NOISE IMPACT ANALYSIS

NEWPORT BEACH CITY HALL AND PARK DEVELOPMENT PLAN

NEWPORT BEACH, CALIFORNIA

LSA

August 2009

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NEWPORT BEACH CITY HALL AND PARK DEVELOPMENT PLAN

INTRODUCTION

This noise impact analysis has been prepared to evaluate the potential noise impacts and mitigation measures associated with the Newport Beach City Hall and Park Development Plan project in the City of Newport Beach, California (City). This report is intended to satisfy the City's requirement for a project-specific noise impact analysis by examining the impacts of the proposed uses on the project site and identifying mitigation measures necessary to reduce the project impacts.

Project Location

The proposed project site is located in the City of Newport Beach between Avocado Avenue and MacArthur Boulevard, as shown in Figure 1.

Project Description

The proposed project site is located in the City between Avocado Avenue and MacArthur Boulevard. The proposed project site is composed of three parcels (referred to as the northern, central, and southern parcels). Altogether, the proposed project site is approximately 20 acres. The northern parcel and the central parcel, both of which are currently vacant, are separated by San Miguel Drive. The southern parcel is occupied by the existing Newport Beach Public Library located at 1000 Avocado Avenue; the Library would remain after project implementation.

The proposed project would result in the relocation of City functions (except for Fire Station No. 2)[1] currently taking place at the existing City Hall located at 3300 Newport Boulevard to the proposed project site. The proposed project includes eight primary components, including: (1) construction and operation of an approximately 98,000-square-foot (sf) City Hall administration building, Community Room, and Council Chambers; (2) a 450-space parking structure; (3) an approximately 17,000 sf expansion of the Newport Beach Central Library (Library); (4) a dedicated 4,800 sf Emergency Operations Center (EOC); (5) a Civic Green; (6) construction of a 14.3-acre public park that includes a dog park, wetlands area, bridges over the wetlands, lookouts, and a pedestrian overcrossing over San Miguel Drive; (7) widening of San Miguel Drive; and (8) reuse of the existing City Hall structures located at 3300 Newport Boulevard with public facilities uses. Throughout this technical report, project components 1–5 are collectively referred to as the Civic Center. The conceptual site plan is shown in Figure 2.

[1] Fire Station No. 2 serves a specific area of the Peninsula and Lido Isle and coincidentally is on the existing City Hall site.

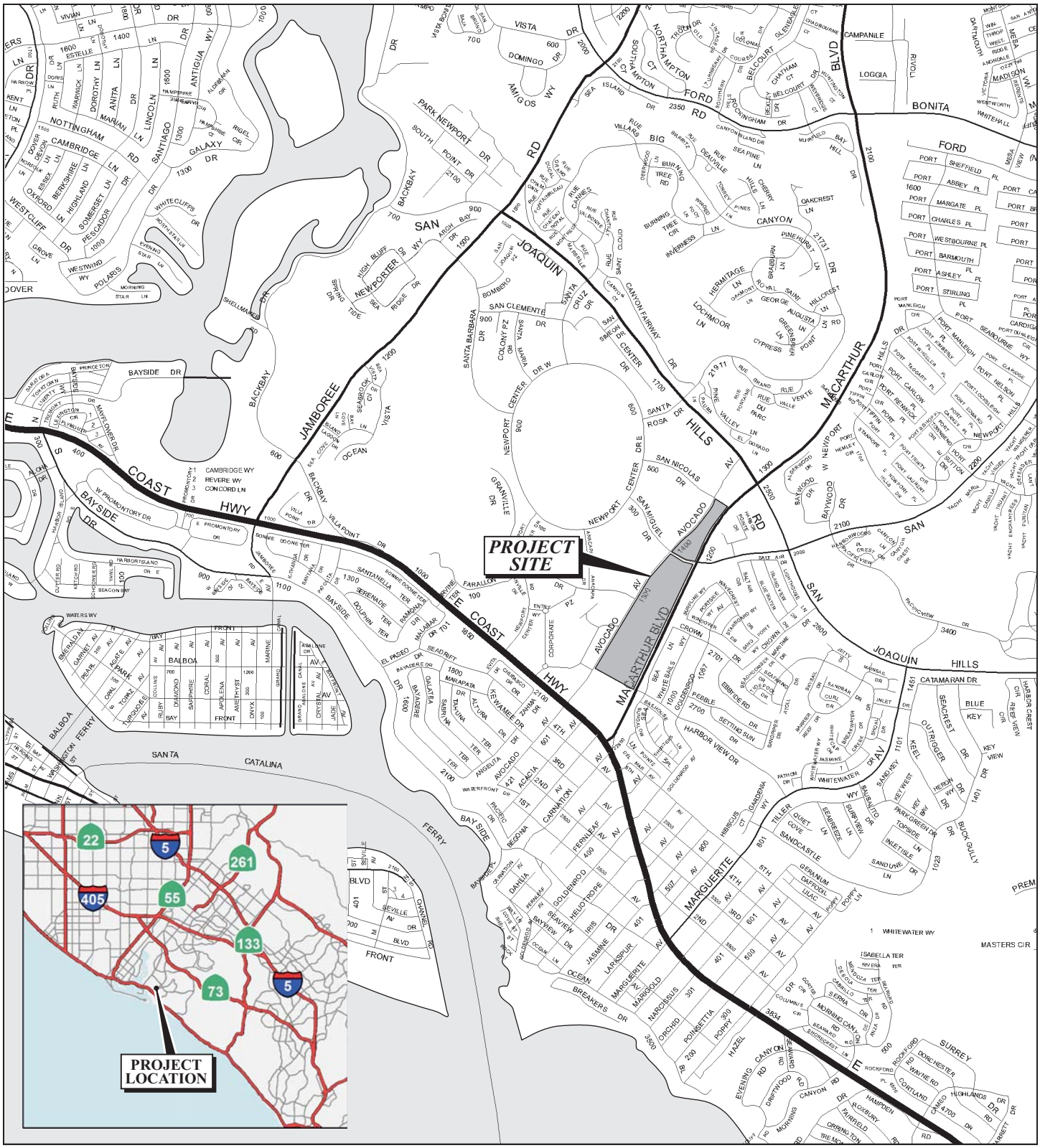

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FIGURE 1

N

0 1000 2000

FEET

SOURCE: The Thomas Guide

Newport Beach City Hall and Park Development Plan

Project Location

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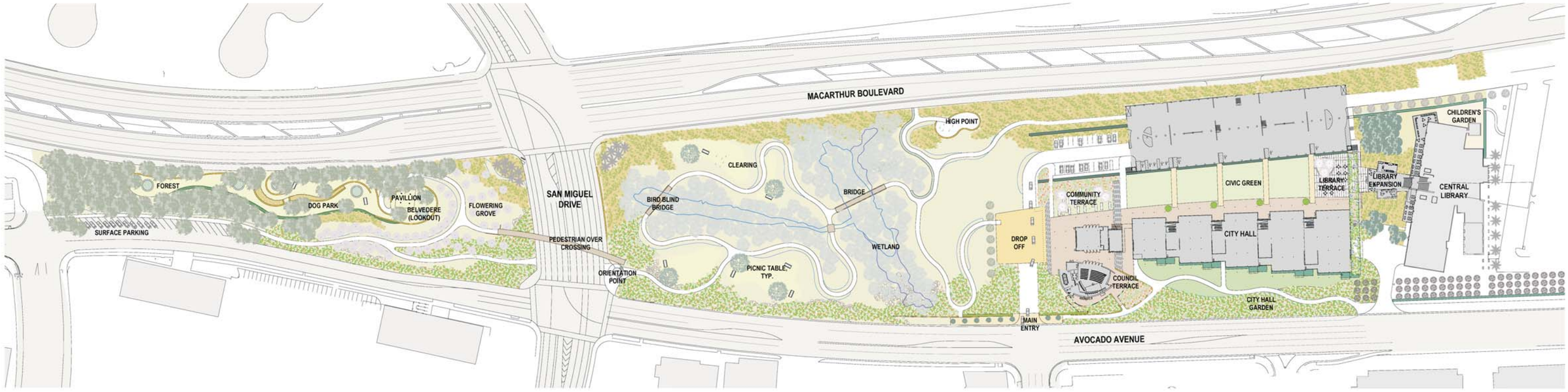

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FIGURE 2

N

0 100 200
FEET

SOURCE: Bohlin Cywinski Jackson/PWP/ARUP

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Newport Beach City Hall and Park Development Plan

Site Plan

The proposed City Hall and parking structure would be located immediately north of the existing Library. The proposed project would stretch from the northern boundary of the Library structure to the northern end of the northern parcel, adjacent to the existing Orange County Transportation Authority (OCTA) facility. The park is proposed to include both natural and more formal park features. A pedestrian bridge over San Miguel Drive is also proposed to link the central and northern parcels. A dog park is proposed to be located in the section of the park north of San Miguel Drive.

Surrounding Land Uses and Setting

Land uses in the project vicinity include the OCTA Newport Transportation Center (bus transfer station), MacArthur Boulevard, and residential uses to the east; Newport Beach Central Library and retail uses to the south; and commercial and medical offices to the west.

The Existing City Hall Site

The existing City Hall site is occupied by 47,809 gross square feet (sf) of floor area in five permanent buildings and five temporary buildings (trailers); approximately 3,417 sf are occupied by Fire Station No. 2, which would remain after project implementation. The 10 buildings on site were constructed at various times between 1945 (City Hall Building B) and 2008 (Human Resources recruitment trailer).

The proposed project includes the reuse of the existing buildings on the City Hall site with public facilities uses. The project does not propose any physical changes to the structures, infrastructure, or types of uses occurring on site.

Steps Related to Noise Impact Assessment

Evaluation of noise impacts associated with this project includes the following steps:

- Determine the short-term construction noise impacts on both on- and off-site noise sensitive uses(e.g. residential uses, library)
- Identify mitigation measures to reduce short-term on- and off-site construction noise impacts
- Determine the long-term mobile source noise impacts, including vehicular traffic, on on- and off-site sensitive uses
- Determine the long-term stationary source noise impacts on off-site noise sensitive uses from on-site operations
- Identify mitigation measures to reduce long-term, on- and off-site noise impacts

Characteristics of Sound

Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep.

To the human ear, sound has two significant characteristics: pitch and loudness. Pitch is generally an annoyance, while loudness can affect the ability to hear. Pitch is the number of complete vibrations, or cycles per second, of a wave resulting in the tone's range from high to low. Loudness is the strength of a sound that describes a noisy or quiet environment and is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound waves combined with the reception characteristics of the human ear. Sound intensity refers to how hard the sound wave strikes an object, which in turn produces the sound's effect. This characteristic of sound can be precisely measured with instruments. The analysis of a project defines the noise environment of the project area in terms of sound intensity and its effect on adjacent sensitive land uses.

Measurement of Sound

Sound intensity is measured through the A-weighted scale to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound similar to the human ear's de-emphasis of these frequencies. Unlike linear units, such as inches or pounds, decibels are measured on a logarithmic scale representing points on a sharply rising curve.

For example, 10 decibels (dB) are 10 times more intense than 1 dB, 20 dB are 100 times more intense than 1 dB, and 30 dB are 1,000 times more intense than 1 dB. Thirty dB represents 1,000 times as much acoustic energy as one decibel. The decibel scale increases as the square of the change, representing the sound pressure energy. A sound as soft as human breathing is approximately 10 times greater than 0 dB. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. A 10 dB increase in sound level is perceived by the human ear as only a doubling of the loudness of the sound. Ambient sounds generally range from 30 dB (very quiet) to 100 dB (very loud).

Sound levels are generated from a source, and their decibel level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. For a single point source, sound levels decrease approximately 6 dB for each doubling of distance from the source. This drop-off rate is appropriate for noise generated by stationary equipment. If noise is produced by a line source, such as highway traffic or railroad operations, the sound decreases 3 dB for each doubling of distance in a hard site environment (no intervening structures or vegetation). Line source, noise in a relatively flat environment with absorptive vegetation, decreases 4.5 dB for each doubling of distance.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. Equivalent continuous sound level (L_{eq}) is the total sound energy of time varying noise over a sample period of time. However, the predominant rating scales for human communities in the State of California are the L_{eq} and community noise equivalent level (CNEL) or the day-night average level (L_{dn}) based on A-weighted decibels (dBA). CNEL is the time varying noise over a 24-hour period of time, with a 5 dBA weighting factor applied to the hourly L_{eq} for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). L_{dn} is similar to the CNEL scale but without the adjustment for events occurring during the evening hours. CNEL and L_{dn} are within 1 dBA of each other and are normally exchangeable. The City uses the CNEL noise scale for long-term noise impact assessment.

Other noise rating scales of importance when assessing the annoyance factor include the maximum noise level (L_{max}), which is the highest exponential time averaged sound level that occurs during a stated time period. The noise environments discussed in this analysis for short-term noise impacts are specified in terms of maximum levels denoted by L_{max}. L_{max} reflects peak operating conditions and identifies the annoying aspects of intermittent noise. It is often used together with another noise scale, or noise standards in terms of percentile noise levels, in noise ordinances for enforcement purposes. For example, the L_{10} noise level represents the noise level exceeded 10 percent of the time during a stated period. The L_{50} noise level represents the median noise level. Half the time the noise level exceeds this level, and half the time it is less than this level. The L_{90} noise level represents the noise level exceeded 90 percent of the time and is considered the background noise level during a monitoring period. For a relatively constant noise source, the L_{eq} and L_{50} are approximately the same.

Noise impacts can be described in three categories. The first is audible impacts that refer to increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3.0 dB or greater because this level has been found to be barely perceptible in exterior environments. The second category, potentially audible, refers to a change in the noise level between 1.0 and 3.0 dB. This range of noise levels has been found to be noticeable only in laboratory environments. The last category is changes in noise levels of less than 1.0 dB, which are inaudible to the human ear. Only audible changes in existing ambient or background noise levels are considered potentially significant.

Physiological Effects of Noise

Physical damage to human hearing begins at prolonged (8 hours or more continuously) exposure to noise levels higher than 85 dBA. Prolonged noise exposure in excess of 75 dBA increases body tensions, thereby affecting blood pressure and functions of the heart and the nervous system. In comparison, extended periods (more than 8 hours continuously) of noise exposure above 90 dBA would result in permanent cell damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear even with short-term exposure. This level of noise is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by the feeling of pain in the ear. This is called the threshold of pain. A sound level of 160 to 165 dBA will result in dizziness or loss of equilibrium. The ambient or background noise problem is widespread and generally more concentrated in urban areas than in outlying less developed areas.

Table A lists “Definitions of Acoustical Terms,” and Table B shows “Common Sound Levels and Their Noise Sources.”

Vibration

Vibration refers to groundborne noise and perceptible motion. Groundborne vibration is almost exclusively a concern inside buildings and is rarely perceived as a problem outdoors, where the motion may be discernable, but without the effects associated with the shaking of a building, there is less of an adverse reaction. Vibration energy propagates from a source through intervening soil and rock layers to the foundations of nearby buildings. The vibration then propagates from the foundation throughout the remainder of the structure. Building vibration may be perceived by the occupants as

Table A: Definitions of Acoustical Terms

Term	Definitions
Decibel, dB	A unit of level that denotes the ratio between two quantities that are proportional to power; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
Frequency, Hz	Of a function periodic in time, the number of times that the quantity repeats itself in one second (i.e., number of cycles per second).
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted, unless reported otherwise.
L_2, L_8, L_{25}, L_{50}	The fast A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 2 percent, 8 percent, 25 percent, and 50 percent of a stated time period.
Equivalent Continuous Noise Level, L_{eq}	The level of a steady sound that, in a stated time period and at a stated location, has the same A-weighted sound energy as the time varying sound.
Community Noise Equivalent Level, CNEL	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 5 dBA to sound levels occurring in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 dBA to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
Day/Night Noise Level, L_{dn}	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 dBA to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
L_{max}, L_{min}	The maximum and minimum A-weighted sound levels measured on a sound level meter, during a designated time interval, using fast time averaging.
Ambient Noise Level	The all encompassing noise associated with a given environment at a specified time, usually a composite of sound from many sources at many directions, near and far; no particular sound is dominant.
Intrusive	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: Handbook of Acoustical Measurements and Noise Control, 1991.
CNEL = Community Noise Equivalent Level
dB = Decibel
dBA = A-weighted decibel
Hz = Hertz
L_2 = A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 2 percent of a stated time period.
L_8 = A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 8 percent of a stated time period.
L_{25} = A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 25 percent of a stated time period.
L_{50} = A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 50 percent of a stated time period.
L_{dn} = Day/night noise level.
L_{eq} = Equivalent continuous noise level.
L_{max} = Maximum A-weighted noise levels that are measured during a designated time interval, using fast time averaging.
L_{min} = Minimum A-weighted noise levels that are measured during a designated time interval, using fast time averaging.

Table B: Common Sound Levels and their Noise Sources

Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Evaluations[1]
Near Jet Engine	140	Deafening	128 times as loud
Civil Defense Siren	130	Threshold of Pain	64 times as loud
Hard Rock Band	120	Threshold of Feeling	32 times as loud
Accelerating Motorcycle at a Few Feet Away	110	Very Loud	16 times as loud
Pile Driver; Noisy Urban Street/Heavy City Traffic	100	Very Loud	8 times as loud
Ambulance Siren; Food Blender	95	Very Loud	
Garbage Disposal	90	Very Loud	4 times as loud
Freight Cars; Living Room Music	85	Loud	
Pneumatic Drill; Vacuum Cleaner	80	Loud	2 times as loud
Busy Restaurant	75	Moderately Loud	
Near Freeway Auto Traffic	70	Moderately Loud	
Average Office	60	Quiet	One-half as loud
Suburban Street	55	Quiet	
Light Traffic; Soft Radio Music in Apartment	50	Quiet	One-quarter as loud
Large Transformer	45	Quiet	
Average Residence without Stereo Playing	40	Faint	One-eighth as loud
Soft Whisper	30	Faint	
Rustling Leaves	20	Very Faint	
Human Breathing	10	Very Faint	Threshold of Hearing
	0	Very Faint	

Source: Compiled by LSA Associates, Inc., 2008.
[1] As compared to 70 dBA.

motion of building surfaces, rattling of items on shelves or hanging on walls, or as a low-frequency rumbling noise. The rumbling noise is caused by the vibrating walls, floors, and ceilings radiating sound waves. Building damage is not a factor for normal development projects, with the occasional exception of blasting and pile driving during construction. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by 10 dB or less. This is an order of magnitude below the damage threshold for normal buildings.

Typical sources of groundborne vibration are construction activities (e.g., blasting, pile driving, and operating heavy-duty earthmoving equipment), steel-wheeled trains, and occasional traffic on rough roads. Problems with groundborne vibration and noise from these sources are usually localized to areas within approximately 100 feet (ft) from the vibration source, although there are examples of

groundborne vibration causing interference out to distances greater than 200 ft (Federal Transit Administration [FTA] 2006). When roadways are smooth, vibration from traffic, even heavy trucks, is rarely perceptible. It is assumed for most projects that the roadway surface will be smooth enough that groundborne vibration from street traffic will not exceed the impact criteria; however, construction of the project could result in groundborne vibration that could be perceptible and annoying, depending on the location and distance of the receptor. Groundborne noise is typically not a problem because noise arriving via the normal airborne path usually will be greater than groundborne noise.

Groundborne vibration has the potential to disturb people as well as to damage buildings. Although it is very rare for train-induced groundborne vibration to cause even cosmetic building damage, it is not uncommon for construction processes such as blasting and pile driving to cause vibration of sufficient amplitudes to damage nearby buildings (FTA 2006). Ground-borne vibration is usually measured in terms of vibration velocity, either the root-mean-square (rms) velocity or peak particle velocity (PPV). The best measurement for characterizing human response to building vibration is rms, and PPV is used to characterize potential for damage. Decibel notation acts to compress the range of numbers required to describe vibration. Vibration velocity level in decibels is defined as:

$L_v = 20 \log_{10} [V/V_{ref}]$

where L_v is the velocity in decibels (VdB), AV@ is the rms velocity amplitude, and AV_{ref}@ is the reference velocity amplitude, or $1x10^{-6}$ inches/second used in the U.S. Table C illustrates human response to various vibration levels, as described in the FTA Transit Noise and Vibration Impact Assessment (FTA, 2006).

Table C: Human Response to Different Levels of Groundborne Noise and Vibration

Vibration Velocity Level	Noise Level		Human Response
	Low Frequency[1]	Mid Frequency[2]	
65 VdB	25 dBA	40 dBA	Approximate threshold of perception for many humans. Low-frequency sound usually inaudible, mid-frequency sound excessive for quiet sleeping areas.
75 VdB	35 dBA	50 dBA	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find transit vibration at this level unacceptable. Low-frequency noise acceptable for sleeping areas, mid-frequency noise annoying in most quiet occupied areas.
85 VdB	45 dBA	60 dBA	Vibration acceptable only if there are an infrequent number of events per day. Low-frequency noise unacceptable for sleeping areas, mid-frequency noise unacceptable even for infrequent events with institutional land uses such as schools and churches.

Source: Federal Transit Administration 2006 and Federal Railroad Administration 1998
[1] Approximate noise level when vibration spectrum peak is near 30 Hz.
[2] Approximate noise level when vibration spectrum peak is near 60 Hz.
dBA = A-weighted decibel
Hz = Hertz
vdB = Vibration velocity decibel

Factors that influence groundborne vibration and noise include the following:

- **Vibration Source:** Vehicle suspension, wheel types and condition, track/roadway surface, track support system, speed, transit structure, and depth of vibration source
- **Vibration Path:** soil type, rock layers, soil layering, depth to water table, and frost depth
- **Vibration Receiver:** foundation type, building construction, and acoustical absorption

Among the factors listed above, there are significant differences in the vibration characteristics when the source is underground compared to at ground surface. In addition, soil conditions are known to have a strong influence on the levels of groundborne vibration. Among the most important factors are the stiffness and internal damping of the soil and the depth to bedrock.

Experience with groundborne vibration is that vibration propagation is more efficient in stiff clay soils than in loose sandy soils, and shallow rock seems to concentrate the vibration energy close to the surface and can result in groundborne vibration problems at a large distance from the source. Factors such as layering of the soil and depth to water table can have significant effects on the propagation of groundborne vibration. Soft, loose, sandy soils tend to attenuate more vibration energy than hard, rocky materials. Vibration propagation through groundwater is more efficient than through sandy soils.

EXISTING CONDITIONS

The Existing City Hall Site

The existing City Hall site is occupied by 47,809 gross square feet (sf) of floor area in five permanent buildings and five temporary buildings (trailers); approximately 3,417 sf are occupied by Fire Station No. 2, which would remain after project implementation. The 10 buildings on site were constructed at various times between 1945 (City Hall Building B) and 2008 (Human Resources recruitment trailer).

The proposed project includes the reuse of the existing buildings on the City Hall site with public facilities uses. The project does not propose any physical changes to the structures, infrastructure, or types of uses occurring on site.

Land Uses in the Project Vicinity

Land uses in the project vicinity of the proposed project site include the Orange County Transit Authority (OCTA) Newport Transportation Center (bus transfer station), MacArthur Boulevard, and residential uses to the east; Newport Beach Central Library and retail uses to the south; and commercial and medical offices to the west. Additional roadways in the project vicinity include Avocado Avenue, San Miguel Drive, San Joaquin Hills Road, and East Coast Highway.

Sensitive Land Uses in the Project Vicinity

The nearest sensitive receptor is located east of the project site, across MacArthur Boulevard, approximately 166 to 188 ft for the northern and central parcels, respectively. These existing homes are approximately 15 to 20 ft above MacArthur Boulevard and have a soundwall along their western property line that helps shield traffic noise from MacArthur Boulevard. The existing Newport Beach Central Library just south of the project site is also considered a noise-sensitive land use. These noise-sensitive uses would be potentially affected by noise from the project site during construction of the project and from on-site operations.

Overview of the Existing Noise Environment

The primary existing noise sources in the project area are transportation facilities. Traffic on MacArthur Boulevard, Avocado Avenue, San Miguel Drive, San Joaquin Hills Road, Pacific Coast Highway, and other local streets is a steady source of ambient noise.

The Federal Highway Administration (FHWA) highway traffic noise prediction model (FHWA RD-77-108) was used to evaluate highway traffic-related noise conditions along roadway segments in the project vicinity. The standard vehicle mix for Orange County roadways was used for traffic on these roadway segments. For a worst-case scenario, the hard site propagation is used in the traffic noise modeling. The modeled 24-hour Community Noise Equivalent Level (CNEL) levels are shown in Table D for the existing traffic conditions (RBF Consulting, July 2009). It should be noted that the average daily traffic volumes provided in the traffic study were rounded to the nearest 100. These traffic noise levels are calculated assuming there are no intervening structures or natural terrain between the roadway and where the noise contours are drawn. Traffic noise levels in the project vicinity are generally moderate (Avocado Avenue, San Miguel Drive, and San Joaquin Hills Road) to high (Pacific Coast Highway, Jamboree Road, and MacArthur Boulevard).

Takeoffs and landings at John Wayne Airport (JWA), a commercial airport located approximately 3.5 miles north of the project site, contribute to the aircraft noise in the project area. The project site is outside the 60 dBA CNEL noise contour of JWA, based on the JWA Impact Zones map in the Airport Environs Land Use Plan (AELUP) for JWA. However, aircraft takeoff noise occasionally contributes to the ambient noise in the project vicinity.

Thresholds of Significance on Noise

A project will normally have a significant effect on the environment related to noise if it will substantially increase the ambient noise levels for adjoining areas or conflict with the adopted environmental plans and goals of the community in which it is located. The applicable noise standards governing the project site are the criteria in the City's Noise Element of the General Plan and its Noise Ordinance.

Table D: Existing (2009) Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (ft)	Centerline to 65 CNEL (ft)	Centerline to 60 CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane
West Coast Highway from Newport Boulevard to Riverside Avenue	54,500	206	648	2,048	74.9
West Coast Highway from Riverside Avenue to Tustin Avenue	47,500	181	564	1,782	73.8
West Coast Highway from Tustin Avenue to Dover Drive	44,500	169	529	1,671	73.8
East Coast Highway from Dover Drive to Bayside	55,500	211	659	2,080	74.3
East Coast Highway from Bayside to Jamboree Road	45,000	175	535	1,685	72.9
East Coast Highway from Jamboree Road to Newport Center Drive	35,700	137	425	1,339	72.6
East Coast Highway from Newport Center Drive to Avocado Avenue	35,700	137	425	1,339	72.6
Jamboree Road from Bison Avenue to Eastbluff/Ford	39,300	152	467	1,473	72.8
Jamboree Road from Eastbluff/Ford to San Joaquin Hills Road	47,100	180	559	1,766	73.5
MacArthur Boulevard from SR-73 NB On-Ramp to Bison Avenue	66,700	254	791	2,497	74.7
MacArthur Boulevard from Bison Avenue to Ford/Bonita Canyon	66,700	254	791	2,497	74.7
MacArthur Boulevard from Ford/Bonita Canyon to San Joaquin Hills Road	61,000	231	724	2,287	74.7
MacArthur Boulevard from San Joaquin Hills Road to San Miguel Drive	40,000	154	476	1,500	72.8
MacArthur Boulevard from San Miguel Drive to East Coast Highway	33,100	129	394	1,241	72.0
Avocado Avenue from East Coast Highway to San Miguel Drive	11,500	< 50	106	332	67.0
Avocado Avenue from San Miguel Drive to San Joaquin Hills Road	5,000	< 50	< 50	145	63.4
San Joaquin Hills Road from Jamboree Road to Santa Cruz	18,400	64	171	530	68.3
San Joaquin Hills Road from Santa Rosa to Avocado Avenue	18,400	64	171	530	68.3
San Joaquin Hills Road from San Miguel Drive to Marguerite Avenue	18,900	65	176	545	68.4
San Joaquin Hills Road from Marguerite Avenue to Spy Glass Hill	14,000	58	168	526	68.8
San Miguel Drive. from Newport Center Drive to Avocado Avenue	10,000	< 50	93	289	66.4
San Miguel Drive from Avocado Avenue to MacArthur Boulevard	19,000	58	174	548	69.2
San Miguel Drive from MacArthur Boulevard to San Joaquin Hills Road	13,000	< 50	121	375	67.3
San Miguel Drive from North of San Joaquin Hills Road	13,000	< 50	121	375	67.3

Source: LSA Associates, Inc., July 2009, RBF, 2009, Traffic Report.
Note: Traffic noise within 50 ft of the roadway centerline should be evaluated with site-specific information.
ADT = Average daily trips
dBA = A-weighted decibel
CNEL = Community Noise Equivalent Level
ft = Feet
NB = Northbound
SR-73 = State Route 73

City of Newport Beach Noise Element of the General Plan. The City's Noise Element (Table N2, Land Use Noise Compatibility Matrix) identifies four zone categories for land use and noise compatibility: Zone A, Clearly Compatible; Zone B, Normally Compatible; Zone C, Normally Incompatible; and Zone D, Clearly Incompatible. Table E depicts the City's land use noise compatibility matrix. These standards are used to assess the compatibility of proposed land uses with the noise environment. For Commercial/Industrial/Institutional uses that include office buildings, research and development (R&D) facilities, professional offices, and City office buildings, the City considers exterior noise levels up to 65 dBA CNEL as Clearly Compatible and between 65 and 75 dBA CNEL as Normally Compatible. Under the Normally Compatible category, new construction or development should be undertaken only after detailed analysis of the noise reduction requirements are made and necessary noise insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.

For open space such as parks, the City considers areas up to 65 dBA CNEL as Clearly Compatible, Normally Compatible between 65 and 70 dBA CNEL, and Normally Incompatible between 70 and 75 dBA CNEL. For libraries, the City considers areas up to 60 dBA CNEL as Clearly Compatible areas, between 60 and 65 dBA CNEL as Normally Compatible areas, and areas between 65 and 75 dBA CNEL as Normally Incompatible. Areas exposed to noise levels exceeding 75 dBA CNEL are Clearly Incompatible for parks and libraries.

Interior noise levels up to 50 dBA CNEL for office uses are considered normally acceptable. For meeting halls such as the Council Chambers and other conference rooms and the proposed Library expansion, where a quiet environment is essential for their functions, the desirable interior noise level is 45 dBA CNEL, similar to that recommended for multifamily residential uses by the State.

The City also enforces the interior and exterior noise standards shown in Table F. Other noise impacts such as construction activities are regulated by the Municipal Code, Chapter 10.28, which limits construction activities to between the hours of 7:00 a.m. and 6:00 p.m., Monday through Friday, and 8:00 a.m. to 6:00 p.m. on Saturdays; no construction is permitted outside of these hours or on Sundays and federal holidays.

In addition, the following policies in the City's Noise Element are applicable to the proposed project.

Policies

N1.1 Noise Compatibility of New Development

Require that all proposed projects are compatible with the noise environment through use of Table N2 (see Table E), and enforce the interior and exterior noise standards shown in Table N3 (see Table F).

N1.3 Remodeling and Additions of Structures

Require that all remodeling and additions of structures comply with the noise standards shown in Table N3 (see Table F).

Table E: Land Use Noise Compatibility Matrix

Land Use Categories		Community Noise Equivalent Level (CNEL)						
Categories	**Uses**	**<55**	**55–60**	**60–65**	**65–70**	**70–75**	**75–80**	**>80**
Residential	Single-family, two-family, multifamily	A	A	B	C	C	D	D
Residential	Mixed use	A	A	A	C	C	C	D
Residential	Mobile home	A	A	B	C	C	D	D
Commercial Regional, District	Hotel, motel, transient lodging	A	A	B	B	C	C	D
Commercial Regional, Village District, Special	Commercial retail, bank, restaurant, movie theater	A	A	A	A	B	B	C
Commercial Industrial Institutional	Office building, research and development, professional offices, city office building	A	A	A	B	B	C	D
Commercial Recreational **Institutional** Civic Center	Amphitheater, concert hall auditorium, meeting hall	B	B	C	C	D	D	D
Commercial Recreation	Children's amusement park, miniature golf course, go-cart track, equestrian center, sports club	A	A	A	B	B	D	D
Commercial General, Special **Industrial, Institutional**	Automobile service station, auto dealership, manufacturing, warehousing, wholesale, utilities	A	A	A	A	B	B	B
Institutional	Hospital, church, Library, schools' classroom	A	A	B	C	C	D	D
Open Space	Parks	A	A	A	B	C	D	D
Open Space	Golf course, cemeteries, nature centers wildlife reserves, wildlife habitat	A	A	A	A	B	C	C
Agriculture	Agriculture	A	A	A	A	A	A	A

Source: City of Newport Beach Noise Element, 2006.

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

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

CNEL = Community Noise Equivalent Level

Table F: City of Newport Beach Noise Standards

Land Use Categories		Allowable Noise Level (dBA L_{eq})			
		Interior[1,2]		Exterior[1,2]	
Categories	Uses	7 a.m.–10 p.m.	10 p.m.–7 a.m.	7 a.m.–10 p.m.	10 p.m.–7 a.m.
Residential	Single Family, Two Family, Multiple Family (Zone I)	45	40	55	50
	Residential Portions of Mixed Use Developments (Zone III)	45	40	60	50
Commercial Industrial	Commercial (Zone II)	N/A	N/A	65	60
	Industrial or Manufacturing (Zone IV)	N/A	N/A	70	70
Institutional	Schools, Day Care Centers, Churches, Libraries, Museums, Health Care Institutions (Zone I)	45	40	55	50

Source: City of Newport Beach Noise Element, 2006.

1 If the ambient noise level exceeds the resulting standard, the ambient shall be the standard.

2 It shall be unlawful for any person at any location within the incorporated area of the City to create any noise or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such a person which causes the noise level when measured on any other property, to exceed the following:

- The noise standard for the applicable zone for any 15-minute period;
- A maximum instantaneous noise level equal to the value of the noise standard plus 20 dBA for any period of time (measured using A-weighted slow response).
- In the event the ambient noise level exceeds the noise standard, the noise standard applicable to said category shall be increased to reflect the maximum ambient noise level.
- The noise standard for the residential portions of the residential property falling within 100 ft of a commercial property, if the intruding noise originates from that commercial property.
- If the measurement location is on a boundary between two different noise zones, the lower noise level standard applicable to the noise zone shall apply.

dBA = A-weighted decibel
ft = feet
L_{eq} = Equivalent continuous noise level over a specified period of time.
NA = Not applicable

N1.8 Significant Noise Impacts

Require the employment of noise mitigation measures for existing sensitive uses when a significant noise impact is identified. A significant noise impact occurs when there is an increase in the ambient CNEL produced by new development impacting existing sensitive uses. The CNEL increase is shown in the table below.

CNEL (dBA)	Increase (dBA)
55	3
60	2
65	1
70	1
Over 75	Any increase is considered significant

dBA = A-weighted decibel
CNEL = Community Noise Equivalent Level

N2.1 New Development

Require that proposed noise-sensitive uses in areas of 60 dBA and greater, as determined the analysis stipulated by Policy N1.1, demonstrate that they meet interior and exterior noise levels.

N2.2 Design of Sensitive Land uses

Require the use of walls, berms, interior noise insulation, double paned windows, or other noise mitigation measures, as appropriate, in the design of new residential or other noise sensitive land uses that are adjacent to major roads. Application of the Noise Standards in Table N3 (see Table F) shall govern this requirement.

N3.1 New Development

Ensure new development is compatible with the noise environment by using airport noise contours no larger than those contained in the 1985 JWA Master Plan, as guides to future planning and development decisions.

N4.1 Stationary Noise Sources

Enforce interior and exterior noise standards outlined in Table N3 (see Table F) and in the City's Municipal Code to ensure that sensitive noise receptors are not exposed to excessive noise levels from stationary noise sources such as heating, ventilation, and air conditioning equipment.

N4.4 Limiting Hours of Recreational Activities

Limit hours when recreational activities in parks and the harbor can take place.

N4.6 Maintenance or Construction Activities

Enforce the Noise Ordinance noise limits and limits on hours of maintenance or construction activity in or adjacent to residential areas, including noise that result in from in-home hobby or work related activities.

N5.1 Limiting Hours of Activity

Enforce the limits on hours of construction activity.

Municipal Code. In addition to the noise/land use compatibility guidelines contained in the General Plan Noise Element, the City has adopted Community Noise Control policies and standards as part of its Municipal Code in order to limit unnecessary, excessive, and annoying noise in the City. The most effective method to control community noise impacts from nontransportation noise sources is through application of Municipal Code standards. The noise levels established by the Municipal Code assure that noise from mechanical equipment and other types of nontransportation noise are not excessive in residential and other noise-sensitive areas.

The City Municipal Code Chapter 10.26, Community Noise Control, establishes the maximum permissible noise level that may intrude into a neighbor's property. The exterior and interior noise standards are the same as those listed in Table E from the Noise Element, without the inclusion of those for the Institutional category.

Chapter 10.28 of the City's Municipal Code regulates the timing of noise-generating construction activities and property maintenance activities and includes special provisions for sensitive land uses. Noise-generating construction activities shall occur only between the hours of 7:00 a.m. and 6:00 p.m., Monday through Friday, and 8:00 a.m. to 6:00 p.m. on Saturdays. No construction shall be permitted outside of these hours or on Sundays and federal holidays. Limited exemptions are possible with City Manager approval.

In addition, any mechanical device, apparatus, or equipment that is utilized for emergency work is exempted from the provisions of the City's Noise Ordinance.

Vibration Impact Criteria

The City does not have specific limits or thresholds for vibration. The FTA and the Federal Railroad Administration (FRA) provide criteria for acceptable levels of groundborne vibration for various buildings that are sensitive to vibration. The criteria for environmental impact from groundborne vibration and noise are based on the maximum levels for a single event.

Federal Transit Administration and Federal Railroad Administration. Both the FTA in its *Transit Noise and Vibration Impact Assessment* (FTA, May 2006) and the FRA in its High-Speed Ground Transportation Noise and Vibration Impact Assessment (FRA, December 1998) included groundborne vibration and noise impact criteria guidance, as shown in Table G. The criteria presented in Table G account for variation in project types, as well as the frequency of events, which differ widely among transit projects. Although the criteria are provided for community response to groundborne vibration from rail rapid transit systems, they also provide good guidelines for human response from exposure to vibration in general.

IMPACTS AND MITIGATION MEASURES

Short-Term Construction-Related Impacts

Construction Noise. Noise levels from grading and other construction activities for the proposed project may range up to 80 dBA L_{max} at the closest residential uses adjacent to the project site for very limited times when construction occurs near the project's boundary. Construction-related noise impacts from the proposed project would be potentially adverse due to the length of the construction period (24–30 months) and level of noise from combination of construction activities (up to 80 dBA L_{max}), even if project construction complies with the City's construction hours requirement.

Short-term noise impacts would be associated with excavation, grading, and erecting of buildings on site during construction of the proposed project. Construction-related short-term noise levels would be higher than existing ambient noise levels in the project area today but would no longer occur once construction of the project is completed.

Table G: Groundborne Vibration and Noise Impact Criteria

Land Use Category	Groundborne Vibration Impact Levels (VdB re 1 micro inch/sec)		Groundborne Noise Impact Levels (dB re 20 micro Pascals)	
	Frequent[1] Events	Infrequent[2] Events	Frequent[1] Events	Infrequent[2] Events
Category 1: Buildings where low ambient vibration is essential for interior operations.	65 VdB[3]	65 VdB[3]	B[4]	B[4]
Category 2: Residences and buildings where people normally sleep.	72 VdB	80 VdB	35 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use.	75 VdB	83 VdB	40 dBA	48 dBA

Source: Federal Transit Administration, 2006.

[1] AFrequent Events@ is defined as more than 70 events per day.
[2] AInfrequent Events@ is defined as fewer than 70 events per day.
[3] This criterion limit is based on levels that are acceptable for most moderately sensitive equipment, such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.
[4] Vibration-sensitive equipment is used in buildings where sufficient noise attenuation is provided; additionally, such equipment is not sensitive to either airborne or groundborne noise.

dB = Decibel
dBA = A-weighted decibel
HVAC = Heating, ventilation, air-conditioning
VdB = Vibration velocity decibel

Two types of short-term noise impacts could occur during construction of the proposed project. First, construction crew commutes and the transport of construction equipment and materials to the site for the proposed project would incrementally increase noise levels on access roads leading to the site. The project's proposed worst-case haul route would be via MacArthur Boulevard north to the State Route 73 (SR-73) toll road, north to State Route 55 (SR-55), to Interstate 405 (I-405), south to Interstate 5 (I-5), continue south to Ortega Highway/State Route 74 (SR-74), then finally east to the Prima Deshecha Landfill[1]. Although there would be a relatively high single-event noise exposure potential causing an intermittent noise irritant (passing trucks at 50 ft would generate up to a maximum of 87 dBA), the effect on longer-term (hourly or daily) ambient noise levels would be small, considering traffic along these roadway segments is and will continue to be heavy with relatively high truck percentages compared to other local streets. Assessing the contribution of 87 dBA to ambient noise levels in terms of a 24-hour weighted CNEL noise level requires making assumptions about the exact location and duration of construction equipment and operations throughout the site. Since construction noise levels are exempt in the City's Noise Ordinance, assessing the CNEL contribution to an area dominated by high traffic noise is not warranted when such assumptions cannot be verified. In addition, in compliance with Chapter 10.28 of the City's Municipal Code, all construction activities would be restricted to the hours of 7:00 a.m. to 6:00 p.m.,

[1] This is considered the worst-case haul route, as it is likely that the City could find a closer disposal site, as described in Chapter 3.0, Project Description.

Monday through Friday, and 8:00 a.m. to 6:00 p.m. on Saturdays; no construction is permitted outside of these hours or on Sundays and federal holidays. Therefore, short-term construction-related impacts associated with worker commute, equipment transport to the project site, and export of excavated materials would be less than significant.

The second type of short-term noise impact is related to noise generated during excavation, grading, and erection of buildings on the project site. Construction is completed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on the site and, therefore, the noise levels surrounding the site as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table H lists typical construction equipment noise levels recommended for noise impact assessments based on a distance of 50 ft between the equipment and a noise receptor. Typical noise levels range up to 91 dBA L_{max} at 50 ft during the noisiest construction phases. The site preparation phase, which includes excavation and grading of the site, tends to generate the highest noise levels because the noisiest construction equipment is earthmoving equipment. After grading is completed, construction noise generally is reduced and would be lower than the peak construction noise discussed for the grading phase.

Table H: Typical Construction Equipment Noise Levels

Type of Equipment	Range of Maximum Sound Levels Measured (dBA at 50 ft)	Anticipated Maximum Sound Levels (dBA at 50 ft)
Pile drivers, 12,000 to 18,000 ft-lb/blow	81–96	93
Rock drills	83–99	96
Jackhammers	75–85	82
Pneumatic tools	78–88	85
Pumps	74–84	80
Scrapers	83–91	87
Haul trucks	83–94	88
Cranes	79–86	82
Portable generators	71–87	80
Rollers	75–82	80
Dozers	77–90	85
Tractors	77–82	80
Front-end loaders	77–90	86
Hydraulic backhoe	81–90	86
Hydraulic excavators	81–90	86
Graders	79–89	86
Air compressors	76–89	86
Trucks	81–87	86

Source: Noise Control for Buildings and Manufacturing Plants, Bolt, Beranek & Newman, 1987.
dBA = A-weighted decibel
ft = feet
ft-lb/blow = feet per pound per blow

Earthmoving equipment includes excavating machinery such as backhoes, bulldozers, and front loaders[1]. Earthmoving and compacting equipment includes compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve 1–2 minutes of full-power operation followed by 3–4 minutes at lower power settings. Construction equipment typically emits less noise at lower power settings.

Construction of the proposed project is expected to require the use of scrapers, bulldozers, and water and pickup trucks. Based on the information in Table H, the maximum noise level generated by each scraper on the proposed project site is assumed to be 87 dBA L_{max} at 50 ft from the scraper. Each bulldozer would also generate 85 dBA L_{max} at 50 ft. The maximum noise level generated by water and pickup trucks is approximately 86 dBA L_{max} at 50 ft from these vehicles. Each doubling of the sound source with equal strength increases the noise level by 3 dBA. Assuming that each piece of construction equipment operates at some distance, and not immediately next to, the other equipment, the worst-case combined noise level during this phase of construction would be 90 dBA L_{max} at a distance of 50 ft from the active construction area.

Excavation of the project site during the initial phase of project construction would potentially expose adjacent residences and existing Library users to relatively high noise levels on an intermittent basis during daytime construction. The residences to the east are located approximately 166 ft from the project construction area. These nearest adjacent residences may be subject to short-term, intermittent, maximum noise generated by construction activities on site and reaching 80 dBA L_{max} during the excavation phase. This range of construction noise would be similar to traffic noise from MacArthur Boulevard and San Miguel Drive. After excavation, construction activities for most of the project site would be below MacArthur Boulevard and therefore below the grade elevation of the nearest residences to the east. Therefore, most construction activities after excavation would be shielded from these residences, and construction noise would be lower than that during the excavation phase.

The existing Library users may be subject to short-term, intermittent, maximum noise generated by construction activities on the Library expansion site and reaching 90 dBA L_{max} during the grading phase. As discussed above, assessing a CNEL noise level to a maximum construction noise event is not warranted when the exact location and duration of construction equipment and operations on site is unknown. In addition, the Library construction will include installation of an interior wall with sound shielding prior to any construction on the existing Library building. This wall would be removed once exterior Library construction is complete. The purpose of the temporary interior wall is to shield Library users from adjacent construction noise.

In summary, noise levels from grading and other construction activities for the proposed project may range up to 80 dBA L_{max} at the closest residential uses adjacent to the project site (located 166 ft from the project construction area) for very limited times when construction occurs near the project's boundary. Therefore, construction-related noise impacts from the proposed project would be

[1] Noise impacts related to trucks hauling excavated materials is included in the above discussion related to the transport of construction equipment and materials to/from the site.

potentially adverse due to the length of the construction period (24–30 months) and level of noise from combination of construction activities (up to 80 dBA L_{max}).

Mitigation Measure 4.11.1 would be implemented to reduce construction noise impacts. Mitigation Measure 4.11.1 requires that (1) all construction equipment be equipped with properly operating and maintained mufflers; (2) all stationary construction equipment be placed so that emitted noise is directed away from sensitive receptors; (3) all construction equipment be placed the greatest distance possible between construction related noise sources and noise sensitive receptors, and; (4) that the construction contractor comply with the construction hours specified in the City's Municipal Code.

In addition to the mitigation described above, it should be noted that (1) the difference in grade elevations after excavation would mean that nearby residences would be shielded from most construction activity on site; (2) project construction would comply with the City's Municipal Code Noise Ordinance requirements; and (3) there would be no blasting or pile-driving activities during construction. Therefore, in light of those factors listed above and with implementation of Mitigation Measure 4.11.1, short-term construction noise impacts from excavation, grading, and erection of buildings on the proposed project site would be reduced to less than significant levels. In addition, construction equipment and vehicles would not have a significant effect on ambient noise levels, as existing ambient noise is dominated by high traffic noise levels in the project vicinity.

Construction Vibration. The Draft Geotechnical Report prepared for this project (Leighton Consulting, Inc., May 2009) states that

> "A portion of the site is underlain by terrace deposits over bedrock. Quaternary terrace deposits at the site consist of varying amounts of sand, silt and clay. In general, the terrace deposits are medium dense to very dense granular soils and stiff to hard cohesive soils."
>
> "…the terrace deposits and bedrock at the site should be readily excavated by conventional earth-moving equipment in good working condition."
>
> "Shoring systems feasible for the site are expected to include cantilever shoring such as soldier piles and lagging in conjunction with tiebacks in areas of the deeper excavation."

The foundations of the proposed structures are designed as spread footings with no piles. Shoring will be drilled, and therefore no pile driving is required. Because rubber tires on trucks isolate vibrations, trucks on nearby roadways would not generate high vibration levels. However, bulldozers and other heavy-tracked construction equipment would generate groundborne vibration. Based on the California Department of Transportation's Transportation Related Earthborne Vibration Technical Advisory (January 23, 2004), the vibration level at 50 ft is approximately 6 VdB lower than the vibration level at 25 ft. Vibration at 100 ft from the source is more than 6 VdB lower than the vibration level at 50 ft, or more than 12 VdB lower than the vibration level at 25 ft. Furthermore, based on the Federal Transit Administration Transit Noise and Vibration Impact Assessment (FTA, FTA-VA-90-1003-06, May 2006), large bulldozers generate approximately 87 VdB at a distance of 25 ft, and loaded trucks generate approximately 86 VdB at 25 ft. At a distance of 166 ft to the nearest residences east of

MacArthur Boulevard, groundborne vibration associated with on-site construction activities would be reduced by 16 VdB or more when compared to the vibration level measured at 25 ft. The vibration level of large bulldozers and loaded trucks would be reduced to 61 and 60 VdB, respectively, to below the 75 VdB vibration impact threshold for occasional events and the 80 VdB vibration impact threshold for infrequent events suggested by the FTA. Such vibration levels would be lower than vibration generated by traffic on MacArthur Boulevard and would not be perceptible to residents living adjacent to the project site east of MacArthur Boulevard, and it would not cause any damage to the residential buildings. Some groundborne vibration may be felt by patrons at the Library when grading occurs at the Library expansion area. Based on the FTA (FTA, May 2006), construction vibration criteria for nonengineered timber and masonry buildings (94 VdB), engineered concrete and masonry (no plaster) buildings (98 VdB), and reinforced concrete, steel, or timber (no plaster) buildings (102 VdB) would occur when the vibration level exceeds 90 VdB. The level of vibration that would be experienced at the Library building would be below this vibration level and would not cause any architectural or structural damages for the existing Library building. Due to the distance (more than 50 ft and at least 6 VdB in vibration level reduction) from the project site of other existing uses are either on the east side of MacArthur Boulevard and on the west side of Avocado Avenue, no significant groundborne vibration would occur at these nearby land uses. No mitigation measures would be required.

Long-Term Aircraft Noise Impacts

The County of Orange Airport Land Use Commission (ALUC) uses the current AELUP for JWA, Appendix D, amended December 19, 2002, as the basis for determining potential aircraft noise impact from JWA. The project site is located outside the 60 dBA CNEL aircraft operation noise contours, where the AELUP defines the noise exposure to be “Moderate Noise Impact” within Noise Impact Zone 2. The AELUP also recognizes that individual sensitivities to annoyance can vary from person to person. The proposed project would not contribute to any measurable long-term aircraft activity. The proposed on-site City Hall and park uses would be exposed to noise levels well below 60 dBA CNEL from JWA operations. No significant noise impacts from aircraft activities would occur.

Long-Term Traffic Noise Impacts

Based on the traffic study conducted for the proposed project (RBF Consulting, July 2009), the project-related daily net increase in vehicular trips will be 3,070 trips per day. These additional daily trips consist of 2,286 daily trips from the proposed 295-employee City Hall, a net increase of 511 daily trips from the Library expansion, 33 daily trips from the proposed passive park, and 240 daily trips from the proposed dog park.

The FHWA highway traffic noise prediction model (FHWA RD-77-108) was used to evaluate highway traffic-related noise conditions along roadway segments in the project vicinity. A standard vehicle mix for Orange County roadways was used for traffic on these roadway segments. For a worst-case scenario, the hard site propagation is used in the traffic noise modeling. The modeled 24-hour CNEL levels for the existing with project traffic scenario are shown in Table I. Tables J and K show the traffic noise levels for the future year 2013 without and with project scenarios. Tables L and M show the traffic noise levels under the General Plan Build Out without and with project scenarios.

Table I: Existing With Project Traffic Noise Levels

Roadway Segment	ADT	Center-line to 70 CNEL (ft)	Center-line to 65 CNEL (ft)	Center-line to 60 CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase CNEL (dBA) 50 ft from Centerline of Outermost Lane
West Coast Highway from Newport Boulevard to Riverside Avenue	55,200	208	656	2,074	75.0	0.1
West Coast Highway from Riverside Avenue to Tustin Avenue	48,200	183	573	1,808	73.9	0.1
West Coast Highway from Tustin Avenue to Dover Drive	45,200	171	537	1,697	73.8	0.0
East Coast Highway from Dover Drive to Bayside	56,400	214	670	2,114	74.3	0.0
East Coast Highway from Bayside to Jamboree Road	45,900	178	545	1,719	73.0	0.1
East Coast Highway from Jamboree Road to Newport Center Drive	36,600	141	435	1,373	72.7	0.1
East Coast Highway from Newport Center Drive to Avocado Avenue	36,400	140	433	1,366	72.7	0.1
Jamboree Road from Bison Avenue to Eastbluff/Ford	40,000	154	476	1,500	72.8	0.0
Jamboree Road from Eastbluff/Ford to San Joaquin Hills Road	47,800	183	568	1,792	73.6	0.1
MacArthur Boulevard from SR-73 NB On-Ramp to Bison Avenue	67,400	257	799	2,523	74.7	0.0
MacArthur Boulevard from Bison Avenue to Ford/Bonita Canyon	67,400	257	799	2,523	74.7	0.0
MacArthur Boulevard from Ford/Bonita Canyon to San Joaquin Hills Road	61,900	235	735	2,320	74.7	0.0
MacArthur Boulevard from San Joaquin Hills Road to San Miguel Drive	41,100	158	489	1,541	73.0	0.2
MacArthur Boulevard from San Miguel Drive to East Coast Highway	33,100	129	394	1,241	72.0	0.0
Avocado Avenue. from East Coast Highway to San Miguel Drive.	13,000	< 50	120	375	67.6	0.6
Avocado Avenue. from San Miguel Drive. to San Joaquin Hills Road.	5,200	< 50	< 50	151	63.6	0.2
San Joaquin Hills Road from Jamboree Road to Santa Cruz	19,100	66	177	550	68.5	0.2
San Joaquin Hills Road from Santa Rosa to Avocado Avenue	19,100	66	177	550	68.5	0.2
San Joaquin Hills Road from San Miguel Drive to Marguerite Avenue	19,100	66	177	550	68.5	0.1
San Joaquin Hills Road from Marguerite Avenue to Spy Glass Hill	14,200	58	170	534	68.8	0.0
San Miguel Drive. from Newport Center Drive. to Avocado Avenue.	10,600	< 50	98	306	66.7	0.3
San Miguel Drive. from Avocado Avenue. to MacArthur Boulevard.	20,200	61	185	583	69.5	0.3
San Miguel Drive from MacArthur Boulevard to San Joaquin Hills Road	13,200	< 50	123	381	67.4	0.1
San Miguel Drive from North of San Joaquin Hills Road	13,100	< 50	122	378	67.3	0.0

Source: LSA Associates, Inc., July 2009.
Note: Traffic noise within 50 feet of the roadway centerline should be evaluated with site-specific information.
ADT = Average daily trips
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibel
ft = feet
NB = Northbound

Table J: 2013 Without Project Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (ft)	Centerline to 65 CNEL (ft)	Centerline to 60 CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane
West Coast Highway from Newport Boulevard to Riverside Avenue	60,700	229	722	2,281	75.4
West Coast Highway from Riverside Avenue to Tustin Avenue	54,000	205	641	2,026	74.4
West Coast Highway from Tustin Avenue to Dover Drive	51,100	193	607	1,918	74.4
East Coast Highway from Dover Drive to Bayside	62,700	238	744	2,350	74.8
East Coast Highway from Bayside to Jamboree Road	52,700	203	626	1,973	73.6
East Coast Highway from Jamboree Road to Newport Center Drive	42,400	162	504	1,591	73.3
East Coast Highway from Newport Center Drive to Avocado Avenue	41,800	160	497	1,568	73.3
Jamboree Road from Bison Avenue to Eastbluff/Ford	45,000	172	535	1,687	73.3
Jamboree Road from Eastbluff/Ford to San Joaquin Hills Road	53,200	203	632	1,994	74.1
MacArthur Boulevard from SR-73 NB On-Ramp to Bison Avenue	70,700	269	838	2,647	74.9
MacArthur Boulevard from Bison Avenue to Ford/Bonita Canyon	70,700	269	838	2,647	74.9
MacArthur Boulevard from Ford/Bonita Canyon to San Joaquin Hills Road	64,900	246	770	2,433	74.9
MacArthur Boulevard from San Joaquin Hills Road to San Miguel Drive	42,500	163	505	1,593	73.1
MacArthur Boulevard from San Miguel Drive to East Coast Highway	36,000	140	428	1,350	72.4
Avocado Avenue. from East Coast Highway to San Miguel Drive.	12,100	< 50	112	349	67.3
Avocado Avenue. from San Miguel Drive. to San Joaquin Hills Road.	5,600	< 50	54	162	63.9
San Joaquin Hills Road from Jamboree Road to Santa Cruz	19,400	66	180	559	68.5
San Joaquin Hills Road from Santa Rosa to Avocado Avenue	19,100	66	177	550	68.5
San Joaquin Hills Road from San Miguel Drive to Marguerite Avenue	19,200	66	178	553	68.5
San Joaquin Hills Road from Marguerite Avenue to Spy Glass Hill	14,300	59	171	537	68.8
San Miguel Drive. from Newport Center Drive. to Avocado Avenue.	10,800	< 50	100	312	66.8
San Miguel Drive. from Avocado Avenue. to MacArthur Boulevard.	19,900	60	182	574	69.4
San Miguel Drive from MacArthur Boulevard to San Joaquin Hills Road	13,300	< 50	124	384	67.4
San Miguel Drive from North of San Joaquin Hills Road	13,200	< 50	123	381	67.4

Source: LSA Associates, Inc., July 2009.
Note: Traffic noise within 50 feet of the roadway centerline should be evaluated with site-specific information.
ADT = Average daily trips
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibel
ft = feet
NB = northbound

Table K: 2013 With Project Traffic Noise Levels

Roadway Segment	ADT	Center-line to 70 CNEL (ft)	Center-line to 65 CNEL (ft)	Center-line to 60 CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase CNEL (dBA) 50 ft from Centerline of Outermost Lane
West Coast Highway from Newport Boulevard to Riverside Avenue	61,300	231	729	2,303	75.5	0.1
West Coast Highway from Riverside Avenue to Tustin Avenue	54,600	207	648	2,048	74.4	0.0
West Coast Highway from Tustin Avenue to Dover Drive	51,700	196	614	1,941	74.4	0.0
East Coast Highway from Dover Drive to Bayside	63,500	241	754	2,380	74.8	0.0
East Coast Highway from Bayside to Jamboree Road	53,500	206	635	2,003	73.7	0.1
East Coast Highway from Jamboree Road to Newport Center Drive	43,300	165	515	1,624	73.4	0.1
East Coast Highway from Newport Center Drive to Avocado Avenue	42,500	162	505	1,594	73.3	0.0
Jamboree Road from Bison Avenue to Eastbluff/Ford	45,600	175	542	1,710	73.4	0.1
Jamboree Road from Eastbluff/Ford to San Joaquin Hills Road	53,900	205	640	2,021	74.1	0.0
MacArthur Boulevard from SR-73 NB On-Ramp to Bison Avenue	71,400	272	846	2,673	75.0	0.1
MacArthur Boulevard from Bison Avenue to Ford/Bonita Canyon	71,500	272	848	2,676	75.0	0.1
MacArthur Boulevard from Ford/Bonita Canyon to San Joaquin Hills Road	65,800	249	781	2,466	75.0	0.1
MacArthur Boulevard from San Joaquin Hills Road to San Miguel Drive	43,500	167	517	1,631	73.2	0.1
MacArthur Boulevard from San Miguel Drive to East Coast Highway	36,000	140	428	1,350	72.4	0.0
Avocado Avenue. from East Coast Highway to San Miguel Drive.	13,500	< 50	124	390	67.7	0.4
Avocado Avenue. from San Miguel Drive. to San Joaquin Hills Road.	5,700	< 50	55	165	64.0	0.1
San Joaquin Hills Road from Jamboree Road to Santa Cruz	20,100	68	186	579	68.7	0.2
San Joaquin Hills Road from Santa Rosa to Avocado Avenue	19,800	67	184	571	68.6	0.1
San Joaquin Hills Road from San Miguel Drive to Marguerite Avenue	19,300	66	179	556	68.5	0.0
San Joaquin Hills Road from Marguerite Avenue to Spy Glass Hill	14,500	59	174	545	68.9	0.1
San Miguel Drive. from Newport Center Drive. to Avocado Avenue.	11,400	< 50	106	329	67.0	0.2
San Miguel Drive. from Avocado Avenue. to MacArthur Boulevard.	21,000	63	192	606	69.7	0.3
San Miguel Drive from MacArthur Boulevard to San Joaquin Hills Road	13,400	< 50	124	387	67.4	0.0
San Miguel Drive from North of San Joaquin Hills Road	13,300	< 50	124	384	67.4	0.0

Source: LSA Associates, Inc., July 2009.
Note: Traffic noise within 50 feet of the roadway centerline should be evaluated with site-specific information.
ADT = Average daily trips
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibel
ft = feet
NB = Northbound

Table L: General Plan Build Out Without Project Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (ft)	Centerline to 65 CNEL (ft)	Centerline to 60 CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane
West Coast Highway from Newport Boulevard to Riverside Avenue	65,000	245	773	2,442	75.7
West Coast Highway from Riverside Avenue to Tustin Avenue	55,000	209	653	2,063	74.4
West Coast Highway from Tustin Avenue to Dover Drive	47,000	178	559	1,765	74.0
East Coast Highway from Dover Drive to Bayside	74,000	280	878	2,774	75.5
East Coast Highway from Bayside to Jamboree Road	62,000	237	735	2,321	74.3
East Coast Highway from Jamboree Road to Newport Center Drive	50,000	190	594	1,876	74.0
East Coast Highway from Newport Center Drive to Avocado Avenue	42,000	160	499	1,576	73.3
Jamboree Road from Bison Avenue to Eastbluff/Ford	46,000	176	546	1,725	73.4
Jamboree Road from Eastbluff/Ford to San Joaquin Hills Road	55,000	209	653	2,062	74.2
MacArthur Boulevard from SR-73 NB On-Ramp to Bison Avenue	70,000	266	830	2,620	74.9
MacArthur Boulevard from Bison Avenue to Ford/Bonita Canyon	70,000	266	830	2,620	74.9
MacArthur Boulevard from Ford/Bonita Canyon to San Joaquin Hills Road	61,000	231	724	2,287	74.7
MacArthur Boulevard from San Joaquin Hills Road to San Miguel Drive	37,000	143	440	1,387	72.5
MacArthur Boulevard from San Miguel Drive to East Coast Highway	35,000	136	416	1,312	72.3
Avocado Avenue. from East Coast Highway to San Miguel Drive.	11,000	< 50	102	318	66.8
Avocado Avenue. from San Miguel Drive. to San Joaquin Hills Road.	5,500	< 50	53	160	63.8
San Joaquin Hills Road from Jamboree Road to Santa Cruz	18,000	63	168	519	68.2
San Joaquin Hills Road from Santa Rosa to Avocado Avenue	22,000	73	203	634	69.1
San Joaquin Hills Road from San Miguel Drive to Marguerite Avenue	25,000	80	230	720	69.6
San Joaquin Hills Road from Marguerite Avenue to Spy Glass Hill	19,000	75	227	714	70.1
San Miguel Drive. from Newport Center Drive. to Avocado Avenue.	11,000	< 50	102	318	66.8
San Miguel Drive. from Avocado Avenue. to MacArthur Boulevard.	20,000	60	183	577	69.4
San Miguel Drive from MacArthur Boulevard to San Joaquin Hills Road	16,000	< 50	148	462	68.2
San Miguel Drive from North of San Joaquin Hills Road	14,000	< 50	130	404	67.6

Source: LSA Associates, Inc., July 2009.
Note: Traffic noise within 50 feet of the roadway centerline should be evaluated with site-specific information.
ADT = Average daily trips
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibel
ft = feet
NB = Northbound

Table M: General Plan Build Out With Project Traffic Noise Levels

Roadway Segment	ADT	Center-line to 70 CNEL (ft)	Center-line to 65 CNEL (ft)	Center-line to 60 CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase CNEL (dBA) 50 ft from Centerline of Outermost Lane
West Coast Highway from Newport Boulevard to Riverside Avenue	65,700	248	781	2,469	75.8	0.1
West Coast Highway from Riverside Avenue to Tustin Avenue	55,700	211	661	2,090	74.5	0.1
West Coast Highway from Tustin Avenue to Dover Drive	47,700	181	567	1,791	74.1	0.1
East Coast Highway from Dover Drive to Bayside	74,900	283	889	2,808	75.6	0.1
East Coast Highway from Bayside to Jamboree Road	62,900	240	746	2,355	74.4	0.1
East Coast Highway from Jamboree Road to Newport Center Drive	51,000	194	606	1,913	74.1	0.1
East Coast Highway from Newport Center Drive to Avocado Avenue	42,700	163	507	1,602	73.3	0.0
Jamboree Road from Bison Avenue to Eastbluff/Ford	46,700	179	555	1,751	73.5	0.1
Jamboree Road from Eastbluff/Ford to San Joaquin Hills Road	55,700	212	661	2,088	74.3	0.1
MacArthur Boulevard from SR-73 NB On-Ramp to Bison Avenue	70,800	269	839	2,650	74.9	0.0
MacArthur Boulevard from Bison Avenue to Ford/Bonita Canyon	70,800	269	839	2,650	74.9	0.0
MacArthur Boulevard from Ford/Bonita Canyon to San Joaquin Hills Road	62,000	235	736	2,324	74.7	0.0
MacArthur Boulevard from San Joaquin Hills Road to San Miguel Drive	38,100	147	453	1,428	72.6	0.1
MacArthur Boulevard from San Miguel Drive to East Coast Highway	35,100	136	418	1,316	72.3	0.0
Avocado Avenue. from East Coast Highway to San Miguel Drive.	12,500	< 50	115	361	67.4	0.6
Avocado Avenue. from San Miguel Drive. to San Joaquin Hills Road.	5,700	< 50	55	165	64.0	0.2
San Joaquin Hills Road from Jamboree Road to Santa Cruz	18,700	65	174	539	68.4	0.2
San Joaquin Hills Road from Santa Rosa to Avocado Avenue	22,700	75	210	654	69.2	0.1
San Joaquin Hills Road from San Miguel Drive to Marguerite Avenue	25,200	81	232	726	69.7	0.1
San Joaquin Hills Road from Marguerite Avenue to Spy Glass Hill	19,200	76	229	721	70.1	0.0
San Miguel Drive. from Newport Center Drive. to Avocado Avenue.	11,600	< 50	107	335	67.1	0.3
San Miguel Drive. from Avocado Avenue. to MacArthur Boulevard.	21,200	64	194	611	69.7	0.3
San Miguel Drive from MacArthur Boulevard to San Joaquin Hills Road	16,200	< 50	150	467	68.2	0.0
San Miguel Drive from North of San Joaquin Hills Road	14,100	< 50	131	407	67.6	0.0

Source: LSA Associates, Inc., July 2009.
Note: Traffic noise within 50 feet of the roadway centerline should be evaluated with site-specific information.
ADT = Average daily trips
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibel
ft = feet
NB = Northbound

It is further noticed that average daily traffic (ADT) volumes on most roadway segments directly adjacent to the project site, except San Miguel Drive between Avocado Avenue and MacArthur Boulevard with a slight difference, would be higher under the 2013 with Project scenario than the General Plan Build Out with Project scenario. Therefore, all on-site traffic noise impacts and associated mitigation measures were based on the traffic noise levels projected for the 2013 with Project scenario (Table K).

These noise levels represent the worst-case scenario, which assumes no shielding is provided between the traffic and the location where the noise contours are drawn. The specific assumptions used in developing these noise levels and model printouts are provided in Appendix A.

Traffic Noise Impacts to Off-Site Uses.. Table I shows that, under the existing with project scenario, project-related traffic would have 0.6 dBA or less in noise level increases along all roadway segments in the project vicinity. This range of traffic noise level increase is less than the thresholds of increase identified in the City's General Plan Policy N1.8.

Similarly, Tables K and M show that, under both future year (2013 and General Plan Build Out) scenarios, project-related traffic would have no perceptible (all with 0.6 dBA or less) noise level increases along roadway segments in the project vicinity. This range of traffic noise level increase is less than the thresholds of increase identified in the City's General Plan Policy N1.8. Therefore, the traffic noise level increase is not considered to be a significant impact. Therefore, no significant long-term off-site traffic noise impacts would occur.

Traffic Noise Impacts to On-Site Uses.. Table K shows that, under the worst-case future year 2013 with project scenario, portions of the project site along MacArthur Boulevard may be exposed to traffic noise levels exceeding the City's Clearly Compatible level of 65 dBA CNEL for City Administration Building uses but within the Normally Compatible level of 75 dBA CNEL. The Council Chambers and the proposed Library expansion will also be potentially exposed to traffic noise exceeding their corresponding Normally Acceptable level (Council Chambers, 60 dBA CNEL; and the Library, 65 dBA CNEL). Under the Normally Compatible category, new construction or development should be undertaken only after detailed analysis of the noise reduction requirements is made and necessary noise insulation features in the design are determined. Conventional construction requirements, with closed windows and fresh air supply systems or air conditioning, will normally suffice.

MacArthur Boulevard. The project site is directly adjacent to MacArthur Boulevard. Based on the project site plan, the City Hall administration building would be approximately 300 ft from the centerline of MacArthur Boulevard and would potentially be exposed to traffic noise reaching 66.4 dBA CNEL when no shielding is provided. However, there would be a landscaped berm area and a parking structure proposed between the proposed City Hall and MacArthur Boulevard. In addition, the base level of the City Hall administration building would be lower than MacArthur Boulevard and would be completed shielded by the parking structure from MacArthur Boulevard traffic. With the parking structure and landscaped area functioning as a barrier providing a minimum of 10 dBA in noise reduction, traffic noise from MacArthur Boulevard would be

reduced to 57 dBA CNEL or lower in the exterior area of City Hall administration building facing east. Based on the United States Environmental Protection Agency (EPA) standard building noise attenuation (Protective Noise Levels, Condensed Version of EPA Levels Document, EPA 550/9-79-100, November 1978) in warm climate areas (including Southern California), with windows open, the building provides 12 dBA exterior-to-interior noise attenuation, and the interior noise levels at City Hall offices would be reduced to 45 dBA CNEL (i.e., 57 dBA - 12 dBA = 45 dBA) or lower. With windows closed, the exterior-to-interior noise attenuation is 24 dBA, and the interior noise levels in these City Hall offices would be reduced to 33 dBA CNEL (57 dBA - 24 dBA = 33 dBA) or lower and below the 50 dBA CNEL interior noise standard for office uses. No building facade enhancements would be required for traffic noise from MacArthur Boulevard.

The proposed Council Chambers would be approximately 375 ft from the centerline of MacArthur Boulevard and would be potentially exposed to traffic noise reaching 65.7 dBA CNEL without shielding. However, there would be a landscaped berm area and a parking structure proposed between the proposed Council Chambers and MacArthur Boulevard. The landscaped berm area along MacArthur Boulevard is proposed to be higher than the road and would function as a noise barrier that would provide a minimum of 8 dBA in noise reduction for traffic on MacArthur Boulevard. Traffic noise from MacArthur Boulevard would be reduced to 58 dBA or lower. With windows closed, the interior noise inside the Council Chambers would be reduced to 34 dBA CNEL or lower. With windows open, the interior noise level would be reduced to 46 dBA CNEL or lower. The Council Chambers must meet the ventilation requirements of the California Building Code (CBC) with windows closed to meet the 45 dBA CNEL interior noise level for meeting room uses. Therefore, it is likely that a form of mechanical ventilation such as air conditioning would be required for the Council Chambers. Although it is anticipated that the Council Chambers will have operable windows, Council Members and the public who are disturbed by vehicular noise can close windows and rely on the proposed mechanical ventilation system.

The proposed Library expansion would be approximately 200 ft from the centerline of MacArthur Boulevard and would be potentially exposed to traffic noise reaching 68.5 dBA CNEL without shielding. The landscaped berm area along MacArthur Boulevard is proposed to be higher than the road and would function as a noise barrier that would provide a minimum of 8 dBA in noise reduction for traffic on MacArthur Boulevard. Traffic noise from MacArthur Boulevard would be reduced to 61 dBA or lower. With windows closed, the interior noise inside the Library expansion area would be reduced to 37 dBA CNEL or lower. With windows open, the interior noise level would be reduced to 49 dBA CNEL or lower. Therefore, the Library expansion area must meet the ventilation requirements of the CBC with windows closed to meet the 45 dBA CNEL interior noise level for Library uses. No operable windows are proposed for the Library expansion. To ensure that the Library meets CBC ventilation requirements and does not exceed 45 dBA CNEL, a form of mechanical ventilation such as air conditioning would be required for the Library expansion area.

All proposed park areas would be outside of the 75 dBA CNEL Normally Incompatible criterion impact zone from MacArthur Boulevard traffic. Portions of the proposed park areas, including the proposed dog park, would be exposed to traffic noise exceeding the City's 70 dBA CNEL Normally Compatible criterion recommended for park uses. The 70 dBA CNEL would extend to 167 ft from the roadway centerline north of San Miguel Drive and to 140 ft from the roadway

centerline south of San Miguel Drive. Because most of the proposed park uses are passive with walkways and benches for short-term stay, the potential traffic noise impact is considered less than significant. The proposed dog park is not considered as noise sensitive as other park areas because dogs and their owners would also generate noise of their own. However, it is recommended that all potential sensitive uses such as picnic tables should be located outside the 70 dBA CNEL impact zone from MacArthur Boulevard.

The proposed Civic Green would be located between the parking lot structure and the City Hall administration building and is approximately 220 ft from the centerline of MacArthur Boulevard. At this distance, without any shielding, traffic noise from MacArthur Boulevard would reach 68 dBA CNEL. However, the proposed Civic Green area would be shielded by the parking structure that functions as a noise barrier that would provide at least 10 dBA in noise attenuation. Traffic noise from MacArthur Boulevard would be reduced to below 58 dBA CNEL in the Civic Green area. This range of noise levels is lower than the 65 dBA CNEL maximum noise level that is clearly compatible for open space or park uses. However, it is higher than the 50 dBA CNEL that is desirable for outdoor gatherings or outdoor activities for which a quiet environment is essential.

Avocado Avenue. The project site is directly adjacent to Avocado Avenue. Table K shows that, under the future year 2013 with Project scenario, the 70 dBA CNEL contour along Avocado Avenue adjacent to the project site would be confined to within 50 ft of the roadway centerline and within the roadway right-of-way. The 65 dBA CNEL would extend to 124 ft from the roadway centerline for the segment south of San Miguel Avenue and to approximately 56 ft from the roadway centerline for the segment north of San Miguel Drive. The proposed City Hall administration building along Avocado Avenue are approximately 150 ft from the centerline of Avocado Avenue and would be exposed to traffic noise reaching 64.2 dBA CNEL at the exterior facing west. This range of traffic noise levels is within the 65 dBA CNEL Clearly Compatible zone for city office building uses. Based on the EPA's standard building noise attenuation with windows or doors open, interior noise levels at the frontline City Hall offices would be exposed to 52 dBA CNEL (i.e., 64.2 dBA - 12 dBA = 52.2 dBA). With windows closed, interior noise levels in these frontline City Hall offices would be reduced to 40 dBA CNEL (64.2 dBA - 24 dBA = 40.2 dBA) and below the 50 dBA CNEL interior noise level recommended for office uses. Building facade enhancements would not be required for traffic noise on Avocado Avenue. Therefore, the City Hall buildings must meet the ventilation requirements of the CBC with windows closed to meet the 50 dBA CNEL interior noise level for office uses. To ensure that City Hall administration buildings and Community Room meets CBC ventilation requirements and does not exceed allowable noise levels, a form of mechanical ventilation such as air conditioning would be required. It is anticipated that the City Hall administration building will have operable windows, but employees who are disturbed by vehicular noise can close windows and rely on the proposed mechanical ventilation system.

The proposed Council Chamber is approximately 80 ft from the centerline of Avocado Avenue and would be potentially exposed to traffic noise reaching 66.9 dBA CNEL without shielding. With windows closed, the interior noise inside the Council Chamber would be reduced to 42.9 dBA CNEL or lower. With windows open, the interior noise level would be reduced to 54.9 dBA CNEL or lower. Therefore, the Council Chambers must meet the ventilation

requirements of the CBC with windows closed to meet the 45 dBA CNEL interior noise level for meeting room uses. A form of mechanical ventilation such as air conditioning would be required. It is anticipated that the Council Chamber will have operable windows but Council members and the public attending the meetings who are disturbed by vehicular noise can close windows and rely on the proposed mechanical ventilation system.

The proposed Library expansion is approximately 250 ft from the centerline of Avocado Avenue and would be potentially exposed to traffic noise reaching 62.0 dBA CNEL without shielding. With windows closed, the interior noise inside the Library expansion area would be reduced to 38.0 dBA CNEL or lower. With windows open, the interior noise level would be reduced to 50 dBA CNEL or lower. Therefore, the Library must meet the ventilation requirements of the CBC with windows closed to meet the 45 dBA CNEL interior noise level for Library uses. No operable windows are proposed for the Library expansion. To ensure that the Library expansion meets CBC ventilation requirements and does not exceed 45 dBA CNEL, a form of mechanical ventilation such as air conditioning would be required for the Library.

The proposed parks on the project site, including the dog park, along Avocado Avenue would be potentially exposed to traffic noise exceeding the 65 dBA CNEL Clearly Compatible criterion, which would extend to 124 ft from the roadway centerline in the area south of San Miguel Drive and to 56 ft from the roadway centerline in the area north of San Miguel Drive. However, all proposed park areas would be within the 70 dBA CNEL Normally Compatible criterion. The proposed dog park is not considered as noise sensitive as other park areas because dogs and their owners would also generate noise of their own. Because the proposed park uses are passive with walkways and benches for short-term stay, and they would be within the Normally Compatible zone, this potential traffic noise impact from Avocado Avenue is considered less than significant.

The proposed Civic Green area would be approximately 225 ft from the centerline of Avocado Avenue and would be completely shielded by the City Hall buildings and Council Chambers from Avocado Avenue. By distance divergence alone, traffic noise from Avocado Avenue would be reduced to 62.4 dBA CNEL or lower. With at least 10 dBA in noise attenuation provided by the City Hall buildings and Council Chambers, traffic noise from Avocado Avenue would be further reduced to 52 dBA CNEL or lower. Again, this range of traffic noise is lower than the 65 dBA CNEL maximum noise level that is clearly compatible for open space or park uses. It would be higher than the 50 dBA CNEL that is desirable for outdoor gatherings or outdoor activities for which a quiet environment is essential.

Long-Term Traffic Vibration Impacts

Because the rubber tires and suspension systems of buses and other on-road vehicles provide vibration isolation, it is unusual for on-road vehicles to cause groundborne noise or vibration problems. When on-road vehicles cause effects such as rattling of windows, the source is almost always airborne noise. Most problems with on-road vehicle-related vibration can be directly related to a pothole, bump, expansion joint, or other discontinuity in the road surface. Smoothing the bump or filling the pothole will usually solve the problem.

Due to the distance to the nearest residences, groundborne vibration associated with onsite vehicle movement would be reduced to much lower than the 72 VdB vibration impact threshold for frequent

events and the 80 VdB vibration impact threshold for infrequent events suggested by the FTA. Such vibration levels would not be perceptible to residents living adjacent to the project site east of MacArthur Boulevard, and it would not cause any damage to the residential buildings. Because other existing uses are either on the east side of MacArthur Boulevard or on the west side of Avocado Avenue, no measurable groundborne vibration would occur at these nearby land uses from onsite activities. No mitigation measures would be required.

Long-Term Stationary Noise Impacts

Potential long-term stationary noise impacts would be associated primarily with operations on the project site from rooftop mechanical units, truck delivery, and other activities at the parking lot. These activities are potential point sources of noise that could affect noise-sensitive receptors adjacent to the project site such as Library users or the existing residential uses to the east across MacArthur Boulevard.

As noise spreads from a source it loses energy, so the farther away the noise receiver is from the noise source, the lower the perceived noise level would be. Geometric spreading causes the sound level to attenuate or be reduced, resulting in a 6 dBA reduction in the noise level for each doubling of distance from a single-point source of noise, such as an idling truck, to the noise-sensitive receptor of concern. Although individual activity may generate relatively high and intermittent noise, when added to the typically lower ambient noise and averaged over a longer period of time, the cumulative noise level would be much lower and would be considered a less than significant impact.

Truck Delivery and Loading/Unloading Activities. Delivery trucks for the proposed on-site City Hall/Council Chamber and Library expansion uses would result in a maximum noise similar to noise readings from loading and unloading activities for other projects with similar operations, which generates a noise level of 75 dBA L_{max} at 50 ft and is used in this analysis. Normal deliveries, including supplies, trash collection, or deliveries by United Parcel Services (UPS) or Federal Express (FedEx) trucks, occur typically once in the morning and sometimes once in the afternoon. Based on the site plan, it is assumed that the City Hall offices loading area (near the front entrance at the drop off area) is at least 450 ft (-19 dBA) from the nearest residences to the east. Although these homes are approximately 15–20 ft above MacArthur Boulevard and therefore would not be effectively blocked by the landscaped areas along MacArthur Boulevard, they all have a 6 ft high sound wall (concrete masonry unit [CMU] with Plexiglas on top) protecting their backyards. These soundwalls would provide a minimum of 8 dBA in noise reduction from activities on the project site. Therefore, with the distance divergence and soundwall attenuation, loading/unloading noise on the project site would be reduced to 48 dBA L_{max} or lower at the nearest residences to the east. This range of maximum noise levels, even if it lasts continuously for more than 15 minutes, would not exceed the 55 dBA L_{eq} (daytime noise standard for residential zone; see Table H) standard at the nearest residences to the east. Although a typical truck unloading process takes an average of 10–15 minutes, this maximum noise level occurs in a much shorter period of time. It is not expected that truck delivery/loading/unloading activities would result in this maximum noise level lasting more than 15 minutes in any hour when it occurs. In addition, this range of noise levels is lower than or compatible to the maximum noise levels generated by traffic on MacArthur Boulevard. Therefore, noise associated with truck delivery/loading/unloading activities at the project site would not result in noise

levels exceeding the typical noise standards at the nearest residences to the east of the project site. No mitigation measures are required.

Other Parking Lot Activities. Representative parking activities such as employees conversing, engine startup, slow-moving vehicles, or car door slamming would generate approximately 60–70 dBA L_{max} at 50 ft. It should be noted that although there might be occasional car alarm noise at the parking lot, it is a security concern and not considered part of the normal operations in a parking lot. Similar to the loading/unloading noise, with the distance factor (more than 10 dBA in noise reduction compared to the noise level measured at 50 ft), shielding provided by the landscaped area between the parking areas and MacArthur Boulevard (minimum 5 dBA in noise reduction), and soundwalls (minimum 5 dBA in noise reduction) and soundwalls along MacArthur Boulevard for these frontline residences, exterior noise levels at adjacent residences from parking lot activities on site would be reduced to 50 dBA L_{max} or lower and below the City's exterior noise standards for residential uses. No significant noise impacts would occur from on-site parking lot activities.

Rooftop Mechanical Equipment. It is anticipated that there will be up to three small condenser units on the flat parts of the City Hall administration building roof (under the wave structures) that are tied to the special cooling system for the IT (data) closets in the City Hall administration building. According to Noise Control for Buildings and Manufacturing Plants (Bolt, Beranek, and Newman Inc.), these condenser units would generate a noise level of up to 77 dBA for the 1-ton unit and 87 dBA for the 5.6-ton unit, respectively, at 5 ft. Assuming they are close enough to be considered as one source, the combined noise level would be approximately 88 dBA at 5 ft. The residences to the east are at least 450 ft from the closest rooftop condenser units and would receive 39 dBA noise reduction from distance divergence compared to the noise level at 5 ft. Noise from the rooftop condenser units would be reduced to 49 dBA or lower at residences to the east. This range of noise levels is lower than the traffic noise associated with MacArthur Boulevard and would not exceed the City's exterior noise standard for residential uses (see Table H). With the EPA-recommended 12 dBA and 24 dBA exterior-to-interior noise reduction provided by standard building construction in warm climate areas (including Southern California) for open and closed window scenarios, respectively, noise from the rooftop mechanical units would be reduced to 37 dBA and 25 dBA inside the residences to the east of the project site. These noise levels are lower than the City's 40 dBA L_{eq} interior noise standards for residential uses.

The Library expansion area is approximately 300 ft from the rooftop condensers located above the data/Telecom rooms, computer room, and the electric and data room. This distance would reduce the condenser noise to 52 dBA L_{max} or lower. The equipment would be located on the flat part of the buildings and away from the edge of the roof, with a minimum additional 10 dBA noise attenuation provided by the building/roof. Therefore, rooftop mechanical equipment noise would be reduced to 42 dBA L_{max} or lower when it reaches the exterior of the Library expansion area. Even if it is assumed that these condenser units would be operated at the maximum noise levels at all times, this range of noise levels is below the exterior noise levels (55 dBA L_{eq} from 7:00 a.m. to 10:00 p.m. and 50 dBA L_{eq} from 10:00 p.m. to 7:00 a.m.) recommended for Library use. With the standard building exterior-to-interior noise attenuation (12 dBA with windows open and 24 dBA with windows closed), the condenser noise would be reduced to 30 dBA L_{max} with windows open and 18 dBA with windows

closed. This range of interior noise levels is much lower than those (45 dBA L_{eq} from 7:00 a.m. to 10:00 p.m. and 40 dBA L_{eq} from 10 p.m. to 7 a.m.) recommended for Library use.

No significant noise impacts would occur from the rooftop mechanical units at the proposed City Hall and Council Chambers buildings.

Civic Green. Events and activities held on the Civic Green may include, but are not limited to, children's story hour, puppet shows, book discussion groups, film screenings, receptions for events and authors, evening dinner events, and Arts Commission events such as plays and art shows. Noise from these events would not be expected to impact residential uses located east of MacArthur Boulevard because of shielding provided by the parking structure, changes in topography, and the location of MacArthur Boulevard. In addition, any events that would generate substantial noise would be subject to the City's Noise Ordinance and would likely be concluded by 10:00 p.m.

Cumulative Impacts

The cumulative study area for noise is consistent with the cumulative study area for traffic. Given the location of the cumulative projects, construction and on-site operations would be considered point sources of noise and would not contribute to off-site cumulative noise impacts from other planned and future projects. In addition, construction noise is exempt in the City's Noise Ordinance, would be temporary, and would cease upon construction completion.

Cumulative traffic noise impacts are measured based on projected noise level increases over existing conditions. The cumulative noise condition represents the planned growth of the City of Newport Beach per the General Plan, in addition to all projects in the City that have been approved but are not yet built and proposed projects under review by the City.

Existing traffic noise levels were presented in Table D. Existing and Future (2013 and General Plan Build Out) traffic noise levels are summarized in Table N. Table N shows that although project-related traffic would contribute to cumulative traffic noise impacts in the vicinity of the project site, traffic noise levels under the future 2013 with project scenario would increase by 0.8 dBA or less compared to existing conditions along all roadway segments in the project vicinity. Table N also shows that under the future General Plan Build Out with Project scenario, traffic noise levels would increase by 1.5 dBA or less compared to existing conditions along all roadway segments in the project vicinity; noise levels attributable to the project under future General Plan Build Out would increase by 0.6 dBA along one roadway segment and by 0.3 dBA or less along all other roadway segments.

A noise level increase of 1.5 dBA in an outside environment is not perceptible to the human ear. In addition, although West Coast Highway from Newport Boulevard to Riverside Avenue and East Coast Highway from Dover Drive to Bayside exceed the 75 dBA threshold (refer to City Policy N1.8), neither of these roadway segments have sensitive uses that would be impacted by an increase in the ambient CNEL produced by the proposed project. Therefore, the project's cumulative traffic noise contribution is considered less than cumulatively considerable, and no mitigation is required.

Table N: Existing Without Project and Future with Project Traffic Noise Levels

Roadway Segment	Existing Without Project CNEL (dBA)	2013 with Project CNEL (dBA)	2013 Change from Existing	General Plan Build Out without Project CNEL (dBA) 50 ft	General Plan Build Out with Project CNEL (dBA) 50 ft	General Plan Build Out Change from Existing	General Plan Build Out Change from Existing - Attributable to Project
West Coast Highway from Newport Boulevard to Riverside Avenue	74.9	75.5	0.6	75.7	75.8	0.9	0.1
West Coast Highway from Riverside Avenue to Tustin Avenue	73.8	74.4	0.6	74.4	74.5	0.7	0.1
West Coast Highway from Tustin Avenue to Dover Drive	73.8	74.4	0.6	74.0	74.1	0.3	0.1
East Coast Highway from Dover Drive to Bayside	74.3	74.8	0.5	75.5	75.6	1.3	0.1
East Coast Highway from Bayside to Jamboree Road	72.9	73.7	0.8	74.3	74.4	1.5	0.1
East Coast Highway from Jamboree Road to Newport Center Drive	72.6	73.4	0.8	74.0	74.1	1.5	0.1
East Coast Highway from Newport Center Drive to Avocado Avenue	72.6	73.3	0.7	73.3	73.3	0.7	0.0
Jamboree Road from Bison Avenue to Eastbluff/Ford	72.8	73.4	0.6	73.4	73.5	0.7	0.1
Jamboree Road from Eastbluff/Ford to San Joaquin Hills Road	73.5	74.1	0.6	74.2	74.3	0.8	0.1
MacArthur Boulevard from SR-73 Northbound On-Ramp to Bison Avenue	74.7	75.0	0.3	74.9	74.9	0.2	0.0
MacArthur Boulevard from Bison Avenue to Ford/Bonita Canyon	74.7	75.0	0.3	74.9	74.9	0.2	0.0
MacArthur Boulevard from Ford/Bonita Canyon to San Joaquin Hills Road	74.7	75.0	0.3	74.7	74.7	0	0.0
MacArthur Boulevard from San Joaquin Hills Road to San Miguel Drive	72.8	73.2	0.4	72.5	72.6	-0.2	0.1
MacArthur Boulevard from San Miguel Drive to East Coast Highway	72.0	72.4	0.4	72.3	72.3	0.3	0.0
Avocado Avenue from East Coast Highway to San Miguel Drive.	67.0	67.7	0.7	66.8	67.4	0.4	0.6
Avocado Avenue from San Miguel Drive. to San Joaquin Hills Road.	63.4	64.0	0.6	63.8	64.0	0.6	0.2
San Joaquin Hills Road from Jamboree Road to Santa Cruz	68.3	68.7	0.4	68.2	68.4	0.1	0.2
San Joaquin Hills Road from Santa Rosa to Avocado Avenue	68.3	68.6	0.3	69.1	69.2	0.9	0.1
San Joaquin Hills Road from San Miguel Drive to Marguerite Avenue	68.4	68.5	0.1	69.6	69.7	1.3	0.1
San Joaquin Hills Road from Marguerite Avenue to Spy Glass Hill	68.8	68.9	0.1	70.1	70.1	1.3	0.0
San Miguel Drive. from Newport Center Drive. to Avocado Avenue	66.4	67.0	0.6	66.8	67.1	0.7	0.3
San Miguel Drive. from Avocado Avenue to MacArthur Boulevard.	69.2	69.7	0.5	69.4	69.7	0.5	0.3
San Miguel Drive from MacArthur Boulevard to San Joaquin Hills Road	67.3	67.4	0.1	68.2	68.2	0.9	0.0
San Miguel Drive from North of San Joaquin Hills Road	67.3	67.4	0.1	67.6	67.6	0.3	0.0

Source: *Noise Impact Analysis*, LSA Associates, Inc. (July 2009)
Note: CNEL (dBA) shown above are 50 feet (ft) from centerline of outermost lane
CNEL = Community Noise Equivalent Level dBA = A-weighted decibel SR-73 = State Route 73

As discussed above, the Council Chambers and Library expansion area directly adjacent to MacArthur Boulevard and the City Hall administration building and Council Chambers directly adjacent to Avocado Avenue would potentially be exposed to traffic noise levels exceeding the City noise standards. In addition, the potentially sensitive uses proposed within the park areas, such as picnic tables, could be exposed to traffic noise above the CNEL from MacArthur Boulevard and San Miguel Drive. Long-term cumulative on-site impacts from traffic noise would be reduced to a less than significant level through implementation of mitigation measures listed below. Long-term cumulative on-site impacts from nearby (nontraffic) uses would not exceed the City's exterior or interior noise standard, and no mitigation would be required.

Based on the above reasons, the project's contribution to cumulative noise impacts in the City would be less than cumulatively significant.

Mitigation Measures

Construction Impacts. Construction of the proposed project would potentially result in relatively high noise levels and annoyance at the closest residences. The following measures would reduce short-term construction-related noise impacts resulting from the proposed project:

- During all project site excavation and grading, the project contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.
- The project contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receptors nearest the project site during all project construction.
- The construction contractor shall limit all construction-related activities that would result in high noise levels to between the hours of 7:00 a.m. and 6:00 p.m., Monday through Friday, and between the hours of 8:00 a.m. and 6:00 p.m. on Saturdays. No construction would occur outside of these hours or on Sundays and federal holidays.

Aircraft Noise Impacts. No mitigation measures are required.

Traffic Noise Impacts. Prior to the issuance of the building permit, the following mitigation measures would be required to be included in the project's architectural drawings:

- Project buildings must meet ventilation standards required by the California Building Code (CBC) with the windows closed. It is likely that a form of mechanical ventilation, such as an air-conditioning system, will be required as part of the project design for the Council Chambers and Library expansion area directly adjacent to MacArthur Boulevard and for the City Hall offices and Council Chambers directly adjacent to Avocado Avenue.

- All potential sensitive uses proposed within the park areas, such as picnic tables, should be located outside the 70 A-weighted decibels (dBA) Community Noise Equivalent Level (CNEL) impact zone from MacArthur Boulevard, which would extend to 167 feet (ft) from the roadway centerline north of San Miguel Drive and to 140 ft from the roadway centerline south of San Miguel Drive.

Stationary Noise Impacts. No mitigation measure is required.

Level of Significance after Mitigation

With implementation of the identified mitigation measures, potential long-term noise impacts would be reduced to below the level of significance. Compliance with the City's Municipal Code requirements and the measures specified above during construction activities would ensure that short-term construction noise impacts from excavation, grading, and erection of buildings on site would also be reduced to a less than significant level.

REFERENCES

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