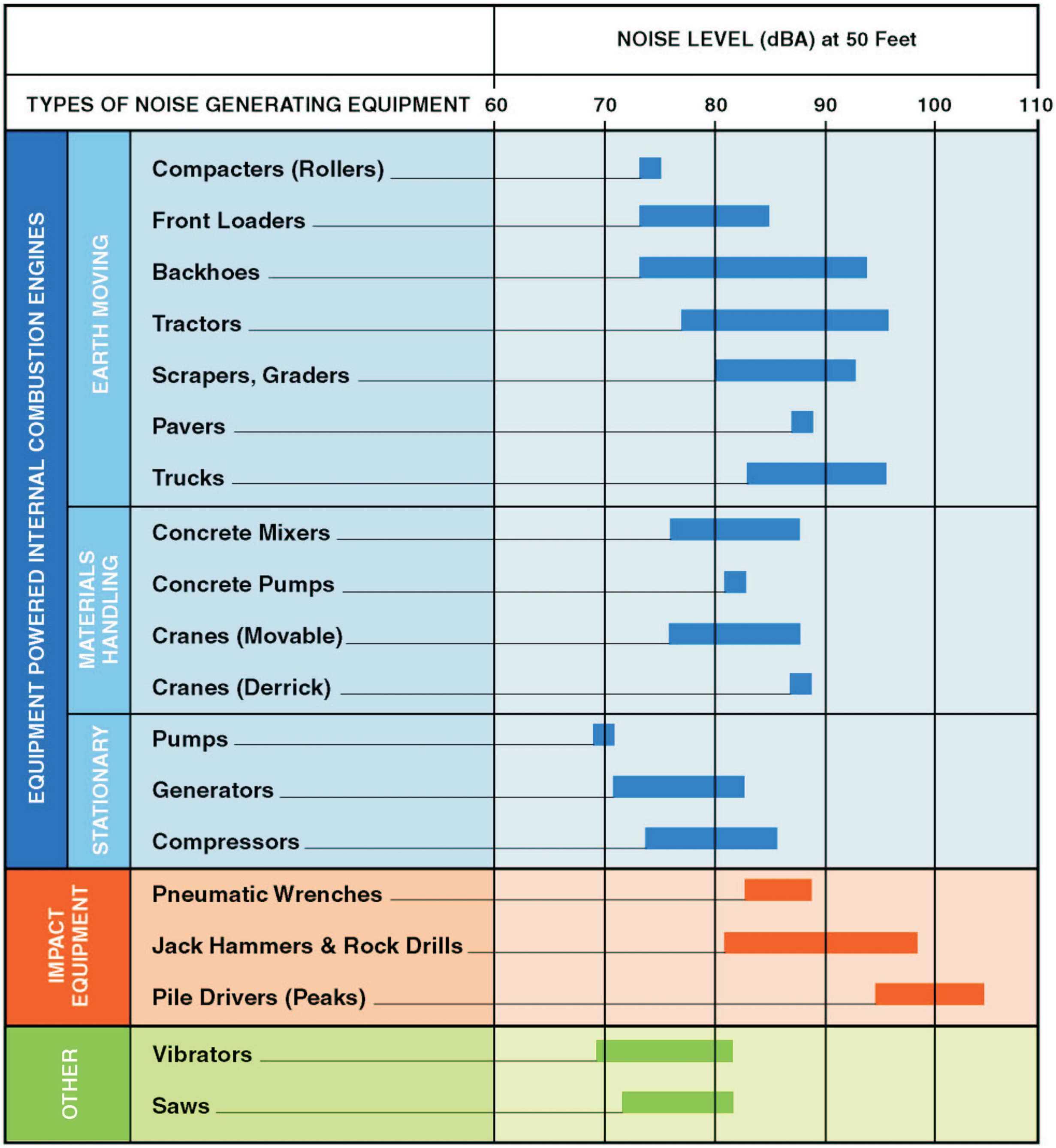
Among other guidance, the Noise Control Act of 1972 directed the EPA to develop noise level guidelines that would protect the population from the adverse effects of environmental noise. The EPA published a guideline (1974) containing recommendations of 55 dBA Ldn outdoors and 45 dBA Ldn indoors as a goal for residential land uses. The agency is careful to stress that the recommendations contain a factor of safety and do not consider technical or economic feasibility issues and, therefore, should not be construed as standards or regulations.

The HUD standards define outdoor noise levels below 65 dBA Ldn as acceptable for residential use. Outdoor noise levels up to 75 dBA Ldn may be made acceptable through the use of insulation in buildings. The Federal Highway Administration, the Federal Interagency Committee on Urban Noise, and the FAA have also developed standards and guidance. However, these federal noise standards do not apply to the situation of the UCI campus.

Vibration

A considerable amount of research has been conducted to correlate vibrations with architectural and structural damage. The Federal Office of Surface Mining (OSM), formally known as U.S. Bureau of Mines, recommends a safety level of 2.0 in/sec for residential structures.

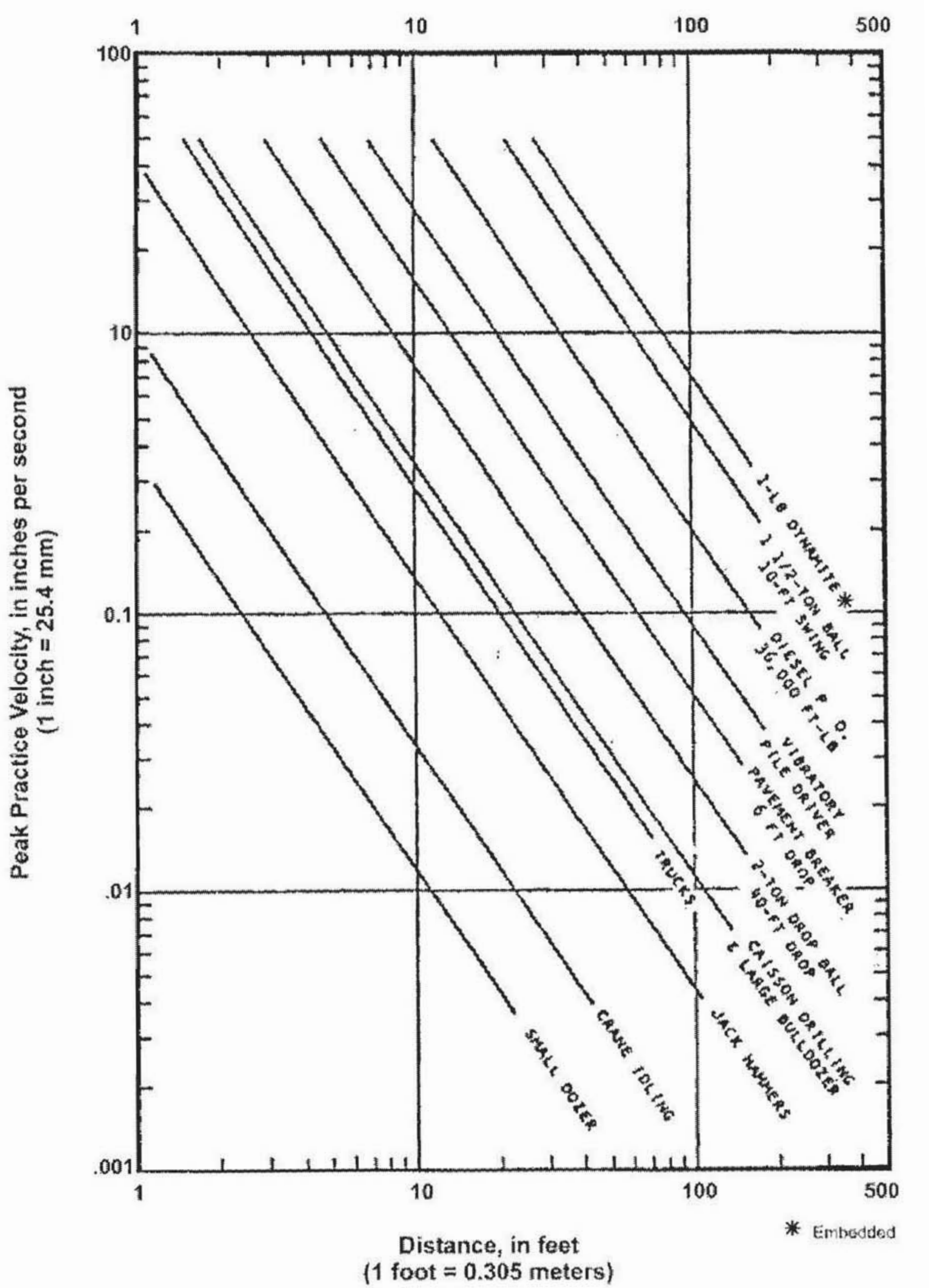
The FTA and Federal Railroad Administration (FRA) have published guidelines for assessing the impacts of ground-borne vibration associated with rail projects, which have been applied by other jurisdictions to other types of projects. The FTA Manual states that the threshold for buildings where vibration would interfere with interior operations is 65 VdB, where VdB is the vibration velocity level or the vibration decibel. However, as a guide, major construction activity within 200 feet and pile driving within 600 feet may be disruptive to vibration-sensitive operations. The FRA measure of the threshold of architectural damage for conventional sensitive structures is 0.2 in/sec.



SOURCE: EPA PB 206717, Environmental Protection Agency, December 31, 1971,
"Noise from Construction Equipment and Operations"

TYPICAL CONSTRUCTION EQUIPMENT NOISE GENERATION LEVELS

FIGURE 4.9-2



RELATIVE INTENSITIES OF CONSTRUCTION VIBRATIONS

FIGURE 4.9-3

Table 4.9-4. Comparison of Existing Traffic Noise Levels and Future Traffic Noise Levels with LRDP Implementation

		Existing					Future with Project					Delta
			Approximate Distance (ft) CNEL Noise Contour from centerline					Approximate Distance (ft) CNEL Noise Contour from centerline				
Roadway Segment	Existing ADT	CNEL at 50 ft from centerline (dBA)	60	65	70	75	CNEL at 50 ft from centerline (dBA)	60	65	70	75	CNEL at 50 ft from centerline (dBA)
Academy Way												
between California Ave. and Medical Plaza	4,000	55	N/A	N/A	N/A	N/A	58	35	--	--	--	3
between Medical Plaza and W. Peltason Dr.	4,000	55	N/A	N/A	N/A	N/A	57	25	--	--	--	2
Adobe Circle Rd.(1)												
North	N/A	N/A	N/A	N/A	N/A	N/A	52	--	--	--	--	N/A
South	N/A	N/A	N/A	N/A	N/A	N/A	49	--	--	--	--	N/A
Anteater Dr.(2)												
between E. Peltason Dr. and Russell Pl.	N/A	N/A	N/A	N/A	N/A	N/A	61	50	--	--	--	N/A
between Russell Pl. and California Ave.	N/A	N/A	N/A	N/A	N/A	N/A	59	40	--	--	--	N/A
between California Ave. and Proposed Rd	N/A	N/A	N/A	N/A	N/A	N/A	59	40	--	--	--	N/A
between Proposed Rd and Culver Dr.	N/A	N/A	N/A	N/A	N/A	N/A	60	45	--	--	--	N/A
Proposed Rd(2) between Anteater Dr. and Bonita Canyon Dr.	N/A	N/A	N/A	N/A	N/A	N/A	50	--	--	--	--	N/A
Arroyo Dr. N(2) east of California Ave.	N/A	N/A	N/A	N/A	N/A	N/A	58	30	--	--	--	N/A
Access Rd. (2)												
between Arroyo Dr. N and Campus Dr.	N/A	N/A	N/A	N/A	N/A	N/A	52	--	--	--	--	N/A
between Arroyo Dr. N and Culver Dr.	N/A	N/A	N/A	N/A	N/A	N/A	57	25	--	--	--	N/A
Arroyo Dr. S(2) east of California Ave.	N/A	N/A	N/A	N/A	N/A	N/A	54	--	--	--	--	N/A
Bison Ave.												
between California Ave. and E. Peltason Dr.	15,000	66	120	55	--	--	67	140	80	25	--	1
south of California Ave.	21,000	67	135	75	25	--	69	125	70	40	--	2
California Ave.												
between University Dr. and Academy Way	12,000	65	110	45	--	--	67	105	60	25	--	2
between Academy Way and Theory	7,000	62	80	30	--	--	64	80	45	--	--	2
between Theory and Bison Ave.	8,000	63	90	30	--	--	66	125	65	--	--	3
east of Bison Ave.	3,000	54	--	--	--	--	54	--	--	--	--	0
between Campus Dr. and Adobe Circle Rd. N	13,000	65	115	50	--	--	67	105	60	30	--	2
between Adobe Circle Rd. N and Arroyo Dr. N	14,000	65	115	50	--	--	67	100	60	25	--	2
between Arroyo Dr. N and Adobe Circle Rd. S(2)	N/A	N/A	N/A	N/A	N/A	N/A	65	85	50	--	--	N/A

Table 4.9-4. Continued

Roadway Segment	Existing ADT	Existing: CNEL at 50 ft from centerline (dBA)	Existing: Approximate Distance (ft) CNEL Noise Contour from centerline 60	65	70	75	Future with Project: CNEL at 50 ft from centerline (dBA)	Future with Project: Approximate Distance (ft) CNEL Noise Contour from centerline 60	65	70	75	Delta: CNEL at 50 ft from centerline (dBA)
between Adobe Circle Rd. S and Palo Verde Rd.[2]	N/A	N/A	N/A	N/A	N/A	N/A	63	70	35	--	--	N/A
between Palo Verde Rd. and Arroyo Dr. S[2]	N/A	N/A	N/A	N/A	N/A	N/A	63	100	35	--	--	N/A
between Arroyo Dr. S and Anteater Dr. [2]	N/A	N/A	N/A	N/A	N/A	N/A	64	75	40	--	--	N/A
between Anteater Dr. and Gabrielino Dr. [2]	N/A	N/A	N/A	N/A	N/A	N/A	56	--	--	--	--	N/A
between Gabrielino Dr. and Owens Dr. [2]	N/A	N/A	N/A	N/A	N/A	N/A	52	--	--	--	--	N/A
E. Peltason Dr.												
between Bison Ave. and S. Circle View	13,000	65	115	50	--	--	67	100	60	25	--	2
between S. Circle View and Los Trancos Dr.	14,000	65	115	50	--	--	67	105	60	25	--	2
between Los Trancos Dr. and Gabrielino Dr.	13,000	65	115	50	--	--	67	135	75	25	--	2
between Gabrielino Dr. and Anteater Dr.	15,000	66	120	55	--	--	65	85	50	--	--	-1
between Anteater Dr. and Palo Verde Rd.	15,000	66	120	55	--	--	67	105	60	30	--	1
between Palo Verde Rd. and Pereira Dr.	16,000	66	125	60	--	--	67	100	60	25	--	1
between Pereira Dr. and Campus Dr.	15,000	66	120	55	--	--	67	105	60	25	--	1
Gabrielino Dr.												
between E. Peltason Dr. and Russell Pl.	4,000	55	--	--	--	--	55	--	--	--	--	0
between Russell Pl. and California Ave.[1]	N/A	N/A	N/A	N/A	N/A	N/A	50	--	--	--	--	N/A
Los Trancos Dr.												
between E. Peltason Dr. and Vista Bonita Dr.	2,000	52	--	--	--	--	52	--	--	--	--	0
between Vista Bonita Dr. and Owens Dr.[1]	N/A	N/A	N/A	N/A	N/A	N/A	50	--	--	--	--	N/A
Mesa Rd.												
between University Dr. and Pereira Dr.	8,000	58	35	--	--	--	59	45	--	--	--	1
between Pereira Dr. and W. Peltason Dr.	6,000	57	25	--	--	--	58	30	--	--	--	1
Palo Verde Rd. between E. Peltason Dr. and California Ave.	2,000	52	--	--	--	--	52	--	--	--	--	0
Pereira Dr.												
between W. Peltason Dr. and Pereira Dr.	9,000	59	40	--	--	--	57	25	--	--	--	-2
between Pereira Dr. and E. Peltason Dr.	9,000	63	100	35	--	--	63	100	35	--	--	0
between E. Peltason Dr. and Adobe Circle Rd.	9,000	63	100	35	--	--	61	55	--	--	--	-2
Russell Pl. between Gabrielino Dr. and Anteater Dr.[2]	N/A	N/A	N/A	N/A	N/A	N/A	58	35	--	--	--	N/A

Table 4.9-4. Continued

Roadway Segment	Existing ADT	Existing: CNEL at 50 ft from centerline (dBA)	Existing: Approximate Distance (ft) CNEL Noise Contour from centerline 60	65	70	75	Future with Project: CNEL at 50 ft from centerline (dBA)	Future with Project: Approximate Distance (ft) CNEL Noise Contour from centerline 60	65	70	75	Delta: CNEL at 50 ft from centerline (dBA)
W. Peltason Dr.												
between Bison Ave. and Academy Way	11,000	60	45	--	--	--	58	30	--	--	--	-2
between Academy Way and Mesa Rd.	10,000	59	45	--	--	--	61	55	--	--	--	2
between Mesa Rd. and Pereira Dr.	13,000	61	55	--	--	--	62	75	25	--	--	1
between Pereira Dr. and Campus Dr.	14,000	65	115	50	--	--	66	125	65	--	--	1
Campus Dr.												
between Bristol N. and MacArthur Blvd.	26,000	72	175	105	60	30	74	210	125	75	45	2
between MacArthur Blvd. and Von Karman Ave.	19,000	71	195	125	65	--	73	225	145	85	30	2
between Von Karman Ave. and Teller Ave.	15,000	70	180	115	50	--	71	200	130	65	--	1
between Teller Ave. and Jamboree Rd.	N/A	N/A	N/A	N/A	N/A	N/A	72	205	135	75	25	N/A
between Jamboree Rd. and Carlson Ave.	20,000	70	180	115	50	--	72	220	140	80	30	2
between Carlson Ave. and University Dr.	20,000	70	180	115	50	--	71	200	130	65	--	1
between University Dr. and W. Peltason Dr.	25,000	72	220	140	80	30	72	215	140	80	25	0
between W. Peltason Dr. and E. Peltason Dr.	22,000	72	205	135	75	25	74	250	165	105	40	2
between E. Peltason Dr. and California Ave.	24,000	72	215	140	80	25	73	240	155	100	35	1
between California Ave. and Culver Dr.	21,000	72	205	130	70	25	71	145	90	55	--	-1
between Culver Dr. and Turtle Rock Dr.	13,000	70	170	110	45	--	71	190	120	55	--	1
University Dr.												
between Jamboree Rd. and MacArthur Blvd. SB	11,000	70	180	120	55	--	71	150	90	55	--	1
between MacArthur Blvd. NB and California Ave.	27,000	74	255	165	105	40	76	260	200	155	55	2
between California Ave. and Mesa Rd.[1]	N/A	N/A	N/A	N/A	N/A	N/A	77	315	200	130	70	N/A
between Mesa Rd. and Campus Dr.	33,000	75	275	180	115	50	76	240	145	90	55	1
between Campus Dr. and Harvard Ave.	24,000	74	245	160	100	40	75	270	175	115	50	1
between Harvard Ave. and Culver Dr.	20,000	73	230	145	90	30	72	170	100	60	30	1
between Culver Dr. and Ridgeline Dr.	28,000	73	225	145	90	30	75	270	175	115	50	2
Harvard Ave.												
between I-405 and Michelson Dr.[1]	N/A	N/A	N/A	N/A	N/A	N/A	71	190	120	55	--	N/A
between Michelson Dr. and University Dr.	17,000	71	190	120	55	--	72	165	100	60	25	1
between University Dr. and Bridge Rd.	13,000	70	170	110	45	--	72	210	135	75	25	2
between Bridge Rd. and Berkeley	13,000	70	170	110	45	--	69	135	75	45	--	-1

Table 4.9-4. Continued

Roadway Segment	Existing ADT	Existing: CNEL at 50 ft from centerline (dBA)	Existing: Approximate Distance (ft) CNEL Noise Contour from centerline 60	65	70	75	Future with Project: CNEL at 50 ft from centerline (dBA)	Future with Project: Approximate Distance (ft) CNEL Noise Contour from centerline 60	65	70	75	Delta: CNEL at 50 ft from centerline (dBA)
between Berkeley and California Ave.	13,000	70	170	110	45	--	71	155	95	55	--	1
between California Ave. and Culver Dr.	14,000	70	175	115	50	--	72	160	95	60	25	2
Culver Dr.												
between I-405 SB and Michelson Dr.	46,000	77	315	200	130	70	77	285	170	105	65	0
between Michelson Dr. and University Dr.	42,000	76	305	195	125	65	77	270	165	100	60	1
between University Dr. and Harvard Ave.	44,000	76	310	200	130	65	78	375	235	155	100	2
between Harvard Ave. and Campus Dr.	33,000	75	275	180	115	50	76	240	145	90	55	1
between Campus Dr. and Anteater Dr.	32,000	73	240	155	100	35	72	160	95	60	25	-1
Ford Rd. between Jamboree Rd. and MacArthur Blvd.	9,000	68	150	90	30	--	69	130	75	45	--	1
Bonita Canyon Rd.												
between MacArthur Blvd. and San Miguel Dr.	26,000	73	220	140	85	30	73	190	115	70	35	0
between San Miguel Dr. and SR-73 SB	17,000	71	190	120	55	--	72	175	105	65	30	1
between Newport Coast Dr. and SR-73 NB	22,000	72	205	135	75	25	73	175	105	65	30	1
between Anteater Dr. and Newport Coast Dr.	24,000	72	215	140	80	25	74	205	125	75	45	2
Michelson Dr.												
between Jamboree Rd. and Carlson Ave.	31,000	75	270	175	115	50	77	330	210	135	75	2
between Carlson Ave. and Harvard Ave.	17,000	72	215	140	80	25	75	275	180	115	50	3
between Harvard Ave. and Culver Dr.	20,000	73	230	145	90	30	73	235	155	100	35	0
between Culver Dr. and Yale Ave.	15,000	72	205	130	70	25	73	220	140	85	30	1
Carlson Ave.												
between Michelson Dr. and Palatine	4,000	63	90	35	--	--	71	195	125	60	--	8
between Palatine and Campus Dr.(1)	N/A	N/A	N/A	N/A	N/A	N/A	69	120	75	40	--	N/A
Shady Canyon Dr. east of Bonita Canyon Dr.	19,000	70	175	115	45	--	67	130	70	--	--	-3
Jamboree Rd.												
between I-405 SB and Michelson Dr.	75,000	79	385	245	155	100	80	425	265	170	110	1
between Michelson Dr. and Dupont Dr.	54,000	77	335	215	140	80	77	335	215	140	80	0
between Dupont Dr. and Campus Dr.	46,000	77	315	200	130	70	77	335	215	140	80	0
between Campus Dr. and Birch St.	37,000	76	290	185	120	55	77	330	210	135	75	1
between Birch St. and Fairchild Rd.	38,000	76	290	185	120	55	78	345	220	140	85	2
between Fairchild Rd. and MacArthur Blvd.(3)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 4.9-4. Continued

Roadway Segment	Existing ADT	Existing: CNEL at 50 ft from centerline (dBA)	Existing: Approximate Distance (ft) CNEL Noise Contour from centerline 60	65	70	75	Future with Project: CNEL at 50 ft from centerline (dBA)	Future with Project: Approximate Distance (ft) CNEL Noise Contour from centerline 60	65	70	75	Delta: CNEL at 50 ft from centerline (dBA)
between MacArthur Blvd. and Bristol NB	N/A	N/A	N/A	N/A	N/A	N/A	77	265	160	95	60	N/A
between Bristol SB and University Dr.	47,000	77	315	205	130	70	77	280	165	100	60	0
between University Dr. and Bison Ave.	37,000	76	290	185	120	55	76	250	150	90	55	0
between Bison Ave. and Ford Rd.	39,000	76	295	190	125	60	77	315	205	130	70	1
Von Karman Ave.												
between Campus Dr. and Birch St.	14,000	70	175	115	50	--	71	195	125	65	--	1
between Birch St. and MacArthur Blvd.	12,000	69	165	105	40	--	71	190	120	55	--	2
Birch St.												
west of MacArthur Blvd.	23,000	70	145	85	50	--	72	205	135	70	25	2
between MacArthur Blvd. and Von Karman Ave.	15,000	69	160	105	40	--	70	140	85	50	--	1
between Von Karman Ave. and Jamboree Rd.	12,000	68	145	90	30	--	70	135	80	50	--	2
MacArthur Blvd.												
between Campus Dr. and Birch St.	27,000	74	255	165	105	40	75	235	145	85	50	1
between Birch St. and Von Karman Ave.	22,000	73	235	155	100	35	74	210	125	75	45	1
between Von Karman Ave. and Jamboree Rd.	26,000	74	250	165	105	40	75	230	140	85	50	1
between Jamboree Rd. and Fairchild Rd.	34,000	75	280	180	115	50	76	295	190	125	60	1
between Fairchild Rd. and University Dr.	34,000	75	280	180	115	50	77	320	205	135	75	2
between University Dr. and SR-73	35,000	75	280	185	120	55	76	290	185	120	55	1
between SR-73 and Bison Ave.	61,000	78	350	225	145	90	79	380	240	155	100	1
between Bison Ave. and Ford Rd.	63,000	78	355	230	145	90	78	320	190	115	70	0
Bison Ave.												
between Jamboree Rd. and MacArthur Blvd.	13,000	71	N/A	N/A	N/A	N/A	72	170	100	60	30	1
between MacArthur Blvd. and SR-73	7,000	68	N/A	N/A	N/A	N/A	70	135	80	--	--	2

(1) Traffic counts were not conducted for these segments.
(2) Traffic Counts were conducted prior to the completion of these segments; therefore, there are no existing traffic noise levels for these roadway segments.
(3) Traffic counts were not conducted at this segment and future traffic volumes were not projected. The segment was included for continuity of segments.

4.9.2.2 STATE

Noise

The pertinent regulations in the California Code of Regulations (CCR) Title 24, Section 1208 (Sound Transmission Control), establish the acceptable interior environmental noise level (45 dBA Ldn) for multi-family dwellings. Title 24 applies to applicable facilities (dormitories, lodging and medical facilities) on the UCI campus. Section 65302(f) of the CCR establishes the requirement that local land use planning jurisdictions prepare a General Plan; though one is not required for University of California campuses. The Noise Element is a mandatory component of the General Plan. It may include general community noise guidelines developed by the California Department of Health Services (CDHS) and specific planning guidelines for noise/land use compatibility developed by the local jurisdiction. The state guidelines also recommend that local jurisdictions and institutions such as UCI consider adopting a local nuisance noise control ordinance. The CDHS developed guidelines (1987) for community noise acceptability for use by local agencies. Selected relevant levels are the following (Note: Ldn/DNL may be considered nearly equal to CNEL):

- CNEL below 60 dBA—normally acceptable for low-density residential use.
- CNEL of 50 to 70 dBA—conditionally acceptable for low-density residential use.
- CNEL below 65 dBA—normally acceptable for high-density residential use.
- CNEL of 60 to 70 dBA—conditionally acceptable for high-density residential, transient lodging, churches, and educational and medical facilities.
- CNEL below 70 dBA—normally acceptable for playgrounds, neighborhood parks.

"Normally acceptable" is defined as satisfactory for the specified land use, assuming that normal conventional construction is used in buildings. "Conditionally acceptable" may require some additional noise attenuation or special study. Under most of these land use categories, overlapping ranges of acceptability and unacceptability are presented, leaving some flexibility in areas where noise levels fall within the overlapping range. Table 4.9-1 depicts the state compatibility requirements.

Section 1208 of the CCR requires that an acoustical analysis be prepared for new transient lodging (e.g., hotels), dormitories, long-term health facilities, and multi-family dwellings in an area exceeding 60 dBA CNEL. This analysis must show that the proposed design would limit interior noise in habitable rooms to below 45 dBA CNEL, or recommend design features that would cause the project to comply. Worst-case noise levels, either existing or future, must be used. Future noise levels must be predicted at least 10 years from the time of building permit application. UCI complies with CCR Title 24 pertaining to noise standards and other state building standards.

The State of California additionally regulates the noise emission levels of licensed motor vehicles traveling on public thoroughfares, sets noise emission limits for certain off-road vehicles and watercraft, and sets required sound levels for light-rail transit vehicle warning signals. The extensive state regulations pertaining to worker noise exposure are, for the most part, applicable only to the construction phase of any project (for example, California Occupational Safety and Health Administration Occupational Noise Exposure Regulations [8 CCR, General Industrial Safety Orders, Article 105, Control of Noise Exposure, Section 5095, et seq.]), or are applicable to workers in a "central plant" and/or a maintenance facility or workers involved in the use of landscape maintenance equipment or heavy machinery. Although UCI attempts to control noise exposures on campus, certain operations and workstations may expose faculty and staff to significant noise levels. All personnel who are regularly exposed to occupational noise levels at or exceeding an 8-hour time-weighted average of 85 dBA are included in the Hearing Conservation Program (HCP) which includes noise exposure assessments, audiometric testing, hearing protection, employee education and training, and recordkeeping. Occupational noise exposure may occur in the following UCI departments: Central Plant, Grounds Keeping, Machine Shop, Carpentry Shop, Key Shop, Housing and Dining Services and Engineering.

The California Airport Noise regulations, contained in CCR Title 21, establish an airport noise compatibility standard of 65 dBA CNEL. This standard is intended to ensure an interior noise level of 45 dBA CNEL in residences, assuming standard construction practices.

Vibration

Caltrans technical advisory circular (TAV-96-01-R9201) agrees with the OSM safety level of 2.0 in/sec for impact pile driving; however, the architectural damage risk level for continuous (or steady-state) vibrations is 0.2 in/sec.

4.9.2.3 LOCAL

Although UCI is not subject to municipal regulations, since the campus is located in the City of Irvine, the City's noise standards are relevant to UCI in establishing guidelines and evaluating impacts. UCI typically pursues consistency with local plans and policies where feasible. Furthermore, City regulations are relevant for addressing UCI development projects that would affect adjacent noise-sensitive land uses in the City of Irvine.

City of Irvine Land Use Compatibility Criteria

General community noise and land use compatibility guidelines are set forth in the City of Irvine General Plan Noise Element. These guidelines are based primarily on noise/land use recommendations from a HUD document entitled "Planning Guidelines for Local Agencies." Sound levels up to 65 dBA CNEL are normally compatible for single-family residential, transient lodging, and park uses. Sound levels up to 60 dBA CNEL are normally compatible for institutional uses such as hospitals, churches, libraries, and schools. Table 4.9-5 depicts the City's compatibility requirements.

City of Irvine Noise Ordinance

The City of Irvine Noise Ordinance identifies criteria used throughout the Irvine community to limit disturbance to residential areas from excessive noise. While UCI is not subject to local regulations such as the Irvine Noise Ordinance, UCI strives to meet community standards to ensure compatibility between UCI land uses and operations and the local community.

The City of Irvine Noise Ordinance regulates noise from construction. Section 6-8-205(A) indicates that construction activities may occur between 7:00 a.m. and 7:00 p.m. Mondays through Fridays, and 9:00 a.m. and 6:00 p.m. on Saturdays. No construction activities shall be permitted outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the Chief Building Official or his or her authorized representative. Trucks, vehicles, and equipment that are making, or are involved with, material deliveries, loading, transfer of materials, equipment service, maintenance of any devices or appurtenances for (or within) any construction project in the City, shall not be operated or driven on City streets outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the City. Any waiver granted shall take into consideration the potential impact upon the community. No construction activity will be permitted outside of these hours, except in emergencies including maintenance work on the City rights-of-way that might be required. Table 4.9-6 presents noise standards published in Section 6-8-204 of the City's Noise Ordinance.

Table 4.9-5. City of Irvine Land Use Compatibility

Land Use Categories		Energy Average (CNEL)						
Categories	**Uses**	**≤**	**55**	**60**	**65**	**70**	**75**	**80 ≥**
Residential	Single-Family, Multiple-Family	A	A	B	B	C	D	D
Residential	Mobile Home	A	A	B	C	C	D	D
Commercial Regional	Hotel, Motel, Transient Lodging	A	A	B	B	C	C	D
Commercial Regional Community	Commercial retail, Bank, Restaurant, Movie theater	A	A	A	A	B	B	C
Commercial Community Industrial & Institutional	Office building, Research & development Professional office, City office building	A	A	A	B	B	C	D
Commercial Recreation Institutional General	Amphitheater, Concert Hall, Auditorium, Meeting Hall	B	B	C	C	D	D	D
Commercial Recreation	Children's amusement park, Miniature golf, Go-cart track, Health club, Equestrian center	A	A	A	B	B	D	D
Commercial Community Industrial General	Automobile Service station, Auto dealer, Manufacturing, Warehousing, Wholesale, Utilities	A	A	A	A	B	B	B
Institutional General	Hospital, Church, Library, School classrooms	A	A	B	C	C	D	D
Open Space	Parks	A	A	A	B	C	D	D
Open Space	Golf courses, Nature centers, Cemeteries, Wildlife reserves, Wildlife habitat	A	A	A	A	B	C	C
Agricultural	Agriculture	A	A	A	A	A	A	A

Interpretation:

Zone A = **Clearly Compatible:** Specified land use is satisfactory based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

Zone B = **Normally Compatible:** New construction or development should be undertaken only after detailed analysis of the noise reduction requirements are made and needed noise insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.

Zone C = **Normally Incompatible:** New construction or development should normally be discouraged. If new construction or development does proceed, a detailed analysis or noise reduction requirements must be made and needed noise insulation features must be included in the design.

Zone D = **Clearly Incompatible:** New construction or development should generally not be undertaken.

Table 4.9-6. City of Irvine Noise Ordinance Limits

Noise Zone		Time Period	Noise Levels (dB(A)) for a Period Not Exceeding				
			30 min	15 min	5 min	1 min	0 (anytime)
Noise Zone 1: All hospitals, libraries, churches, schools, and residential properties.	Exterior	7:00 a.m. – 10:00 p.m.	55	60	65[1]	70	75
		10:00 p.m. – 7:00 a.m.	50	55	60	65[1]	70
	Interior	7:00 a.m. – 10:00 p.m.	--	--	55	60	65
		10:00 p.m. – 7:00 a.m.	--	--	45	50	55
Noise Zone 2: All professional office and public institutional properties.	Exterior	Any time	55	60	65	70	75
	Interior	Any time	--	--	55	60	65
Noise Zone 3: All commercial properties excluding professional office properties.	Exterior	Any time	60	65	70	75	80
	Interior	Any time	--	--	55	60	65
Noise Zone 4: All industrial properties.	Exterior	Any time	70	75	80	85	90
	Interior	Any time	--	--	55	60	65

(1) This standard does not apply to multi-family residence private balconies. Multi-family developments with balconies that do not meet the 65 CNEL are required to provide occupancy disclosure notice to all future tenants regarding potential noise impacts.

(2) It shall be unlawful for any person at any location within the City to create any noise or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person which causes the noise level when measured on any property within designated noise zones either within or without the City to exceed the applicable noise standard.

(3) Each of the noise standards specified above shall be reduced by five dB(A) for impact, or predominant tone noise or for noises consisting of speech or music.

(4) In the event that the noise source and the affected property are within different noise zones, the noise standards of the affected property shall apply.

Source: City of Irvine Municipal Code, Title 6, Division 8, Chapter 2, Section 6-8-204.

4.9.3 PROJECT IMPACTS AND MITIGATION

4.9.3.1 ISSUE 1 –PERMANENT INCREASES IN AMBIENT NOISE

Noise Issue 1 Summary

Would implementation of the 2007 LRDP result in a substantial permanent increase in ambient noise levels or expose persons to noise in excess of standards?

Impact: Implementation of the 2007 LRDP would expose persons within future Student Housing, located south of E. Peltason Drive and east of Bison Avenue, to significant direct traffic noise levels, and would expose persons within future Housing Reserve, located north of Bonita Canyon Road and west of Anteater Drive, to significant cumulative traffic noise levels (Noi-1A), and would expose persons to significant direct noise impacts from operation of new stationary noise sources, including a satellite utilities plant in the Health Sciences Complex, major HVAC systems, and parking structures (Noi-1B).

Mitigation: Site planning and noise reduction design measures per acoustical analyses for new noise-sensitive land uses (Noi-1A); and noise reduction design measures for new and modified stationary noise sources (Noi-1B).

Significance Before Mitigation: Significant.

Significance After Mitigation: Less than significant.

Standards of Significance

Based on Appendix G of the CEQA Guidelines, implementation of the 2007 LRDP would have a significant permanent (direct) noise impact if it would result in:

- Exposure of persons to, or generation of, noise levels in excess of levels set forth in Table 4.9-1 (State of California noise standards to be applied on-campus) or Table 4.9-5 (City of Irvine noise standards to be applied off-campus), and
- A permanent increase of 3 dBA or more in ambient noise levels at sensitive receptors.

Impact Analysis

The proposed 2007 LRDP could result in significant noise impacts by increasing noise levels at existing sensitive receptors in excess of the thresholds listed above, or by developing new sensitive receptors in areas that would expose them to substantial noise. Permanent noise sources can be divided into vehicular and stationary noise sources, the effects of which are discussed in this section.

Vehicular Traffic Noise Sources

The primary way in which implementation of the 2007 LRDP will change noise on and off campus is by increasing traffic, which is the primary source of noise in the vicinity of the campus. The major roadways on and off campus are discussed in Section 4.13 (Traffic/Circulation) of this EIR. As discussed in Section 4.13, implementation of the LRDP would result in an increase in vehicular traffic on these roadways, and this would incrementally increase ambient noise levels. Acoustical calculations were performed using future traffic volumes (with LRDP implementation) based on the FWHA Traffic Noise Model Version 2.5. Calculations were performed at a distance of 50 feet from the centerline of each roadway segment, and were used to determine the distances to the 60, 65, 70, and 75 dBA CNEL noise contours. The actual sound level at any receptor location is dependent upon such factors as the source-to-receptor distance and the presence of intervening structures, barriers, and topography.

As previously stated, implementation of the LRDP would result in increased vehicular traffic on the regional road network, which would incrementally increase ambient noise levels. Major roadways on campus include Peltason Drive, Campus Drive, Bison Avenue, and California Avenue. Major access roadways in the campus vicinity adjacent to existing sensitive residential receptors include University Drive, Harvard Avenue, Culver Drive, and Bonita Canyon Drive. Table 4.9-4 shows the existing noise levels and the projected increases in noise levels for all the study area intersections associated with implementation of the LRDP.

As shown in Table 4.9-4, the difference between the existing and future-with-project traffic noise level (delta) would range from a decrease of approximately 3 dBA to an increase of approximately 8 dBA. As an increase of less than 3 dBA is not perceptible by the average human ear, the increase in ambient noise levels for all roadway segments, with four exceptions, would not be perceptible. The four impacted roadway segments are shown in Figure 4.9-4 and listed in Table 4.9-7. These segments would experience an increase in future-with-project traffic noise levels of 3 dBA or greater. The roadway noise impacts along these segments due to LRDP traffic volumes (without future projects) are discussed below.

Table 4.9-7. Existing and Future-with-Project Traffic Noise Levels of Impacted Roadway Segments

		CNEL at 50 ft from Centerline (dBA)			Noise Standards		LRDP Traffic Volumes	
Segment	**Roadway Segment**	**Existing**	**Future w/Project**	**Δ**	**Proposed Uses**	**Limits[1]**	**2025 ADT**	**3dBA**
1	Academy Way between California Avenue and Medical Plaza (on campus)	55	58	3	Inclusion Areas (Office) Open Space (Parks)	75 67	4,000[2]	Yes
2	California Avenue between Theory and Bison Avenue (on campus)	63	66	3	Academic/ Support Schools) Inclusion Areas (Office)	70 75	9,000[2]	Yes
3	Michelson Drive between Carlson Avenue and Harvard Avenue (off campus)	72	75	3	N/A	---	1,000[3]	No
4	Carlson Avenue between Michelson Drive and Palatine (off campus)	63	71	8	N/A	---	1,000[3]	No

(1) From Table 4.9-1.
(2) Difference between Figures 7-1 and 3-2 in Appendix D.
(3) Difference between Figures 4-2 and 4-1 in Appendix D.

Segment 1 is adjacent to on-campus areas designated as Income Producing Inclusion Areas and Open Space in the 2007 LRDP. Although the projected noise level of 58 dBA along this segment from LRDP traffic volumes would represent an increase of 3 dBA over the existing noise level of 55 dBA, it would not exceed the state noise standards for office buildings (75 dBA) or parks (67 dBA) (see Tables 4.9-1 and 4.9-7). Therefore, the direct traffic noise impacts along segment 1 from LRDP traffic volumes would be less than significant.

On-campus land uses adjacent to segment 2 are categorized as Academic and Support Uses or Income Producing Inclusion Area. Although the projected noise level of 66 dBA along this segment from LRDP traffic volumes would represent an increase of 3 dBA over the existing noise level of 63 dBA, it would not exceed the state noise standards for schools (70 dBA) or office buildings (75 dBA) (see Tables 4.9-1 and 4.9-7). Therefore, the direct traffic noise impacts along segment 2 from LRDP traffic volumes would be less than significant.

The off-campus segments 3 and 4 would also experience an increase in ambient noise of 3 dBA or greater. The ADT on segment 3 would increase from 17,000 vehicles to 33,000 vehicles, and the ADT on segment 4 would increase from 4,000 vehicles to 25,000 vehicles. However, the ADT increase attributable to the LRDP alone would be 1,000 vehicles on these segments, which would correspond to a noise level increase of less than 1 dBA (see Table 4.9-7). Therefore, because the increased noise levels generated by LRDP traffic volumes on these segments would be less than 1 dBA, the direct traffic noise impacts along segments 3 and 4 would be less than significant. The cumulative contribution of the LRDP to noise impacts on these segments is discussed in Section 4.9.4.1 below.

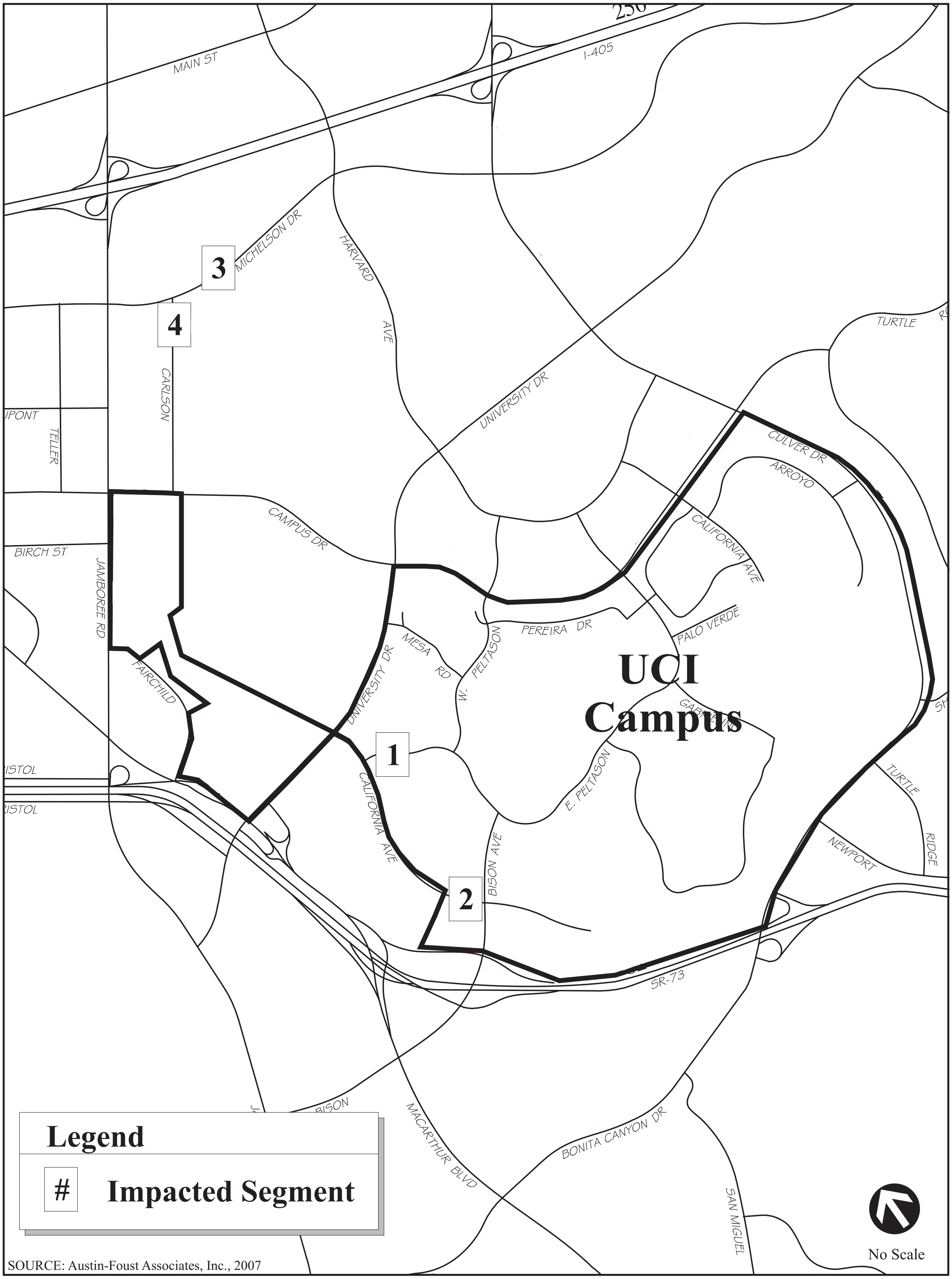
New Noise-Sensitive Land Uses

New Faculty/Staff Housing, in a combination of single- and multi-family units, is proposed south of California Avenue and west of the intersection of California Avenue and Gabrielino Drive (Figure 3-6). Student Housing, which would consist of multi-family units, is proposed at the following locations: (1) south of E. Peltason Drive and east of Bison Avenue; (2) east of Anteater Drive and north of Culver Drive; and (3) east of California Avenue and south of Arroyo Drive. Housing Reserve is bordered by California Avenue, Anteater Drive, and Bonita Canyon Road, adjacent to Faculty/Staff Housing area. With the exception of the proposed Student Housing located south of E. Peltason Drive and east of Bison Avenue, and the proposed Housing Reserve located north of Bonita Canyon Road and west of Anteater Drive, future noise levels from vehicular traffic are not projected to exceed the state noise standards for single-family residential (60 dBA) and for multi-family residential (65 dBA) in these areas (see Tables 4.9-1 and 4.9-4). The vehicular noise levels on E. Peltason Drive between Bison Avenue and South Circle View would increase to 67 dBA, and the projected noise levels on Bonita Canyon Road west of Anteater Drive would increase to 74 dBA, which would exceed the State of California "normally acceptable" limit of 65 dBA for multi-family residential land uses (see Tables 4.9-1 and 4.9-4). Therefore, the direct traffic noise impact to proposed Student Housing, located south of E. Peltason Drive and east of Bison Avenue, would be significant. The cumulative traffic noise impact to proposed Housing Reserve, located north of Bonita Canyon Road and west of Anteater Drive, is addressed in Section 4.9.4 below.

New Stationary Noise Sources

The 2007 LRDP would also result in elevated noise levels on campus from new stationary sources of noise (such as the proposed satellite utilities plant in the Health Sciences Complex, major HVAC systems, and parking structures) and by increasing human activity throughout the campus. These sources may generate significant noise levels and be of concern if they are located in proximity to noise-sensitive land uses. In addition, noise from new stationary sources, if not appropriately shielded, may disrupt communication and certain activities if constructed near less sensitive receptors, such as offices.

Based on a review of existing sound level measurements at a comparable university central utility plant, the proposed satellite utilities plant in the Health Sciences Complex could generate unmitigated sound levels ranging from 85 to 105 dBA at 3 feet. As a conservative estimate of noise impacts to educational land uses in the vicinity of the proposed satellite utilities plant, it is assumed that the sound propagation characteristics for the noise levels generated from the operation of this facility would be similar to that of



LOCATION OF NOISE IMPACTS DUE TO INCREASED TRAFFIC

FIGURE 4.9-4

construction equipment operations. Specifically, construction-related noise levels are assumed to propagate as a point source which decays at a rate of 6 dB per doubling of distance from the source (assuming no ground interaction). Based on this conservative assumption, continuous noise levels from the proposed satellite utilities plant would exceed the state noise standard for schools (70 dBA CNEL) at a distance of up to 400 feet. Land uses located within 400 feet of the central plant utility and would therefore be affected by its noise are existing and proposed facilities within the Health Sciences Complex including teaching, research and outpatient clinical uses Therefore, assuming no noise-attenuating design features for the proposed satellite utilities plant, the direct operational noise impact from this facility on the surrounding educational land uses within the Health Sciences Complex would be significant.

New major HVAC systems located on the ground or on rooftops of new buildings could generate unmitigated sound levels ranging from 65 to 75 dBA CNEL at 50 feet when equipment is operating constantly for 24 hours. Based on the same sound propagation assumption described above for the proposed satellite utilities plant (i.e., 6 dB noise level reduction with each doubling of distance from the noise source), continuous noise levels from new major HVAC systems would exceed the state noise standard for schools (70 dBA CNEL) at a distance of up to 100 feet, and would exceed the state noise standard for low-density residential uses (60 dBA CNEL) at a distance of up to 275 feet. Therefore, assuming no noise-attenuating design features for new major HVAC systems, the direct operational noise impact from these facilities on the surrounding educational and residential land uses on campus would be significant.

Noise from parking structures typically consists of vehicles arriving and departing, vehicle movement within the parking structure, wheel squeal, car alarms, opening and closing of car doors, and peoples' voices. If the parking structure is mechanically ventilated, noise would also be generated by the parking structure ventilation system. Parking structure noise is difficult to predict due to many variables and was not quantified because to do so would be speculative. Variation in sound levels will depend on such factors as parking structure design and the number of vehicles moving through the structure at any given time. Therefore, assuming no noise-attenuating design features for parking structures, the direct noise impact from these facilities on the surrounding educational and residential land uses on campus would be significant (under a "worst-case" analysis).

Impact Noi-1A Implementation of the 2007 LRDP would expose persons within future Student Housing, located south of E. Peltason Drive and east of Bison Avenue, to significant direct traffic noise levels, and would expose persons within future Housing Reserve, located north of Bonita Canyon Road and west of Anteater Drive, to significant cumulative traffic noise levels (refer to Section 4.9.4 below).

Impact Noi-1B Implementation of the 2007 LRDP would expose persons to significant direct noise impacts from operation of new stationary noise sources, including a satellite utilities plant in the Health Sciences Complex, major HVAC systems, and parking structures.

Mitigation Measures

The following mitigation measures would reduce the permanent (direct) noise impacts to noise-sensitive land uses on and off campus from vehicular and new stationary noise sources to a level of Less than Significant. The mitigation measures are designed to address future development under the 2007 LRDP, including:

- New or modified noise-sensitive land uses that would be affected by an existing noise source;
- New or modified stationary noise sources.

Noi-1A Prior to project design approval for future projects that implement the 2007 LRDP and include noise-sensitive land uses (i.e., campus housing, classrooms, libraries, and clinical facilities), UCI shall ensure that the project design will adhere to the following state noise standards: 60 dBA CNEL (single-family campus housing); 65 dBA CNEL (multi-family campus housing, dormitories, lodging); and 70 dBA CNEL (classrooms, libraries, clinical facilities). Applicable project design features may include, but are not limited to, the following:

i. Specific window treatments, such as dual glazing, and mechanical ventilation when the 45 dBA CNEL limit within habitable rooms and the 50 dBA CNEL limit within classrooms can only be achieved with a closed window condition.

ii. Setbacks; orientation of usable outdoor living spaces, such as balconies, patios, and common areas, away from roadways; and/or landscaped earthen berms, noise walls, or other solid barriers.

Noi-1B As early as possible in the planning process of future projects that implement the 2007 LRDP and would include new or modified stationary noise sources such as utility plant facilities (constant noise source), major HVAC systems (constant noise source), and parking structures (constant and/or intermittent noise source), UCI shall ensure they are designed in a manner that would minimize the exposure of noise-sensitive land uses (i.e., campus housing, classrooms, libraries, and clinical facilities) to noise levels that exceed the following state noise standards: 60 dBA CNEL (single-family campus housing); 65 dBA CNEL (multi-family campus housing, dormitories, lodging); and 70 dBA CNEL (classrooms, libraries, clinical facilities). If the affected noise-sensitive land uses are already exposed to noise levels in excess of these standards, then the new or modified stationary noise sources shall not increase the ambient noise level by more than 3 dBA. These criteria shall be achieved by:

i. Implementing the following noise reduction measures into the design of the satellite utilities plant, as applicable:

- Use low-speed fans, baffles, mufflers, or other mechanical system design features to reduce emitted noise;
- Increase the distance from the noise source to sensitive receptors with setbacks;
- Place equipment inside buildings or within solid enclosures;
- Construct earthen berms, noise walls, or other solid barriers for noise attenuation;
- Eliminate glass, louvers, openings, or vents in the exterior walls of the plant, particularly those facing noise-sensitive land uses. If openings are necessary, install acoustical louvers or baffles on project components at all exterior openings;
- Install silencers on the intake and exhaust system;
- Place cooling towers as close to plant buildings as possible to utilize the buildings as noise barriers; and
- Install integrated noise barriers on the sides of cooling towers.

ii. Implementing the following noise reduction measures into the design of new major HVAC systems, as applicable:

- Install acoustical shielding (parapet wall or near-field noise barrier) around all new equipment; and
- Place equipment below grade in basement space.

iii. Implementing the following noise reduction measures into the design of new parking structures:

- Incorporate architectural design features that attenuate noise including solid panels at locations facing noise-sensitive land uses; and
- Construct earthen berms, noise walls, or other solid barriers between noise-sensitive land uses and parking structures.

4.9.3.2 ISSUE 2 – TEMPORARY INCREASES IN AMBIENT NOISE

Noise Issue 2 Summary

Would implementation of the 2007 LRDP result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity?

Impact: Construction activities associated with implementation of the 2007 LRDP would result in substantial temporary increases in ambient noise levels affecting noise-sensitive land uses on campus (Noi-2A).

Mitigation: Construction noise mitigation program (Noi-2A).

Significance Before Mitigation: Significant.

Significance After Mitigation: Less than significant.

Standards of Significance

Construction activities associated with implementation of the 2007 LRDP would have a significant temporary (direct) noise impact if they would result in:

- Exposure of persons to, or generation of noise levels in, excess of a 12-hour average sound level of 75 dBA between 7:00 am and 7:00 pm at any noise-sensitive land use, or
- An increase of 3 dBA or more if the ambient noise levels already exceed a 12-hour average sound level of 75 dBA between 7:00 am and 7:00 pm at any noise-sensitive land use.
- Based on Appendix G of the CEQA Guidelines, the continuation of outdoor events associated with implementation of the 2007 LRDP would have a significant temporary (direct) noise impact if they would result in exposure of persons to, or generation of, noise levels in excess of levels set forth in Table 4.9-1 (State of California noise standards to be applied on-campus) or Table 4.9-6 (City of Irvine noise ordinance limits to be applied off-campus).

Impact Analysis

Based on the projected peak-daily construction activity which is assumed for the LRDP (see Table 4.2-5 in Section 4.2 [Air Quality] of this EIR), there could be as many as three major building projects and two to three smaller projects under various phases of construction at any one time. As indicated in Table 4.2-5, development occurring under the LRDP would utilize conventional construction techniques and equipment typically associated with institutional and residential construction, such as scrapers, graders, backhoes, loaders, tractors, cranes, and miscellaneous trucks. Specialized construction activities such as pile driving are not anticipated to occur on a frequent basis during implementation of LRDP. Construction of campus buildings and facilities would generate noise that could expose nearby receptors, some of which are sensitive, to elevated noise levels. The magnitude of the impact would depend on the type of construction activity, noise level generated by various pieces of construction equipment, duration of the construction phase, distance between the noise source and receiver, and intervening structures, topography, and barriers.

Figure 4.9-2 shows average noise levels generated by typical construction equipment which range from 60 to 90 dBA at 50 feet from the source. Noise from construction equipment propagates as a point source which decays at a rate of 6 dB per doubling of distance from the source (assuming no ground interaction). For example, noise from construction equipment generating a 90 dBA noise level at 50 feet could exceed 75 dBA at any noise-sensitive land use located up to 300 feet away. If the ambient noise level at the noise-sensitive land uses adjacent to construction activities already exceeds 75 dBA, then the operation of certain construction equipment could exceed the 3 dBA threshold depending on the distance between the noise source and the receptor. Therefore, construction within the campus could result in temporary, but significant, noise impacts at noise-sensitive land uses.

Noise-generating outdoor events on campus could continue to occur under the 2007 LRDP and demand for such events could increase as campus programs grow. Specifically, UCI hosts outdoor events as part of the academic, cultural and social life of the campus. This includes festivals, sporting events, concerts and other community events held in each of the five sectors of the campus. Outdoor events, such as concerts, that occur during nighttime hours and use amplified sound systems or other noise- or vibration-generating equipment could result in noise impacts to on- and off-campus residential areas. Noise from outdoor events is difficult to predict due to many variables and was not quantified because to do so would be speculative. Variation in noise levels depends on such factors as the type of event, location and orientation of sound systems, distance between the noise source and residential receptors, and intervening features (e.g., topography, barriers, elevation differences). UCI is establishing an Outdoor Event Noise Control Plan to regulate noise-generating outdoor events to ensure consistency with community noise standards. The Plan includes a process for review and approval of proposed events, maximum allowable noise thresholds, and monitoring and reporting of event noise. As a result of continued implementation of the Outdoor Event Noise Control Plan, the impact from outdoor event noise would be less than significant.

Impact Noi-2A Construction activities associated with implementation of the 2007 LRDP would result in substantial temporary increases in ambient noise levels affecting noise-sensitive land uses on campus.

Mitigation Measures

The following mitigation measure would reduce the significant (direct) temporary noise impacts from construction activities to a level of Less than Significant.

Noi-2A Prior to initiating on-site construction for future projects that implement the 2007 LRDP, UCI shall approve contractor specifications that include measures to reduce construction/ demolition noise to the maximum extent feasible. These measures shall include, but are not limited to, the following:

i. Noise-generating construction activities occurring Monday through Friday shall be limited to the hours of 7:00 am to 7:00 pm, except during summer, winter, or spring break at which construction may occur at the times approved by UCI.

ii. Noise-generating construction activities occurring on weekends in the vicinity of (can be heard from) off-campus land uses shall be limited to the hours of 9:00 am to 6:00 pm on Saturdays, with no construction occurring on Sundays or holidays.

iii. Noise-generating construction activities occurring on weekends in the vicinity of (can be heard from) on-campus residential housing shall be limited to the hours of 9:00 am to 6:00 pm on Saturdays, with no construction on Sundays or holidays. However, as determined by UCI, if on-campus residential housing is unoccupied (during summer, winter, or spring break, for example), or would otherwise be unaffected by construction noise, construction may occur at any time.

iv. Construction equipment shall be properly outfitted and maintained with manufacturer recommended noise-reduction devices to minimize construction-generated noise.

v. Stationary construction noise sources such as generators, pumps or compressors shall be located at least 100 feet from noise-sensitive land uses (i.e., campus housing, classrooms, libraries, and clinical facilities), as feasible.

vi. Laydown and construction vehicle staging areas shall be located at least 100 feet from noise-sensitive land uses (i.e., campus housing, classrooms, libraries, and clinical facilities), as feasible.

vii. All neighboring land uses that would be subject to construction noise shall be informed at least two weeks prior to the start of each construction project, except in an emergency situation.

viii. Loud construction activity such as jackhammering, concrete sawing, asphalt removal, pile driving, and large-scale grading operations occurring within 600 feet of a residence or an academic building shall not be scheduled during any finals week of classes. A finals schedule shall be provided to the construction contractor.

4.9.3.3 ISSUE 3 – EXPOSURE TO AIRCRAFT NOISE

Noise Issue 3 Summary

Would implementation of the 2007 LRDP expose people residing or working in the project area to excessive noise levels resulting from aircraft?

Impact: Implementation of the 2007 LRDP would not expose new noise-sensitive land uses on campus to excessive noise levels resulting from aircraft.

Mitigation: No mitigation is necessary.

Significance Before Mitigation: None.

Significance After Mitigation: Not applicable.

Standards of Significance

Based on Appendix G of the CEQA Guidelines, implementation of the 2007 LRDP would have a significant (indirect) noise impact if it would expose people residing or working in new noise-sensitive land uses on campus to excessive noise levels resulting from aircraft.

Impact Analysis

As discussed in Section 4.9.1.3 above, the UCI campus is located approximately 1.5 miles southeast of John Wayne Airport. While general aircraft and helicopter overflights originating from John Wayne Airport were observed during the noise measurements, the airport's 60 CNEL contour does not extend to the campus, as shown in Figure 4.9-5. Therefore, the campus would not be subject to aircraft noise in excess of regulatory limits.

Mitigation Measures

The 2007 LRDP would not have a significant impact related to exposure of new noise-sensitive land uses to aircraft noise; therefore, no mitigation measures are required.

4.9.3.4 ISSUE 4 – EXCESSIVE GROUND-BORNE VIBRATIONS

Noise Issue 4 Summary

Would implementation of the 2007 LRDP result in the exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels?

Impact: Construction activities associated with implementation of the 2007 LRDP could result in the exposure of persons and vibration-sensitive instruments, operations and buildings on campus to, or generation of, excessive ground-borne vibration or ground-borne noise levels (Noi-4).

Mitigation: Construction vibration mitigation program (Noi-4A).

Significance Before Mitigation: Significant.

Significance After Mitigation: Less than significant.

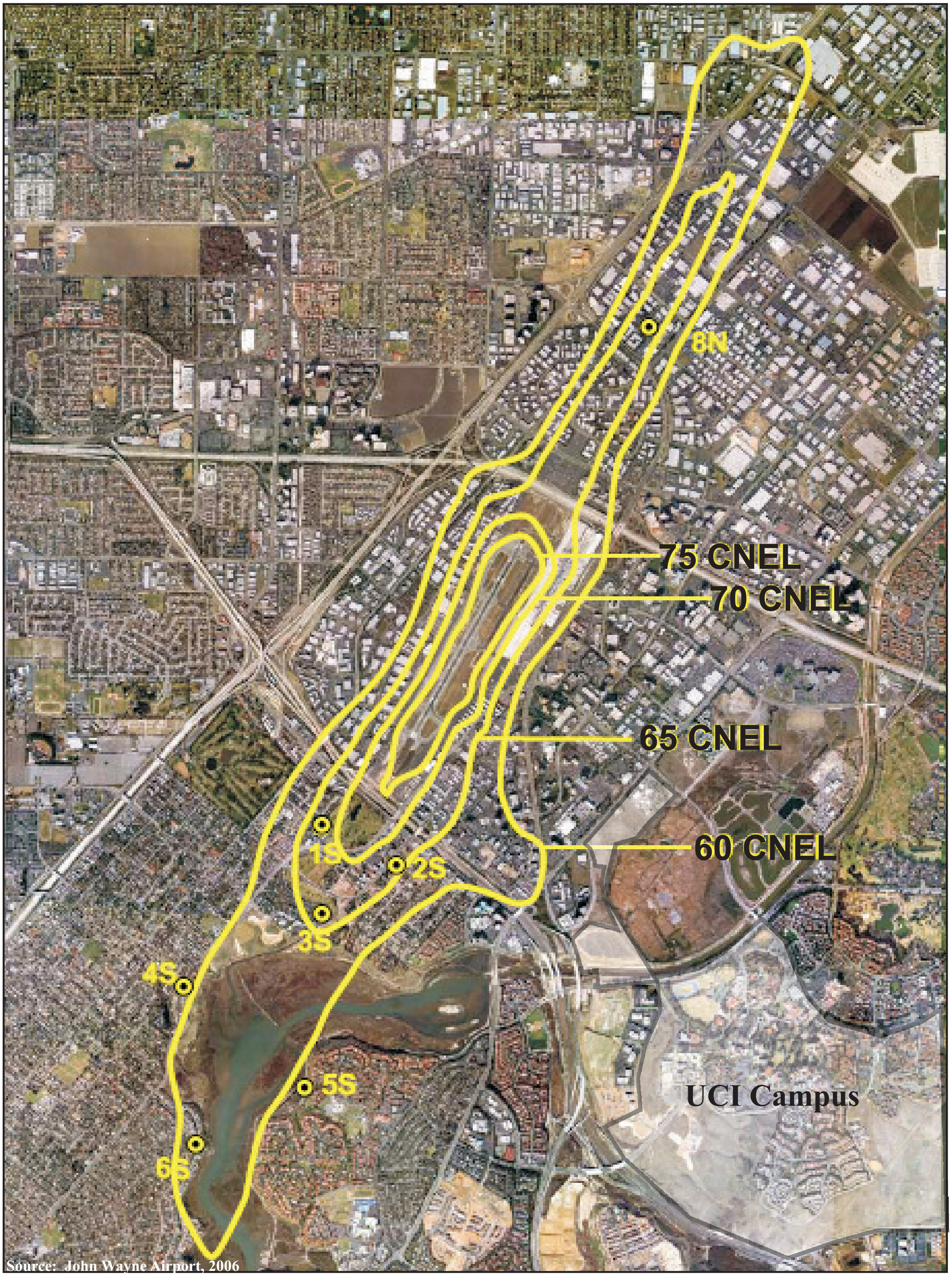
Standards of Significance

Based on Appendix G of the CEQA Guidelines, construction activities associated with implementation of the 2007 LRDP would have a significant (direct) temporary impact if they would result in the exposure of persons and vibration-sensitive instruments, operations and buildings on campus to, or generation of, excessive ground-borne vibration or ground-borne noise levels. For this analysis, excessive ground-borne vibration or ground-borne noise levels would occur if the measured vibration level were to equal or exceed 0.2 in/sec at any structure, or 65 VdB at buildings where vibration would interfere with interior vibration-sensitive instruments and operations.

Impact Analysis

Impacts from ground-borne vibration include human annoyance, structural damage, and disruption of vibration-sensitive instruments and operations used in campus research and clinical operations. The following provides a general discussion of impacts at the UCI campus from ground-borne vibration caused by LRDP construction activities.

Construction activities that would occur under the 2007 LRDP could generate low levels of ground-borne vibration. As discussed in Section 4.9.1.4 above, the level of vibration would depend on the type of soils and the energy-generating capability of the construction equipment (see Figure 4.9-3). As shown in Figure 4.9-3, ground-borne vibration levels could exceed 0.2 in/sec at structures located between 10 and 100 feet away from the following construction equipment operations and activities: trucks, drilling, large



JOHN WAYNE AIRPORT 2005 ANNUAL CNEL NOISE CONTOURS

FIGURE 4.9-5

bulldozers, 2-ton drop ball (40-foot drop), pavement breaker, and vibratory pile driver. Vibration-sensitive instruments, operations and buildings at UCI may require special consideration during nearby construction activities. As stated in Section 4.9.2.1 above, major construction activity within 200 feet and pile driving within 600 feet may exceed 65 VdB at the interior of buildings containing vibration-sensitive instruments and operations on campus.

Impact Noi-4 Construction activities associated with implementation of the 2007 LRDP could result in the exposure of persons and vibration-sensitive instruments, operations and buildings on campus to, or generation of, excessive ground-borne vibration or ground-borne noise levels.

Mitigation Measures

The following mitigation measure would reduce the significant (direct) temporary ground-borne vibration impacts from construction activities to a level of Less than Significant.

Noi-4A Prior to initiating on-site construction for future projects that implement the 2007 LRDP and are located within 100 feet of vibration-sensitive uses (i.e., buildings containing vibration-sensitive instruments or operations, or buildings that are considered vibration sensitive due to their age, construction type and/or fragile condition), UCI shall approve a construction vibration mitigation program as part of the contractor specifications that includes measures to reduce vibration resulting from construction activities to the maximum extent practicable. The program shall include measures to establish baseline vibration conditions, vibration monitoring, work methods or equipment necessary to reduce vibration, and a pre-construction notification process for impacted building occupants (six-month and one-month interval prior to construction).

If pile driving is proposed, building occupants within 600 feet of the pile-driving site shall be notified of construction at six-month and one-month intervals prior to the start of construction.

4.9.4 CUMULATIVE IMPACTS AND MITIGATION

Noise Cumulative Issue Summary

Would implementation of the 2007 LRDP have a cumulatively considerable contribution to a cumulative noise impact considering past, present, and probable future projects?

Cumulative Impact	Significance (With LRDP)	LRDP Contribution
Roadway Noise: Permanent traffic noise impacts along on- and off-campus roads due to increased traffic volumes.	Significant.	Not cumulatively considerable.
Operational Noise: Permanent noise impacts at noise-sensitive land uses on and adjacent to the campus from new stationary noise sources in both locations.	Less than significant.	Not cumulatively considerable.
Temporary Noise: Temporary noise impacts at noise-sensitive land uses on and adjacent to the campus from construction activities in both locations, including the possible increase of outdoor events at UCI.	Less than significant.	Not cumulatively considerable.
Airport Noise: Because noise-sensitive land uses on campus would not be affected by airport noise, there is no analysis of cumulative impacts.	N/A	N/A
Ground-Borne Vibration: Temporary ground-borne vibration impacts at vibration-sensitive land uses on and adjacent to the campus from construction activities in both locations.	Less than significant.	Not cumulatively considerable.

4.9.4.1 ROADWAY NOISE

The geographic context for the analysis of cumulative impacts for permanent (long-term) roadway noise encompasses the on- and off-campus circulation network shown in Figure 4.13-1 in Section 4.13 (Traffic/Circulation) of this EIR. As shown in Table 4.9-4, the projected future-with-project noise levels along several roadways would exceed state noise standards (for on-campus segments) or City of Irvine noise standards (for off-campus segments). In general, most segments that are projected to exceed 60 dBA would result in a significant cumulative noise impact (in terms of a substantial permanent increase in ambient noise levels along these roadways). Therefore, a project that would cause an increase of 3 dBA or more at a sensitive receptor along any of these segments would be considered cumulatively considerable.

As shown in Table 4.9-7, there are two on-campus roadways (segments 1 and 2) in which LRDP traffic volumes would exceed the 3dBA threshold; however, the state noise standards would not be exceeded along these segments. Because significant cumulative traffic noise impacts are not expected along segments 1 and 2, the noise level contribution from 2007 LRDP traffic volumes would not be cumulatively considerable.

As shown in Table 4.9-7, there are two off-campus roadways (segments 3 and 4) in which LRDP traffic volumes would exceed the 3dBA threshold. The land use designations surrounding segment 3 include urban-industrial, high-density residential, commercial recreation, open space–preservation, and open space–recreation. The land use designations surrounding segment 4 include urban-industrial and high-density residential. The City of Irvine noise standards for these land use designations range from 65 dBA to 70 dBA. The future-with-project noise levels on segments 3 and 4 are projected to be 75 dBA and 71 dBA, respectively. Therefore a significant cumulative noise impact would occur to the land uses along these segments. The ADT on segment 3 would increase by 16,000 vehicles and the ADT on segment 4 would increase by 21,000 vehicles.

As evaluated in Section 4.9.3.1 above, the 2007 LRDP would contribute approximately 1,000 vehicles to each of these segments, which corresponds to a noise level increase of less than 1 dBA (see Table 4.9-7). Furthermore, the ADT attributable to the 2007 LRDP would constitute less than six percent of the total ADT projected for these segments. Therefore, because the increased noise levels generated by LRDP traffic volumes on segments 3 and 4 would be less than 1 dBA, and changes in noise levels of less than 3 dBA are typically not perceptible, the 2007 LRDP's contribution to the significant cumulative impact would not be cumulatively considerable.

In addition, as evaluated in Section 4.9.3.1 above, the future-with-project traffic noise levels at the proposed on-campus Housing Reserve, located north of Bonita Canyon Road and west of Anteater Drive, would exceed state noise standards and would therefore result in a significant cumulative noise impact. However, the 2007 LRDP would contribute approximately 2,000 vehicles to this segment, which corresponds to a noise level increase of less than 2 dBA. Furthermore, the ADT attributable to the 2007 LRDP would constitute 0.05 percent of the total ADT projected for this segment. Therefore, because the increased noise levels generated by LRDP traffic volumes on Bonita Canyon Road, west of Anteater Drive, would be less than 2 dBA, and changes in noise levels of less than 3 are typically not perceptible, the 2007 LRDP's contribution to the significant cumulative traffic noise impact at the adjacent proposed Housing Reserve on campus would not be cumulatively considerable.

4.9.4.2 OPERATIONAL NOISE

The geographic context for the analysis of cumulative impacts for permanent (long-term) operational noise encompasses the on- and off-campus land uses immediately adjacent to the UCI boundaries. Noise levels generated by stationary sources are localized and drastically reduce in magnitude as distance from the source increases. Consequently, only new development or redevelopment in the immediate community areas surrounding UCI would contribute to cumulative operational noise impacts.

The combination of cumulative on- and off-campus projects that may be developed in areas immediately surrounding UCI during LRDP implementation would not result in a significant cumulative noise impact (in terms of a substantial permanent increase in ambient noise levels in these areas) for the following reasons: (1) any long-term operational noise levels from land uses outside the campus perimeter are not expected to reach the noise-sensitive land uses on campus due to intervening distances, topography, roadways and barriers; (2) it is assumed the majority of stationary noise sources that would be introduced in areas adjacent to the campus would be rooftop machinery on new commercial and industrial development or redevelopment, and it is reasonable to expect shielding would be utilized on such equipment; and (3) the commercial and industrial areas adjacent to UCI tend to have higher ambient noise levels than the adjoining on-campus residential, academic/support and mixed use land uses (except for a small area designated for campus support services at the North Campus boundary). Because noise levels rapidly decrease as distance increases, any new stationary noise sources along the campus perimeter are not expected to contribute to the higher ambient noise levels within these adjacent off-campus commercial and industrial areas. Therefore, new stationary noise sources associated with implementation of the 2007 LRDP would not result in a cumulatively considerable increase in permanent ambient noise levels.

4.9.4.3 TEMPORARY NOISE

The geographic context for the analysis of cumulative impacts for temporary (short-term) construction and outdoor event noise is the same as that described in section 4.9.4.2 above. Future construction in areas adjacent to UCI would not be expected to result in a significant cumulative noise impact causing substantial temporary or periodic increases in ambient noise levels in the vicinity of the campus boundaries for the following reasons: (1) construction-related noise levels are temporary and localized in nature, and decrease substantially with distance; (2) because the campus is separated from adjacent land uses by major roadways and landscaped setbacks, which provide a noise buffer between on-campus activities and off-campus land uses, it is unlikely that noise levels from the 2007 LRDP construction activities would be loud enough to make a cumulative contribution to ambient levels in the adjacent areas; and (3) implementation of mitigation measure Noi-2A, as well as campus policies and practices relating to construction noise management, would further reduce noise levels associated with on-campus construction near campus boundaries. Therefore, construction activities associated with implementation of the 2007 LRDP would not result in a cumulatively considerable increase in temporary ambient noise levels.

With respect to increased noise levels at on- and off-campus land uses due to outdoor events, such events typically occur in the evenings during which time other noise-generating community events are not expected to occur in proximity to the campus. In addition, the continued implementation of UCI's Outdoor Event Noise Control Plan would further reduce temporary noise impacts from outdoor events on campus. Therefore, the possible increase of outdoor events associated with implementation of the 2007 LRDP would not result in a cumulatively considerable increase in temporary ambient noise levels.

4.9.4.4 AIRPORT NOISE

Section 4.9.3.3 above concluded that implementation of the 2007 LRDP would not expose new noise-sensitive land uses to airport noise in excess of regulatory limits. Therefore, this issue is not addressed in this cumulative analysis pursuant to Section 15130(a)(1) of the CEQA Guidelines, which states that "an EIR should not discuss impacts which do not result in part from the project evaluated in the EIR."

4.9.4.5 GROUND-BORNE VIBRATION

The geographic context for the analysis of cumulative impacts for temporary (short-term) ground-borne vibration is the same as that described in Section 4.9.4.2 above. Future construction in areas adjacent to UCI would not be expected to result in a significant cumulative noise impact causing the exposure of people to, or the generation of, excessive ground-borne vibration and/or noise levels in the vicinity of the campus boundaries for the same reasons as given in Section 4.9.4.3 above. Therefore, the impact from ground-borne vibrations due to construction activities associated with implementation of the 2007 LRDP would not be cumulatively considerable.

4.9.5 CEQA CHECKLIST ITEMS ADEQUATELY ADDRESSED IN INITIAL STUDY

For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

There are no private airstrips located in the vicinity of the UCI campus.

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