Acoustical Assessment

845 El Centro Street Project

City of South Pasadena, California

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LIST OF ABBREVIATED TERMS

ADT	Average Daily Traffic
ALUCP	Airport Land Use Compatibility Plan
ANSI	American National Standards Institute
APN	Assessor's Parcel Number
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CLUP	Comprehensive Land Use Plan
CN	Commercial-Neighborhood
CNEL	Community Noise Equivalent Level
CUP	Conditional Use Permit
cy	cubic yard
dB	decibel
dBA	A-weighted decibel
DNL	day-night average
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
Hz	hertz
L_{dn}	day-night average sound level
L_{eq}	Equivalent Sound Level
L_{max}	maximum A-weighted sound level
L_{min}	minimum A-weighted sound level
L_{dn}	day-night average sound level
L_{eq}	Equivalent Sound Level
MSSP	Mission Street Specific Plan
µPa	micropascals
mph	miles per hour
OSHA	Occupational Safety and Health Administration
RM	Residential Medium Density
SPGP	South Pasadena General Plan
SPMC	South Pasadena Municipal Code
PPV	peak particle velocity
RCNM	Roadway Construction Noise Model
STC	Sound Transmission Class

1 INTRODUCTION

This report documents the results of an Acoustical Assessment prepared for the 845 El Centro Street Project (Project). The purpose of this Acoustical Assessment is to evaluate the potential operational noise levels associated with the proposed Project and determine the level of impact the Project would have on the environment.

1.1 Project Location & Setting

The Project site is located along the south side of El Centro Street, immediately west of the Metro Gold Line right-of-way and north of Orange Grove Place in the City of South Pasadena (City), within Los Angeles County, California; refer to **Exhibit 1: Regional Vicinity**. The Project site is more specifically located at 845 El Centro Street/832 Orange Grove Place, with a common reference of 899 El Centro Street. Local access to the Project area is provided via Mission Street to the north, Fremont Avenue to the east and Monterey Road to the south. Regional access is available via the 110 Freeway, accessible from both the north and west of the subject site; refer to **Exhibit 2: Site Vicinity**.

The Project site consists of three parcels (Assessor's Parcel Numbers [APNs] 5315-019-045, 046, and 048) totaling approximately 1.61 acres. The site is currently developed with an approximately 36,000 square-foot, two-story office building (built in 1980) and 159 parking spaces in both covered (gated) and surface parking. Access to the surface parking area is provided at the Project site's eastern boundary from El Centro Street. Access to the covered parking area is provided at the site's western boundary, from El Centro Street. Other noted site conditions include parking lot light standards, ornamental landscaping and a cinderblock wall along the eastern, southern and the southernmost portion of the site's western perimeter.

The Project site is designated Mission Street Specific Plan and Medium Density Residential by the General Plan and is zoned Mission Street Specific Plan (MSSP) and Residential Medium Density (RM). The MSSP was developed to address the impacts of the Metro Gold Line and to implement the Community Vision of Mission Street as South Pasadena's pedestrian oriented historic shopping street.

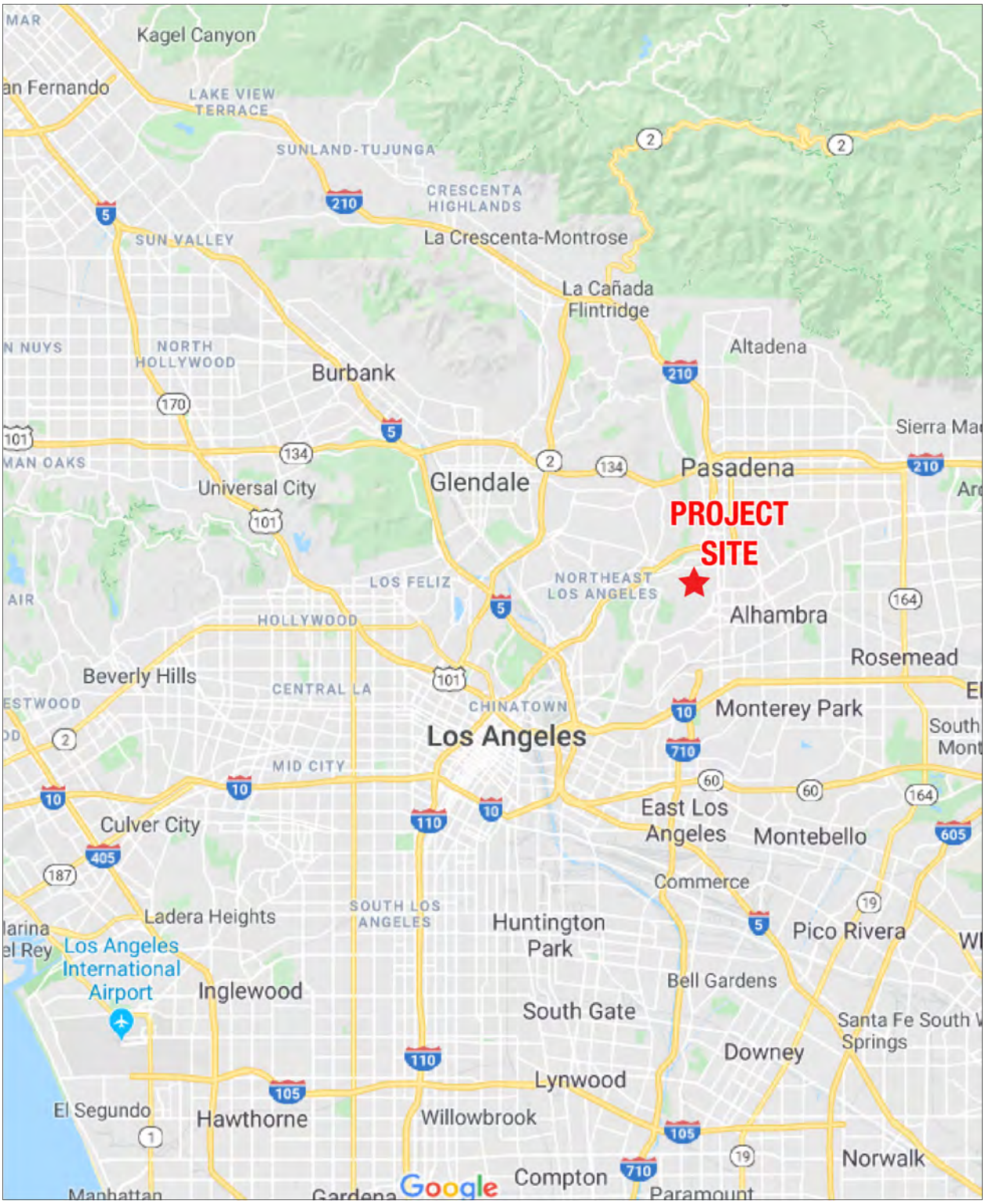
The Project site is bordered by a variety of land uses, including El Centro Street, Orange Grove Park, a self-storage facility, and the City of South Pasadena Public Works Department Maintenance and Operations facility to the north; the Metro Gold Line South Pasadena to the northeast; the Metro Gold Line rail and right-of-way, and single-family residential uses to the east; the terminus of Orange Grove Place and single-family residential uses located across Orange Grove Place to the south; and single-family residential uses to the west.

1.2 Project Description

The Project proposes to remove the existing office building and parking and develop a mixed-use project with underground parking. The proposed Project would combine the three parcels into a single 70,116 square-foot parcel, retaining the existing split of zoning (MSSP and RM), referenced herein as Zone 1: MSSP and Zone 2: RM.

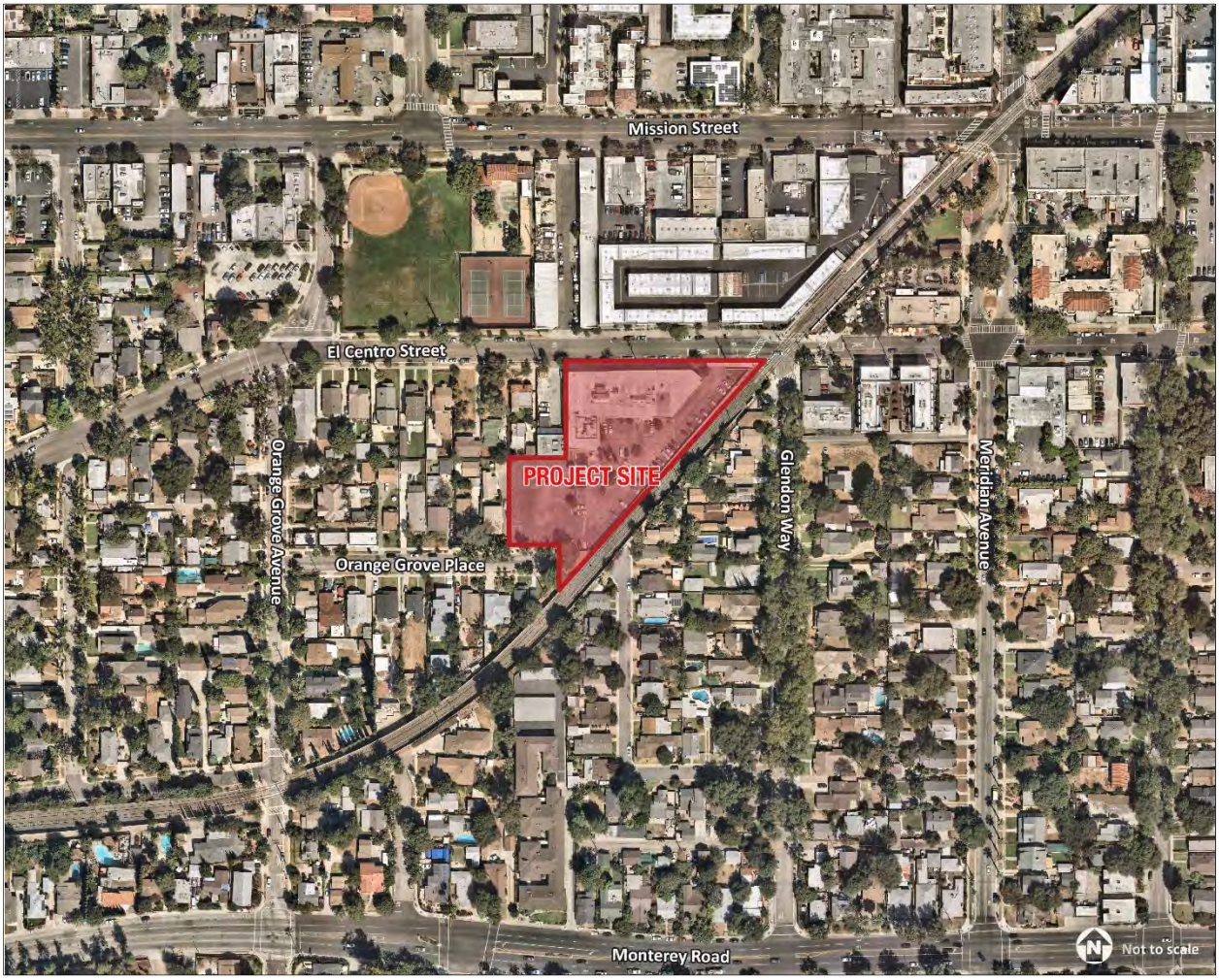
Within Zone 1, the Project proposes a 79,860 square-foot structure with 57 residential units and 6,100 square-feet of commercial uses; refer to **Exhibit 3: Conceptual Site Plan**. The commercial uses would be

Exhibit 1: Regional Vicinity



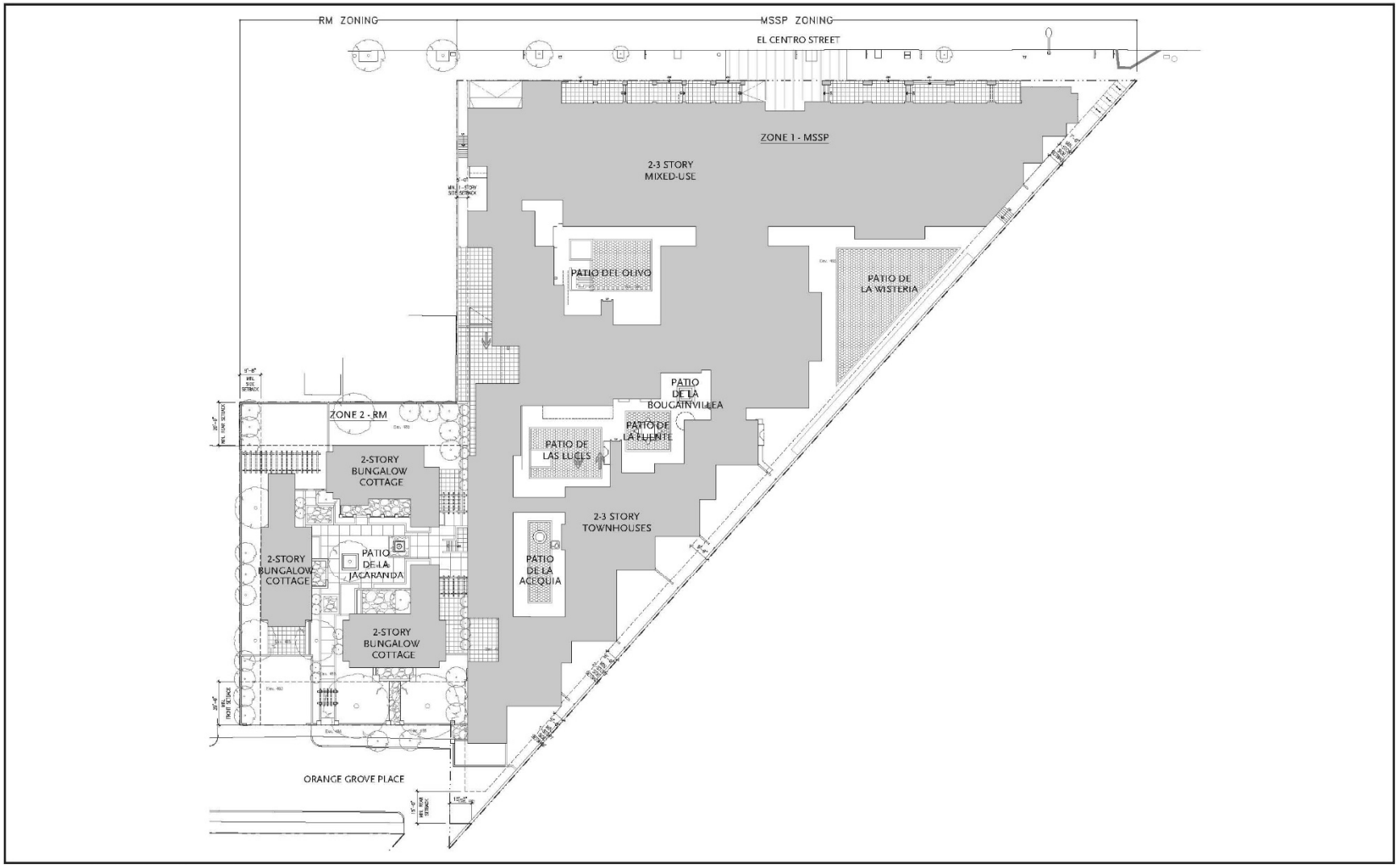
Source: Google Maps, 2019.

Exhibit 2: Site Vicinity



Source: Nearmap, 2019.

Exhibit 3: Site Plan



Source: Moule & Polyzoides, 2019

located on the ground level fronting El Centro Street and are anticipated to be a mixture of restaurant and retail uses. The residential uses would be comprised of studios, lofts, flats, and townhomes within a maximum of three stories. On-site amenities, including a lobby, gym and community rooms would be located within the ground floor of the mixed-use structure. Within Zone 2, the Project proposes three, two-story bungalow cottages with two to four bedrooms and with a maximum height of 30 feet.

Parking for the non-residential (65 spaces) and the residential (112 spaces) uses would be provided within two levels accessed from El Centro Street along the western Project boundary. Residential parking for Zone 1 would be gated and located within Basement Plan 1. Residential parking for Zone 2 would be gated and located within Basement Plan 2 under the cottage bungalows. The remainder of the parking spaces, including five ADA spaces within Basement Plan 2, would be available for visitors accessing the non-residential uses. Six bicycle parking spaces would also be provided.

The Project also proposes open space within six patios distributed throughout the development. Extensive landscaping would be provided along the site's perimeter and throughout the site. Several existing trees, including one street tree and one protected tree, would be removed. The Project proposes to protect in place the remaining street trees and protected trees and provide 95 replacement trees.

Project Construction and Phasing

The Project would be developed in one phase. It is assumed that project construction would occur over approximately 12 months beginning in the summer of 2021. For analysis purposes, it is anticipated that the Project would open in the fall of 2022.

2 FUNDAMENTALS OF 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. The fundamental acoustics model consists of a sound (or 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 to the receptor 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 ambient noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this ambient noise is the sound from individual local sources. These sources can vary from an occasional aircraft or train passing by to virtually continuous noise from, for example, 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 and awkward 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 (dB) correspond closely to human perception of relative loudness. **Table 1: Typical Noise Levels** provides typical noise levels associated with common activities.

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

dBA = A-weighted decibels; mph = miles per hour

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}) is the average noise level averaged 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 pascal 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 decibels 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 noise level during the measurement period.
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} or DNL)	A 24-hour average L_{eq} with a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
Community Noise Equivalent Level (CNEL)	A 24-hour average L_{eq} with a 5 dBA "weighting" during the hours of 7:00 p.m. to 10:00 p.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 used. 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. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

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, 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 dB higher than one source under the same conditions. Under the dB scale, three sources of equal loudness together would produce an increase of 5 dB.

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, often referred to as cylindrical spreading. 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 A-weighted noise levels (dBA), the following relationships should be noted:

- Except in carefully controlled laboratory experiments, a change of 1-dBA 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. An 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 (OSHA) 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]

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

3 REGULATORY SETTING

To limit population exposure to physically and/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 the purpose of 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 residential buildings, schools, and hospitals, the acceptable interior noise limit for new construction is 45 dBA CNEL.

3.2 City of South Pasadena

City of South Pasadena General Plan

The *City of South Pasadena General Plan* (SPGP, adopted October 1998) *Safety and Noise Element*[2] (Noise Element) was developed to identify present noise levels and set forth a program for the control of noise levels that would be harmful to the health, safety and general welfare of the community. Some general objectives of the Noise Element include limiting the noise levels within residential areas, establishing compatible land use adjacent to transportation facilities, and maintaining an ambient noise level within the City that will not be physically or psychologically detrimental to the residents of South Pasadena. Lastly, the objective of the Noise Element is to establish appropriate standards and criteria for desirable sound levels and the identification of means available to achieve the sound levels in the community.

[2] The City of South Pasadena is currently updating its General Plan and released the draft South Pasadena General Plan Update on November 4, 2019. However, since the proposed South Pasadena General Plan Update has not been adopted at the time this Acoustical Assessment was prepared, the relevant policies listed herein are from the SPGP.

The Noise Element contains suggested noise standards for ambient noise levels (average noise level of all background sounds) in the City, as shown in **Table 3: Community Ambient Noise Levels**.

Table 3: Community Ambient Noise Levels

Zone	Time	Quiet	Slightly Noisy
R-1 and R-2	10:00 PM – 7:00 AM 7:00 AM – 7:00 PM 7:00 PM – 10:00 PM	45 dBA 55 dBA 50 dBA	50 dBA 60 dBA 55 dBA
R-3	10:00 PM – 7:00 AM 7:00 AM – 10:00 PM	50 dBA 55 dBA	55 dBA 60 dBA
Commercial	10:00 PM – 7:00 AM 7:00 AM – 10:00 PM	55 dBA 60 dBA	60 dBA 65 dBA
Industrial	Anytime	70 dBA	65 dBA

Source: City of South Pasadena, *City of South Pasadena General Plan Safety and Noise Element*, Table VIII-3

The Noise Element specifies compatibility guidelines for different categories of land use. The City identifies "normally acceptable," "conditionally acceptable," "normally unacceptable" and "clearly unacceptable" noise levels for various land use types. As discussed in the Noise Element, multiple family residential land uses are "normally acceptable" in exterior noise environments up to 65 CNEL and "conditionally acceptable" up to 70 CNEL. Single family residential areas are "normally acceptable" up to 60 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 profession uses. Recreational uses, such as water recreation, are "normally acceptable" up to 75 CNEL and "normally unacceptable" from 70 to 80 CNEL. A "conditionally acceptable" designation implies that new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements for each land use type is made and needed noise insulation features are incorporated in the design. By comparison, a "normally acceptable" designation indicates that standard construction can occur with no special noise reduction requirements. City standards require residential structures to be designed to prevent the intrusion of exterior noises such that interior noise levels attributable to exterior sources do not exceed 45 dBA CNEL in noise-sensitive interior rooms. This conforms to Title 24 of the California Code of Regulations, which requires interior noise levels due to exterior sources not to exceed 45 dBA CNEL.

The Noise Element identifies several different noise sources in the City, including mobile traffic, rail-related noise from the Metro Gold Line, commercial activity, and periodic noise from construction, loud parties, and other events. The Noise Element is intended to identify these sources and provide objectives and policies that ensure that noise from these sources does not create an unacceptable noise environment. The following objectives and policies from the Noise Element would apply to the proposed Project.

Policy 5 Adequately protect indoor and outdoor living areas, and noise-sensitive uses such as schools and convalescent homes, from transportation noise impacts.

Strategy 5.2 Requires the inclusion of appropriate noise mitigation measures in the design as a condition of approval for projects involving a significant increase in noise.

Strategy 5.3: Review truck routes for noise impacts on residential areas and sensitive land uses such as schools and hospitals. If changes in truck routes could reduce noise impacts on sensitive receptors, consider changing the routes.

Strategy 5.5: Require sound insulation of all new development adjacent to high noise areas, including arterials and the freeway, to reduce interior noise levels to 45 dBA.

City of South Pasadena Municipal Code

The City of South Pasadena Municipal Code (SPMC) Chapter 19A (Noise Regulation), herein referenced as the "Noise Ordinance," establishes acceptable ambient sound levels to regulate noises generated by stationary mechanical equipment and vehicles within specific land use zones and provides procedures and criteria for the measurement of noise sources.

In accordance with the Noise Ordinance, a noise level increase from certain regulated noise sources of 5 dBA over the existing ambient noise level at an adjacent property line is considered a noise violation, with adjustments made for steady audible tones, repeated impulsive noise, and noise occurring at limited time periods. The 5 dBA increase above ambient is applicable to City-regulated noise sources (e.g., mechanical equipment), and it is applicable for any time of day.

The following sections of the Noise Ordinance are applicable to the Project:

§ 19A.13 – Construction of Building and Projects

A. It is unlawful for any person to perform any construction activity within a residential zone or within 500 feet thereof on Monday through Friday before 8:00 a.m. and after 7:00 p.m., Saturday before 9:00 a.m. and after 7:00 p.m., and on Sundays and city recognized holidays before 10:00 a.m. and after 6:00 p.m.

B. For the purposes of this section, "construction activity" is activity requiring a building permit and defined to include, but is not limited to, the operation of any manual, electric or pneumatic hammer, saw, shovel, hoist, derrick or any other device used in the performance of site preparation, assembly, repair, demolition, alteration or similar action on structures, rights-of-way, or land.

C. The prohibition of this section shall not apply to emergency work as defined in Article 1 of this chapter.

§ 19A.12 – Machinery, Equipment, Fans, and Air Conditioning

It is unlawful for any person to operate any machinery, equipment, pump, fan, air-condition apparatus, or similar mechanical device in any manner so as to create any noise which would cause the noise level at the property line of any property to exceed the ambient noise level by more than five decibels based on a reference sound pressure of 0.0002 microbars, as measured in any octave band center frequency, in cycles per second, as follows: 63, 125, 250, 500, 1,000, 2,000, 4,000, and 8,000 and for the combined frequency bands, "(A)" band. This regulation does not apply to utilities performing emergency work.

4 EXISTING CONDITIONS

4.1 Sensitive Receptors

Certain land uses are particularly sensitive to noise, including schools, hospitals, rest homes, long-term medical and mental care facilities, and parks and recreation areas. Residential areas are also considered noise sensitive, especially during the nighttime hours. The nearest noise-sensitive uses to the Project site include residential uses to the east, south, and west. **Table 4: Sensitive Receptors**, lists the distances and locations of nearby sensitive receptors, which primarily include single- and multiple-family family residences, religious institutions, educational institutions, recreational facilities, and medical and healthcare facilities.

Table 4: Sensitive Receptors

Receptor Type/Description	Distance and Direction from the Project Site[1,2]
RESIDENTIAL	
Single-Family Residences	Adjoining to the west, south, and east
RELIGIOUS INSTITUTIONS	
South Pasadena Assembly of God	989 feet west
Pasadena United Methodist Church	1,099 feet southwest
Holy Family Catholic Church	2,483 feet southwest
Calvary Presbyterian Church	1,662 feet east
Grace Brethren Church	1,658 feet east
EDUCATIONAL INSTITUTIONS	
El Centro School	704 feet east
Arroyo Vista Elementary School	1,929 feet west
South Pasadena Senior High School	1,634 feet southeast
RECREATIONAL FACILITIES	
Orange Grove Park	43 feet northwest
South Pasadena Public Library	765 feet east
MEDICAL AND HEALTHCARE FACILITIES	
South Pasadena Convalescent Hospital	413 feet to the north

1. Distances measured in Google Earth, 2019.
2. Distance measured from the nearest Project site boundary to the area of frequent receptor exposure (e.g., at a residence, recreational activity area at a park, playground facilities at a school, etc.).

4.2 Noise Measurements

To determine ambient noise levels in the Project area, two 10-minute noise measurements were taken using an American National Standards Institute (ANSI) Type I integrating sound level meter between 11:00 a.m. and 1:00 p.m. on January 14, 2020; refer to **Appendix A: Noise Data**, for noise measurement data. Noise Measurement 1 was taken to represent the ambient noise level at sensitive receptors to the west of the Project site and Noise Measurement 2 was taken to represent the ambient noise level at single family residential uses east of the Project site. The primary noise source during the measurements was traffic on El Centro Street and rail noise from the Metro Gold Line South Pasadena. **Table 5: Noise Measurements**, provides the ambient noise levels measured at these locations, and **Exhibit 4: Noise Measurement Locations**, shows the locations of the noise measurements.

Exhibit 4: Noise Measurement Locations

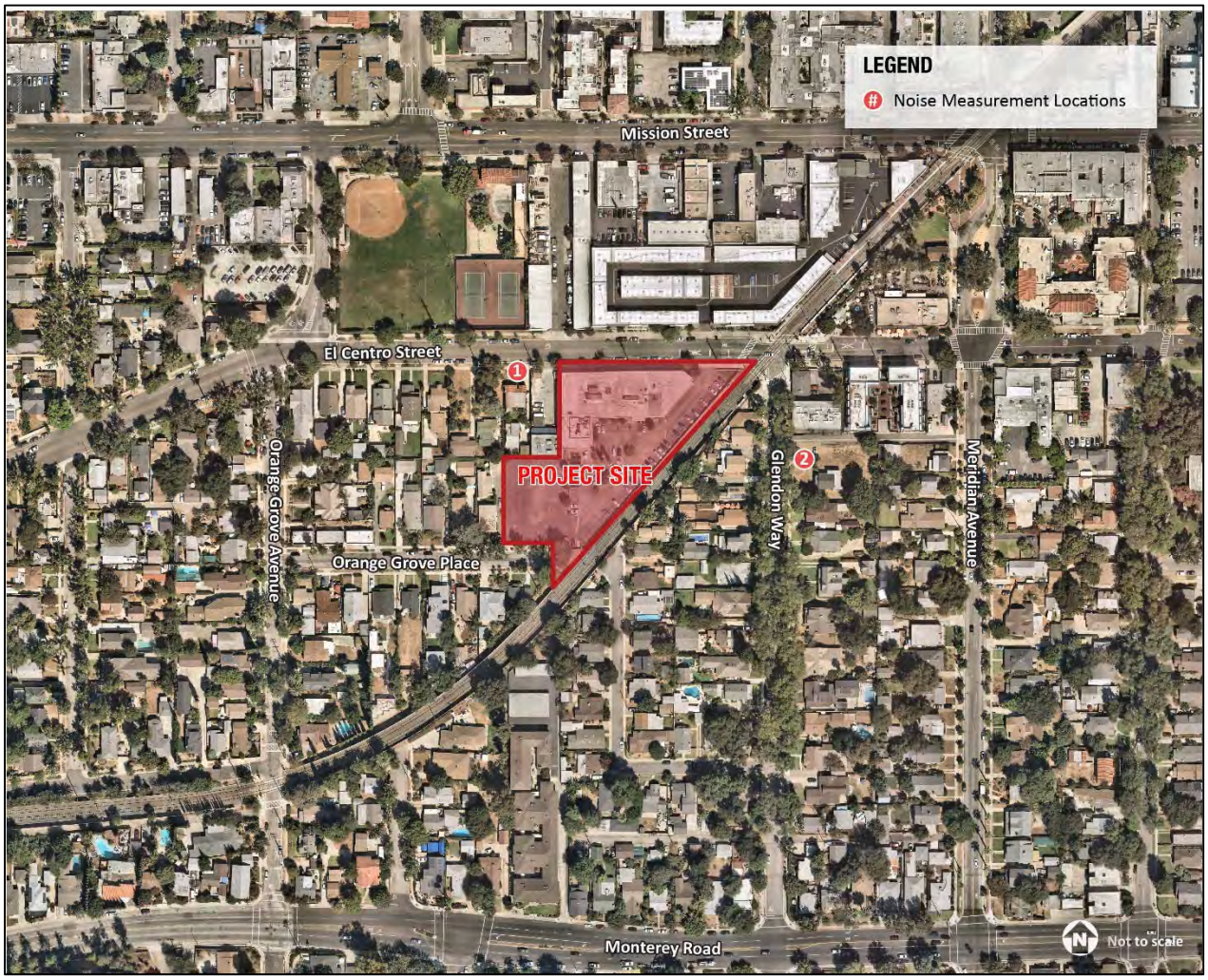


Table 5: Noise Measurements					
Site No.	**Location**	**L_{eq} (dBA)**	**L_{min} (dBA)**	**L_{max} (dBA)**	**Time**
1	Adjacent to residence located at 833 El Centro Street	61.9	46.0	74.8	11:26 a.m.
2	Adjacent to residence located at 1001 Glendon Way	71.1	57.3	82.8	12:45 p.m.
Source: Noise measurements taken by Kimley-Horn on January 14, 2020.					

4.3 Existing Noise Sources

The City is impacted by various noise sources. According to the Noise Element, the major sources of noise in the City include freeway and highway traffic, street traffic, rail-related noised from the Metro Gold Line, commercial activities, and construction activity. The existing noise sources in the Project vicinity are discussed in more detail below.

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 *Seven Patios Mixed-Use Residential/Commercial Retail Project Traffic Impact Analysis* prepared by Ganddini Group, Inc. (February 2020) (Traffic Impact Analysis). 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 6: Existing Traffic Noise Levels**. As shown in **Table 6**, existing traffic noise levels in the Project vicinity range between 41.3 dBA CNEL and 63.9 dBA CNEL.

The Project site is located along El Centro Street and adjacent to the Metro Gold Line South Pasadena. According to the South Pasadena General Plan Update (November 4, 2019), the Project site is located within the 75 dB CNEL to >85 dB CNEL transportation noise contour for the Metro Gold Line South Pasadena rail tracks and El Centro Street (see Figure 2.5.5 of the South Pasadena General Plan Update).[3]

Stationary Sources

The Project site is located within an urbanized area. The primary sources of stationary noise in the Project vicinity are urban-related activities (i.e., mechanical equipment, residential/commercial/medical uses, parking areas, and pedestrians). The noise associated with these sources may represent a single-event noise occurrence, short-term, or long-term/continuous noise.

[3] The City of South Pasadena is currently updating its General Plan and released the draft South Pasadena General Plan Update on November 4, 2019. The proposed South Pasadena General Plan Update has not been adopted at the time this Acoustical Assessment was prepared. Figure 2.5.5 is from the South Pasadena General Plan Update.

Table 6: Existing Traffic Noise Levels

Roadway Segment	ADT	dBA CNEL[1]
El Centro Street		
West of Orange Grove Ave	2,900	55.3
Orange Grove Ave to Project Driveway	4,500	57.2
Project Driveway to Meridian Ave	4,500	57.2
East of Meridian Ave	3,700	56.3
Monterey Road		
West of Orange Grove Ave	18,500	63.4
Orange Grove Ave to Meridian Ave	21,000	63.9
East of Meridian Ave	17,800	63.2
Orange Grove Avenue		
North of El Centro St	3,400	53.6
El Centro St to Monterey Rd	1,300	49.5
South of Monterey Rd	200	41.3
Meridian Avenue		
North of El Centro St	3,600	53.9
El Centro St to Monterey Rd	5,500	55.7
South of Monterey Rd	9,800	58.2

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 Ganddini Group, Inc., February 2020. Refer to **Appendix A** for traffic noise modeling results.

5 SIGNIFICANCE CRITERIA AND METHODOLOGY

5.1 CEQA Thresholds

Based upon the criteria derived from Appendix G of the California Environmental Quality Act (CEQA) Guidelines, a project normally would have a significant effect on the environment 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 ground borne vibration or ground borne 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.

5.2 Methodology

This analysis of noise impacts is based on noise prediction calculations and empirical observations. Construction noise levels were based on typical noise levels generated by construction equipment published by the Federal Transit Administration (FTA). 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.

Groundborne vibration levels associated with construction-related activities for the Project were evaluated utilizing typical groundborne vibration levels associated with construction equipment, obtained from data published by the FTA for construction equipment. Potential groundborne vibration impacts related to structural damage and human annoyance 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 generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. During construction, exterior noise levels could affect the uses surrounding the construction site. Project construction would occur adjacent to a self-storage facility, and the City of South Pasadena Public Works Department Maintenance and Operations facility to the north; single-family residential uses to the east; single-family residential uses located across Orange Grove Place to the south; and single-family residential uses to the west. The closest sensitive receptors are single-family residential dwellings located approximately 20 feet to the west of the Project construction area. However, it is acknowledged that construction activities would occur throughout the Project site and would not be concentrated at a single point near sensitive receptors.

Construction activities would include demolition, site preparation, grading, building construction, paving, and architectural coating. Such activities would require dozers, concrete/industrial saws, and excavators during demolition; dozers and tractors/loaders/backhoes during site preparation; graders, dozers, excavators, and tractors/loaders/backhoes during grading; cranes, forklifts, generators, tractors/loaders/backhoes, and welders during building construction; pavers, rollers, mixers, and paving equipment during paving; and air compressors during architectural coating. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full power operation followed by 3 to 4 minutes at lower power settings. Other primary sources of acoustical disturbance would be random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts). Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. Typical noise levels associated with individual construction equipment are listed in **Table 7: Typical Construction Noise Levels.**

The nearest sensitive receptors to the Project site are the single-family residential dwellings located approximately 20 feet to the west of the Project construction area. Although these receptors would experience increased noise levels during Project construction activities (see **Table 7**), the City does not have construction noise standards for residential uses. Rather, SPMC Section 19A.13 prohibits construction activities within 500 feet of a residential district between the hours of 7:00 p.m. and 8:00 a.m. Monday through Friday, and between 7:00 p.m. and 9:00 a.m. on Saturdays. Construction and repair work is prohibited between the hours of 6:00 p.m. and 10:00 a.m. on Sunday and holidays. These permitted hours of construction are included in the code in recognition that construction activities undertaken during daytime hours are a typical part of living in an urban environment and do not cause a significant disruption. Following compliance with the City's allowable construction hours and SPMC Section 19A.13, Project construction noise would be less than significant.

Table 7: Typical Construction Noise Levels		
Equipment	**Typical Noise Level (dBA) at 50 feet from Source[1]**	**Typical Noise Level (dBA) at 20 feet from Source**
Air Compressor	80	88
Backhoe	80	88
Compactor	82	90
Concrete Mixer	85	93
Concrete Pump	82	90
Concrete Vibrator	76	84
Crane, Derrick	88	96
Crane, Mobile	83	91
Dozer	85	93
Generator	82	90
Grader	85	93
Impact Wrench	85	93
Jack Hammer	88	96
Loader	80	88
Paver	85	93
Pneumatic Tool	85	109
Pump	77	103
Roller	85	93
Saw	76	85
Scraper	85	93
Shovel	82	84
Truck	84	93
1. Calculated using the inverse square law formula for sound attenuation: $dBA_2 = dBA_1+20Log(d_1/d_2)$ Where: dBA_2 = estimated noise level at receptor; dBA_1 = reference noise level; d_1 = reference distance; d_2 = receptor location distance.		
Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.		

Although Project construction noise levels would not exceed any City-established noise standards for construction activities (the City does not employ maximum construction noise level criteria), construction noise levels would exceed existing ambient noise levels at residential receptors in the Project vicinity.[4] Therefore, Noise Recommendation 1 (REC-1) is recommended to reduce construction noise levels at nearby sensitive receptors during Project construction activities.

Construction Traffic Noise

Construction noise may be generated by large trucks moving materials to and from the Project site and due to movement of equipment and workers. Large trucks would be necessary to deliver building materials as well as remove dump materials. Excavation and cut and fill would be required. Based on the California Emissions Estimator Model (CalEEMod) default assumptions for the Project,[5] the Project would generate the highest number of trips during the building construction phase. The model estimates that the Project would generate up to 73 worker trips and 19 vendor trips per day during the building construction phase. Because of the logarithmic nature of noise levels, a doubling of the traffic volume (assuming that the speed and vehicle mix do not also change) would result in a noise level increase of 3

[4] Existing ambient noise levels are shown in **Table 5.**
[5] Kimley-Horn, *845 El Centro Street Project Air Quality Assessment,* February 2020.

dBA.[6] El Centro Street from the Project driveway to Meridian Avenue current experiences 4,500 average daily traffic (ADT) volumes; refer to **Table 7**. Therefore, 92 Project construction trips (73 worker trips and 19 vendor trips) would not double the existing traffic volume per day. Construction related traffic noise would not be noticeable and would not create a significant noise impact.

California establishes noise limits for vehicles licensed to operate on public roads using a pass-by test procedure. Pass-by noise refers to the noise level produced by an individual vehicle as it travels past a fixed location. The pass-by procedure measures the total noise emissions of a moving vehicle with a microphone. When the vehicle reaches the microphone, the vehicle is at full throttle acceleration at an engine speed calculated for its displacement. For heavy trucks, the state pass-by standard is consistent with the federal limit of 80 dB. The state pass-by standard for light trucks and passenger cars (less than 4.5 tons gross vehicle rating) is also 80 dB at 15 meters from the centerline.

Compliance with the SPMC would minimize impacts from construction noise, as construction would be limited to daytime hours. By following the SPMC noise standards, Project construction activities would result in a less than significant noise impact.

Operations

After completion of construction activities, typical noise associated with the proposed Project would include mechanical equipment, parking lot noise, occasional delivery trucks/trash and recycling truck collection, and mobile traffic noise.

Mechanical Equipment

Mechanical equipment (e.g., heating, ventilation, and air conditioning [HVAC] equipment) typically generates noise levels of approximately 52 dBA at 50 feet.[7] Noise has a decay rate due to distance attenuation, which is calculated based on the Inverse Square Law of sound propagation. Based upon the Inverse Square Law, sound levels decrease by 6 dBA for each doubling of distance from the source.[8] The nearest noise-sensitive use (a single-family residential use to the east of the Project site) would be located as close as 40 feet from the HVAC equipment at the Project site. At this distance, mechanical equipment noise would attenuate to approximately 53.9 dBA which is within the City's "Normally Acceptable" range for single-family residential land uses. In addition, noise from the HVAC equipment would meet the City's 65 dBA interior noise standard for single-family residences assuming a standard exterior-interior reduction of 20 dB from standard construction practices and would not exceed existing ambient noise levels in the Project vicinity (see **Table 7**) compliant with SPMC Section 19A.12. It should also be noted that the HVAC equipment would run sporadically throughout the day (when temperatures are warmer) and less frequent during nighttime hours (when temperatures are cooler). Other mechanical equipment (e.g., fire and water pump equipment, generator room, etc.) for the Project would be located in fully enclosed spaces throughout the Project site. Therefore, impacts from mechanical equipment would be less than significant.

[6] 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 February 13, 2020.
[7] Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, 2015.
[8] Cyril M. Harris, *Noise Control in Buildings*, 1994.

Parking Lot Noise

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[9] and may be an annoyance to adjacent noise-sensitive receptors. 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.[10]

Parking lot noise would occur within the subterranean parking structure on the Project site. As noted above, noise levels from parking lot activities typically range from approximately 50 to 61 dBA at a distance of 50 feet. However, parking lot noise is instantaneous and would be well below the City's community noise standards when averaged over time. In addition, parking lot noise would occur within a fully enclosed underground parking garage that would further attenuate parking lot noise and parking lot noise is currently generated on-site and in the Project vicinity under existing conditions. Therefore, noise impacts from parking lots would be less than significant.

Slow-Moving Trucks (Deliveries and Trash/Recycling Collection)

The proposed Project would involve occasional deliveries and weekly trash/recycling collection from slow-moving trucks during normal daytime hours. Deliveries and trash/recycling pickup at the Project site would occur via the access driveway along El Centro Street. Low speed truck noise results from a combination of engine, exhaust, and tire noise as well as the intermittent sounds of back-up alarms and releases of compressed air associated with truck air-brakes. Medium-sized delivery trucks and trash collection trucks typically generate noise levels of 75 dBA at distance of 50 feet.[11] The nearest noise-sensitive receptor (a single-family residential use) would be located approximately 60 feet west of the Project site access driveway along El Centro Street. At this distance, noise levels from truck deliveries and trash collection trucks using this access driveway would be approximately 65 dBA assuming attenuation from intervening buildings and walls,[12] which would result in an interior noise level of 41.4 dBA assuming a standard exterior-interior reduction of 24 dB from standard construction practices. As such, noise from slow-moving trucks accessing the Project site would be within the City's "normally acceptable" noise level of 65 CNEL for residential uses and interior noise level of 45 dBA CNEL. In addition, truck deliveries and trash/recycle collection activities occur in the Project vicinity under existing conditions. Therefore, noise impacts from delivery trucks would be less than significant.

Off-Site Mobile Noise

Implementation of the Project would generate increased traffic volumes along nearby roadway segments. According to the Traffic Impact Analysis, the proposed Project would generate 757 daily trips which would result in noise increases on Project area roadways. In general, a traffic noise increase of less than 3 dBA is

[9] Kariel, H. G., *Noise in Rural Recreational Environments*, Canadian Acoustics 19(5), 3-10, 1991.
[10] Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, 2015.
[11] Ibid.
[12] Federal Highway Administration, *Roadway Construction Noise Model User's Guide Final Report*, January 2006.

barely perceptible to people, while a 5-dBA increase is readily noticeable.[13] 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 8: Existing and Project Traffic Noise Levels**, Existing traffic-generated noise levels on Project area roadways range between 41.3 dBA CNEL and 63.9 dBA CNEL at 100 feet from the centerline, and the Project would result in a maximum increase of 0.4 dBA CNEL along El Centro Street from the Project Driveway to Meridian Avenue. In addition, as shown in **Table 9: Opening Year and Opening Year Plus Project Traffic Noise Levels**, Opening Year traffic noise levels on Project area roadways range between 43.1 dBA CNEL and 64.0 dBA CNEL at 100 feet from the centerline, and the Project would result in a maximum increase of 0.3 dBA CNEL along El Centro Street (from Orange Grove Avenue to the Project driveway and from the Project driveway to Meridian Avenue) and Orange Grove Avenue (from El Centro Street to Monterey Road). In addition, traffic noise levels under Existing Plus Project and Opening Year Plus Project conditions would be below the City's "normally acceptable" noise level of 65 dBA CNEL at all modeled roadways. As such, the Project would result in an increase of less than 3.0 dBA CNEL for the roadway segments analyzed and traffic noise levels would be within the City's acceptable noise standards. A less than significant impact would occur in this regard.

Table 8: Existing and Project Traffic Noise Levels

Roadway Segment	Existing		Existing Plus Project		Project Change from Existing Conditions	Significant Impact?
	ADT	dBA CNEL[1]	ADT	dBA CNEL[1]		
El Centro Street						
West of Orange Grove Ave	2,900	55.3	2,900	55.3	0.0	No
Orange Grove Ave to Project Driveway	4,500	57.2	4,800	57.5	0.3	No
Project Driveway to Meridian Ave	4,500	57.2	4,900	57.6	0.4	No
East of Meridian Ave	3,700	56.3	3,700	56.3	0.0	No
Monterey Road						
West of Orange Grove Ave	18,500	63.4	18,600	63.4	0.0	No
Orange Grove Ave to Meridian Ave	21,000	63.9	21,000	63.9	0.0	No
East of Meridian Ave	17,800	63.2	18,000	63.3	0.1	No
Orange Grove Avenue						
North of El Centro St	3,400	53.6	3,600	53.9	0.3	No
El Centro St to Monterey Rd	1,300	49.5	1,400	49.8	0.3	No
South of Monterey Rd	200	41.3	200	41.3	0.0	No
Meridian Avenue						
North of El Centro St	3,600	53.9	3,800	54.2	0.3	No
El Centro St to Monterey Rd	5,500	55.7	5,700	55.9	0.2	No

[13] 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 February 13, 2020.

Table 8: Existing and Project Traffic Noise Levels

Roadway Segment	Existing		Existing Plus Project		Project Change from Existing Conditions	Significant Impact?
	ADT	dBA CNEL[1]	ADT	dBA CNEL[1]		
South of Monterey Rd	9,800	58.2	9,900	58.3	0.1	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 Ganddini Group, Inc., February 2020. Refer to **Appendix A** for traffic noise modeling results.

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

Roadway Segment	Opening Year		Opening Year Plus Project		Project Change from Opening Year Conditions	Significant Impact?
	ADT	dBA CNEL[1]	ADT	dBA CNEL[1]		
El Centro Street						
West of Orange Grove Ave	3,100	55.6	3,100	55.6	0.0	No
Orange Grove Ave to Project Driveway	4,600	57.3	4,900	57.6	0.3	No
Project Driveway to Meridian Ave	4,600	57.3	5,000	57.6	0.3	No
East of Meridian Ave	3,900	56.6	3,900	56.6	0.0	No
Monterey Road						
West of Orange Grove Ave	18,900	63.5	19,000	63.5	0.0	No
Orange Grove Ave to Meridian Ave	21,400	64.0	21,400	64.0	0.0	No
East of Meridian Ave	18,200	63.3	18,400	63.4	0.1	No
Orange Grove Avenue						
North of El Centro St	3,600	53.9	3,800	54.1	0.2	No
El Centro St to Monterey Rd	1,400	49.8	1,500	50.1	0.3	No
South of Monterey Rd	300	43.1	300	43.1	0.0	No
Meridian Avenue						
North of El Centro St	3,700	54.1	3,900	54.3	0.2	No
El Centro St to Monterey Rd	5,700	55.9	5,900	56.0	0.1	No
South of Monterey Rd	10,100	58.4	10,200	58.4	0.0	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 Ganddini Group, Inc., February 2020. Refer to **Appendix A** for traffic noise modeling results.

On-Site Mobile Noise[14]

As discussed in Section 4.3, *Existing Noise Sources*, the Project site is located along El Centro Street and adjacent to the Metro Gold Line South Pasadena. According to the South Pasadena General Plan Update, the Project site is located within the 75 dB CNEL to >85 dB CNEL transportation noise contour for the Metro Gold Line South Pasadena rail tracks and El Centro Street. As such, future residents of the proposed

[14] The California Supreme Court in a December 2015 opinion (*California Building Industry Association v. Bay Area Air Quality Management District,* 62 Cal. 4th 369 [No. S 213478]) confirmed that CEQA, with several specific exceptions, is concerned with the impacts of a project on the environment, not the effects the existing environment may have on a project. Therefore, this section is not required under CEQA and is included for informational purposes only the evaluation of the significance of Project impacts in the following discussion is provided to ensure compliance with City and State Building Code noise standards.

on-site residential units could be exposed to elevated noise levels from traffic noise along El Centro Street and the Metro Gold Line. Thus, REC-2 and REC-3 are recommended to reduce on-site interior and exterior mobile noise levels to within City standards. REC-2 addresses elevated noise exposure levels by incorporating a minimum of sound transmission class (STC) 39 rated windows for residential units facing the Metro Gold Line tracks and a minimum of STC 32 rated windows for all other residential units on-site. REC-3 recommends the construction of barrier at a minimum height of five feet along the outer edges of the private patios facing the Metro Gold Line rail. The barrier would reduce noise levels at the private patios to below the City's "normally acceptable" noise standard of 65 dBA CNEL.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

Noise Recommendations:

REC-1 Though construction noise is temporary and sporadic and will not present any long-term impacts, the following practices would reduce noise level increases produced by Project construction equipment at the nearby noise-sensitive residential land uses:

- Construction contracts specify that all construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers and other State required noise attenuation devices.

- Property owners and occupants located within 200 feet of the Project boundary shall be sent a notice, at least 15 days prior to commencement of construction of each phase, regarding the construction schedule of the proposed Project. A sign, legible at 50 feet shall also be posted at the Project construction site. All notices and signs shall be reviewed and approved by the City of South Pasadena Planning and Community Development Department, prior to mailing or posting and shall indicate the dates and duration of construction activities, as well as provide a contact name and a telephone number where residents can inquire about the construction process and register complaints.

- Prior to issuance of any Grading or Building Permit, the Project Applicant shall demonstrate to the satisfaction of the City Engineer that construction noise reduction methods shall be used where feasible. These reduction methods include shutting off idling equipment, installing temporary acoustic barriers around stationary construction noise sources, maximizing the distance between construction equipment staging areas and occupied residential areas, and electric air compressors and similar power tools.

- Construction haul routes shall be designed to avoid noise sensitive uses (e.g., residences, convalescent homes, etc.) to the extent feasible.

- During construction, stationary construction equipment shall be placed such that emitted noise is directed away from sensitive noise receivers.

REC-2 After the final architectural drawings have been developed and prior to the issuance of building permits, the Project Applicant shall demonstrate, to the satisfaction of the City of South Pasadena Building Official that the applicable Project plans and specifications incorporate a minimum of sound transmission class (STC) 39 rated for residential units facing the Metro Gold Line tracks windows and the remaining on-site residential units incorporate a minimum of STC 32 rated windows.

REC-3 Prior to the issuance of building permits, the Project Applicant shall demonstrate, to the satisfaction of the City of South Pasadena Building Official that residential units with patios facing the Metro Gold Line tracks shall incorporate noise attenuating balcony and/or patio treatments. Balconies more than 6 feet deep and patios shall include a barrier that is at least 42 inches high as measured from the floor. Acceptable materials for the construction of the barrier shall have a weight of 2.5 pounds per square foot of surface area. The barrier may be composed of the following: masonry block, stucco veneer over wood framing (or foam core), glass, Plexiglass or Lexan (1/4-inch thin) and may be constructed out of a combination of the above listed materials.

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

Construction

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* (FTA Noise and Vibration 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. 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 buildings extremely susceptible to vibration damage (e.g., historic brick buildings, ruins, and ancient monuments, etc.) the FTA guidelines show that a vibration level of up to 0.12 in/sec is considered safe and would not result in any construction vibration damage. Based on the construction vibration guidance and criterion from the FTA Noise and Vibration Manual, a vibration level of 0.3 inch-per-second (in/sec) peak particle velocity (PPV) is used in this analysis to analyze potential significant vibration impacts for construction damage at off-site structures in the Project vicinity. A human annoyance criterion of 0.4 in/sec PPV is also utilized in accordance with Caltrans guidance.[15]

[15] California Department of Transportation, *Transportation and Construction Vibration Guidance Manual, Table 20*, September 2013.

Table 10: Typical Construction Equipment Vibration Levels, lists vibration levels at 25 feet and 50 feet for typical construction equipment. Groundborne 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 0.003 to 0.089 in/sec PPV at 25 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 20 Feet (in/sec)	Peak Particle Velocity at 15 Feet (in/sec)
Vibratory Roller	0.210	0.293	0.452
Hoe Ram	0.089	0.124	0.191
Large Bulldozer	0.089	0.124	0.191
Caisson Drilling	0.089	0.124	0.191
Loaded Trucks	0.076	0.106	0.164
Jackhammer	0.035	0.049	0.075
Small Bulldozer/Tractors	0.003	0.004	0.006

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.
2. Calculated using the following formula: Lv(D) = Lv(25 feet) - (30 x log10(D/25 feet)) per the FTA Transit Noise and Vibration Impact Assessment Manual (2018).

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

The nearest off-site structure is a commercial building located approximately 15 feet to the west of the Project construction zone, located at 835 El Centro Street. This property has been identified as a contributor to a potential historic district (800 Block El Centro Cluster) that is eligible for local listing or designation through survey evaluation in the City of South Pasadena Historic Resources Survey (January 12, 2017). Construction of the proposed Project would not require pile driving or blasting, which are generally the most severe sources of vibration. However, conventional construction equipment, such as bulldozers and loaded trucks would be used for demolition of the existing buildings and paving and heavy trucks may be used for export of demolished and excavated materials.

As shown in **Table 10**, vibration velocities from vibratory rollers would exceed the FTA's 0.3 in/sec PPV threshold and Caltrans' 0.4 in/sec PPV threshold for human annoyance within a distance of 15 feet and is below these thresholds at 20 feet. As such, construction vibration impacts could occur at the nearest off-site structure located approximately 15 feet west of the Project construction zone without mitigation. Thus, Mitigation Measure NOI-1 (MM NOI-1) is recommended to reduce potential construction vibration impacts at the nearest off-site structures. MM NOI-1 prohibits the use of vibratory rollers within 20 feet of any off-site structure and allows for the use of small-scale static or asphalt rollers within this distance. Following compliance with MM NOI-1, construction vibration impacts would be less than significant.

Operations

The Project would not generate ground-borne vibrations that could be felt at surrounding uses. The proposed Project would not involve railroads or substantial heavy truck operations, and therefore would not result in vibration impacts at surrounding uses. As such, no impact would occur in this regard.

Mitigation Measures:

MM NOI-1 Prior to the issuance of a grading permit, the Project Applicant shall provide proof to the City of South Pasadena Planning and Community Development Director that the Contractor would not use large vibratory rollers within 20 feet of off-site buildings, and/or would only use small static wheel rollers or asphalt rollers within 20 feet of off-site buildings.

Level of Significance: Less than significant impact with mitigation.

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 is the Hollywood Burbank Airport located approximately 12.3 miles to the northwest of the Project site. The Project is not within 2.0 miles of a public airport or within an airport land use plan. Additionally, there are no private airstrips located within the Project vicinity. 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

The Project's construction activities would not result in a substantial temporary increase in ambient noise levels. The City permits construction activities within 500 feet of a residential district to the hours before 7:00 a.m. and after 7:00 p.m. on weekdays, before the hours of 8:00 a.m. and after 7:00 p.m. on Saturdays, and restricted to before 10:00 a.m. and after 6:00 p.m. on Sundays and Federal holidays. There would be periodic, 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 compliance with the General Plan and the SPMC. 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, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.
2. California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, September 2013.
3. City of South Pasadena, *City of South Pasadena Mission Street Specific Plan*, April 1996.
4. City of South Pasadena, *Historic Resources Survey*, January 20, 2017.
5. City of South Pasadena, *Proposed 2020 General Plan update*, 2019.
6. City of South Pasadena, *Pasadena Municipal Code*, codified through Ordinance No. 2332, adopted June 19, 2019.
7. Cyril M. Harris, *Noise Control in Buildings*, 1994.
8. Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, 2010.
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 February 13, 2020
10. Federal Highway Administration, *Roadway Construction Noise Model*, 2006.
11. Federal Highway Administration, *Roadway Construction Noise Model User's Guide Final Report*, 2006.
12. Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, 1992.
13. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.
14. Ganddini Group, Inc., *Seven Patios Mixed-Use Residential/Commercial Retail Project Traffic Impact Analysis*, February 2020.
15. Google Earth, 2019.
16. Kariel, H. G., *Noise in Rural Recreational Environments*, Canadian Acoustics 19(5), 3-10, 1991.
17. Moule & Polyzoides Architects and Urbanists, *Site Plans for Seven Patios, 899 El Centro Street, South Pasadena, CA*, received November 2019.
18. United States Environmental Protection Agency, *Protective Noise Levels (EPA 550/9-79-100)*, 1979.

Appendix A

Noise Data

Noise Measurement Field Data

Project:	845 El Centro South Pasadena	**Job Number:**	194231001
Site No.:	1	**Date:**	1/14/2020
Analyst:	Alex Howard	**Time:**	11:26 AM - 11:36 AM
Location:	833 El Centro St., South Pasadena		
Noise Sources:	Traffic noise, Metro rail line, Metro alerts, person vacuuming car		
Comments:	Metro alerts were clearly heard during pass-bys. Metro rail pass-bys weren't too loud but the honking noise was clearly heard, but less than the initial crossing alert.		

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
61.9	46.0	74.8	95.1

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	60
Wind (mph):	< 5
Sky:	Clear
Bar. Pressure:	30.07" Hg
Humidity:	58%

Photo:

Kimley»Horn

Measurement Report

Report Summary

Meter's File Name	GR_EC_.003	Computer's File Name	SLM_0005586_GR_EC__003.02.ldbin
Meter	LxT SE		
Firmware	2.402		
User	Alex Howard	Location	
Description	845 El Centro Street		
Note			
Start Time	2020-01-14 11:26:18	Duration	0:10:00.0
End Time	2020-01-14 11:36:18	Run Time	0:10:00.0
Pause Time	0:00:00.0		

Results

Overall Metrics

LA_{eq}	61.9 dB		
LAE	89.7 dB	SEA	--- dB
EA	103.6 µPa²h		
LZ_{peak}	95.1 dB	2020-01-14 11:28:13	
LAS_{max}	74.8 dB	2020-01-14 11:33:11	
LAS_{min}	46.0 dB	2020-01-14 11:34:32	
LA_{eq}	61.9 dB		
LC_{eq}	68.4 dB	LC_{eq} - LA_{eq}	6.5 dB
LAI_{eq}	63.5 dB	LAI_{eq} - LA_{eq}	1.6 dB

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LZpeak > 135.0 dB	0	0:00:00.0
LZpeak > 137.0 dB	0	0:00:00.0
LZpeak > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight
	61.9 dB	61.9 dB	0.0 dB

	LDEN	LDay	LEve	LNight
	61.9 dB	61.9 dB	--- dB	--- dB

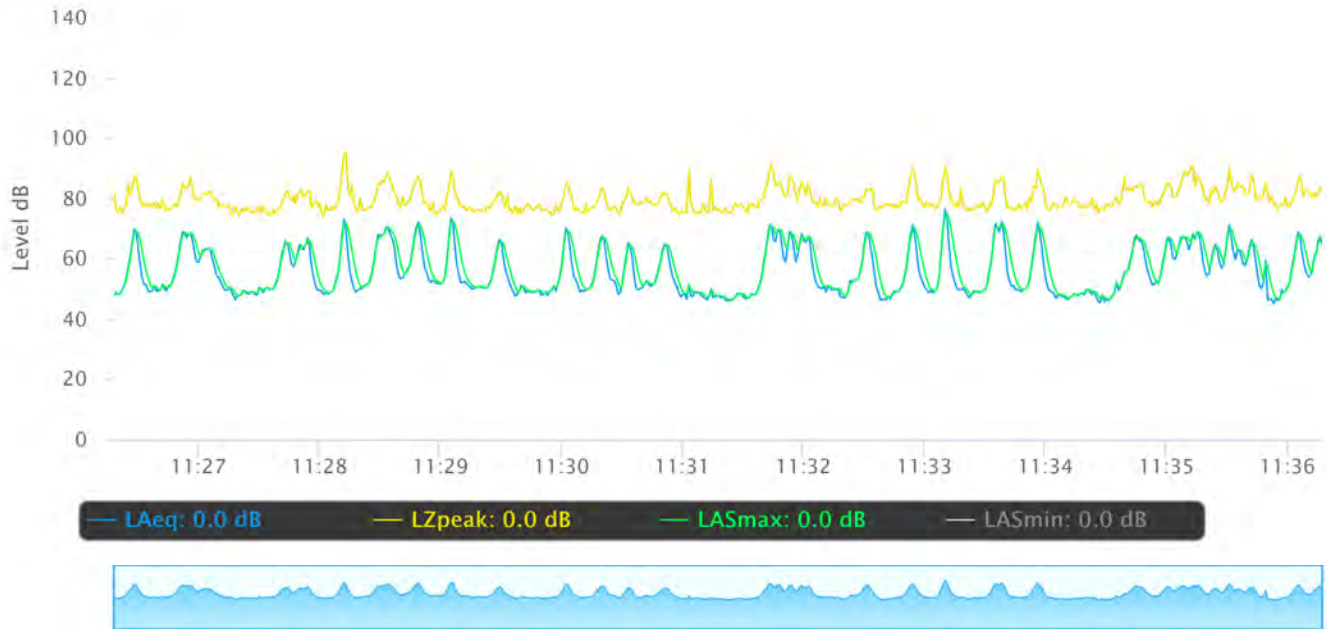
Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	61.9 dB		68.4 dB		--- dB	
$LS_{(max)}$	74.8 dB	2020-01-14 11:33:11	--- dB		--- dB	
$LS_{(min)}$	46.0 dB	2020-01-14 11:34:32	--- dB		--- dB	
$L_{Peak(max)}$	--- dB		--- dB		95.1 dB	2020-01-14 11:28:13

Overloads	Count	Duration	OBA Count	OBA Duration
	0	0:00:00.0	0	0:00:00.0

Statistics

LAS 5.0	68.4 dB
LAS 10.0	66.8 dB
LAS 33.3	60.1 dB
LAS 50.0	54.0 dB
LAS 66.6	50.4 dB
LAS 90.0	48.0 dB

Time History



Noise Measurement Field Data

Project:	845 El Centro South Pasadena	**Job Number:**	194231001
Site No.:	2	**Date:**	1/14/2020
Analyst:	Alex Howard	**Time:**	12:45 PM - 12:55 PM
Location:	1001 Glendon Way, South Pasadena		
Noise Sources:	Traffic noise, Metro, Metro crossing alert		
Comments:	Metro rail noise was most prominent here when during pass-bys, otherwise the noise environment was quiet.		

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
54.4	45.2	68.5	95.9

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	62
Wind (mph):	< 5
Sky:	Partly Cloudy
Bar. Pressure:	30.07" Hg
Humidity:	56%

Photo:

Kimley»Horn

Measurement Report

Report Summary

Meter's File Name	GR_EC_.004	Computer's File Name	SLM_0005586_GR_EC__004.02.ldbin
Meter	LxT SE		
Firmware	2.402		
User	Alex Howard	Location	
Description	845 El Centro Street		
Note			
Start Time	2020-01-14 12:45:05	Duration	0:10:00.0
End Time	2020-01-14 12:55:05	Run Time	0:10:00.0
Pause Time	0:00:00.0		

Results

Overall Metrics

LA_{eq}	54.4 dB		
LAE	82.2 dB	SEA	--- dB
EA	18.5 µPa²h		
LZ_{peak}	95.9 dB	2020-01-14 12:45:31	
LAS_{max}	68.5 dB	2020-01-14 12:50:05	
LAS_{min}	45.2 dB	2020-01-14 12:46:31	
LA_{eq}	54.4 dB		
LC_{eq}	66.0 dB	LC_{eq} - LA_{eq}	11.6 dB
LAI_{eq}	57.0 dB	LAI_{eq} - LA_{eq}	2.6 dB

Exceedances

	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LZpeak > 135.0 dB	0	0:00:00.0
LZpeak > 137.0 dB	0	0:00:00.0
LZpeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight
54.4 dB	54.4 dB	0.0 dB

LDEN	LDay	LEve	LNight
54.4 dB	54.4 dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	54.4 dB		66.0 dB		--- dB	
$LS_{(max)}$	68.5 dB	2020-01-14 12:50:05	--- dB		--- dB	
$LS_{(min)}$	45.2 dB	2020-01-14 12:46:31	--- dB		--- dB	
$L_{Peak(max)}$	--- dB		--- dB		95.9 dB	2020-01-14 12:45:31

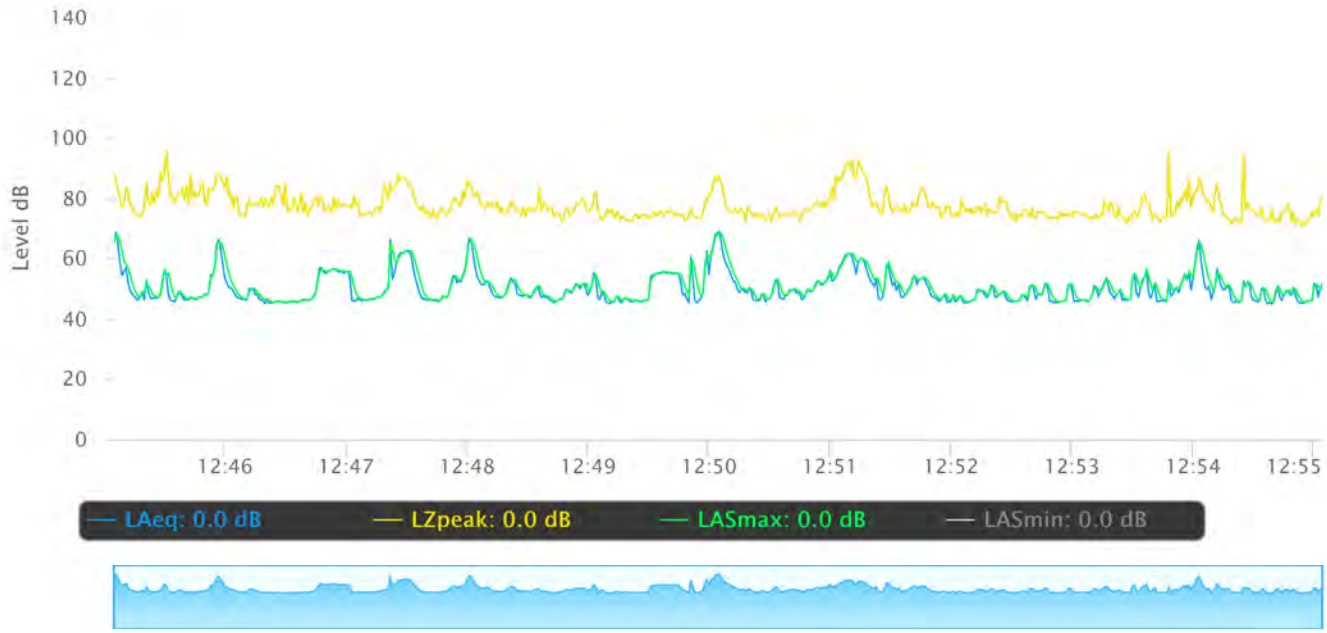
Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	0	0:00:00.0

Statistics

LAS 5.0	61.0 dB
LAS 10.0	57.3 dB
LAS 33.3	51.1 dB
LAS 50.0	49.0 dB
LAS 66.6	47.5 dB
LAS 90.0	46.0 dB

Time History



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

Project Name: Seven Patios Mixed-Use Residential/Commercial Retail Project
Project Number:
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	El Centro	West of Orange Grove Ave	2	0	2,900	35	0	2.0%	1.0%	55.3	-	-	34	107
2	El Centro	Orange Grove Ave to Project Driveway	2	0	4,500	35	0	2.0%	1.0%	57.2	-	-	52	165
3	El Centro	Project Driveway to Merdian Ave	2	0	4,500	35	0	2.0%	1.0%	57.2	-	-	52	165
4	El Centro	East of Meridian Ave	2	0	3,700	35	0	2.0%	1.0%	56.3	-	-	43	136
5	Monterey Rd	West of Orange Grove Ave	4	0	18,500	35	0	2.0%	1.0%	63.4	-	69	218	690
6	Monterey Rd	Orange Grove Ave to Meridian Ave	4	0	21,000	35	0	2.0%	1.0%	63.9	-	78	248	783
7	Monterey Rd	East of Meridian Ave	4	0	17,800	35	0	2.0%	1.0%	63.2	-	66	210	663
8	Orange Grove Ave	North of El Centro St	2	0	3,400	25	0	2.0%	1.0%	53.6	-	-	-	73
9	Orange Grove Ave	El Centro St to Monterey Rd	2	0	1,300	25	0	2.0%	1.0%	49.5	-	-	-	-
10	Orange Grove Ave	South of Monterey Rd	2	0	200	25	0	2.0%	1.0%	41.3	-	-	-	-
11	Meridian Ave	North of El Centro St	2	20	3,600	25	0	2.0%	1.0%	53.9	-	-	-	78
12	Meridian Ave	El Centro St to Monterey Rd	2	0	5,500	25	0	2.0%	1.0%	55.7	-	-	37	118
13	Meridian Ave	South of Monterey Rd	2	0	9,800	25	0	2.0%	1.0%	58.2	-	-	67	211

[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: Seven Patios Mixed-Use Residential/Commercial Retail Project
Project Number:
Scenario: Existing 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			
#	Roadway	Segment	Lanes	Median Width	ADT Volume	Speed (mph)	Alpha Factor	Medium Trucks	Heavy Trucks	CNEL at 100 Feet	Distance to Contour 70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	El Centro	West of Orange Grove Ave	2	0	2,900	35	0	2.0%	1.0%	55.3	-	-	34	107
2	El Centro	Orange Grove Ave to Project Driveway	2	0	4,800	35	0	2.0%	1.0%	57.5	-	-	56	176
3	El Centro	Project Driveway to Merdian Ave	2	0	4,900	35	0	2.0%	1.0%	57.6	-	-	57	180
4	El Centro	East of Meridian Ave	2	0	3,700	35	0	2.0%	1.0%	56.3	-	-	43	136
5	Monterey Rd	West of Orange Grove Ave	4	0	18,600	35	0	2.0%	1.0%	63.4	-	69	219	693
6	Monterey Rd	Orange Grove Ave to Meridian Ave	4	0	21,000	35	0	2.0%	1.0%	63.9	-	78	248	783
7	Monterey Rd	East of Meridian Ave	4	0	18,000	35	0	2.0%	1.0%	63.3	-	67	212	671
8	Orange Grove Ave	North of El Centro St	2	0	3,600	25	0	2.0%	1.0%	53.9	-	-	-	78
9	Orange Grove Ave	El Centro St to Monterey Rd	2	0	1,400	25	0	2.0%	1.0%	49.8	-	-	-	-
10	Orange Grove Ave	South of Monterey Rd	2	0	200	25	0	2.0%	1.0%	41.3	-	-	-	-
11	Meridian Ave	North of El Centro St	2	20	3,800	25	0	2.0%	1.0%	54.2	-	-	-	83
12	Meridian Ave	El Centro St to Monterey Rd	2	0	5,700	25	0	2.0%	1.0%	55.9	-	-	39	123
13	Meridian Ave	South of Monterey Rd	2	0	9,900	25	0	2.0%	1.0%	58.3	-	-	67	213

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

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

Project Name: Seven Patios Mixed-Use Residential/Commercial Retail Project
Project Number:
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			
#	Roadway	Segment	Lanes	Median Width	ADT Volume	Speed (mph)	Alpha Factor	Medium Trucks	Heavy Trucks	CNEL at 100 Feet	Distance to Contour 70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	El Centro	West of Orange Grove Ave	2	0	3,100	35	0	2.0%	1.0%	55.6	-	-	36	114
2	El Centro	Orange Grove Ave to Project Driveway	2	0	4,600	35	0	2.0%	1.0%	57.3	-	-	53	169
3	El Centro	Project Driveway to Merdian Ave	2	0	4,600	35	0	2.0%	1.0%	57.3	-	-	53	169
4	El Centro	East of Meridian Ave	2	0	3,900	35	0	2.0%	1.0%	56.6	-	-	45	143
5	Monterey Rd	West of Orange Grove Ave	4	0	18,900	35	0	2.0%	1.0%	63.5	-	70	223	704
6	Monterey Rd	Orange Grove Ave to Meridian Ave	4	0	21,400	35	0	2.0%	1.0%	64.0	-	80	252	798
7	Monterey Rd	East of Meridian Ave	4	0	18,200	35	0	2.0%	1.0%	63.3	-	68	215	678
8	Orange Grove Ave	North of El Centro St	2	0	3,600	25	0	2.0%	1.0%	53.9	-	-	-	78
9	Orange Grove Ave	El Centro St to Monterey Rd	2	0	1,400	25	0	2.0%	1.0%	49.8	-	-	-	-
10	Orange Grove Ave	South of Monterey Rd	2	0	300	25	0	2.0%	1.0%	43.1	-	-	-	-
11	Meridian Ave	North of El Centro St	2	20	3,700	25	0	2.0%	1.0%	54.1	-	-	-	81
12	Meridian Ave	El Centro St to Monterey Rd	2	0	5,700	25	0	2.0%	1.0%	55.9	-	-	39	123
13	Meridian Ave	South of Monterey Rd	2	0	10,100	25	0	2.0%	1.0%	58.4	-	-	69	217

[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: Seven Patios Mixed-Use Residential/Commercial Retail Project
Project Number:
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	El Centro	West of Orange Grove Ave	2	0	3,100	35	0	2.0%	1.0%	55.6	-	-	36	114
2	El Centro	Orange Grove Ave to Project Driveway	2	0	4,900	35	0	2.0%	1.0%	57.6	-	-	57	180
3	El Centro	Project Driveway to Merdian Ave	2	0	5,000	35	0	2.0%	1.0%	57.6	-	-	58	184
4	El Centro	East of Meridian Ave	2	0	3,900	35	0	2.0%	1.0%	56.6	-	-	45	143
5	Monterey Rd	West of Orange Grove Ave	4	0	19,000	35	0	2.0%	1.0%	63.5	-	71	224	708
6	Monterey Rd	Orange Grove Ave to Meridian Ave	4	0	21,400	35	0	2.0%	1.0%	64.0	-	80	252	798
7	Monterey Rd	East of Meridian Ave	4	0	18,400	35	0	2.0%	1.0%	63.4	-	69	217	686
8	Orange Grove Ave	North of El Centro St	2	0	3,800	25	0	2.0%	1.0%	54.1	-	-	-	82
9	Orange Grove Ave	El Centro St to Monterey Rd	2	0	1,500	25	0	2.0%	1.0%	50.1	-	-	-	32
10	Orange Grove Ave	South of Monterey Rd	2	0	300	25	0	2.0%	1.0%	43.1	-	-	-	-
11	Meridian Ave	North of El Centro St	2	20	3,900	25	0	2.0%	1.0%	54.3	-	-	-	85
12	Meridian Ave	El Centro St to Monterey Rd	2	0	5,900	25	0	2.0%	1.0%	56.0	-	-	40	127
13	Meridian Ave	South of Monterey Rd	2	0	10,200	25	0	2.0%	1.0%	58.4	-	-	69	220

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