APPENDIX F – ACOUSTICAL ASSESSMENT

Acoustical Assessment
Moreno Valley Mall Redevelopment Project
City of Moreno Valley, California

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LIST OF ABBREVIATED TERMS

APN	Assessor's Parcel Number
ADT	average daily traffic
dBA	A-weighted sound level
CEQA	California Environmental Quality Act
CNEL	community equivalent noise level
L_{dn}	day-night noise level
dB	decibel
du/ac	dwelling units per acre
L_{eq}	equivalent noise level
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HVAC	heating ventilation and air conditioning
Hz	hertz
in/sec	inches per second
L_{max}	maximum noise level
μPa	micropascals
L_{min}	minimum noise level
PPV	peak particle velocity
RMS	root mean square
VdB	vibration velocity level

1 INTRODUCTION

This report documents the results of an Acoustical Assessment completed for the Moreno Valley Mall Redevelopment Project ("Project" or "Proposed Project"). The purpose of this Acoustical Assessment is to evaluate the potential construction and operational noise and vibration levels associated with the Project and determine the level of impact the Project would have on the environment.

1.1 Project Location and Setting

The Project site is located within the northwestern portion of the City within the County of Riverside (County) at 22500 Town Circle, Moreno Valley. The approximately 58.6-acre site is located south of I-60, north of Towngate Boulevard, and west of Frederick Street. Town Circle is a loop road that borders the site. The following Assessor Parcel Numbers (APNs) are associated with the Project site: 291-110-032, 291-110-033, 291-110-034, and 291-110-035. Regional access to the site is provided via Frederick Street and Day Street from SR-60 and Eucalyptus Avenue from I-215, (see Exhibit 1: Regional Location Map and Exhibit 2: Project Vicinity Map).

1.2 Project Description

The Project proposes revitalization and redevelopment of a portion of the existing Moreno Valley Mall (excluding the existing JC Penny and Macy's parcels). The intent of the proposed Project is to plan and integrate multiple uses across the site that enable crossover of professional, shopping, and resident populations. To this end, the Project site would be divided into 14 parcels. Each use is intended to grow density and increase value and attraction of the original commercial Mall. Key features of the concept plan include the following:

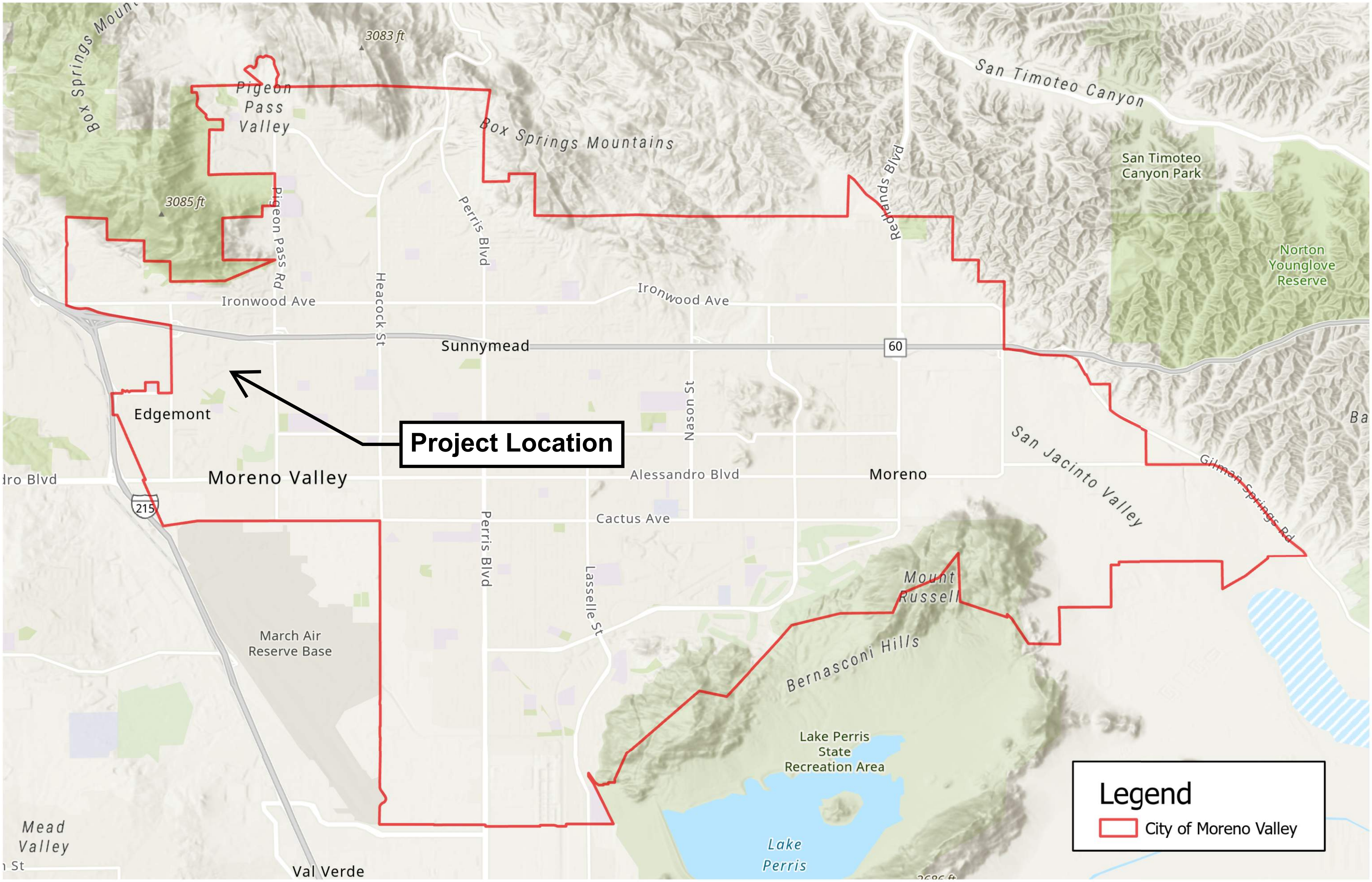
- Residential North West: There is approximately 250 multi-family units proposed amongst two residential buildings in the northwest corner of the site, adjacent to the Theater and existing two-level parking structure.
- Residential South East: There is approximately 1,500 multi-family units proposed in the south east portion of the site. The three residential buildings would be proposed in three phases and interconnected by pedestrian scaled streetscapes. To this end, the existing Mall Ring Road is proposed to be narrowed between new residential and existing residential uses outside of the Project site to the south. A commons greenway is proposed to connect this residential district to the existing Mall's southeast entry.
- Hospitality: There are two hotels proposed in the North East parking field of the site. The two hotels would operate jointly out of one building. One hotel would have a capacity of 120 keys, and the second hotel would have a capacity of 150 keys with an event/conference space.
- New Parking Structure: The existing/vacant 'Gottshalks' anchor building is proposed to maintain the majority of its commercial/retail square footage and a wrap parking structure shall be added. The new parking will serve Mall customers, and Hospitality/Event parking from both upper-level connections and lower parking field access to the west side of the structure.
- Entertainment: The north lower-level parking field will be re-planned to accommodate an exterior entry/exit to the Theater, and a new outdoor dining patio for multiple tenants.

- Transit Center: The Transit Center is proposed to be relocated to the northern portion of the Project site on Town Circle to serve and connect various user populations which may include resident, workforce, student, and shopping/business markets.
- Food Market: The existing Mall "Food Court" is planned to be redeveloped into a new interior and exterior "pavilion" Food Market.
- Existing Mall: This existing Mall interior is intended to be re-modeled to match the new level of development, variety and pedestrian connections across the entire site. Various entries, exterior facades, interior bridges, common restrooms, and re-planned tenant square footage will all be part of the vision that ties the Specific Plan Amendment together.

Exhibit 3: Conceptual Site Plan, provide the overall vision for the Project and the development of the anticipated residential, hospitality, office, and commercial uses.

Construction/Operation

Construction is expected to be initiated in early 2023 and completed by mid-2026. Hours of operation would be specified in the Specific Plan and EIR, generally anticipated to be 24 hours per day, 7 days per week for the hotel and residential uses, late night for the Theater and dining area (similar to current theater operations), with typical retail store hours for the interior mall and Food Market.



Source: ESRI, 2022

EXHIBIT 1: Regional Location Map
Moreno Valley Mall Redevelopment Project

Not to scale

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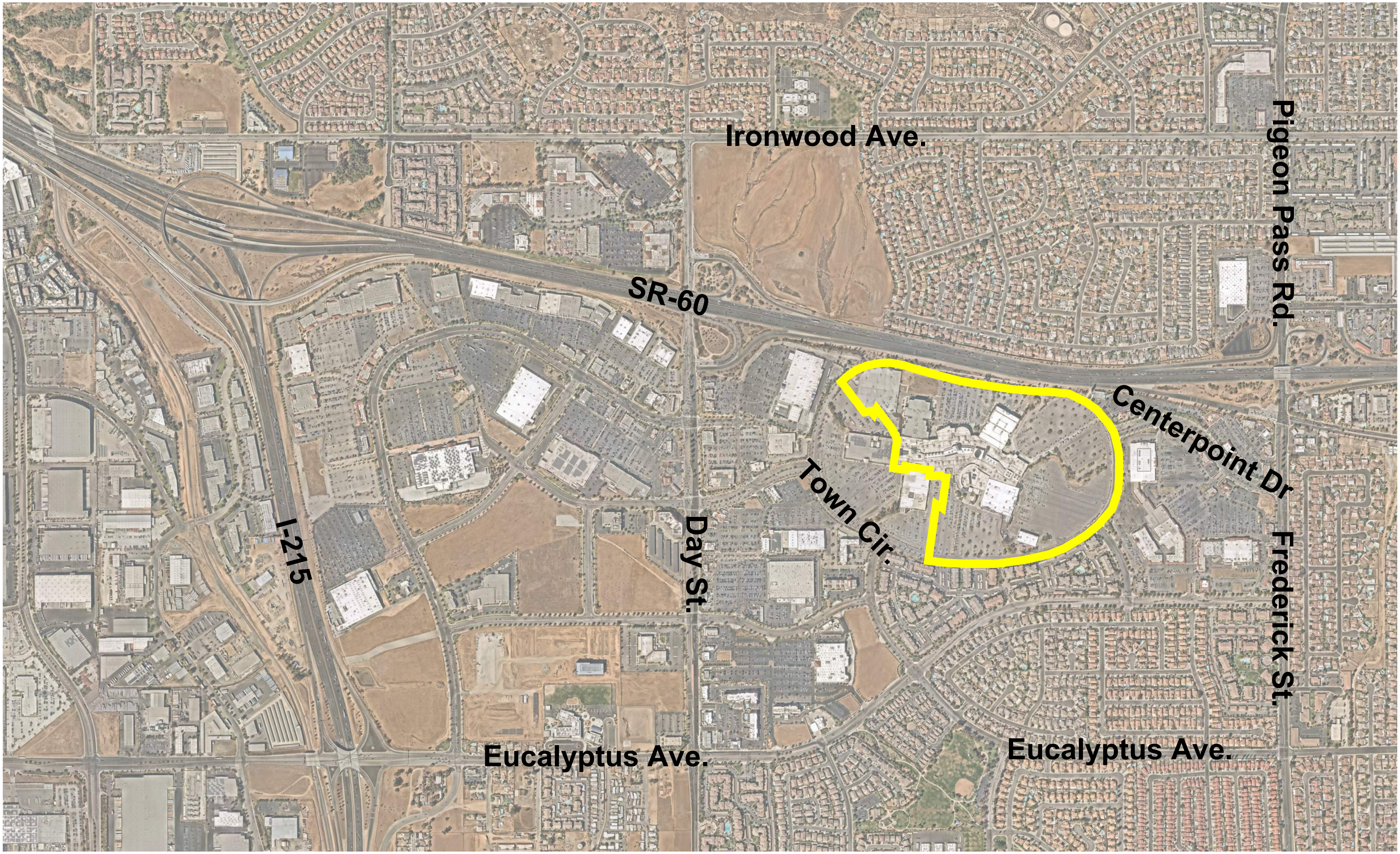

Map source: Nearmap, September 18, 2021

Project Site

EXHIBIT 2: Project Vicinity Map
Moreno Valley Mall Redevelopment Project

Not to scale

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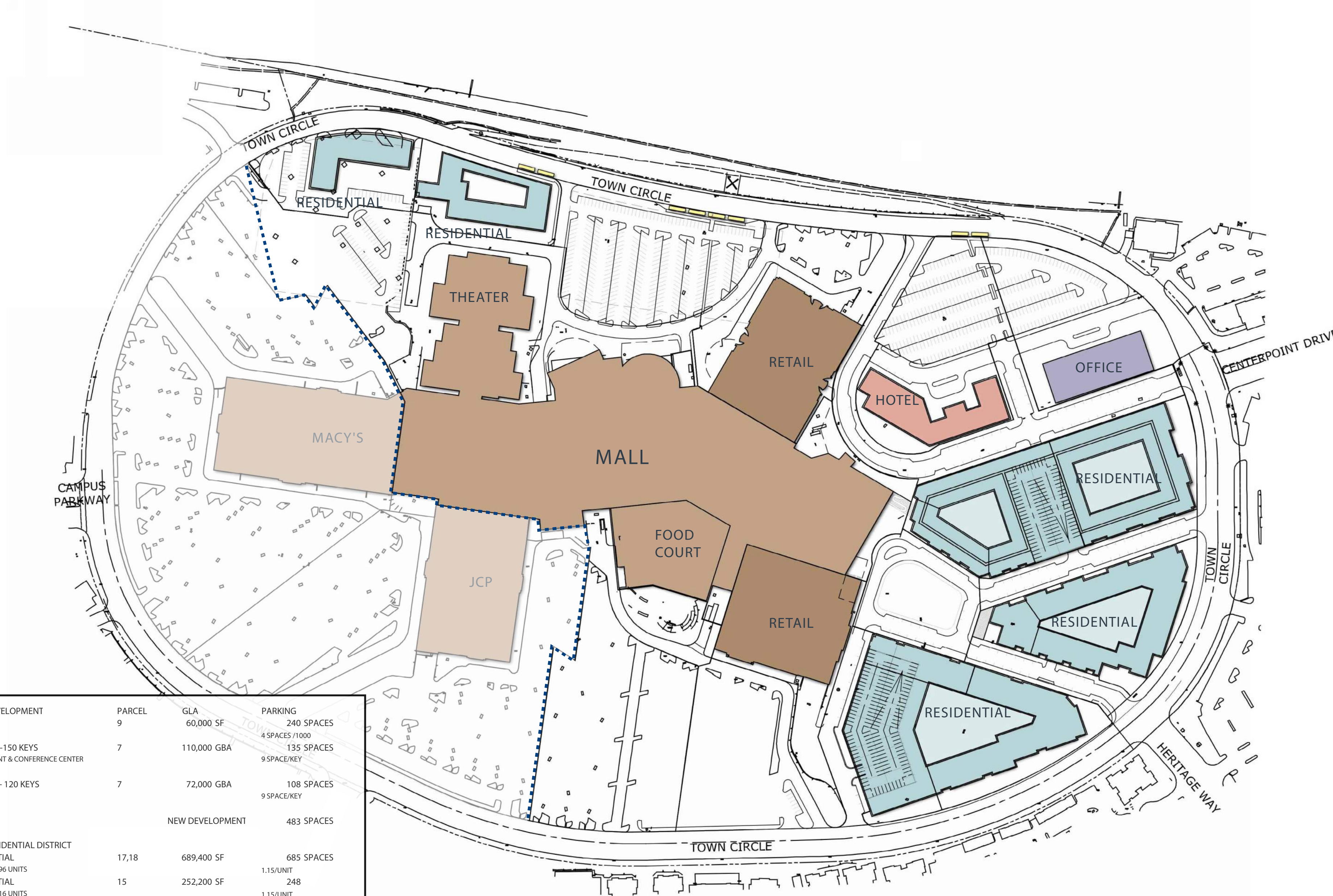

NEW DEVELOPMENT	PARCEL	GLA	PARKING
OFFICE 3 LEVELS	9	60,000 SF	240 SPACES 4 SPACES /1000
HOTEL A -150 KEYS RESTAURANT & CONFERENCE CENTER 5 LEVELS	7	110,000 GBA	135 SPACES 9 SPACE/KEY
HOTEL B - 120 KEYS 3 LEVELS	7	72,000 GBA	108 SPACES 9 SPACE/KEY
		NEW DEVELOPMENT	483 SPACES
NEW RESIDENTIAL DISTRICT			
RESIDENTIAL 7 LEVELS/596 UNITS	17,18	689,400 SF	685 SPACES 1.15/UNIT
RESIDENTIAL 5 LEVELS/216 UNITS	15	252,200 SF	248 1.15/UNIT
RESIDENTIAL 7 LEVELS/565 UNITS	11,12	646,100 SF	650 1.15/UNIT
RESIDENTIAL 4 LEVELS/250 UNITS	1,2	280,000 SF	288 1.15/UNIT
		RESIDENTIAL	1,871 SPACES

Source: Hanna Partners, 02/10/2022

EXHIBIT 3: Conceptual Site Plan
Moreno Valley Mall Redevelopment Project

Not to scale

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2 ACOUSTIC FUNDAMENTALS

2.1 Sound and Environmental Noise

Acoustics is the science of sound. Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a medium (e.g. air) to human (or animal) ear. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second, or hertz (Hz).

Noise is defined as loud, unexpected, or annoying sound. In acoustics, the fundamental model consists of a noise source, a receptor, and the propagation path between the two. The loudness of the noise source, obstructions, or atmospheric factors affecting the propagation path, determine the perceived sound level and noise characteristics at the receptor. Acoustics deal primarily with the propagation and control of sound. A typical noise environment consists of a base of steady background noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this background noise is the sound from individual local sources. These sources can vary from an occasional aircraft or train passing by to continuous noise from traffic on a major highway. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a large range of numbers. To avoid this, the decibel (dB) scale was devised. The dB scale uses the hearing threshold of 20 micropascals (μPa) as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The dB scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels correspond closely to human perception of relative loudness. Table 1: Typical Noise Levels provides typical noise levels.

Table 1: Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	– 110 –	Rock Band
Jet fly-over at 1,000 feet		
	– 100 –	
Gas lawnmower at 3 feet		
	– 90 –	
Diesel truck at 50 feet at 50 miles per hour		Food blender at 3 feet
	– 80 –	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower, 100 feet	**– 70 –**	Vacuum cleaner at 10 feet
Commercial area		Normal Speech at 3 feet
Heavy traffic at 300 feet	**– 60 –**	
		Large business office
Quiet urban daytime	**– 50 –**	Dishwasher in next room
Quiet urban nighttime	**– 40 –**	Theater, large conference room (background)
Quiet suburban nighttime		
	– 30 –	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	– 20 –	
		Broadcast/recording studio
	– 10 –	
Lowest threshold of human hearing	**– 0 –**	Lowest threshold of human hearing

Source: California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.

Noise Descriptors

The dB scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise on people is largely dependent on the total acoustical energy content of the noise, as well as the time of day when the noise occurs. The equivalent noise level (L_{eq}) represents the continuous sound pressure level over the measurement period, while the day-night noise level (L_{dn}) and Community Equivalent Noise Level (CNEL) are measures of energy average during a 24-hour period, with dB weighted sound levels from 7:00 p.m. to 7:00 a.m. Most commonly, environmental sounds are described in terms of L_{eq} that has the same acoustical energy as the summation of all the time-varying events. Each is applicable to this analysis and defined in Table 2: Definitions of Acoustical Terms.

Table 2: Definitions of Acoustical Terms

Term	Definitions
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in μPa (or 20 micronewtons per square meter), where 1 pascals is the pressure resulting from a force of 1 newton exerted over an area of 1 square meter. The sound pressure level is expressed in dB as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g. 20 μPa). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level (dBA)	The sound pressure level in dB as measured on a sound level meter using the A-weighting filter network. 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.
Equivalent Noise Level (L_{eq})	The average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
Maximum Noise Level (L_{max}) Minimum Noise Level (L_{min})	The maximum and minimum dBA during the measurement period.
Exceeded Noise Levels (L_{01}, L_{10}, L_{50}, L_{90})	The dBA values that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day-Night Noise Level (L_{dn})	A 24-hour average L_{eq} with a 10 dBA weighting added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity at nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
Community Noise Equivalent Level (CNEL)	A 24-hour average L_{eq} with a 5 dBA weighting during the hours of 7:00 a.m. to 10:00 a.m. and a 10 dBA weighting added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.7 dBA CNEL.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

The A-weighted decibel (dBA) sound level scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends on the distance between the receptor and the noise source.

A-Weighted Decibels

The perceived loudness of sounds is dependent on many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable and can be approximated by dBA values. There is a strong correlation between dBA and the way the human ear perceives sound. For this reason, the dBA has become the standard tool of environmental noise assessment. All noise levels reported in this document are in terms of dBA, but are expressed as dB, unless otherwise noted.

Addition of Decibels

The dB scale is logarithmic, not linear, and therefore sound levels cannot be added or subtracted through ordinary arithmetic. Two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic dB is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound and twice as loud as a 60-dBA sound. When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dBA higher than one source under the same conditions. Under the dB scale, three sources of equal loudness together would produce an increase of 5 dBA.

Sound Propagation and Attenuation

Sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6 dB for each doubling of distance from a stationary or point source. Sound from a line source, such as a highway, propagates outward in a cylindrical pattern. Sound levels attenuate at a rate of approximately 3 dB for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics. No excess attenuation is assumed for hard surfaces like a parking lot or a body of water. Soft surfaces, such as soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed. For line sources, an overall attenuation rate of 3 dB per doubling of distance is assumed.

Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. The way older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units is generally 30 dBA or more.

Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

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

- Except in carefully controlled laboratory experiments, a 1-dBA change cannot be perceived by humans.
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference.
- A minimum 5-dBA change is required before any noticeable change in community response would be expected. A 5-dBA increase is typically considered substantial.
- A 10-dBA change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

Effects of Noise on People

Hearing Loss. While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise. The Occupational Safety and Health Administration has a noise exposure standard that is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over 8 hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

Annoyance. Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. A noise level of about 55 dBA L_{dn} is the threshold at which a substantial percentage of people begin to report annoyance.[1]

2.2 Groundborne Vibration

Sources of groundborne vibrations include natural phenomena (earthquakes, volcanic eruptions, sea waves, landslides, etc.) or man-made causes (explosions, machinery, traffic, trains, construction equipment, etc.). Vibration sources may be continuous (e.g. factory machinery) or transient (e.g. explosions). Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One is the peak particle velocity (PPV); another is the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. The RMS velocity is defined as the average of the squared amplitude of the signal. The PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration.

Table 3: Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations**,** displays the reactions of people and the effects on buildings produced by continuous vibration levels. The annoyance levels shown in the table should be interpreted with care since vibration may be found to be annoying at much lower levels than those listed, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high noise environments, which are more prevalent where groundborne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows.

Table 3: Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations

Maximum PPV (in/sec)	Vibration Annoyance Potential Criteria	Vibration Damage Potential Threshold Criteria	FTA Vibration Damage Criteria
0.008	--	Extremely fragile historic buildings, ruins, ancient monuments	--
0.01	Barely Perceptible	--	--
0.04	Distinctly Perceptible	--	--
0.1	Strongly Perceptible	Fragile buildings	--
0.12	--	--	Buildings extremely susceptible to vibration damage
0.2	--	--	Non-engineered timber and masonry buildings
0.25	--	Historic and some old buildings	--
0.3	--	Older residential structures	Engineered concrete and masonry (no plaster)
0.4	Severe	--	--
0.5	--	New residential structures, Modern industrial/commercial buildings	Reinforced-concrete, steel or timber (no plaster)

PPV = peak particle velocity; in/sec = inches per second; FTA = Federal Transit Administration

Source: California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, 2020 and Federal Transit administration, Transit Noise and Vibration Assessment Manual, 2018.

Ground vibration can be a concern in instances where buildings shake, and substantial rumblings occur. However, it is unusual for vibration from typical urban sources such as buses and heavy trucks to be perceptible. Common sources for groundborne vibration are planes, trains, and construction activities

[1] Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, August 1992.

such as earth-moving which requires the use of heavy-duty earth moving equipment. For the purposes of this analysis, a PPV descriptor with units of inches per second (in/sec) is used to evaluate construction-generated vibration for building damage and human complaints.

3 REGULATORY SETTING

To limit population exposure to physically or psychologically damaging as well as intrusive noise levels, the Federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise.

3.1 State of California

California Government Code

California Government Code Section 65302(f) mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines established by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of “normally acceptable”, “conditionally acceptable”, “normally unacceptable”, and “clearly unacceptable” noise levels for various land use types. Single-family homes are “normally acceptable” in exterior noise environments up to 60 CNEL and “conditionally acceptable” up to 70 CNEL. Multiple-family residential uses are “normally acceptable” up to 65 CNEL and “conditionally acceptable” up to 70 CNEL. Schools, libraries, and churches are “normally acceptable” up to 70 CNEL, as are office buildings and business, commercial, and professional uses.

Title 24 – Building Code

The State’s noise insulation standards are codified in the California Code of Regulations, Title 24: Part 1, Building Standards Administrative Code, and Part 2, California Building Code. These noise standards are applied to new construction in California for interior noise compatibility from exterior noise sources. The regulations specify that acoustical studies must be prepared when noise-sensitive structures, such as residential buildings, schools, or hospitals, are located near major transportation noise sources, and where such noise sources create an exterior noise level of 65 dBA CNEL or higher. Acoustical studies that accompany building plans must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new multi-family residential buildings, the acceptable interior noise limit for new construction is 45 dBA CNEL.

3.2 Local

City of Moreno Valley General Plan

The City of Moreno Valley 2040 General Plan was adopted on June 15, 2021. Chapter 7, Noise contains goals and policies that seek to proactively address sources of noise in Moreno Valley, protect against excessive noise, and support the social and economic vitality of the community. Goals and policies that relate to noise impacts include the following:

Goal N-1 **Design for a pleasant, healthy sound environment conducive to living and working.**

Policy N.1-1 Protect occupants of existing and new buildings from exposure to excessive noise, particularly adjacent to freeways, major roadways, the railroad, and within areas of aircraft overflight.

Policy N.1-3 Apply the community noise compatibility standards (Table N-1) to all new development and major redevelopment projects outside the noise and safety compatibility zones established in the March Air Reserve Base/Inland Port Airport Land Use Compatibility (ALUC) Plan in order to protect against the adverse effects of noise exposure. Projects within the noise and safety compatibility zones are subject to the standards contained in the ALUC Plan.

Policy N.1-4 Require a noise study and/or mitigation measures if applicable for all projects that would expose people to noise levels greater than the "normally acceptable" standard and for any other projects that are likely to generate noise in excess of these standards.

Policy N.1-5 Noise impacts should be controlled at the noise source where feasible, as opposed to at receptor end with measures to buffer, dampen, or actively cancel noise sources. Site design, building orientation, building design, hours of operation, and other techniques, for new developments deemed to be noise generators shall be used to control noise sources.

Policy N.1-7 Developers shall reduce the noise impacts on new development through appropriate means (e.g. double-paned or soundproof windows, setbacks, berming, and screening). Noise attenuation methods should avoid the use of visible sound walls where possible.

Goal N-2 **Ensure that noise does not have a substantial, adverse effect on the quality of life in the community.**

Policy N.2-1 Use the development review process to proactively identify and address potential noise compatibility issues.

Policy N.2-2 Continue to work with community members and business owners to address noise complaints and ensure voluntary resolution of issues through the enforcement of Municipal Code provisions.

Policy N.2-3 Limit the potential noise impacts of construction activities on surrounding land uses through noise regulations in the Municipal Code that address allowed days and hours of construction, types of work, construction equipment, and sound attenuation devices.

City of Moreno Valley Municipal Code

The Moreno Valley Municipal Code establishes the following noise provisions relative to the Project:

<u>Section 11.80.030 - Prohibited Acts</u>

C. Nonimpulsive Sound Decibel Limits. No person shall maintain, create, operate or cause to be operated on private property any source of sound in such a manner as to create any nonimplusive sound which exceeds the limits set forth for the source land use category (as defined in Section 11.80.020) in Table 11.80.030-2 (refer to <u>Table 4: Maximum Sound Levels (in dBA) for Source Land Uses</u>) when measured at a distance of two hundred (200) feet or more from the real property line of the source of the sound, if the sound occurs on privately owned property, or from the source of the sound, if the sound occurs on public right-of-way, public space or other publicly owned property. Any source of sound in violation of this subsection shall be deemed prima facie to be a noise disturbance.

Table 4: Maximum Sound Levels (in dBA) for Source Land Uses			
Residential		**Commercial**	
Daytime	Nighttime	Daytime	Nighttime
60	55	65	60
Source: Moreno Valley Municipal Code Table 11.80.030-2			

D. Specific Prohibitions. In addition to the general prohibitions set out in subsection A of this section, and unless otherwise exempted by this chapter, the following specific acts, or the causing or permitting thereof, are regulated as follows:

7. Construction and Demolition. No person shall operate or cause the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between the hours of eight p.m. and seven a.m. the following day such that the sound there from creates a noise disturbance, except for emergency work by public service utilities or for other work approved by the city manager or designee. This section shall not apply to the use of power tools as provided in subsection (D)(9) of this section.

9. Power Tools. No person shall operate or permit the operation of any mechanically, electrically or gasoline motor-driven tool during nighttime hours so as to cause a noise disturbance across a residential real property boundary.

Section 9.10.170 Performance Standards - Vibration

No vibration shall be permitted which can be felt at or beyond the property line.

4 EXISTING CONDITIONS

4.1 Existing Noise Sources

Moreno Valley is subject to typical urban noises such as noise generated by cars on local roadways, noise from intermittent construction activities, and day-today outdoor activities. There are also several transportation-related noise sources that operate at the periphery of the city, including Interstate 215 (I-215), the March Air Reserve Base, and State Route 60 (SR 60), which passes through the northern part of the city.

Mobile Sources

Existing roadway noise levels were calculated for the roadway segments in the Project vicinity. This task was accomplished using the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD-77-108) and existing traffic volumes from the *Moreno Valley Mall Redevelopment Traffic Impact Analysis*, prepared by Kittelson and Associates (March 2022) (Traffic Impact Study). The noise prediction model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, and site environmental conditions. The average vehicle noise rates (also referred to as energy rates) used in the FHWA model have been modified to reflect average vehicle noise rates identified for California by the California Department of Transportation (Caltrans). The Caltrans data indicates that California automobile noise is 0.8 to 1.0 dBA higher than national levels and that medium and heavy truck noise is 0.3 to 3.0 dBA lower than national levels. The average daily noise levels along roadway segments in proximity to the Project site are included in Table 5: Existing Traffic Noise Levels. As shown in Table 5, existing traffic noise levels in the Project vicinity range between 62.9 dBA CNEL and 72.0 dBA CNEL.

Table 5: Existing Traffic Noise Levels

Roadway Segment	ADT	dBA CNEL[1]
Day Street		
SR 60 WB Ramp to SR 60 EB Ramp	35,968	70.5
SR 60 EB Ramp to Canyon Springs Parkway	45,986	72.0
Canyon Springs Pkwy to Campus Parkway	31,649	70.4
Campus Pkwy to Gateway Drive	29,621	70.0
Gateway Drive to Eucalyptus Avenue	23,103	68.9
Eucalyptus Avenue		
I-215 Ramps to Day Street	17,931	66.6
Day Street to Towngate Boulevard	15,902	66.1
Town Circle		
Campus Pkwy to Centerpoint Drive	7,426	62.9
Centerpoint Drive		
Town Circle and Frederick Street	17,765	65.9
Towngate Boulevard		
Eucalyptus Avenue and Frederick Street	10,941	65.4
Pigeon Pass Road		
Hemlock Avenue to Sunnymead Boulevard	38,384	71.7

Table 5: Existing Traffic Noise Levels		
Roadway Segment	**ADT**	**dBA CNEL[1]**
Frederick Street		
Sunnymead Blvd to Centerpoint Drive	37,458	70.8
Centerpoint Drive to Towngate Boulevard	27,528	69.4
Towngate Blvd to Eucalyptus Avenue	26,319	69.3
ADT = average daily trips; dBA = A-weighted decibels; CNEL= Community Equivalent Noise Level 1. Traffic noise levels are at 100 feet from the roadway centerline. Source: Based on traffic data provided by Kittelson and Associates, Inc., March 2022. Refer to Appendix B for traffic noise modeling results.		

Stationary Sources

The primary sources of stationary noise in the Project vicinity are those associated with Moreno Valley Mall, commercial properties to the east and west, and multi-family residential properties to the south of the Project. The noise associated with these sources may represent a single-event noise occurrence or short-term noise. Other noises include mechanical equipment (e.g., heating ventilation and air conditioning [HVAC] equipment), dogs barking, idling vehicles, and customers or residents talking.

4.2 Noise Measurements

The Project site is the current location of the Moreno Valley Mall. To quantify existing ambient noise levels in the Project area, Kimley-Horn conducted six short-term noise measurements on March 30, 2022; see Appendix A: Existing Ambient Noise Measurements. The noise measurement sites were representative of typical existing noise exposure within and immediately adjacent to the Project site. The 10-minute measurements were taken between 12:17 p.m. and 1:44 p.m. Measurements of L_{eq} are considered representative of the noise levels throughout the day. The average noise levels and sources of noise measured at each location are listed in Table 6: Existing Noise Measurements and shown on Exhibit 4: Noise Measurement Locations.

Table 6: Existing Noise Measurements				
Site	**Location**	**Measurement Period**	**Duration**	**Daytime Average L_{eq} (dBA)**
ST-1	Southeast of Town Circle and Heritage Way intersection	12:17 – 12:27 p.m.	10 Minutes	59.6
ST-2	Parking lot, north of Town Circle and south of JC Penny	12:33 – 12:43 p.m.	10 Minutes	61.6
ST-3	Parking area, east of Town Circle and northwest of Macy's	12:47 – 12:57 p.m.	10 Minutes	63.7
ST-4	Vacant field, south of Town Circle and north of Harkins Theater	1:04 – 1:14 p.m.	10 Minutes	62.9
ST-5	Parking lot, south of Town Circle and north of bus bay	1:20 – 1:30 p.m.	10 Minutes	63.6
ST-6	Parking lot, west of Moreno Valley Mall's eastern entrance	1:34 – 1:44 p.m.	10 Minutes	55.4
Source: Noise measurements taken by Kimley-Horn, March 30, 2022. See Appendix A for noise measurement results.				

4.3 Sensitive Receptors

Sensitive populations are more susceptible to the effects of air pollution than is the general population. Sensitive receptors that are in proximity to localized sources of toxics are of particular concern. Land uses considered sensitive receptors include residences, schools, playgrounds, childcare centers, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. The Project site is mainly surrounded by commercial land uses to the west and commercial/residential to the east, residential south, and State Route 60 (SR-60) and residential uses to the north. TownGate Memorial Park is located to the south. Sensitive land uses nearest to the Project are shown in Table 7: Sensitive Receptors.

Table 7: Sensitive Receptors

Receptor Description	Distance and Direction from the Project
Multi-family Residences	110 feet to the south
Single-family Residences	300 feet to the north
TownGate Memorial Park	1,500 feet to the south
Single-family Residences	1,600 feet to the east

Source: Google Earth

Source: ESRI World Imagery

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EXHIBIT 4: Noise Measurement Locations
Moreno Valley Mall Redevelopment Project

Kimley»Horn

5 SIGNIFICANCE CRITERIA AND METHODOLOGY

5.1 CEQA Thresholds

Appendix G of the California Environmental Quality Act (CEQA) Guidelines contains analysis guidelines related to noise impacts. These guidelines have been used by the City to develop thresholds of significance for this analysis. A project would create a significant environmental impact if it would:

- Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Generate excessive groundborne vibration or groundborne noise levels; and
- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the Project area to excessive noise levels.

Thresholds

Construction Noise

The Project is within the City of Moreno Valley. The City of Moreno Valley does not establish quantitative construction noise standards, stating only that construction is prohibited between the hours of 8 p.m. and 7 a.m.; therefore, this analysis conservatively uses the FTA's threshold of 80 dBA (8-hour L_{eq}) for residential uses and 90 dBA (8-hour L_{eq}) for non-residential uses to evaluate construction noise impacts.[2]

Operational Noise

Non-Transportation Noise

Non-transportation related noise generators are commonly called "stationary," "fixed," "area," or "point" sources of noise. Industrial processing, mechanical equipment, pumping stations, and heating, ventilating, and air conditioning (HVAC) equipment are examples of fixed location, non-transportation noise sources.

The City of Moreno Valley municipal code contains thresholds for residential and commercial properties (refer to Table 4). Residential properties are prohibited from generating noise levels that exceed 60 dBA during daytime and 55 dBA during the nighttime when measured 200 feet from the property line. Commercial properties are prohibited from generating noise levels that exceed 65 dBA during daytime and 60 dBA during the nighttime when measured 200 feet from the property line.

Mobile Noise

Traffic noise, including automobiles, trucks, and other motor vehicles is the most pervasive source of noise in the City. The General Plan does not include thresholds for Traffic generated noise impacts. Therefore, this noise assessment uses and increase of three dBA as the threshold for mobile noise impacts because

[2] Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, Table 7-2, Page 179, September 2018.

outside of a laboratory environment, a 3-dBA change is barely noticeable and therefore would not result in a significant impact.

Vibration

The City of Moreno Valley municipal code states that no vibration shall be permitted which can be felt at or beyond the property line but does not identify specific vibration level limits. Therefore, this analysis relies on the vibration levels identified in the Caltrans 2020 Transportation and Construction Vibration Guidance Manual (refer to Table 3). The manual states that vibration levels of 0.04 in/sec can begin to cause annoyance and levels of 0.2 in/sec can cause building damage in non-engineered timber and masonry buildings

5.2 Methodology

Construction

Construction noise levels were based on typical noise levels generated by construction equipment published by the Federal Transit Administration (FTA) and FHWA. Construction noise is assessed in dBA Leq. This unit is appropriate because Leq can be used to describe noise level from operation of each piece of equipment separately, and levels can be combined to represent the noise level from all equipment operating during a given period.

Construction noise modeling was conducting using the FHWA Roadway Construction Noise Model (RCNM). Reference noise levels are used to estimate operational noise levels at nearby sensitive receptors based on a standard noise attenuation rate of 6 dB per doubling of distance (line-of-sight method of sound attenuation for point sources of noise). Noise level estimates do not account for the presence of intervening structures or topography, which may reduce noise levels at receptor locations. Therefore, the noise levels presented herein represent a conservative, reasonable worst-case estimate of actual temporary construction noise. As noted above, this analysis conservatively uses the FTA's threshold of 80 dBA (8-hour L_{eq}) for residential uses and 90 dBA (8-hour L_{eq}) for non-residential uses to evaluate construction noise impacts.

Operations

The analysis of the Without Project and With Project noise environments is based on noise prediction modeling and empirical observations. Reference noise level data are used to estimate the Project operational noise impacts from stationary sources. Noise levels are collected from field noise measurements and other published sources from similar types of activities are used to estimate noise levels expected with the Project's stationary sources. The reference noise levels are used to represent a worst-case noise environment as noise level from stationary sources can vary throughout the day. Operational noise is evaluated based on the standards within the City's Noise Ordinance and General Plan.

An analysis was conducted of the Project's effect on traffic noise conditions at offsite land uses. Without Project traffic noise levels were compared to With Project traffic noise levels. The environmental baseline is the Without Project condition. The Without Project and With Project traffic noise levels in the Project vicinity were calculated using the FHWA Highway Noise Prediction Model (FHWA-RD-77-108). The actual sound level at any receptor location is dependent upon such factors as the source-to-receptor distance and the presence of intervening structures (walls and buildings), barriers, and topography. The noise attenuating effects of changes in elevation, topography, and intervening structures were not included in the model. Therefore, the modeling effort is considered a worst-case representation of the roadway noise. In general, a 3-dBA increase in traffic noise is barely perceptible to people, while a 5-dBA increase is readily noticeable.

Vibration

Ground-borne vibration levels associated with construction-related activities for the Project were evaluated utilizing typical ground-borne vibration levels associated with construction equipment, obtained from FTA published data for construction equipment. Potential ground-borne vibration impacts related to building/structure damage and interference with sensitive existing operations were evaluated, considering the distance from construction activities to nearby land uses and typically applied criteria for structural damage and human annoyance.

6 POTENTIAL IMPACTS AND MITIGATION

6.1 Acoustical Impacts

Threshold 6.1 Would the Project generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Construction

Construction noise typically occurs intermittently and varies depending on the nature or phase of construction (e.g. land clearing, grading, excavation, paving. Noise impacts associated with construction activity are a function of the noise generated by construction equipment, the location and sensitivity of nearby land uses, and the timing and duration of the noise-generating activities. Each phase of construction involves different types of equipment and has distinct noise characteristics. Noise levels from construction activities are typically dominated by the loudest several pieces of equipment.

The noise produced at each construction phase is determined by combining the L_{eq} contributions from the top three loudest pieces of equipment used at a given time, while accounting for the ongoing time-variations of noise emissions (commonly referred to as the usage factor). Heavy equipment, such as a dozer or a loader, can have maximum, short-duration noise levels of up to 85 dBA at 50 feet. However, overall noise emissions vary considerably, depending on what specific activity is being performed at any given moment.

Noise attenuation due to distance, the number and type of equipment, and the load and power requirements to accomplish tasks at each construction phase would result in different noise levels from construction activities at a given receptor. Since noise from construction equipment is intermittent and diminishes at a rate of at least 6 dBA per doubling of distance (conservatively ignoring other attenuation effects from air absorption, ground effects, and shielding effects), the average noise levels at noise-sensitive receptors could vary considerably, because mobile construction equipment would move around the site (site of each development phase) with different loads and power requirements.

The City's Municipal Code does not establish quantitative exterior construction noise standards however, Section 11.80.030(D)7 states that construction activities are prohibited from taking place between 8:00 p.m. and 7:00 a.m., therefore this analysis conservatively uses the FTA's threshold of 80 dBA (8-hour L_{eq}) for residential uses and 90 dBA (8-hour L_{eq}) for non-residential uses to evaluate construction noise impacts.[3] Standard construction provides 25 dBA of exterior-to-interior noise attenuation with windows closed and 15 dBA with windows open.[4] Therefore, it can be assumed that exterior noise levels of 80 dBA would equal 55 dBA when measured from the interior with windows closed.

Noise levels from project-related construction activities were calculated from the top three loudest construction equipment at spatially averaged distances (i.e., from the acoustical center) to the property line of the nearest receptors. Although construction may occur across the Project Area, the distance from

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[3] Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, Table 7-2, Page 179, September 2018.

[4] United States Environmental Protection Agency, *Protective Noise Levels (EPA 550/9-79-100)*, 1979.

the center of the nearest Project construction area to sensitive receptors, best represents the potential average construction-related noise levels.

The nearest sensitive receptors are multi-family residences located to the south of the Project site. Distances were measured from the center of the nearest Project construction site to the property line. The center of the site is used because the L_{eq} metric is an average and equipment would move around the site a center distance represents the average. As shown in Table 8: Project Construction Noise Levels at Nearest Sensitive Receptor, construction activities would not exceed the 80 dBA L_{eq} residential threshold for sensitive receptors. Therefore, construction related noise impacts would be less than significant.

Table 8: Project Construction Noise Levels at Nearest Sensitive Receptor

Construction Phase	Modeled Exterior Construction Noise Level (dBA L_{eq})	Noise Threshold (dBA L_{eq})	Exceed Threshold?
Demolition	69.9	80	No
Site Preparation	68.7	80	No
Grading	69.6	80	No
Building Construction	68.8	80	No
Paving	63.6	80	No
Architectural Coating	59.0	80	No
Combined Overlapping Phases[1]	70.3	80	No

1. Overlapping phases combine building construction, architectural coating, and paving.
Source: Federal Highway Administration, *Roadway Construction Noise Model,* 2006. Refer to Appendix B for noise modeling results.

Compliance with the Municipal Code would minimize impacts from construction noise, as construction would be limited to the permitted times. By following Municipal Code standards, Project construction activities would result in a less than significant noise impact.

Operations

The Project site is an existing shopping mall that the Project will be redeveloped to include new multi-family residential, two hotels, new parking structures, outdoor dining. As the Moreno Valley Mall is currently operating, this analysis only focuses on new sources of noise associated with Project improvements and does not analyze the mall as a whole. Implementation of the proposed Project would create new sources of noise in the project vicinity. The major noise sources associated with the Project that would potentially impact existing nearby residences would include stationary noise equipment (i.e. trash compactors, air conditioners, etc.); new parking areas (i.e. car door slamming, car radios, engine start-up, and car pass-by); and off-site traffic noise.

Mechanical Equipment. The nearest sensitive receptors to the Project site are the residences 110 feet south of the Project site. Potential stationary noise sources related to long-term operation of the Project would include mechanical equipment. Mechanical equipment (e.g. heating ventilation and air conditioning [HVAC] equipment) typically generates noise levels of approximately 52 dBA at 50 feet.[5] Based on Project site plans, the nearest potential location for a HVAC unit would be located approximately 200 feet from the nearest residential property and HVAC noise levels would attenuate by the distance to approximately 38.0 dBA, which is well below he City's 60 dBA daytime and 55 dBA nighttime noise

[5] Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, 2015.

standard for residential uses. Operation of mechanical equipment would not increase ambient noise levels beyond the acceptable compatible land use noise levels. Therefore, the proposed project would result in a less than significant impact related to stationary noise levels.

Parking Noise. The Project would provide podium parking structures for the new multi-family residential buildings. Traffic associated with parking lots is typically not of sufficient volume to exceed community noise standards, which are based on a time-averaged scale such as the CNEL scale. The instantaneous maximum sound levels generated by a car door slamming, engine starting up, and car pass-bys range from 53 to 61 dBA.[6] Conversations in parking areas may also be an annoyance to adjacent sensitive receptors. Sound levels of speech typically range from 33 dBA at 50 feet for normal speech to 50 dBA at 50 feet for very loud speech.[7] It should be noted that parking lot noises are instantaneous noise levels compared to noise standards in the hourly L_{eq} metric, which are averaged over the entire duration of a time period. As a result, actual noise levels over time resulting from parking lot activities would be far lower than the reference levels identified above.

For the purpose of providing a conservative, quantitative estimate of the noise levels that would be generated from the vehicles entering and exiting the parking lot, the methodology recommended by FTA for the general assessment of stationary transit noise sources is used. Using the methodology, the Project's peak hourly noise level that would be generated by the on-site parking levels was estimated using the following FTA equation for a parking lot:

$$L_{eq(h)} = SEL_{ref} + 10 \log (NA/1{,}000) - 35.6$$

Where:

$L_{eq(h)}$ = hourly L_{eq} noise level at 50 feet

SEL_{ref} = reference noise level for stationary noise source represented in sound exposure level (SEL) at 50 feet

NA = number of automobiles per hour

35.6 is a constant in the formula, calculated as 10 times the logarithm of the number of seconds in an hour

Based on the peak hour trip generation rates in the Traffic Study, approximately 634 trips during peak hours would be made to the Project site each day. Using the FTA's reference noise level of 92 dBA SEL[8] at 50 feet from the noise source, the Project's highest peak hour vehicle trips would generate noise levels of approximately 54.4 dBA L_{eq} at 50 feet from the parking lot. The nearest sensitive receptor is 200 feet from a parking area. Conservatively assuming that all residential vehicles would access the same structure located nearest to sensitive receptors rather than dispersed throughout all available parking structures and based strictly on distance attenuation, parking lot noise at the nearest receptor would be 42.4 dBA which is below the City's residential noise standard. Therefore, noise impacts from parking lots would be less than significant.

Off-Site Traffic Noise. Implementation of the Project would generate increased traffic volumes along nearby roadway segments. According to the Traffic Impact Study, the proposed Project would generate

[6] Kariel, H. G., *Noise in Rural Recreational Environments*, Canadian Acoustics 19(5), 3-10, 1991.
[7] Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden. Noise Navigator Sound Level Database with Over 1700 Measurement Values, July 6, 2010.
[8] Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.

11,076 daily trips which would result in noise increases on Project area roadways. In general, a traffic noise increase of less than 3 dBA is barely perceptible to people, while a 5-dBA increase is readily noticeable.[9] Generally, traffic volumes on Project area roadways would have to approximately double for the resulting traffic noise levels to increase by 3 dBA. Therefore, permanent increases in ambient noise levels of less than 3 dBA are considered to be less than significant.

Traffic noise levels for roadways primarily affected by the Project were calculated using the FHWA's Highway Noise Prediction Model (FHWA-RD-77-108). Traffic noise modeling was conducted for conditions with and without the Project, based on traffic volumes from the Traffic Impact Analysis. As indicated in Table 9: Opening Year and Opening Year Plus Project Traffic Noise Levels, Opening Year Plus Project traffic-generated noise levels on Project area roadways would range between 65.8 dBA CNEL and 73.2 dBA CNEL at 100 feet from the centerline, and the Project would result in a maximum increase of 2.6 dBA CNEL along Town Circle. Noise impacts from off-site traffic would be less than significant.

Table 9: Opening Year and Opening Year Plus Project Traffic Noise Levels

Roadway Segment	Opening Year		Opening Year Plus Project		Project Change from No Build Conditions	Noise Threshold	Significant Impact?
	ADT	dBA CNEL[1]	ADT	dBA CNEL[1]			
Day Street							
SR 60 WB Ramp to SR 60 EB Ramp	41,732	71.2	42,588	71.3	0.1	3.0	No
SR 60 EB Ramp to Canyon Springs Parkway	55,258	72.8	60,436	73.2	0.4	3.0	No
Canyon Springs Pkwy to Campus Parkway	39,617	71.4	44,430	71.9	0.5	3.0	No
Campus Pkwy to Gateway Drive	37,321	71.0	40,300	71.3	0.3	3.0	No
Gateway Drive to Eucalyptus Avenue	27,819	69.7	27,059	69.5	-0.2	3.0	No
Eucalyptus Avenue							
Day Street to Towngate Boulevard	22,235	67.6	23,761	67.8	0.2	3.0	No
Campus Pkwy to Centerpoint Drive	18,854	66.8	19,669	67.0	0.2	3.0	No
Town Circle							
Campus Pkwy to Centerpoint Drive	7,984	63.2	14,664	65.8	2.6	3.0	No
Centerpoint Drive							
Town Circle and Frederick Street	19,098	66.2	28,095	67.9	1.7	3.0	No
Towngate Boulevard							
Eucalyptus Avenue and Frederick Street	12,379	65.9	14,899	66.8	0.9	3.0	No
Pigeon Pass Road							
Hemlock Avenue to Sunnymead Boulevard	42,095	72.1	43,663	72.2	0.1	3.0	No
Frederick Street							
Sunnymead Blvd to Centerpoint Drive	41,279	71.3	48,177	71.9	0.6	3.0	No
Centerpoint Drive to Towngate Boulevard	30,604	69.9	27,829	69.5	-0.4	3.0	No
Towngate Boulevard to Eucalyptus Avenue	28,687	69.6	28,437	69.6	0.0	3.0	No

ADT = average daily trips; dBA = A-weighted decibels; CNEL= Community Equivalent Noise Level
1. Traffic noise levels are at 100 feet from the roadway centerline.
Source: Based on traffic data provided by Kittelson and Associates, Inc., March 2022. Refer to Appendix B for traffic noise modeling results.

[9] Federal Highway Administration, *Highway Traffic Noise Analysis and Abatement Policy and Guidance, Noise Fundamentals*, https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm, accessed April 13, 2022.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

Threshold 6.2 Would the Project generate excessive groundborne vibration or groundborne noise levels?

Increases in groundborne vibration levels attributable to the proposed Project would be primarily associated with short-term construction-related activities. The Federal Transit Administration (FTA) has published standard vibration velocities for construction equipment operations in their 2018 *Transit Noise and Vibration Impact Assessment Manual*. The types of construction vibration impacts include human annoyance and building damage.

The Federal Transit Administration (FTA) has published standard vibration velocities for construction equipment operations. In general, the FTA architectural damage criterion for continuous vibrations (i.e., 0.2 in/sec) appears to be conservative. The types of construction vibration impacts include human annoyance and building damage. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time. Building damage can be cosmetic or structural. Ordinary buildings that are not particularly fragile would not experience any cosmetic damage (e.g., plaster cracks) at distances beyond 30 feet. This distance can vary substantially depending on the soil composition and underground geological layer between vibration source and receiver. In addition, not all buildings respond similarly to vibration generated by construction equipment. For example, for a building that is constructed with reinforced concrete with no plaster, the FTA guidelines show that a vibration level of up to 0.20 in/sec is considered safe and would not result in any construction vibration damage.

Table 10: Typical Construction Equipment Vibration Levels, lists vibration levels at 25 feet for typical construction equipment. Vibration levels at 110 feet, the distance from the Project boundary to the nearest existing structure is also included in Table 10. Ground-borne vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. As indicated in Table 10, based on FTA data, vibration velocities from typical heavy construction equipment operations that would be used during Project construction range from 0.0003 to 0.0096 in/sec PPV at 110 feet from the source of activity.

Table 10: Typical Construction Equipment Vibration Levels

Equipment	Peak Particle Velocity at 25 Feet (in/sec)	Peak Particle Velocity at 110 Feet (in/sec)[1]
Large Bulldozer	0.089	0.0096
Caisson Drilling	0.089	0.0096
Loaded Trucks	0.076	0.0082
Jackhammer	0.035	0.0038
Small Bulldozer/Tractors	0.003	0.0003

[1] Calculated using the following formula: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$, where: PPV_{equip} = the peak particle velocity in in/sec of the equipment adjusted for the distance; PPV_{ref} = the reference vibration level in in/sec from Table 7-4 of the Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, 2018; D = the distance from the equipment to the receiver.

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, 2018.

The nearest structure to the Project construction site is approximately 110 feet away. Table 10 shows that at 110 feet the vibration velocities from construction equipment would not exceed 0.0096 in/sec PPV, which is below the FTA's 0.20 in/sec PPV threshold for building damage. It is also acknowledged that construction activities would occur throughout the Project site and would not be concentrated at the point closest to the nearest structure. Therefore, vibration impacts associated with Project construction would be less than significant.

Once operational, the Project would not be a significant source of groundborne vibration. Groundborne vibration surrounding the Project currently result from heavy-duty vehicular travel (e.g. refuse trucks, heavy duty trucks, delivery trucks, and transit buses) on the nearby local roadways. Due to the rapid drop-off rate of ground-borne vibration and the short duration of the associated events, vehicular traffic-induced ground-borne vibration is rarely perceptible beyond the roadway right-of-way, and rarely results in vibration levels that cause damage to buildings in the vicinity. Impacts would be less than significant in this regard.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

Threshold 6.3 For a Project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise levels?

The nearest airport to the Project site is the March Air Force Reserve Base located approximately 2.4 miles to the south. According to the noise compatibility contours figure for the March Air Reserve Base/Inland Port Airport Land Use Compatibility Plan (Riverside County Airport Land Use Commission 2014), the project site is located outside the airport's 60 dBA CNEL noise contour. Therefore, the Project would not expose people residing or working in the Project area to excessive airport- or airstrip-related noise levels and no mitigation is required.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

6.2 Cumulative Noise Impacts

Cumulative Construction Noise

The Project's construction activities would not result in a substantial temporary increase in ambient noise levels. Construction noise would be periodic and temporary noise impacts that would cease upon completion of construction activities. The Project would contribute to other proximate construction project noise impacts if construction activities were conducted concurrently. However, based on the noise analysis above, the Project's construction-related noise impacts would be less than significant following the City of Moreno Valley Municipal Code.

Construction activities at other planned and approved projects near the Project site would be required to comply with applicable City rules related to noise and would take place during daytime hours permitted by the applicable Municipal Code, and projects requiring discretionary City approvals would be required to evaluate construction noise impacts, comply with the City's standard conditions of approval, and implement mitigation, if necessary, to minimize noise impacts. Construction noise impacts are by nature localized. Based on the fact that noise dissipates as it travels away from its source, noise impacts would be limited to the Project site and vicinity. Therefore, Project construction would not result in a cumulatively considerable contribution to significant cumulative impacts, assuming such a cumulative impact existed, and impacts in this regard are not cumulatively considerable.

Cumulative Operational Noise

Cumulative Off-Site Traffic Noise

Cumulative noise impacts describe how much noise levels are projected to increase over existing conditions with the development of the proposed Project and other foreseeable projects. Cumulative noise impacts would occur primarily as a result of increased traffic on local roadways due to buildout of the proposed Project and other projects in the vicinity. Cumulative increases in traffic noise levels were estimated by comparing the Existing and Opening Year Without Project scenarios to the Opening Year Plus Project scenario. The traffic analysis considers cumulative traffic from future growth assumed in the transportation model, as well as cumulative projects.

A project's contribution to a cumulative traffic noise increase would be considered significant when the combined effect exceeds perception level (i.e., auditory level increase) threshold. The following criteria is used to evaluate the combined and incremental effects of the cumulative noise increase.

- *Combined Effect.* The cumulative with Project noise level ("Horizon Year With Project") would cause a significant cumulative impact if a 3.0 dB increase over "Existing" conditions occurs and the resulting noise level exceeds the applicable exterior standard at a sensitive use. Although there may be a significant noise increase due to the proposed Project in combination with other related projects (combined effects), it must also be demonstrated that the Project has an incremental effect. In other words, a significant portion of the noise increase must be due to the proposed Project.
- *Incremental Effects*. The "Horizon Year With Project" causes a 1.0 dBA increase in noise over the "Horizon Year Without Project" noise level.

A significant impact would result only if both the combined and incremental effects criteria have been exceeded. Noise by definition is a localized phenomenon and reduces as distance from the source increases. Consequently, only the proposed Project and growth due to occur in the general area would contribute to cumulative noise impacts.

Table 11: Cumulative Traffic Noise Levels identifies the traffic noise effects along roadway segments in the Project vicinity for "Existing," "Horizon Year Without Project," and "Horizon Year With Project," conditions, including incremental and net cumulative impacts. Table 11 shows the increase for combined effects and incremental effects and none of the segments meet the criteria for cumulative noise increase. The proposed Project would not result in long-term mobile noise impacts based on project-generated traffic as well as cumulative and incremental noise levels. Therefore, the proposed Project, in combination with cumulative background traffic noise levels, would result in a less than significant cumulative impact. The proposed Project's contribution would not be cumulatively considerable.

Table 11: Cumulative Traffic Noise Levels						
Roadway Segment	**Existing (dBA CNEL)**	**Horizon Year Without Project (dBA CNEL)**	**Horizon Year With Project (dBA CNEL)**	**Combined Effects**	**Incremental Effects**	**Cumulatively Significant Impact?**
				Difference In dBA Between Existing and Horizon Year With Project	**Difference In dBA Between Horizon Year Without Project and Horizon Year With Project**	
Day Street						
SR 60 WB Ramp to SR 60 EB Ramp	70.5	72.2	72.3	1.8	0.1	No
SR 60 EB Ramp to Canyon Springs Parkway	72.0	73.9	73.9	1.9	0.0	No
Canyon Springs Pkwy to Campus Parkway	70.4	73.0	73.1	2.7	0.1	No
Campus Pkwy to Gateway Drive	70.0	72.8	72.8	2.8	0.0	No
Gateway Drive to Eucalyptus Avenue	68.9	72.2	72.2	3.3	0.0	No
Eucalyptus Avenue						
I-215 Ramps to Day Street	66.6	69.2	69.4	2.8	0.2	No
Day Street to Towngate Boulevard	66.1	68.4	68.6	2.5	0.2	No
Town Circle						
Campus Parkway to Centerpoint Drive	62.9	63.3	65.2	2.3	1.9	No
Centerpoint Drive						
Town Circle to Frederick Street	65.9	66.4	67.4	1.5	1.0	No
Towngate Boulevard						
Eucalyptus Avenue to Frederick Street	65.4	67.7	68.1	2.7	0.4	No
Pigeon Pass Road						
Hemlock Avenue to Sunnymead Boulevard	71.7	72.6	72.8	1.1	0.2	No
Frederick Street						
Sunnymead Boulevard to Centerpoint Drive	70.8	71.8	72.2	1.4	0.4	No
Centerpoint Drive to Towngate Boulevard	69.4	70.5	70.6	1.2	0.1	No
Towngate Boulevard to Eucalyptus Avenue	69.3	70.3	70.5	1.2	0.2	No
ADT = average daily trips; dBA = A-weighted decibels; CNEL= Community Equivalent Noise Level Source: Based on traffic data provided by Kittelson and Associates, Inc., March 2022. Refer to Appendix B for traffic noise modeling results.						

Cumulative Stationary Noise

Stationary noise sources of the proposed Project would result in an incremental increase in non-transportation noise sources in the Project vicinity. However, as discussed above, operational noise caused by the proposed Project would be less than significant. Similar to the proposed Project, other planned and approved projects would be required to mitigate for stationary noise impacts at nearby sensitive receptors, if necessary. As stationary noise sources are generally localized, there is a limited potential for other projects to contribute to cumulative noise impacts.

No known past, present, or reasonably foreseeable projects would combine with the operational noise levels generated by the Project to increase noise levels above acceptable standards because each project must comply with applicable City regulations that limit operational noise. Therefore, the Project, together with other projects, would not create a significant cumulative impact, and even if there was such a significant cumulative impact, the Project would not make a cumulatively considerable contribution to significant cumulative operational noises.

Given that noise dissipates as it travels away from its source, operational noise impacts from on-site activities and other stationary sources would be limited to the Project site and vicinity. Thus, cumulative operational noise impacts from related projects, in conjunction with Project specific noise impacts, would not be cumulatively significant.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

7 REFERENCES

1. California Department of Transportation, *California Vehicle Noise Emission Levels*, 1987.
2. California Department of Transportation, *Traffic Noise Analysis Protocol*, 2020.
3. California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, 2013.
4. California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, 2020.
5. City of Moreno Valley, *General Plan 2006,* July 2006.
6. City of Moreno Valley, *Municipal Code*, 2021.
7. Federal Highway Administration, *Roadway Construction Noise Model*, 2006.
8. Federal Highway Administration, *Roadway Construction Noise Model User's Guide Final Report*, 2006.
9. Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, 1992.
10. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, 2018.
11. Hanna Partners, *Concept Parcel Plan*, February 2022
12. Kittelson & Associates, *Moreno Valley Mall Redevelopment Traffic Impact Analysis*, March 2022.
13. United States Environmental Protection Agency, *Protective Noise Levels (EPA 550/9-79-100)*, 1979.

Appendix A

NOISE MEASUREMENTS

Noise Measurement Field Data

Project:	Moreno Valley Mall	**Job Number:**	195381001
Site No.:	ST-1	**Date:**	3/30/2022
Analyst:	Serena Lin and Melissa Thayer	**Time:**	12:17 - 12:27 PM
Location:	southeast of the Town Cir and Heritage Way intersection, northwest of the Regency Theater, east of the Fresco Neighborhood		
Noise Sources:	cars, people, residential noise		

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
59.5	47.8	71.2	86.6

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	4 feet

Weather	
Temp. (degrees F):	63
Wind (mph):	< 5 mph
Sky:	Clear
Bar. Pressure:	30.00 inHg
Humidity:	51%

Photo:

Summary

File Name on Meter	March_.007.s	
File Name on PC	LxTse_0005586-20220330 121726-March_.007	
Serial Number	0005586	
Model	SoundExpert® LxT	
Firmware Version	2.404	
User		
Location		
Job Description		
Note		

Measurement

Description		
Start	2022-03-30 12:17:26	
Stop	2022-03-30 12:27:26	
Duration	00:10:00.0	
Run Time	00:10:00.0	
Pause	00:00:00.0	
Pre-Calibration	2022-03-29 16:29:50	
Post-Calibration	None	
Calibration Deviation	---	

Overall Settings

RMS Weight	A Weighting	
Peak Weight	A Weighting	
Detector	Slow	
Preamplifier	PRMLxT1L	
Microphone Correction	Off	
Integration Method	Linear	
OBA Range	Normal	
OBA Bandwidth	1/1 and 1/3	
OBA Frequency Weighting	A Weighting	
OBA Max Spectrum	At LMax	
Overload	122.4 dB	
	A	**C**
Under Range Peak	**78.9**	75.9
Under Range Limit	**25.2**	25.9
Noise Floor	16.1	16.7

Results

LAeq	59.5	
LAE	87.3	
EA	60.052 µPa²h	
LApeak (max)	2022-03-30 12:19:26	86.6
LASmax	2022-03-30 12:22:10	71.2
LASmin	2022-03-30 12:19:02	47.8

Noise Measurement Field Data

Project:	Moreno Valley Mall	**Job Number:**	195381001
Site No.:	ST-2	**Date:**	3/30/2022
Analyst:	Serena Lin and Melissa Thayer	**Time:**	12:33 - 12:43 PM
Location:	north of Town Cir, south of JC Penny		
Noise Sources:	cars		

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
61.6	46.2	73.6	91.8

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	4 feet

Weather	
Temp. (degrees F):	64
Wind (mph):	< 5 mph
Sky:	Clear
Bar. Pressure:	30.00 inHg
Humidity:	49%

Photo:

Kimley»Horn

Summary		
File Name on Meter	March_.008.s	
File Name on PC	LxTse_0005586-20220330 123306-March_.008	
Serial Number	0005586	
Model	SoundExpert® LxT	
Firmware Version	2.404	
User		
Location		
Job Description		
Note		

Measurement		
Description		
Start	2022-03-30 12:33:06	
Stop	2022-03-30 12:43:06	
Duration	00:10:00.0	
Run Time	00:10:00.0	
Pause	00:00:00.0	
Pre-Calibration	2022-03-29 16:29:50	
Post-Calibration	None	
Calibration Deviation	---	

Overall Settings		
RMS Weight	A Weighting	
Peak Weight	A Weighting	
Detector	Slow	
Preamplifier	PRMLxT1L	
Microphone Correction	Off	
Integration Method	Linear	
OBA Range	Normal	
OBA Bandwidth	1/1 and 1/3	
OBA Frequency Weighting	A Weighting	
OBA Max Spectrum	At LMax	
Overload	122.4 dB	
	A	**C**
Under Range Peak	**78.9**	75.9
Under Range Limit	**25.2**	25.9
Noise Floor	16.1	16.7

Results		
LA_{eq}	61.6	
LAE	89.4	
EA	96.242 µPa²h	
$LA_{peak\ (max)}$	2022-03-30 12:39:09	91.8
LAS_{max}	2022-03-30 12:33:12	73.6
LAS_{min}	2022-03-30 12:37:09	46.2

Noise Measurement Field Data

Project:	Moreno Valley Mall	**Job Number:**	195381001
Site No.:	ST-3	**Date:**	3/30/2022
Analyst:	Serena Lin and Melissa Thayer	**Time:**	12:47 - 12:57 PM
Location:	east of Town Cir and Macy's		
Noise Sources:	cars		

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
63.7	52.1	79.3	92.6

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	4 feet

Weather	
Temp. (degrees F):	64
Wind (mph):	< 5 mph
Sky:	Clear
Bar. Pressure:	29.99 inHg
Humidity:	48%

Photo:

Kimley»Horn

Summary

File Name on Meter	March_.009.s
File Name on PC	LxTse_0005586-20220330 124749-March_.009
Serial Number	0005586
Model	SoundExpert® LxT
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2022-03-30 12:47:49
Stop	2022-03-30 12:57:49
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre-Calibration	2022-03-29 16:29:50
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting	
Peak Weight	A Weighting	
Detector	Slow	
Preamplifier	PRMLxT1L	
Microphone Correction	Off	
Integration Method	Linear	
OBA Range	Normal	
OBA Bandwidth	1/1 and 1/3	
OBA Frequency Weighting	A Weighting	
OBA Max Spectrum	At LMax	
Overload	122.4 dB	
	A	**C**
Under Range Peak	**78.9**	75.9
Under Range Limit	**25.2**	25.9
Noise Floor	16.1	16.7

Results

LAeq	63.7	
LAE	91.4	
EA	155.050 µPa²h	
LApeak (max)	2022-03-30 12:53:40	92.6
LASmax	2022-03-30 12:53:41	79.3
LASmin	2022-03-30 12:50:24	52.1

Noise Measurement Field Data

Project:	Moreno Valley Mall	**Job Number:**	195381001
Site No.:	ST-4	**Date:**	3/30/2022
Analyst:	Serena Lin and Melissa Thayer	**Time:**	1:04 - 1:14 PM
Location:	north of Harkins Theater, south of Town Cir		
Noise Sources:	cars, freeway		

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
62.9	56.3	68.3	82.3

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	4 feet

Weather	
Temp. (degrees F):	65
Wind (mph):	< 5 mph
Sky:	Clear
Bar. Pressure:	29.98 inHg
Humidity:	47%

Photo:

Kimley»Horn

Summary

File Name on Meter	March_.010.s	
File Name on PC	LxTse_0005586-20220330 130455-March_.010	
Serial Number	0005586	
Model	SoundExpert® LxT	
Firmware Version	2.404	
User		
Location		
Job Description		
Note		

Measurement

Description		
Start	2022-03-30 13:04:55	
Stop	2022-03-30 13:14:55	
Duration	00:10:00.0	
Run Time	00:10:00.0	
Pause	00:00:00.0	
Pre-Calibration	2022-03-29 16:29:50	
Post-Calibration	None	
Calibration Deviation	---	

Overall Settings

RMS Weight	A Weighting	
Peak Weight	A Weighting	
Detector	Slow	
Preamplifier	PRMLxT1L	
Microphone Correction	Off	
Integration Method	Linear	
OBA Range	Normal	
OBA Bandwidth	1/1 and 1/3	
OBA Frequency Weighting	A Weighting	
OBA Max Spectrum	At LMax	
Overload	122.4 dB	
	A	**C**
Under Range Peak	**78.9**	75.9
Under Range Limit	**25.2**	25.9
Noise Floor	16.1	16.7

Results

LAeq	62.9	
LAE	90.7	
EA	131.050 µPa²h	
LApeak (max)	2022-03-30 13:13:36	82.3
LASmax	2022-03-30 13:11:12	68.3
LASmin	2022-03-30 13:12:06	56.3

Noise Measurement Field Data

Project:	Moreno Valley Mall	**Job Number:**	195381001
Site No.:	ST-5	**Date:**	3/30/2022
Analyst:	Serena Lin and Melissa Thayer	**Time:**	1:20 - 1:30 PM
Location:	south of Town Cir, north of bus bay		
Noise Sources:	freeway, bus bay		

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
63.6	58.1	69.8	83.2

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	4 feet

Weather	
Temp. (degrees F):	65
Wind (mph):	< 5 mph
Sky:	Clear
Bar. Pressure:	29.97 inHg
Humidity:	47%

Photo:

Kimley»Horn

Summary		
File Name on Meter	March_.011.s	
File Name on PC	LxTse_0005586-20220330 132039-March_.011	
Serial Number	0005586	
Model	SoundExpert® LxT	
Firmware Version	2.404	
User		
Location		
Job Description		
Note		

Measurement		
Description		
Start	2022-03-30 13:20:39	
Stop	2022-03-30 13:30:39	
Duration	00:10:00.0	
Run Time	00:10:00.0	
Pause	00:00:00.0	
Pre-Calibration	2022-03-29 16:29:50	
Post-Calibration	None	
Calibration Deviation	---	

Overall Settings		
RMS Weight	A Weighting	
Peak Weight	A Weighting	
Detector	Slow	
Preamplifier	PRMLxT1L	
Microphone Correction	Off	
Integration Method	Linear	
OBA Range	Normal	
OBA Bandwidth	1/1 and 1/3	
OBA Frequency Weighting	A Weighting	
OBA Max Spectrum	At LMax	
Overload	122.4 dB	
	A	**C**
Under Range Peak	**78.9**	75.9
Under Range Limit	**25.2**	25.9
Noise Floor	16.1	16.7

Results		
LA_{eq}	63.6	
LAE	91.4	
EA	151.647 µPa²h	
$LA_{peak\ (max)}$	2022-03-30 13:29:25	83.2
LAS_{max}	2022-03-30 13:29:25	69.8
LAS_{min}	2022-03-30 13:25:38	58.1

Noise Measurement Field Data

Project:	Moreno Valley Mall	**Job Number:**	195381001
Site No.:	ST-6	**Date:**	3/30/2022
Analyst:	Serena Lin and Melissa Thayer	**Time:**	1:34 - 1:44 PM
Location:	near the Moreno Valley Mall's eastern entrance		
Noise Sources:	cars, birds, freeway		

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
55.4	49.9	64.3	86.6

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	4 feet

Weather	
Temp. (degrees F):	66
Wind (mph):	< 5 mph
Sky:	Clear
Bar. Pressure:	29.97 inHg
Humidity:	47%

Photo:

Kimley»Horn

Summary

File Name on Meter	March_.012.s
File Name on PC	LxTse_0005586-20220330 133435-March_.012
Serial Number	0005586
Model	SoundExpert® LxT
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2022-03-30 13:34:35
Stop	2022-03-30 13:44:35
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre-Calibration	2022-03-29 16:29:50
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting		
Peak Weight	A Weighting		
Detector	Slow		
Preamplifier	PRMLxT1L		
Microphone Correction	Off		
Integration Method	Linear		
OBA Range	Normal		
OBA Bandwidth	1/1 and 1/3		
OBA Frequency Weighting	A Weighting		
OBA Max Spectrum	At LMax		
Overload	122.4	dB	
	A		**C**
Under Range Peak	**78.9**		75.9
Under Range Limit	**25.2**		25.9
Noise Floor	16.1		16.7

Results

LAeq	55.4		
LAE	83.1		
EA	22.935	µPa²h	
LApeak (max)	2022-03-30 13:43:05		86.6
LASmax	2022-03-30 13:38:30		64.3
LASmin	2022-03-30 13:35:27		49.9

Appendix B

NOISE DATA

Roadway Construction Noise Model (RCNM),Version 1.

Report date: 3/29/2022
Case Description: Demolition

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Multi-Family	Residential	1	1	1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	270	0
Excavator	No	40		80.7	270	0
Dozer	No	40		81.7	270	0

Results

Equipment		Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Concrete Saw		74.9	67.9	N/A	N/A	N/A	N/A
Excavator		66.1	62.1	N/A	N/A	N/A	N/A
Dozer		67	63	N/A	N/A	N/A	N/A
	Total	74.9	69.9	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Single Family	Residential	1	1	1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	715	0
Excavator	No	40		80.7	715	0
Dozer	No	40		81.7	715	0

Results

Equipment		Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Concrete Saw		66.5	59.5	N/A	N/A	N/A	N/A
Excavator		57.6	53.6	N/A	N/A	N/A	N/A
Dozer		58.6	54.6	N/A	N/A	N/A	N/A
	Total	66.5	61.5	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.

Report date: 3/29/2022
Case Description: Site Prep

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Multi-Family	Residential	1	1	1

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
			Equipment			
Dozer	No	40		81.7	270	0
Tractor	No	40	84		270	0
Dozer	No	40		81.7	270	0

Results

Equipment		Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Dozer		67	63	N/A	N/A	N/A	N/A
Tractor		69.4	65.4	N/A	N/A	N/A	N/A
Dozer		67	63	N/A	N/A	N/A	N/A
	Total	69.4	68.7	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Single Family	Residential	1	1	1

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
			Equipment			
Dozer	No	40		81.7	715	0
Tractor	No	40	84		715	0
Dozer	No	40		81.7	715	0

Results

Equipment		Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Dozer		66.5	59.5	N/A	N/A	N/A	N/A
Tractor		57.6	53.6	N/A	N/A	N/A	N/A
Dozer		58.6	54.6	N/A	N/A	N/A	N/A
	Total	66.5	61.5	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.

Report date: 3/29/2022
Case Description: Grading

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Multi-Family	Residential	1	1	1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	270	0
Grader	No	40	85		270	0
Scraper	No	40		83.6	270	0

Results

Equipment		Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Leq	Evening Lmax	Leq
Excavator		66.1	62.1	N/A	N/A	N/A	N/A
Grader		70.4	66.4	N/A	N/A	N/A	N/A
Scraper		68.9	65	N/A	N/A	N/A	N/A
	Total	70.4	69.6	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Single Family	Residential	1	1	1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	715	0
Grader	No	40	85		715	0
Scraper	No	40		83.6	715	0

Results

Equipment		Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Leq	Evening Lmax	Leq
Excavator		57.6	53.6	N/A	N/A	N/A	N/A
Grader		61.9	57.9	N/A	N/A	N/A	N/A
Scraper		60.5	56.5	N/A	N/A	N/A	N/A
	Total	61.9	61.1	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.

Report date: 3/29/2022
Case Description: Grading

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Multi-Family	Residential	1	1	1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	270	0
Tractor	No	40	84		270	0
Tractor	No	40	84		270	0

Results

Equipment		Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Leq	Evening Lmax	Leq
Crane		65.9	57.9	N/A	N/A	N/A	N/A
Tractor		69.4	65.4	N/A	N/A	N/A	N/A
Tractor		69.4	65.4	N/A	N/A	N/A	N/A
	Total	69.4	68.8	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Single Family	Residential	1	1	1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	715	0
Tractor	No	40	84		715	0
Tractor	No	40	84		715	0

Results

Equipment		Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Leq	Evening Lmax	Leq
Crane		57.6	53.6	N/A	N/A	N/A	N/A
Tractor		61.9	57.9	N/A	N/A	N/A	N/A
Tractor		60.5	56.5	N/A	N/A	N/A	N/A
	Total	61.9	61.1	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.

Report date: 3/29/2022
Case Description: Paviing

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Multi-Family	Residential	1	1	1

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Paver	No	50		77.2	270	0
Roller	No	20		80	270	0
Roller	No	20		80	270	0

Results

		Calculated (dBA)			Noise Limits (dBA)		
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver		62.6	59.6	N/A	N/A	N/A	N/A
Roller		65.4	58.4	N/A	N/A	N/A	N/A
Roller		65.4	58.4	N/A	N/A	N/A	N/A
	Total	65.4	63.6	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Single Family	Residential	1	1	1

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Paver	No	50		77.2	715	0
Roller	No	20		80	715	0
Roller	No	20		80	715	0

Results

		Calculated (dBA)			Noise Limits (dBA)		
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver		54.1	51.1	N/A	N/A	N/A	N/A
Roller		56.9	49.9	N/A	N/A	N/A	N/A
Roller		56.9	49.9	N/A	N/A	N/A	N/A
	Total	56.9	55.1	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.

Report date: 3/29/2022
Case Description: Architectural Coating

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Multi-Family	Residential	1	1	1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	270	0

Results

Equipment		Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Leq	Evening Lmax	Leq
Compressor (air)		63	59	N/A	N/A	N/A	N/A
	Total	63	59	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Single Family	Residential	1	1	1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	715	0

Results

Equipment		Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Leq	Evening Lmax	Leq
Compressor (air)		54.6	50.6	N/A	N/A	N/A	N/A
	Total	54.6	50.6	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Moreno Valley Mall
Project Number: 195381001
Scenario: Existing
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

								Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Day Street	SR 60 WB Ramp to SR 60 EB Ramp	5	0	35,968	40	0	3.0%	5.0%	70.5	113	358	1,131	3,575
2	Day Street	SR 60 EB Ramp to Canyon Springs Pk	8	10	45,986	40	0	3.0%	5.0%	72.0	159	503	1,590	5,028
3	Day Street	Canyon Springs Pkwy to Campus Pkw	7	25	31,649	40	0	3.0%	5.0%	70.4	110	349	1,104	3,492
4	Day Street	Campus Pkwy to Gateway Drive	6	25	29,621	40	0	3.0%	5.0%	70.0	100	316	999	3,158
5	Day Street	Gateway Drive to Eucalyptus Avenue	6	20	23,103	40	0	3.0%	5.0%	68.9	77	243	769	2,432
6	Eucalyptus Avenue	I-215 Ramps to Day Street	4	16	17,931	35	0	3.0%	5.0%	66.6	-	145	459	1,453
7	Eucalyptus Avenue	Day Street to Towngate Boulevard	4	16	15,902	35	0	3.0%	5.0%	66.1	-	129	407	1,288
8	Town Circle	Campus Pkwy to Centerpoint Drive	4	12	7,426	30	0	3.0%	5.0%	62.9	-	61	193	610
9	Centerpoint Drive	Town Circle and Frederick Street	6	20	17,765	25	0	3.0%	5.0%	65.9	-	123	388	1,227
10	Towngate Blvd	Eucalyptus Avenue and Frederick Stre	4	20	10,941	40	0	3.0%	5.0%	65.4	-	110	348	1,100
11	Pigeon Pass Road	Hemlock Avenue to Sunnymead Blvd	5	0	38,384	45	0	3.0%	5.0%	71.7	147	465	1,469	4,645
12	Frederick Street	Sunnymead Blvd to Centerpoint Drive	5	20	37,458	40	0	3.0%	5.0%	70.8	122	384	1,215	3,843
13	Frederick Street	Centerpoint Drive to Towngate Blvd	5	12	27,528	40	0	3.0%	5.0%	69.4	88	278	881	2,785
14	Frederick Street	Towngate Blvd to Eucalyptus Avenue	5	12	26,319	40	0	3.0%	5.0%	69.3	84	266	842	2,662

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Moreno Valley Mall
Project Number: 195381001
Scenario: Opening Year
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

								Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	**Roadway**	**Segment**	**Lanes**	**Width**	**Volume**	**(mph)**	**Factor**	**Trucks**	**Trucks**	**100 Feet**	**70 CNEL**	**65 CNEL**	**60 CNEL**	**55 CNEL**
1	Day Street	SR 60 WB Ramp to SR 60 EB Ramp	5	0	41,732	40	0	3.0%	5.0%	71.2	131	415	1,312	4,148
2	Day Street	SR 60 EB Ramp to Canyon Springs Pk	8	10	55,258	40	0	3.0%	5.0%	72.8	191	604	1,910	6,041
3	Day Street	Canyon Springs Pkwy to Campus Pkw	7	25	39,617	40	0	3.0%	5.0%	71.4	138	437	1,382	4,372
4	Day Street	Campus Pkwy to Gateway Drive	6	25	37,321	40	0	3.0%	5.0%	71.0	126	398	1,258	3,979
5	Day Street	Gateway Drive to Eucalyptus Avenue	6	20	27,819	40	0	3.0%	5.0%	69.7	93	293	926	2,929
6	Eucalyptus Avenue	I-215 Ramps to Day Street	4	16	22,235	35	0	3.0%	5.0%	67.6	57	180	570	1,801
7	Eucalyptus Avenue	Day Street to Towngate Boulevard	4	16	18,854	35	0	3.0%	5.0%	66.8	-	153	483	1,527
8	Town Circle	Campus Pkwy to Centerpoint Drive	4	12	7,984	30	0	3.0%	5.0%	63.2	-	66	207	655
9	Centerpoint Drive	Town Circle and Frederick Street	6	20	19,098	25	0	3.0%	5.0%	66.2	-	132	417	1,319
10	Towngate Blvd	Eucalyptus Avenue and Frederick Stre	4	20	12,379	40	0	3.0%	5.0%	65.9	-	124	393	1,244
11	Pigeon Pass Road	Hemlock Avenue to Sunnymead Blvd	5	0	42,095	45	0	3.0%	5.0%	72.1	161	509	1,611	5,094
12	Frederick Street	Sunnymead Blvd to Centerpoint Drive	5	20	41,279	40	0	3.0%	5.0%	71.3	134	424	1,339	4,235
13	Frederick Street	Centerpoint Drive to Towngate Blvd	5	12	30,604	40	0	3.0%	5.0%	69.9	98	310	979	3,096
14	Frederick Street	Towngate Blvd to Eucalyptus Avenue	5	12	28,687	40	0	3.0%	5.0%	69.6	92	290	918	2,902

[1] Distance is from the centerline of the roadway segment to the receptor location.

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FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Moreno Valley Mall
Project Number: 195381001
Scenario: Opening Year Plus Project
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

								Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Day Street	SR 60 WB Ramp to SR 60 EB Ramp	5	0	42,588	40	0	3.0%	5.0%	71.3	134	423	1,339	4,233
2	Day Street	SR 60 EB Ramp to Canyon Springs Pk	8	10	60,436	40	0	3.0%	5.0%	73.2	209	661	2,090	6,608
3	Day Street	Canyon Springs Pkwy to Campus Pkw	7	25	44,430	40	0	3.0%	5.0%	71.9	155	490	1,550	4,903
4	Day Street	Campus Pkwy to Gateway Drive	6	25	40,300	40	0	3.0%	5.0%	71.3	136	430	1,359	4,296
5	Day Street	Gateway Drive to Eucalyptus Avenue	6	20	27,059	40	0	3.0%	5.0%	69.5	90	285	901	2,849
6	Eucalyptus Avenue	I-215 Ramps to Day Street	4	16	23,761	35	0	3.0%	5.0%	67.8	61	192	609	1,925
7	Eucalyptus Avenue	Day Street to Towngate Boulevard	4	16	19,669	35	0	3.0%	5.0%	67.0	-	159	504	1,593
8	Town Circle	Campus Pkwy to Centerpoint Drive	4	12	14,664	30	0	3.0%	5.0%	65.8	-	120	381	1,204
9	Centerpoint Drive	Town Circle and Frederick Street	6	20	28,095	25	0	3.0%	5.0%	67.9	-	194	614	1,940
10	Towngate Blvd	Eucalyptus Avenue and Frederick Stre	4	20	14,899	40	0	3.0%	5.0%	66.8	-	150	474	1,498
11	Pigeon Pass Road	Hemlock Avenue to Sunnymead Blvd	5	0	43,663	45	0	3.0%	5.0%	72.2	167	528	1,671	5,284
12	Frederick Street	Sunnymead Blvd to Centerpoint Drive	5	20	48,177	40	0	3.0%	5.0%	71.9	156	494	1,563	4,943
13	Frederick Street	Centerpoint Drive to Towngate Blvd	5	12	27,829	40	0	3.0%	5.0%	69.5	89	281	890	2,815
14	Frederick Street	Towngate Blvd to Eucalyptus Avenue	5	12	28,437	40	0	3.0%	5.0%	69.6	91	288	910	2,876

[1] Distance is from the centerline of the roadway segment to the receptor location.
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FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Moreno Valley Mall
Project Number: 195381001
Scenario: Horizon Year
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

								Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	**Roadway**	**Segment**	**Lanes**	**Width**	**Volume**	**(mph)**	**Factor**	**Trucks**	**Trucks**	**100 Feet**	**70 CNEL**	**65 CNEL**	**60 CNEL**	**55 CNEL**
1	Day Street	SR 60 WB Ramp to SR 60 EB Ramp	5	0	52,895	40	0	3.0%	5.0%	72.2	166	526	1,663	5,258
2	Day Street	SR 60 EB Ramp to Canyon Springs Pk	8	10	70,504	40	0	3.0%	5.0%	73.9	244	771	2,438	7,708
3	Day Street	Canyon Springs Pkwy to Campus Pkw	7	25	57,253	40	0	3.0%	5.0%	73.0	200	632	1,998	6,318
4	Day Street	Campus Pkwy to Gateway Drive	6	25	56,813	40	0	3.0%	5.0%	72.8	192	606	1,915	6,057
5	Day Street	Gateway Drive to Eucalyptus Avenue	6	20	49,467	40	0	3.0%	5.0%	72.2	165	521	1,647	5,208
6	Eucalyptus Avenue	I-215 Ramps to Day Street	4	16	32,794	35	0	3.0%	5.0%	69.2	84	266	840	2,656
7	Eucalyptus Avenue	Day Street to Towngate Boulevard	4	16	26,745	35	0	3.0%	5.0%	68.4	69	217	685	2,167
8	Town Circle	Campus Pkwy to Centerpoint Drive	4	12	8,295	30	0	3.0%	5.0%	63.3	-	68	215	681
9	Centerpoint Drive	Town Circle and Frederick Street	6	20	20,004	25	0	3.0%	5.0%	66.4	-	138	437	1,382
10	Towngate Blvd	Eucalyptus Avenue and Frederick Stre	4	20	18,495	40	0	3.0%	5.0%	67.7	59	186	588	1,859
11	Pigeon Pass Road	Hemlock Avenue to Sunnymead Blvd	5	0	47,371	45	0	3.0%	5.0%	72.6	181	573	1,813	5,733
12	Frederick Street	Sunnymead Blvd to Centerpoint Drive	5	20	46,131	40	0	3.0%	5.0%	71.8	150	473	1,497	4,733
13	Frederick Street	Centerpoint Drive to Towngate Blvd	5	12	35,452	40	0	3.0%	5.0%	70.5	113	359	1,134	3,586
14	Frederick Street	Towngate Blvd to Eucalyptus Avenue	5	12	33,363	40	0	3.0%	5.0%	70.3	107	337	1,067	3,375

[1] Distance is from the centerline of the roadway segment to the receptor location.
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FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Moreno Valley Mall
Project Number: 195381001
Scenario: Horizon Year Plus Project
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

								Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Day Street	SR 60 WB Ramp to SR 60 EB Ramp	5	0	53,514	40	0	3.0%	5.0%	72.3	168	532	1,682	5,319
2	Day Street	SR 60 EB Ramp to Canyon Springs Pk	8	10	71,605	40	0	3.0%	5.0%	73.9	248	783	2,476	7,829
3	Day Street	Canyon Springs Pkwy to Campus Pkw	7	25	58,338	40	0	3.0%	5.0%	73.1	204	644	2,036	6,438
4	Day Street	Campus Pkwy to Gateway Drive	6	25	56,949	40	0	3.0%	5.0%	72.8	192	607	1,920	6,071
5	Day Street	Gateway Drive to Eucalyptus Avenue	6	20	49,775	40	0	3.0%	5.0%	72.2	166	524	1,657	5,241
6	Eucalyptus Avenue	I-215 Ramps to Day Street	4	16	34,337	35	0	3.0%	5.0%	69.4	88	278	880	2,782
7	Eucalyptus Avenue	Day Street to Towngate Boulevard	4	16	28,496	35	0	3.0%	5.0%	68.6	73	231	730	2,308
8	Town Circle	Campus Pkwy to Centerpoint Drive	4	12	12,618	30	0	3.0%	5.0%	65.2	-	104	328	1,036
9	Centerpoint Drive	Town Circle and Frederick Street	6	20	25,264	25	0	3.0%	5.0%	67.4	-	174	552	1,745
10	Towngate Blvd	Eucalyptus Avenue and Frederick Stre	4	20	20,316	40	0	3.0%	5.0%	68.1	65	204	646	2,042
11	Pigeon Pass Road	Hemlock Avenue to Sunnymead Blvd	5	0	50,100	45	0	3.0%	5.0%	72.8	192	606	1,917	6,063
12	Frederick Street	Sunnymead Blvd to Centerpoint Drive	5	20	51,206	40	0	3.0%	5.0%	72.2	166	525	1,661	5,254
13	Frederick Street	Centerpoint Drive to Towngate Blvd	5	12	35,637	40	0	3.0%	5.0%	70.6	114	360	1,140	3,605
14	Frederick Street	Towngate Blvd to Eucalyptus Avenue	5	12	35,370	40	0	3.0%	5.0%	70.5	113	358	1,131	3,578

[1] Distance is from the centerline of the roadway segment to the receptor location.

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