The Junipers Project
Environmental Impact Report
SCH No. 2018041032 - Project No. 586670

Appendix C

Acoustical Analysis Report

February 2020

HELIX
Environmental Planning

The Junipers Project

Acoustical Analysis Report

January 2020 | LEN-84

Prepared for:

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ACRONYMS AND ABBREVIATIONS

ADT	average daily trips
ANSI	American National Standards Institute
CAD	Computer Aided Design
CadnaA	Computer Aided Noise Abatement
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dB	decibel
dBA	A-weighted decibel
HVAC	heating, ventilation, and air conditioning
Hz	Hertz
I-	Interstate
kHz	kilohertz
L_{DN}	Day Night sound level
L_{EQ}	time-averaged noise level
LLG	Linscott, Law & Greenspan Engineers
mph	miles per hour
mPa	micro Pascal
NSLU	noise sensitive land use
PPV	peak particle velocity
RCNM	Roadway Construction Noise Model
SANDAG	San Diego Association of Governments
SPL	sound pressure level
STC	Sound Transmission Class
S_{WL}	Sound Power Level
TFIC	Transportation Forecast Information Center
TNM	Traffic Noise Model
USDOT	U.S. Department of Transportation

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EXECUTIVE SUMMARY

This report assesses potential construction and operational noise impacts associated with The Junipers Project (project), a proposed residential development located in the Rancho Peñasquitos Community Plan Area in San Diego, California.

The project proposes the development of a vacant property formerly used as a golf course to create a residential subdivision with a total of 536 units. The project would include 455 attached and detached, multi-family, age-restricted residences, 81 affordable age-restricted multi-family apartments, public and private parks, and internal private streets.

Project construction would involve demolition of existing on-site structures, clearing and grubbing, excavation/soil recompaction, grading, utilities installation, building construction, and paving. Project construction noise would not result in noise levels above City of San Diego (City) Noise Ordinance construction noise thresholds to off-site and on-site noise sensitive land uses (NSLUs). Vibration impacts from construction would not exceed City thresholds.

Operational noise from the project's heating, ventilation, and air conditioning (HVAC) units and recreational use area activities would not exceed City Noise Ordinance thresholds. Project-generated traffic would also result in less than significant noise impacts.

Exterior noise from traffic on Interstate 15 (I-15) would exceed the City Noise Element guidelines for new residents in the project's multi-family residences located in the eastern portion of the site near the freeway. Noise reduction measure NOI-1 has been incorporated into the project design and would reduce noise levels at private exterior use areas through the use of noise barriers. The barriers would be between 6 and 9 feet in height, and would reduce noise exposure to conditionally compatible levels. No noise attenuation measures would be required for common space exterior use areas.

Interior noise levels from freeway traffic noise would exceed the City Noise Element interior noise thresholds of 45 Community Noise Equivalent Level (CNEL) for the new residential uses in the eastern portion of the project site in the vicinity of I-15. The project proposes to implement noise reduction measure NOI-2, requiring an exterior-to-interior noise analysis for interior noise control for all new residences that would be exposed to noise levels of at least 60 CNEL, in order to meet the City Noise Element guidelines. The measure would provide for enhanced noise control design for exterior walls and windows to meet the City's interior 45 CNEL standard. Interior noise reduction measures specifying building materials and techniques would sufficiently reduce interior noise levels to achieve consistency with the City Noise Element guidelines.

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1.0 INTRODUCTION

This report addresses the potential noise impacts that would be associated with construction noise, operational noise, and project-generated traffic noise for The Junipers Project (project). The analysis also includes an assessment of the compatibility of the proposed residential land use with exterior noise generated from Interstate 15 (I-15) and identifies the necessary noise reduction measures to reduce exterior and interior noise levels. These measures were incorporated into the proposed project.

1.1 PROJECT LOCATION

The project is located on an approximately 112.3-acre property at 14455 Peñasquitos Drive (Assessor's Parcel Numbers [APNs] 313-011-06, 313-011-07, and 313-060-10) in the Rancho Peñasquitos Community Plan Area of San Diego. The project is located west of I-15, north of Carmel Mountain Road, and east of Peñasquitos Drive. Surrounding uses include single- and multi-family residential to the west and north, and a hotel (Hotel Karlan) immediately to the south. A large commercial shopping area is located beyond I-15, east of the site along Carmel Mountain Road. Black Mountain Open Space Park is located farther west of the project site, west of Peñasquitos Drive.

The site is currently zoned as Residential (RS-1-14), and is designated as Park, Open Space, and Recreation in the City of San Diego (City) General Plan and Preserve Golf Course Use in the Rancho Peñasquitos Community Plan. Refer to Figure 1, *Regional Location*, and Figure 2, *Project Vicinity*.

1.2 PROJECT DESCRIPTION

The project proposes the development of a property formerly used as a golf course to create a residential subdivision with a total of 536 units. The project would include 455 attached and detached, multi-family, age-restricted residences, and 81 affordable, age-restricted, income-restricted, multi-family apartments. The project would also include amenities such as a privately maintained but publicly-accessible "social loop" perimeter trail, open space/parks for the residents, internal private streets, a public park along Peñasquitos Drive, and a privately-maintained but publicly accessible park adjacent to Carmel Mountain Road that would include a basketball court, two pickleball courts, a mobility zone, a bike hub, and other amenities. As part of the project approval, zoning would be changed to RM-1-1 for the 455 market rate multi-family units, RM-3-7 for the 81 affordable multi-family residences, and OR-1-1 and OP-1-1 for the proposed parks and open space areas. The project would also require a General Plan Amendment and Community Plan Amendment to change the land use designations to Low Density Residential.

Four residential unit types would be constructed throughout the project site. The project would provide 133 single detached units, 136 duplex units, and 186 six-plex units. The single detached units would be a mixture of one- and two-story residences. The first floor would reach a height of 17 feet, and second-story units would have a maximum height of 24 feet. Duplex units would be two stories, with a maximum height of 30 feet. The six-plexes would consist of six residences in a "U" shape, organized around a single drive-aisle. Six-plexes would have a first story of approximately 16.5 feet, with a second story reaching a maximum of 28 feet 7 inches. The fourth residential unit type would be affordable housing apartments. These units would be located in a single structure with a maximum height of approximately 40 feet. The residences would be built around an interior courtyard.

Recreational amenities include private parks located throughout the site. Private park areas would include a private project pool/spa with pickleball courts, and a number of small pocket parks with shade trees, seating areas and other passive uses. An approximately 2.75-mile "social loop" pedestrian trail would be built around the perimeter of the project site. The project would also construct a public park near the Janal Way entry road to the project. The exact amenities provided at the public park will be decided through a General Development Plan public input process. The public park would be dedicated to the City and would be maintained by the City. Finally, the project includes a privately maintained but publicly accessible park in the southeast corner of the site adjacent to Carmel Mountain Road. This park incorporates a mobility zone and bike hub, as well as two pickleball courts, a basketball court, shade structures and seating areas. The mobility zone is proposed to include a drop-off/pickup area for rideshare, carpool and similar purposes; signage regarding transit options and schedule; and shaded seating areas. The bicycle hub is proposed to include bicycle racks (14 spaces), pneumatic air pressure facilities, bike stands with tethered repair tools, outdoor day use lockers and two bike vending kiosks, a staging area for shared scooters and e-bikes with posted user information, and posted information regarding local and regional streets and trails showing bike routes.

Vehicular access to the project site would be provided from Peñasquitos Drive at the existing intersection with Janal Way, and from a right-in only deceleration lane and driveway off of Carmel Mountain Road. Multiple internal roadways and roundabouts would be constructed to provide access within the project site. Pedestrian and other non-vehicular (e.g., bicycle) circulation would be accommodated throughout the site. A 20-foot-wide, gated secondary emergency access road would replace the existing emergency access road in the northern portion of the project site, terminating at Del Diablo Street. Refer to Figure 3, *Site Plan*.

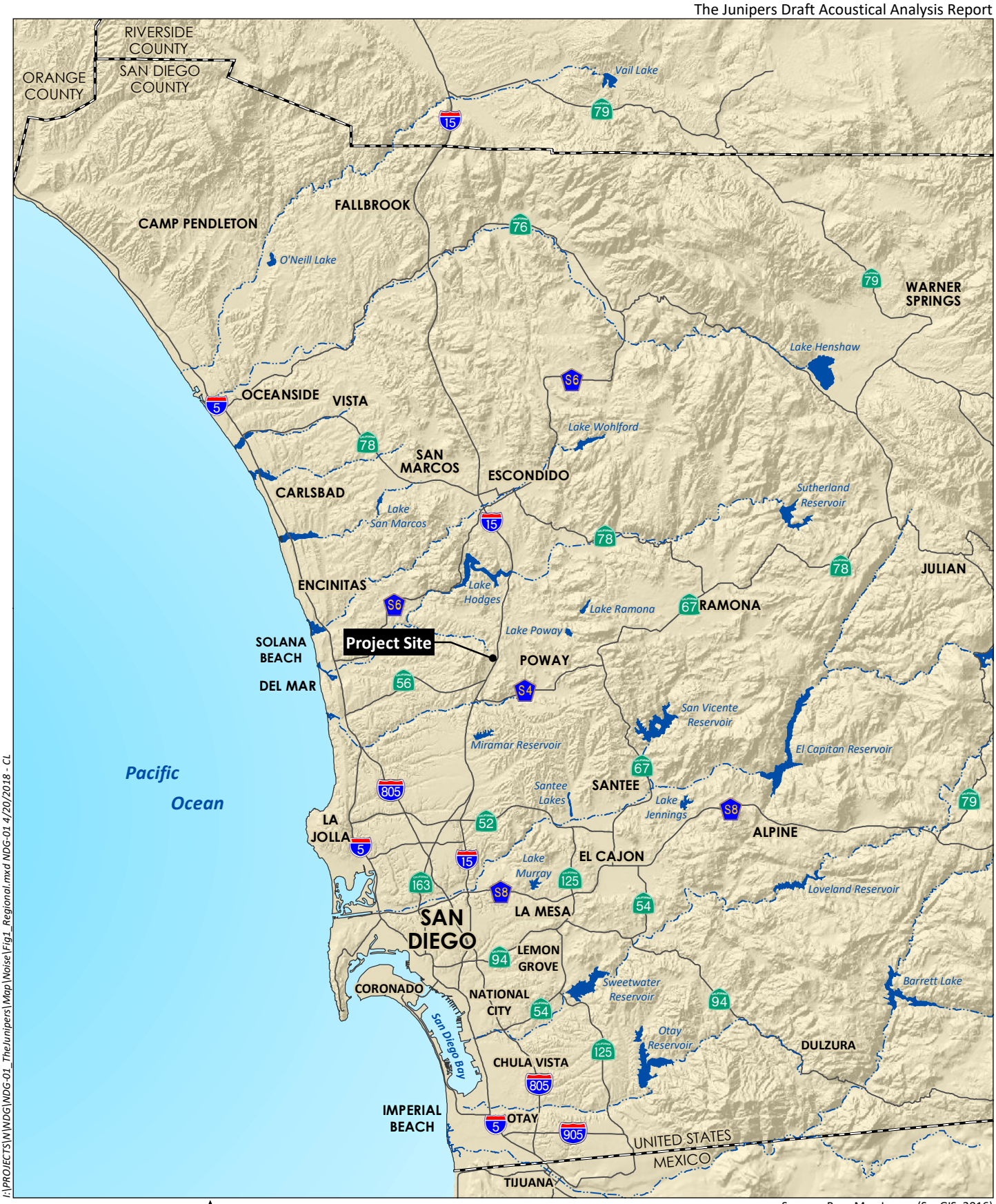
2.0 ENVIRONMENTAL SETTING

2.1 NOISE AND SOUND LEVEL DESCRIPTORS AND TERMINOLOGY

All noise level or sound level values presented herein are expressed in terms of decibels (dB), with A-weighting (dBA) to approximate the hearing sensitivity of humans. Time-averaged noise levels are expressed by the symbol L_{EQ}, with a specified duration. The Community Noise Equivalent Level (CNEL) is a 24-hour average, where noise levels during the evening hours of 7:00 p.m. to 10:00 p.m. have an added 5 dBA weighting, and sound levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. have an added 10 dBA weighting. This is similar to the Day Night sound level (L_{DN}), which is a 24-hour average with an added 10 dBA weighting on the same nighttime hours but no added weighting on the evening hours. Sound levels expressed in CNEL are always based on dBA. These metrics are used to express noise levels for both measurement and municipal regulations, as well as for land use guidelines and enforcement of noise ordinances.

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air) to a hearing organ, such as a human ear. Noise is defined as loud, unexpected, or annoying sound.

In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver contribute to the sound level and



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0 8 Miles

Source: Base Map Layers (SanGIS, 2016)

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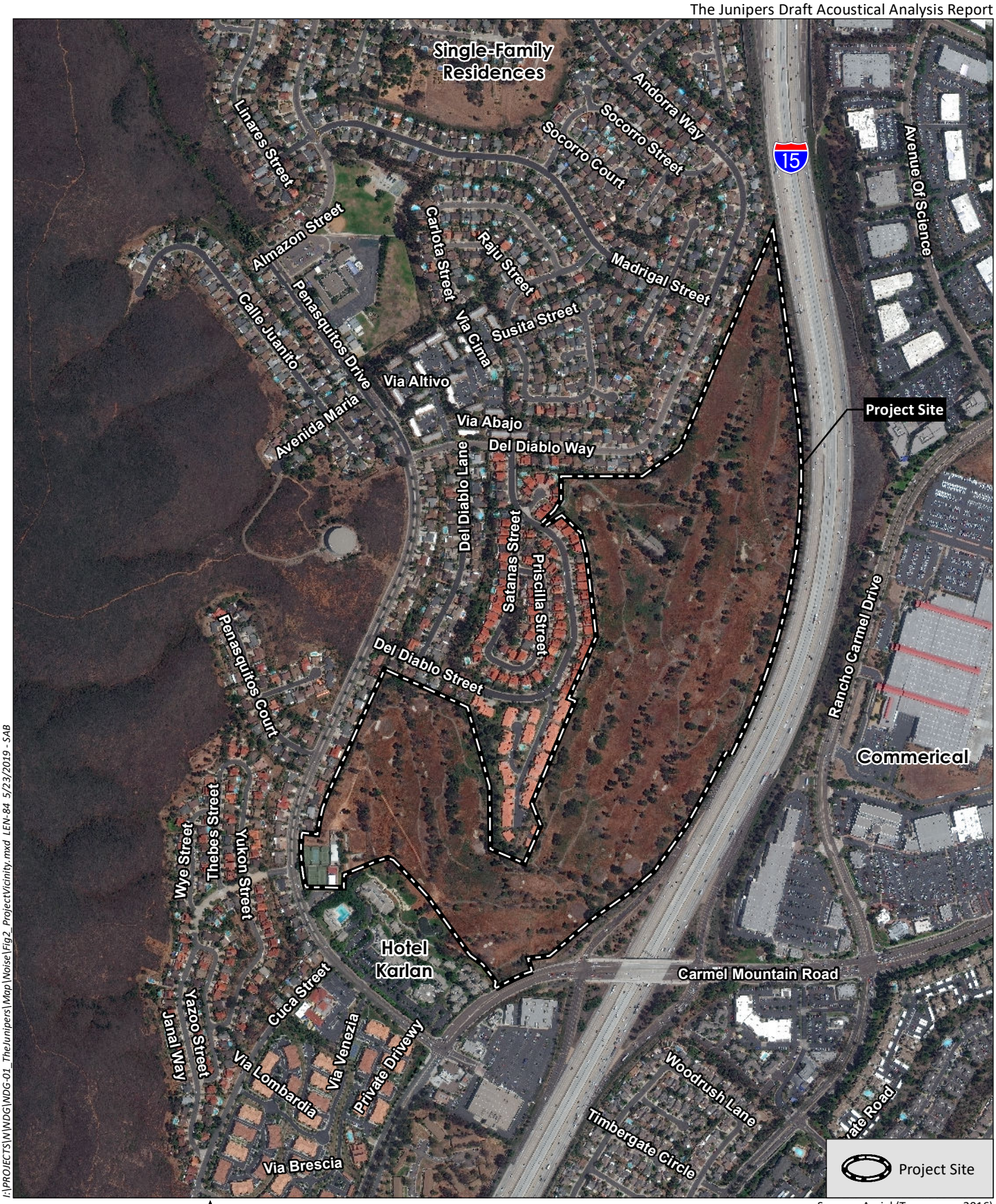
Regional Location

Figure 1



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0 800 Feet

Source: Aerial (Terraserver 2016)

HELIX Environmental Planning

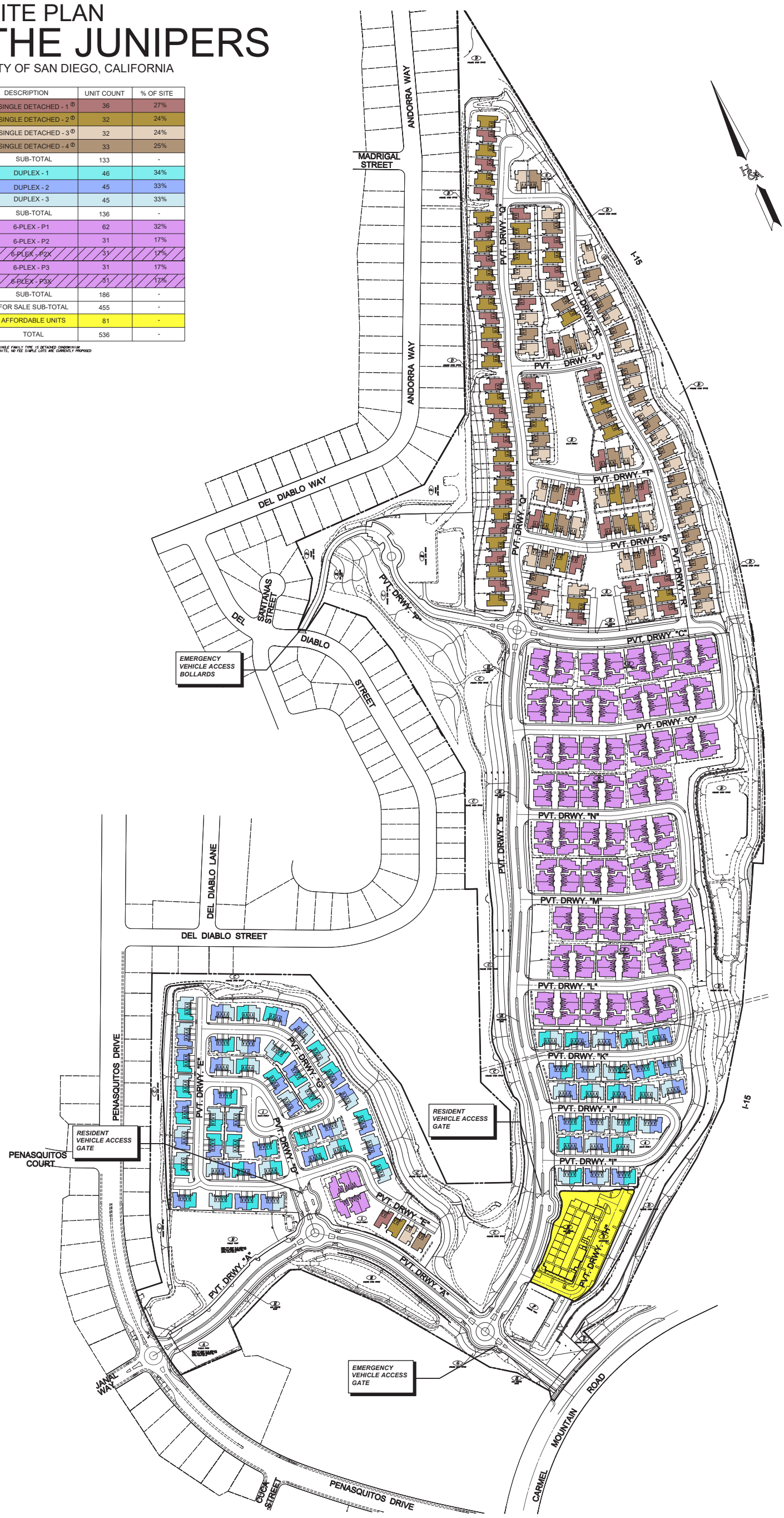
Project Vicinity

Figure 2

SITE PLAN
THE JUNIPERS
CITY OF SAN DIEGO, CALIFORNIA

DESCRIPTION	UNIT COUNT	% OF SITE
SINGLE DETACHED - 1 ①	36	27%
SINGLE DETACHED - 2 ①	32	24%
SINGLE DETACHED - 3 ①	32	24%
SINGLE DETACHED - 4 ①	33	25%
SUB-TOTAL	133	-
DUPLEX - 1	46	34%
DUPLEX - 2	45	33%
DUPLEX - 3	45	33%
SUB-TOTAL	136	-
6-PLEX - P1	62	32%
6-PLEX - P2	31	17%
6-PLEX - P2X	31	17%
6-PLEX - P3	31	17%
6-PLEX - P3X	31	17%
SUB-TOTAL	186	-
FOR SALE SUB-TOTAL	455	-
AFFORDABLE UNITS	81	-
TOTAL	536	-

① SINGLE FAMILY TYPE IS DETACHED CONDOMINIUM UNITS; NO FEE SIMPLE LOTS ARE CURRENTLY PROPOSED



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Source: Hunsaker & Associates 8/2019

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Site Plan

Figure 3

characteristics of the noise perceived by the receiver. The field of acoustics deals primarily with the propagation and control of sound.

Continuous sound can be described by frequency (pitch) and amplitude (loudness). A low frequency sound is perceived as low in pitch. Frequency is expressed in terms of cycles per second, or Hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). High frequencies are sometimes more conveniently expressed in kilohertz (kHz), or thousands of Hertz. The audible frequency range for humans is generally between 20 Hz and 20,000 Hz.

The amplitude of pressure waves generated by a sound source determines the loudness of that source. A logarithmic scale is used to describe sound pressure level (SPL) in terms of dBA units. The threshold of hearing for the human ear is about 0 dBA, which corresponds to 20 micro Pascals (mPa).

Because decibels are logarithmic units, SPL cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3 dBA increase. In other words, 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.

2.2 NOISE AND VIBRATION SENSITIVE LAND USES

Noise-sensitive land uses (NSLUs) are land uses that may be subject to stress and/or interference from excessive noise, such as residential dwellings, schools, transient lodging (hotels), hospitals, educational facilities, and libraries. Industrial and commercial land uses are generally not considered sensitive to noise. Noise receptors are individual locations that may be affected by noise. NSLUs in the project area include single-family residences to the north (see Figure 2).

Land uses in which ground-borne vibration could potentially interfere with operations or equipment, such as research, manufacturing, hospitals, and university research operations (California Department of Transportation [Caltrans] 2013) are considered “vibration-sensitive.” The degree of sensitivity depends on the specific equipment that would be affected by the ground-borne vibration. In addition, excessive levels of ground-borne vibration of either a regular or an intermittent nature can result in annoyance to residential uses or schools. Land uses in the project area that are subject to annoyance from vibration include the single-family residences to the north.

2.3 REGULATORY FRAMEWORK

Applicable noise standards for the proposed project are codified in the following City regulations:

2.3.1 City of San Diego Municipal Code, Chapter 5, Article 9.5, Division 4, §59.5.0404 Construction Noise

(a) It shall be unlawful for any person, between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, or on legal holidays as specified in Section 21.04 of the San Diego Municipal Code, with exception of Columbus Day and Washington’s Birthday, or on Sundays, to erect, construct, demolish, excavate for, alter or repair any building or structure in such a manner as to create disturbing, excessive or offensive noise unless a permit has been applied for and granted beforehand by the Noise Abatement and Control Administrator. In granting such permit, the Administrator shall consider whether

the construction noise in the vicinity of the proposed work site would be less objectionable at night than during the daytime because of different population densities or different neighboring activities; whether obstruction and interference with traffic particularly on streets of major importance, would be less objectionable at night than during the daytime; whether the type of work to be performed emits noises at such a low level as to not cause significant disturbances in the vicinity of the work site; the character and nature of the neighborhood of the proposed work site; whether great economic hardship would occur if the work were spread over a longer time; whether proposed night work is in the general public interest; and he shall prescribe such conditions, working times, types of construction equipment to be used, and permissible noise levels as he deems to be required in the public interest.

(b) Except as provided in subsection (c) hereof, it shall be unlawful for any person, including the City of San Diego, to conduct any construction activity so as to cause, at or beyond the property lines of any property zoned residential, an average sound level greater than 75 dBA during the 12-hour period from 7:00 a.m. to 7:00 p.m.

(c) The provisions of subsection (b) of this section shall not apply to construction equipment used in connection with emergency work, provided the Administrator is notified within 48 hours after commencement of work.

2.3.2 City of San Diego Municipal Code, Chapter 5, Article 9.5, Division 4, §59.5.0401, Sound Level Limits

(a) It shall be unlawful for any person to cause noise by any means to the extent that the one-hour average sound level exceeds the applicable limit given in the following table (Table 1, *Applicable Noise Limits*), at any location in the City on or beyond the boundaries of the property on which the noise is produced. The noise subject to these limits is that part of the total noise at the specified location that is due solely to the action of said person.

Table 1
APPLICABLE NOISE LIMITS

Land Use Zone	Time of Day	One-hour Average Sound Level (dBA)
Single Family Residential	7:00 a.m. to 7:00 p.m.	50
	7:00 p.m. to 10:00 p.m.	45
	10:00 p.m. to 7:00 a.m.	40
Multi-Family Residential (up to a maximum density of 1/2000)	7:00 a.m. to 7:00 p.m.	55
	7:00 p.m. to 10:00 p.m.	50
	10:00 p.m. to 7:00 a.m.	45
All other Residential	7:00 a.m. to 7:00 p.m.	60
	7:00 p.m. to 10:00 p.m.	55
	10:00 p.m. to 7:00 a.m.	50
Commercial	7:00 a.m. to 7:00 p.m.	65
	7:00 p.m. to 10:00 p.m.	60
	10:00 p.m. to 7:00 a.m.	60
Industrial or Agricultural	Anytime	75

Source: City of San Diego Municipal Code, Chapter 5, Article 9.5, Division 4, §59.5.0401, Sound Level Limits

(b) The sound level limit at a location on a boundary between two zoning districts is the arithmetic mean of the respective limits for the two districts. Permissible construction noise level limits shall be governed by Section 59.5.0404 of this article.

2.3.3 City of San Diego General Plan Noise Element

The City General Plan Noise Element (City 2008, amended in 2015) establishes noise compatibility guidelines for uses affected by traffic noise, as shown in Table 2, *City of San Diego Land Use Noise Compatibility Guidelines*. The conditionally compatible noise levels for project land uses are 65 CNEL for single-family residential, 70 CNEL for multi-family residential, and 75 CNEL for commercial-retail and for active and passive recreation (neighborhood and community parks). For outdoor uses at a conditionally compatible land use, feasible noise mitigation techniques should be analyzed and incorporated to reduce noise levels to make the outdoor activities acceptable. For indoor uses at a conditionally compatible land use, exterior noise must be attenuated to 45 CNEL for single- and multi-family residential and 50 CNEL for commercial-retail to be considered a compatible land use.

Table 2
CITY OF SAN DIEGO LAND USE NOISE COMPATIBILITY GUIDELINES[1]

Land Use Category	Exterior Noise Exposure (dBA CNEL)				
	<60	60-65	65-70	70-75	75+
Parks and Recreational					
Parks, Active and Passive Recreation					
Outdoor Spectator Sports, Golf Courses; Water Recreational Facilities; Indoor Recreation Facilities					
Agricultural					
Crop Raising & Farming; Community Gardens, Aquaculture, Dairies; Horticulture Nurseries & Greenhouses; Animal Raising, Maintain & Keeping; Commercial Stables					
Residential					
Single Dwelling Units; Mobile Homes		45			
Multiple Dwelling Units		45	45		
Institutional					
Hospitals; Nursing Facilities; Intermediate Care Facilities; K-12 Educational Facilities; Libraries; Museums; Child Care Facilities		45			
Other Educational Facilities including Vocational/Trade Schools and Colleges, and Universities)		45	45		
Cemeteries					
Retail Sales					
Building Supplies/Equipment; Groceries; Pets & Pet Supplies; Sundries, Pharmaceutical, & Convenience Sales; Apparel & Accessories			50	50	
Commercial Services					
Building Services; Business Support; Eating & Drinking; Financial Institutions; Maintenance & Repair; Personal Services; Assembly & Entertainment (includes public and religious assembly); Radio & Television Studios; Golf Course Support			50	50	
Visitor Accommodations		45	45	45	
Offices					
Business & Professional; Government; Medical, Dental & Health Practitioner; Regional & Corporate Headquarters			50	50	
Vehicle and Vehicular Equipment Sales and Services Use					
Vehicle Repair & Maintenance; Vehicle Sales & Rentals; Vehicle Equipment & Supplies Sales & Rentals; Vehicle Parking					
Wholesale, Distribution, Storage Use Category					
Equipment & Materials Storage Yards; Moving & Storage Facilities; Warehouse; Wholesale Distribution					

Table 2 (cont.)
CITY OF SAN DIEGO LAND USE NOISE COMPATIBILITY GUIDELINES[1]

Land Use Category				Exterior Noise Exposure (dBA CNEL)				
				<60	60-65	65-70	70-75	75+
Industrial								
Heavy Manufacturing; Light Manufacturing; Marine Industry; Trucking & Transportation Terminals; Mining & Extractive Industries								
Research & Development							50	
	Compatible	Indoor Uses	Standard construction methods should attenuate exterior noise to an acceptable indoor noise level.					
		Outdoor Uses	Activities associated with the land use may be carried out.					
45, 50	Conditionally Compatible	Indoor Uses	Building structure must attenuate exterior noise to the indoor noise level indicated by the number (45 or 50) for occupied areas.					
		Outdoor Uses	Feasible noise mitigation techniques should be analyzed and incorporated to make the outdoor activities acceptable.					
	Incompatible	Indoor Uses	New construction should not be undertaken.					
		Outdoor Uses	Severe noise interference makes outdoor activities unacceptable.					

Source: City 2008 (as amended in 2015)

[1] Compatible noise levels and land use definitions reflect amendments to the City's General Plan Noise Element approved in 2015.

2.3.4 City of San Diego Land Development Manual – Biology Guidelines

Noise mitigation is required for significant noise impacts to certain avian species during their breeding season depending on the location. If these species are present, then mitigation would be required if construction or operational noise levels exceed 60 dBA, or the existing ambient noise level if already above 60 dBA during the breeding season. For California gnatcatcher habitat within the MHPA and occupied, construction or operational noise levels exceeding 60 dBA, or the existing ambient noise level if already above 60 dBA during the breeding season is considered significant. There are no restrictions for gnatcatcher habitat outside the MHPA anytime of the year.

2.4 EXISTING CONDITIONS

2.4.1 Surrounding Land Uses

Surrounding uses include single- and multi-family residential to the west and north, and a hotel (Hotel Karlan) immediately to the south (see Figure 2). A large commercial shopping area is located beyond I-15, east of the site along Carmel Mountain Road. Black Mountain Open Space Park is located farther west of the project site, west of Peñasquitos Drive.

2.4.2 Existing Noise Conditions

2.4.2.1 Existing Noise Sources

Existing noise is dominated by the project's proximity to I-15. The nearest airport, MCAS Miramar, is located approximately 7.5 miles to the south. Although some aircraft noise would be audible at the project site, noise levels from MCAS Miramar aircraft would be less than significant and is not addressed in this analysis.

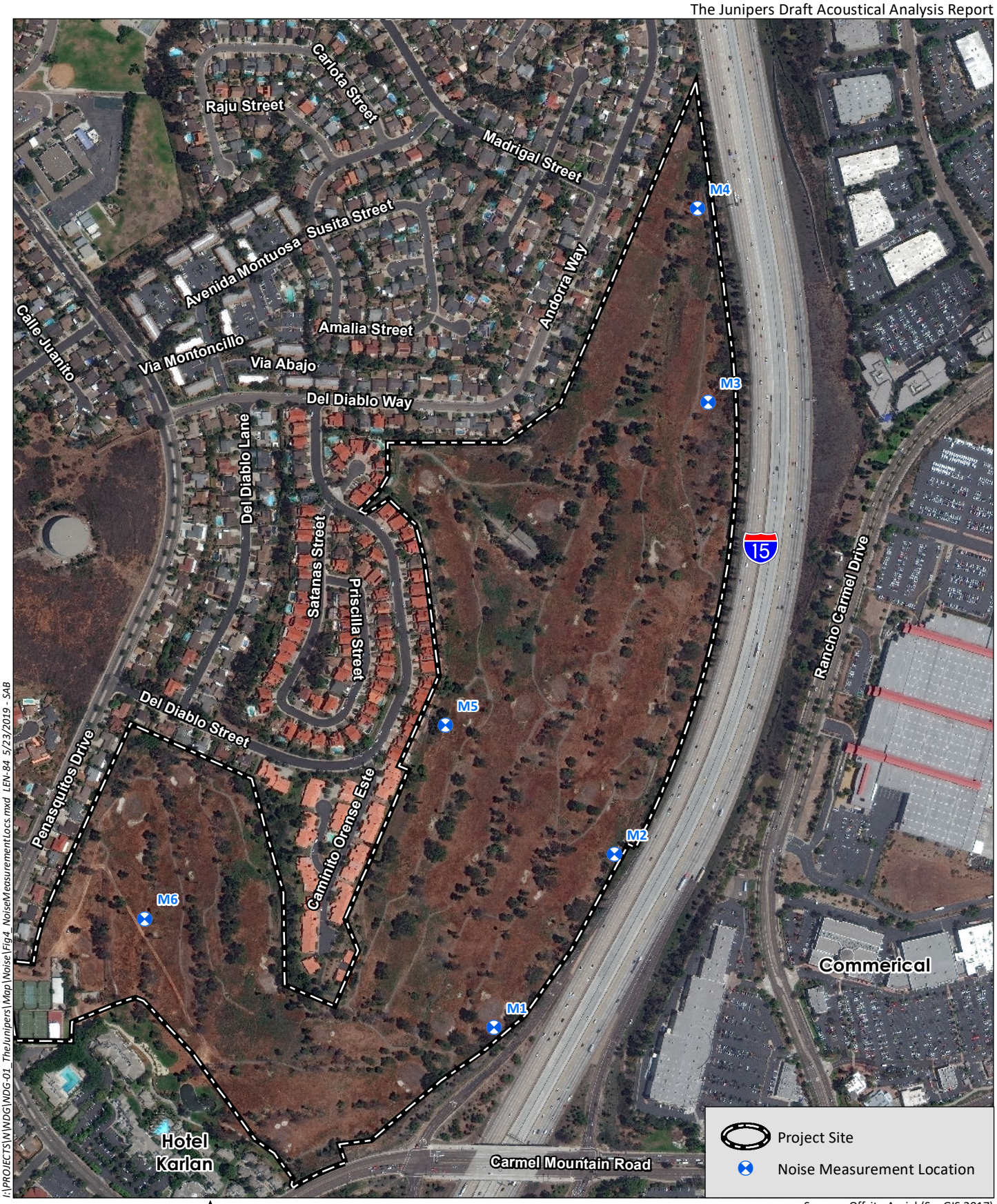
2.4.2.2 General Site Survey

Eight short-term ambient noise measurements (M1 through M6) were conducted during a site visit on March 8, 2018. The measurements were heavily influenced by traffic noise from I-15. Site M1 is located in the southeastern edge of the site and measured at a 5-foot height. Site M2 is in the central portion of the site approximately 250 feet from the I-15 centerline at a 5-foot height. Sites M3a and M3b were measured at 5-foot height and 15-foot heights, respectively, to approximate one- and two-story buildings. These sites were measured in the northern half of the project site. Sites M4a and M4b were also measured at 5-foot and 15-foot heights and were located near the northernmost corner of the site. Sites M5 and M6 were measured in the western and southwestern areas of the project site, respectively. These measurements were taken to identify the general ambient noise levels in areas more distant from the freeway.

The measured noise levels and related weather conditions for the short-term measurements are shown in Table 3, *Short-term Noise Measurement Results*. Locations of each measurement site are shown in Figure 4, *Noise Measurement Locations*. See Appendix A, *On-site Noise Measurement Sheets*, for survey notes from the short-term measurements.

Table 3
SHORT-TERM NOISE MEASUREMENT RESULTS

Measurement	Location	Conditions	Time	dBA L_{EQ}	Notes
M1	Southeastern edge of project site, approximately 330 feet from the I-15 centerline.	73°F, 10 mph wind, 26 percent humidity, mostly sunny	1:31 p.m. to 1:46 p.m.	70.1	Measured at 5-feet above ground level. Location at higher elevation, with direct line-of-sight to I-15.
M2	Eastern edge of the central portion of the project site, approximately 250 feet from the I-15 centerline.	73°F, 10 mph wind, 26 percent humidity, mostly sunny	1:04 p.m. to 1:19 p.m.	69.3	Measured at 5-feet above ground level. Location at higher elevation, with direct line-of-sight to I-15.
M3a	Northeastern edge of the project site, approximately 300 feet from the I-15 centerline.	73°F, 10 mph wind, 26 percent humidity, mostly sunny	12:17 p.m. to 12:32 p.m.	60.0	Measured at 5-feet above ground level. Location at lower elevation, with no direct line-of-sight to I-15.



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Source: Offsite Aerial (SanGIS 2017)

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Noise Measurement Locations

Figure 4

Table 3 (cont.)
SHORT-TERM NOISE MEASUREMENT RESULTS

Measurement	Location	Conditions	Time	dBA L_{EQ}	Notes
M3b	Northeastern edge of the project site, approximately 300 feet from the I-15 centerline.	73°F, 10 mph wind, 26 percent humidity, mostly sunny	12:17 p.m. to 12:52 p.m.	61.4	Measured at 15-feet above ground level.
M4a	Northernmost corner of the project site, approximately 280 feet from the I-15 centerline.	73°F, 10 mph wind, 26 percent humidity, mostly sunny	11:36 a.m. to 11:51 a.m.	61.5	Measured 5-feet above ground level. Location at lower elevation, with no direct line-of-sight to I-15.
M4b	Northernmost corner of the project site, approximately 280 feet from the I-15 centerline.	73°F, 10 mph wind, 26 percent humidity, mostly sunny	11:37 a.m. to 11:52 a.m.	63.5	Measured at 15-feet above ground level.
M5	Western edge of the central portion of the project site, approximately 1,100 feet from the I-15 centerline.	73°F, 10 mph wind, 26 percent humidity, mostly sunny	1:55 p.m. to 2:05 p.m.	56.9	Measured at 5-feet above ground level. Location at higher elevation, with direct line-of-sight to I-15.
M6	Southwestern portion of the project site, approximately 1,800 feet from the I-15 centerline, and 500 feet from Peñasquitos Drive.	73°F, 10 mph wind, 26 percent humidity, mostly sunny	2:45 p.m. to 2:55 p.m.	47.2	Measured at 5-feet above ground level. Noise levels from ambient nature sounds and distant I-15 traffic.

dBA = A-weighted decibel; L_{EQ} = time-averaged noise level

3.0 METHODOLOGY, ASSUMPTIONS, AND THRESHOLDS

3.1 TOOLS AND METHODOLOGY

The following equipment was used to measure existing noise levels at the project site:

- Larson Davis System LxT Integrating Sound Level Meters
- Larson Davis 831 Sound Level Meter
- Larson Davis Model CAL250 Calibrator
- Windscreen and tripod for the sound level meter
- Telescoping pole
- Digital camera

The sound-level meters were field-calibrated immediately prior to the noise measurement to ensure accuracy. All measurements were made with meters that conform to the American National Standards

Institute (ANSI) specifications for sound level meters (ANSI SI.4-1983 R2006). All instruments were maintained with National Institute of Standards and Technology traceable calibration per the manufacturers' standards.

Modeling of the exterior noise environment for this report was accomplished using two computer noise models: Computer Aided Noise Abatement (CadnaA) version 2017 and Traffic Noise Model (TNM) version 2.5. CadnaA is a model-based computer program developed by DataKustik for predicting noise impacts in a wide variety of conditions. CadnaA assists in the calculation, presentation, assessment, and mitigation of noise exposure. It allows for the input of project related information, such as noise source data, barriers, structures, and topography to create a detailed CadnaA model, and uses the most up-to-date calculation standards to predict outdoor noise impacts. Computer Aided Design (CAD) plans (provided by the project applicant) were used in the models. Input variables included elevation, area topography, structure locations, structure heights, and other project features.

The one-hour L_{EQ} noise level is calculated utilizing peak-hour traffic; peak-hour traffic volumes can be estimated based on the assumption that 10 percent of the average daily traffic would occur during a peak hour. The one-hour L_{EQ} noise level output calculated by the model based on the 10 percent peak hour traffic is equivalent to the CNEL (Caltrans 2013a).

Project construction noise was analyzed using the Roadway Construction Noise Model (RCNM; USDOT 2008), which utilizes estimates of sound levels from standard construction equipment.

3.2 ASSUMPTIONS

3.2.1 Construction

Construction activities would include demolition, clearing and grubbing, excavation/recompaction and grading, utilities installation, building construction, and paving. Construction activities would use a variety of construction equipment, including dozers, loaders, water trucks, graders, vibratory rollers, scrapers, and pavers. The most intensive construction noise would be during mass excavation activities, which would involve the simultaneous use of multiple scrapers.

3.2.2 Operation

The proposed operational noise sources for the commercial uses include heating, ventilation, and air conditioning (HVAC) systems, and recreational noise from the project's proposed public park and private park and open space areas. In addition, the project would generate vehicular traffic that would increase noise levels on nearby roadways.

3.2.2.1 Heating, Ventilation, and Air Conditioning Units

Specific HVAC planning information for the project, including unit types and locations, is not currently available. Analysis using a typical to larger-sized residential condenser mounted on ground level pads for the residences provides a reasonable basis for analysis. The unit used in this analysis is a Carrier 38HDR060 split system condenser (see Appendix B, *Condenser Manufacturer's Specifications*). The manufacturer's noise data is provided below in Table 4, *Condenser Noise Data*.

Table 4
CONDENSER NOISE DATA

Source	Noise Levels in Decibels[1] (dB) Measures at Octave Frequencies									dBA L_{EQ}
	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
Carrier 38HDR060 (Residential)	63.0	63.0	63.0	61.5	64.0	66.5	66.0	64.5	55.5	72.0

Source: Appendix B
[1] Sound Power Levels (S_{WL})
Hz = Hertz; kHz = kilohertz; dBA = A-weighted decibel; L_{EQ} = time-averaged noise level

3.2.2.2 Public and Private Parks

The project proposes new public and private park spaces for recreational use. The City-maintained public park would be located adjacent to Peñasquitos Drive at the project's southwestern corner. The private parks would be located at multiple sites throughout the development. Refer to Figure 5, *Proposed Public and Private Parks*, for the park and common exterior use area locations.

A playground and dog park would be provided at the public park. The center of the playground would be located approximately 100 feet from the nearest residences along Peñasquitos Drive to the north. The center of the dog park would be located approximately 125 feet from the nearest residences across Peñasquitos Drive to the west.

Privately-maintained amenities include a dog park, basketball court, pickleball courts, and a small amphitheater. While not a designated park, an additional dog run is proposed for the northernmost location within the project. The basketball and pickleball courts located to the south of the project are approximately 180 feet from the nearest off-site hotels to the west, and 120 feet from the on-site multi-family residences to the east. Similarly, pickleball courts would be located within the northern portion of the project, at a distance of approximately 120 feet from the nearest on-site residences. Due to the distance and low levels of noise generated by these recreational uses, significantly elevated noise levels are not expected at nearby on-site or off-site receptors. The amphitheater would be used as an outdoor classroom space, and no loudspeakers or amplified sound would be used.

Forecasting exact noise conditions is not feasible for playgrounds and dog parks due to both a lack of specific numbers and utilization, however reasonable estimates may be made as a basis for planning.

For playgrounds, children playing on the equipment would be expected to form ad-hoc groups that generate varying noise levels depending on the activity and the equipment used. This analysis assumes 35 children playing simultaneously at both park areas, resulting in 35 individually distributed noise sources. Prior measurements of an outdoor playground area were used to model noise levels and are provided in Table 5, *Playground Noise Data*.

Table 5
PLAYGROUND NOISE DATA

Noise Levels in Decibels[1] (dB) Measured at Octave Frequencies							Overall Noise Level in dBA[1]
125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
65.2	64.0	72.8	80.0	76.7	69.1	55.9	82.6

[1] Sound Power Levels (S_{WL})
Hz = Hertz; kHz = kilohertz; dBA = A-weighted decibel

For dog parks, noise levels vary widely depending on the dogs' temperament, activity level, breed, and number of dogs. A single dog bark would typically have a maximum noise level of approximately 85 dBA at about 5 feet and have a duration of less than 0.2 second. A single dog bark, averaged over the duration of one hour, would be approximately 38.8 dBA L_{EQ} at 5 feet, 19.3 dBA L_{EQ} at 50 feet, and 13.0 dBA L_{EQ} at 100 feet.

3.2.2.3 Transportation

Vehicular Traffic Volumes

Traffic modeling is based on data provided by Linscott, Law & Greenspan Engineers (LLG; 2019) and the San Diego Association of Governments (SANDAG) Transportation Forecast Information Center (TFIC) Series 13 forecasts for the year 2050 (SANDAG 2018). Refer to Appendix C, *Project-Generated Traffic Noise Levels*. Traffic data from LLG includes traffic estimates for surrounding street segments for Existing, Existing + Project, and Year 2050 conditions with and without the project. The SANDAG Series 13 2050 forecasts were used to estimate exposure by future residents to noise levels from I-15. Table 6*, Project Traffic Volumes,* displays the traffic volumes on surrounding streets. Table 7*, Interstate 15 Traffic Volumes* displays the SANDAG Series 13 2050 forecast volumes for I-15. Anticipated future traffic noise levels are based on these forecasted traffic volumes. A peak hour traffic volume of 10 percent of ADT was used for modeling.

Table 6
PROJECT TRAFFIC VOLUMES

Roadway Segment	ADT					
	Existing	Existing + Project	Existing + Cumulative Projects	Existing + Cumulative Projects + Project	Year 2050 No Project	Year 2050 + Project
Carmel Mountain Road						
Stoney Peak Drive to Rancho Carmel Drive	32,609	32,989	32,888	32,268	44,700	45,080
Rancho Carmel Drive to I-15 NB Ramps	46,156	46,790	46,435	47,069	51,200	51,834
I-15 SB Ramps to Peñasquitos Drive	25,463	26,255	26,640	27,432	33,700	34,492
Peñasquitos Drive to Cuca Street	12,824	13,246	14,223	14,645	15,700	16,122
Cuca Street to Paseo Cardiel	13,565	14,051	14,406	14,892	18,800	19,286

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Source: Hunsaker & Associates 5/2019

HELIX Environmental Planning

Proposed Public and Private Parks

Figure 5

Table 6 (cont.)
PROJECT TRAFFIC VOLUMES

Roadway Segment	ADT					
	Existing	Existing + Project	Existing + Cumulative Projects	Existing + Cumulative Projects + Project	Year 2050 No Project	Year 2050 + Project
Peñasquitos Drive						
Carmel Mountain Road to Cuca Street	14,504	15,771	14,549	15,816	15,900	17,167
Cuca Street to Jamal Way	11,393	12,724	11,438	12,769	12,600	13,931

Source: LLG 2019, Appendix C
ADT = average daily trips

Table 7
INTERSTATE 15 TRAFFIC VOLUMES

Roadway Segment	2050 Forecast ADT
Interstate 15 Northbound	
General Traffic Lanes	134,900
HOV Lanes	19,200
Interstate 15 Southbound	
General Traffic Lanes	138,600
HOV Lanes	14,900
Exit 21 Offramp	7,400

Source: SANDAG 2018
ADT = average daily trips; HOV = high occupancy vehicle

The posted speed limits for the analyzed roads are 35 or 40 miles per hour (mph) for Carmel Mountain Road, 35 mph for Peñasquitos Drive, and 65 mph on I-15. Vehicle speeds of 70 mph were conservatively used to model traffic on I-15. A typical breakdown of 96 percent automobiles, 2 percent medium trucks, and 2 percent heavy trucks was used for modeling existing and future noise conditions in the vicinity of the project for all segments.

TNM software was used to calculate the noise contour distances for the off-site impacts (refer to Section 4.4.2). The on-site noise analysis was calculated using CadnaA software, and only included traffic noise from I-15, as it is the primary noise source at the site.

3.2.2.4 Residences

Single detached, duplex, and six-plex residences at the site would be one or two stories, depending on model type. The affordable multi-family apartments would be constructed in a single three-story structure at the southern end of the project site (refer to Figure 3). Planning for interior noise levels is dependent on each unit's exposure to exterior noise at the structure's façade wall. The residences' locations and heights were modeled using CadnaA software.

3.3 GUIDELINES FOR THE DETERMINATION OF SIGNIFICANCE AND CONDITIONS OF APPROVAL

The following thresholds are based on the City Significance Determination Thresholds and Noise Ordinance, as applicable to the project.

A potentially significant noise impact would occur if the project would:

1. Result in temporary construction noise that exceeds 75 dBA L_{EQ} (12 hour) at the property line of a residentially-zoned property from 7:00 a.m. to 7:00 p.m. (as identified in Section 59.0404 of the City's Municipal Code) or if non-emergency construction occurs during the 12-hour period from 7:00 p.m. to 7:00 a.m.

2. Subject vibration-sensitive land uses to construction-related ground-borne vibration that exceeds the "strongly perceptible" vibration annoyance potential criteria for human receptors, as specified by Caltrans (2013b), of 0.1 inches per second peak particle velocity (PPV), and 0.5 inches per second PPV for damage to older residential structures for continuous/frequent intermittent construction sources (such as impact pile drivers, vibratory pile drivers, and vibratory compaction equipment).

3. Result in a substantial permanent increase in existing ambient noise levels that:

    a. Exceeds the exterior noise limits specified by the Noise Ordinance as shown in Table 1; or

    b. Results in transportation-related noise levels that exceed the Conditionally Compatible limits specified by the Noise Element as shown in Table 2. If existing conditions are already at or above those limits, a significant increase would occur if the project generates a perceptible change (3 dBA) over existing conditions.

The following condition of approval would be required for all proposed new uses:

4. Projects shall not expose new development to noise levels at exterior use areas or interior areas in excess of the noise compatibility guidelines established in the City General Plan Noise Element. The conditionally compatible noise levels for project land uses are 70 CNEL for multi-family residential and 75 CNEL for active and passive parks. For outdoor uses at a conditionally compatible land use, feasible noise mitigation techniques should be analyzed and incorporated to make the outdoor activities acceptable. For indoor uses at a conditionally compatible land use, exterior noise must be attenuated to 45 CNEL within residences to be considered a compatible land use.

4.0 IMPACTS

4.1 ISSUE 1: TEMPORARY INCREASE IN AMBIENT NOISE LEVELS

4.1.1 Construction Equipment

The most substantial noise increases from construction activities that may affect off-site uses would occur during over-excavation and mass excavation operations. Scrapers would be the primary equipment type used during excavation. Over-excavation would occur as close as 100 feet from off-site residences adjacent to the western boundary of the project site. Over-excavation activities would involve between two and six passes of a scraper per day in front of any one residence, over a course of one to two days. As such, a scraper was modeled to be in operation for 40 percent of a construction hour, for one hour per day. At a distance of 100 feet, a scraper would generate a noise level of 64.2 dBA L_{EQ} (12 hour).

Based on the grading plan, mass excavation would involve significant earth movement in the northeastern portion of the project site adjacent to I-15, and as well as in the southern portion of the site. Mass grading activities at these locations would occur between approximately 500 and 900 feet from the nearest off-site residences. For modeling of mass excavation, it was assumed that three scrapers would be used simultaneously. The scrapers would be in operation for 40 percent of a typical construction hour. It was conservatively assumed that these pieces of equipment would be in operation simultaneously at the same location. At 500 feet, the three scrapers would generate a noise level of 64.0 dBA L_{EQ} (12 hour). See Appendix D, *Construction Noise Model Outputs*, for model outputs.

The use of construction equipment during over-excavation and mass excavation activities would not exceed the City Noise Ordinance construction threshold of 75 dBA L_{EQ} (12 hour). As other project construction activities would be expected to use less intensive equipment, project construction noise would comply with the City Noise Ordinance and temporary increases in ambient noise levels from construction activity would be less than significant.

4.1.2 Construction Traffic

Construction would generate vehicular traffic in the form of worker vehicles and material import and export trucks. The number of haul truck trips is assumed to be minimal, however, due the anticipated near-balanced amount of cut and fill during grading activities. Vehicles associated with project-construction would likely utilize Peñasquitos Drive and Carmel Mountain Road to access the site. Peñasquitos Drive has an existing volume of 14,504 ADT and Carmel Mountain Road has an existing volume of 25,463 ADT. A general rule of thumb is that a doubling of ADT would cause a doubling in noise (a 3 dBA increase), which would be considered a significant increase. Although the specific number of construction-related trips is unknown at this time, it is assumed that project construction would not generate vehicle trips that would result in a doubling of traffic volumes on either Peñasquitos Drive or Carmel Mountain Road. Therefore, the increase in traffic from the project would have a minor impact on noise and temporary increases in ambient noise levels from construction traffic would be less than significant.

4.1.3 Mitigation Measures

Because impacts related to Issue 1 would be less than significant, no mitigation is required.

4.1.4 Significance of Impacts After Mitigation

Impacts would be less than significant without mitigation.

4.2 ISSUE 2: EXCESSIVE GROUND-BORNE VIBRATION

4.2.1 Impact Analysis

4.2.1.1 Construction Vibration

Construction activities known to generate excessive ground-borne vibration, such as pile driving, would not be conducted by the project. A possible source of vibration during general project construction activities would be a vibratory roller, which may be used within 100 feet of the nearest off-site residence. A vibratory roller would create approximately 0.210 inch per second PPV at 25 feet (Caltrans 2013b). A 0.210 inch per second PPV vibration level would equal 0.046 inch per second PPV at a distance of 100 feet.[1] This would be lower than what is considered a "strongly perceptible" impact for humans of 0.1 inches per second PPV, and lower than the structural damage impact threshold that would affect older residential structures of 0.5 inches per second PPV. Therefore, although a vibratory roller may be perceptible to nearby human receptors, temporary impacts associated with the roller (and other potential equipment) would be less than significant.

4.2.1.2 Operational Vibration

Land uses that may generate substantial operational vibration include heavy industrial or mining operations that would require the use of vibratory equipment. The proposed residential land uses do not include equipment that would generate substantial vibration. Therefore, operational vibration impacts are less than significant.

4.2.2 Mitigation Measures

Because impacts related to Issue 2 would be less than significant, no mitigation is required.

4.2.3 Significance of Impacts After Mitigation

Impacts would be less than significant without mitigation.

[1] Equipment PPV = Reference PPV * $(25/D)^n$ (in/sec), where Reference PPV is PPV at 25 feet, D is distance from equipment to the receiver in feet, and n = 1.1 (the value related to the attenuation rate through the ground); formula from Caltrans 2013b.

4.3 ISSUE 3: PERMANENT INCREASE IN AMBIENT NOISE LEVELS

The anticipated primary project operational noise sources would be from HVAC units, vehicular traffic, and noise generated by recreation activity at the public park. Compatibility of the proposed residential use with exterior noise levels is discussed in Section 4.5.

4.3.1 Operational Noise

As mentioned in Section 3.2.2.1, modeling assumed that the project's residential HVAC units would be a Carrier 38HDR060 split system. This unit typically generates a noise level of 56 dBA at a distance of 7 feet. Based on the site plan, the project's residences nearest to a residential property line would be located along the northwestern edge of the site. These residences are at a distance of approximately 80 feet from existing off-site residences on Andorra Way. At this distance, the HVAC unit would generate a noise level of 34 dBA, which would be well below the City's nighttime allowable hourly limit of 40 dBA. Therefore, impacts from project HVAC units to off-site uses would be less than significant.

The proposed City-maintained park would be located adjacent to single-family residences along Peñasquitos Drive. As a conservative analysis, it is assumed that a playground would support 35 playing children simultaneously. With the center of the playground located approximately 100 feet from the nearest residence to the north, the combined 35 individual noise sources would generate noise levels of 50 dBA L_{EQ}. At this distance, noise generated by children's use of the playground would not exceed the evening hour limits for a multi-family land use as specified in the Noise Ordinance, and operational impacts from children playing would be less than significant.

Dog parks are proposed at both the City-maintained park and at the northern tip of the project site. Dogs would be able to move freely within their enclosed play areas, and would be moving across the dog park throughout their visit. For modeling purposes, the dog barks are assumed to be centered in their respective enclosures. The center of the privately maintained northern dog run is expected to be at least 80 feet from the nearest off-site residences to the west. The center of the public park's enclosure would be approximately 120 feet east of the nearest off-site residences. Modeling does not take into account topography or existing barriers. At these distances, up to a total of one minute per hour of continuous barking, or 300 barks, at the dog park would not exceed the City's 50 dBA L_{EQ} limit for single-family residential zones at the nearest NSLUs.

The exact number of dogs and their barking patterns would vary during the day of week and hour of the day. A conservative assumption for the dog park on a given hour during a busy day would be 30 dogs in the park, each with 10 barking events per hour, for a total of 300 barking events per hour. At the northern privately maintained dog run, the noise generated would be 49.9 dBA L_{EQ} at 80 feet. At the public park dog enclosure, noise levels would be 46.5 dBA L_{EQ} at 120 feet. This would not cause an exceedance of City thresholds and impacts would be less than significant.

As mentioned in Section 3.2.2.2, due to the distance and low levels of noise, the project's basketball and pickleball courts and amphitheater are not expected to generate significant noise levels at nearby on-site or off-site receptors. Impacts would be less than significant.

4.3.2 Project-Generated Transportation Noise

4.3.2.1 Exterior

TNM software was used to calculate the noise contour distances for roadway segments in the project vicinity for the following scenarios: Existing, Existing + Project, Existing + Cumulative (No Project), Existing + Cumulative + Project, Year 2050 No Project, and Year 2050 + Project. The project-generated traffic noise roadway modeling represents a conservative analysis that does not take into account topography or attenuation provided by existing structures. The results of this analysis for the CNEL at the nearest NSLU to the roadway segments are shown below in Table 8, *Project-Generated Traffic Noise Levels*. Additional analysis for the 70, 65, and 60 CNEL distances is provided in Appendix C.

Table 8
PROJECT-GENERATED TRAFFIC NOISE LEVELS

Roadway Segment	Distance to Nearest NSLU (feet)[1]	NSLU Type	CNEL at Nearest NSLU								
			Existing			Existing + Cumulative			Year 2050		
			Existing	Existing + Project	Change in CNEL	Existing + Cumulative Projects (No Project)	Existing + Cumulative Projects + Project	Change in CNEL	Year 2050 (No Project)	Year 2050 + Project	Change in CNEL
Carmel Mountain Road											
Stoney Peak Drive to Rancho Carmel Drive	100	MF	63.5	63.6	+0.1	63.5	63.6	+0.1	64.9	64.9	+0.0
Rancho Carmel Drive to I-15 NB Ramps	220	Hotel	57.3	57.4	+0.1	57.3	57.4	+0.1	57.7	57.8	+0.1
Future Driveway to Peñasquitos Drive	65	Hotel	66.7	66.8	+0.1	66.9	66.9	+0.0	67.9	68.0	+0.1
Peñasquitos Drive to Cuca Street	70	MF	61.3	61.5	+0.2	61.8	61.9	+0.1	62.2	62.3	+0.1
Cuca Street to Paseo Cardiel	65	MF	62.3	62.5	+0.2	62.6	62.7	+0.1	63.7	63.8	+0.1
Peñasquitos Drive											
Carmel Mountain Road to Cuca Street	90	SF	59.4	59.8	+0.4	59.5	59.8	+0.3	60.0	60.3	+0.3
Cuca Street to Jamal Way	60	SF	62.3	62.8	+0.5	62.3	62.8	+0.5	62.7	63.2	+0.5

[1] Distance measured from roadway centerline.
NSLU = Noise Sensitive Land Use; CNEL = Community Noise Equivalent Level; SF = Single-family Residential; MF = Multi-family Residential

A direct significant impact would occur if off-site exterior useable spaces are exposed to noise levels that exceed the "Conditionally Compatible" guidelines listed under Table 2, if those uses were not exposed to noise levels above the guidelines before the project. For the nearest off-site NSLUs to the studied roadways, single-family and multi-family residential, the limit would be 65 CNEL and 70 CNEL, respectively. If noise levels under the Existing, Existing + Cumulative (No Project), or Year 2050 (No Project) scenarios already exceed the applicable significance thresholds, a significant impact would occur for the Existing + Project, Existing + Cumulative + Project, or Year 2050 + Project scenarios if the project's contribution would be 3 CNEL or greater. Table 9 displays noise levels both with and without the project. As shown, noise levels do not currently exceed the applicable limits without the project along the analyzed roadway segments. Furthermore, the project's contribution to traffic noise would not exceed 3 CNEL along any segment, nor would it cause an increase in traffic noise that would expose off-site exterior use areas to levels in excess of 65 or 70 CNEL. Therefore, direct exterior off-site transportation noise impacts would be less than significant.

4.3.2.2 Interior

For off-site single- and multi-family residential land uses, the interior noise threshold is 45 CNEL. As typical architectural materials are expected to attenuate noise levels by 15 CNEL, if the project increases traffic noise levels above 60 CNEL at off-site building façades, a significant interior impact would occur. If noise levels under the Existing, Existing + Cumulative (No Project), or Year 2050 (No Project) scenarios already exceed 60 CNEL, a significant impact would occur for the Existing + Project, Existing + Cumulative + Project, or Year 2050 scenarios if the project's contribution would be 3 CNEL or greater.

As shown in Table 9, existing noise levels without the project already exceed 60 CNEL for all segments except Peñasquitos Drive between Carmel Mountain Road and Cuca Street. In the scenarios with the project, the increase in noise levels from project-added traffic would be less than 3 CNEL. Therefore, project-generated transportation noise would not cause significant direct impacts related to interior noise.

4.3.2.3 Cumulative

Exterior

The potential for a cumulative noise impact can occur when traffic from multiple projects combine to increase noise levels above thresholds. A significant cumulative exterior impact would occur if:

- Cumulative projects in combination with the proposed project result in the exposure of a single-family residential NSLU that is exposed to less than 65 CNEL in the Existing scenario to an exterior noise level of 65 CNEL or greater in the Year 2050 + Project scenario, or a multi-family residential NSLU that is exposed to less than 70 CNEL in the Existing scenario to an exterior noise level of 70 CNEL or greater in the Year 2050 + Project scenario; or

- If the NSLU is already exposed to noise levels above the applicable threshold under the Existing scenario, cumulative projects in combination with the proposed project cause an increase of at least 3 CNEL from the Existing scenario to the Year 2050 + Project scenario.

If a significant cumulative impact occurs, the City does not have a specific threshold to determine if the project's contribution would result in a cumulatively considerable increase. Therefore, the County of

San Diego's cumulatively considerable threshold of an increase in the CNEL level of more than 1 dBA is used in for this analysis (County 2009).

As shown in Table 9, *Cumulative Project-generated Traffic Noise Levels*, noise levels would not exceed the applicable thresholds along the analyzed roadway segments. Furthermore, the contribution from cumulative projects in combination with the proposed project would not cause an increase in the CNEL level of at least 3 dBA.

Interior

A significant cumulative interior impact would occur if cumulative projects in combination with the proposed project meet the following conditions:

1. If the single- and multi-family residential NSLUs are exposed to interior noise levels below 45 CNEL, result in interior noise levels at the NSLUs in excess of 45 CNEL; or

2. If the NSLUs are already exposed to interior noise levels in excess of 45 CNEL, cause an increase of at least 3 CNEL from the Existing scenario to the Year 2050 + Project scenario.

As typical architectural materials are expected to attenuate noise levels by 15 CNEL, interior noise levels would be 45 CNEL or greater if the noise levels at the building façades exceed 60 CNEL. All analyzed segments except for Peñasquitos Drive from Carmel Mountain Road to Cuca Street and Carmel Mountain Road from Rancho Carmel Drive to I-15 Onramps exceed 60 CNEL and therefore the NSLUs may currently be exposed to interior noise levels above 45 CNEL. The project in combination with cumulative projects would not cause an increase of 3 CNEL from the Existing scenario to the Year 2050 + Project scenario for any segment. Furthermore, for the Carmel Mountain Road from Rancho Carmel Drive to I-15 Onramps segment, noise levels do not currently exceed 60 CNEL would not exceed 60 CNEL in the Year 2050 + Project scenario.

For the Carmel Mountain Road to Cuca Street segment of Peñasquitos Drive, the contribution from cumulative projects in combination with the proposed project would increase noise levels above the 60 CNEL threshold. However, the project's contribution from the Year 2050 (No Project) to Year 2050 + Project scenario would only be 0.4 dBA, which would be a negligible increase below the cumulatively considerable increase of more than 1 CNEL. Therefore, traffic-related interior noise impacts from the project would not be cumulatively considerable.

Table 9
CUMULATIVE PROJECT-GENERATED TRAFFIC NOISE LEVELS

Roadway Segment	Distance to Nearest NSLU (feet)[1]	NSLU Type	CNEL at Nearest NSLU						
			Existing	Year 2050 (No Project)	Year 2050 + Project	Change from Existing to Year 2050 + Project	Cumulative Impact?	Change from Year 2050 (No Project) to Year 2050 + Project	Cumulatively Considerable Contribution?
Carmel Mountain Road									
Stoney Peak Drive to Rancho Carmel Drive	100	MF	63.5	64.9	64.9	+1.4	No	+0.0	No
Rancho Carmel Drive to I-15 NB Ramps	220	Hotel	57.3	57.7	57.8	+0.5	No	+0.1	No
Future Driveway to Peñasquitos Drive	65	Hotel	66.7	67.9	68.0	+1.3	No	+0.1	No
Peñasquitos Drive to Cuca Street	70	MF	61.3	62.2	62.3	+1.0	No	+0.1	No
Cuca Street to Paseo Cardiel	65	MF	62.3	63.7	63.8	+1.5	No	+0.1	No
Peñasquitos Drive									
Carmel Mountain Road to Cuca Street	90	SF	59.4	60.0	60.3	+0.9	**Yes**	+0.4	No
Cuca Street to Janal Way	60	SF	62.3	62.7	63.2	+0.9	No	+0.5	No

[1] Distance measured from roadway centerline.

Note: A significant cumulative exterior impact would occur if cumulative projects (including the proposed project) generate noise exterior levels at single-family residential NSLU to 65 CNEL or greater, or a multi-family residential NSLU to an exterior noise level of 70 CNEL or greater or increase noise levels by 3 CNEL in areas that currently exceed those levels. A cumulative considerable contribution would occur if the proposed project is responsible for 1 dBA or more increase of an impacted NSLU.

A significant cumulative interior impact would occur if cumulative projects (including the proposed project) either: (1) result in interior noise levels at single-family and multi-family NSLUs in excess of 45 CNEL; or (2) if interior noise levels currently exceed 45 CNEL and cause an increase of at least 3 CNEL compared to existing conditions.

NSLU = Noise Sensitive Land Use; SF = Single-family Residential; MF = Multi-family Residential

4.3.3 Mitigation Measures

Because impacts related to Issue 3 would be less than significant, no mitigation is required.

4.3.4 Significance of Impacts After Mitigation

Impacts would be less than significant without mitigation.

4.4 ISSUE 4: NOISE LEVEL STANDARD COMPLIANCE FOR NEW USES

4.4.1 Transportation Noise

4.4.1.1 Exterior Noise Levels

Traffic from I-15 serves as the largest contributor of noise at the project site. As noted in Section 3.2.2.3, SANDAG Series 13 2050 forecasts were used to estimate exposure by future residents to noise levels from I-15. Noise levels for exterior use areas were modeled in CadnaA using a height of approximately 5 feet above ground level.

Figure 6, *2050 I-15 Traffic Noise Levels – Existing Site*, displays the noise contours from future (2050) traffic on I-15 across the site in its currently undeveloped state. Under future traffic conditions and existing site topography, noise levels range from 65 CNEL to 80 CNEL for the majority of the site that is adjacent to the freeway, where the residences are proposed. Upon completion of the project, the noise levels on the site would be altered compared to existing conditions due to the change in topography, elevation heights, and future structures. Noise levels across the western portions of the site would generally be reduced due to the shielding of the freeway noise by the proposed homes.

Communal Exterior Use Areas

As shown on Figure 5, communal exterior use areas would be located throughout the project. Most designated park areas would be provided in areas where modeling indicates that noise levels would not exceed 70 CNEL. These designated park areas are therefore counted toward the City's park requirements for the project. Designated park areas includes several private park spaces and the City-maintained public park, which would not be located within a direct line-of-sight of the freeway, and would be compatible for recreational uses as defined in the City Noise Element (refer to Table 2).

The proposed dog park at the northern corner of the project would not be counted as a communal exterior use area due to its proximity to elevated noise levels. The "social loop" pedestrian trail would be counted as designated park space; however it would not be required to adhere to the 70 CNEL limit because the trail would not serve as an area for long-term stationary use.

Private Exterior Use Areas

Due to shielding from intervening structures, noise levels at the majority of residences were modeled to be below the City Noise Element's 70 CNEL limit for multi-family residence exterior use areas such as private yards and patios. However, most of the project's easternmost residences would be directly exposed to noise levels from I-15 exceeding 70 CNEL. These affected residences are depicted on Figure 7, *Exterior Use Area Noise Barrier Requirements*. Because these residences would have exterior

use areas such as patios facing I-15, the project would require noise reduction measures to ensure that the residential use is compatible with the guidelines within the Noise Element.

4.4.1.2 Interior Noise Levels

Traditional architectural materials typically attenuate noise levels by 15 CNEL. Therefore, at locations where noise levels at residence's façades would exceed 60 CNEL, interior noise levels of proposed residential units would exceed the City Noise Element's interior noise standard of 45 CNEL for multi-family residential land uses.

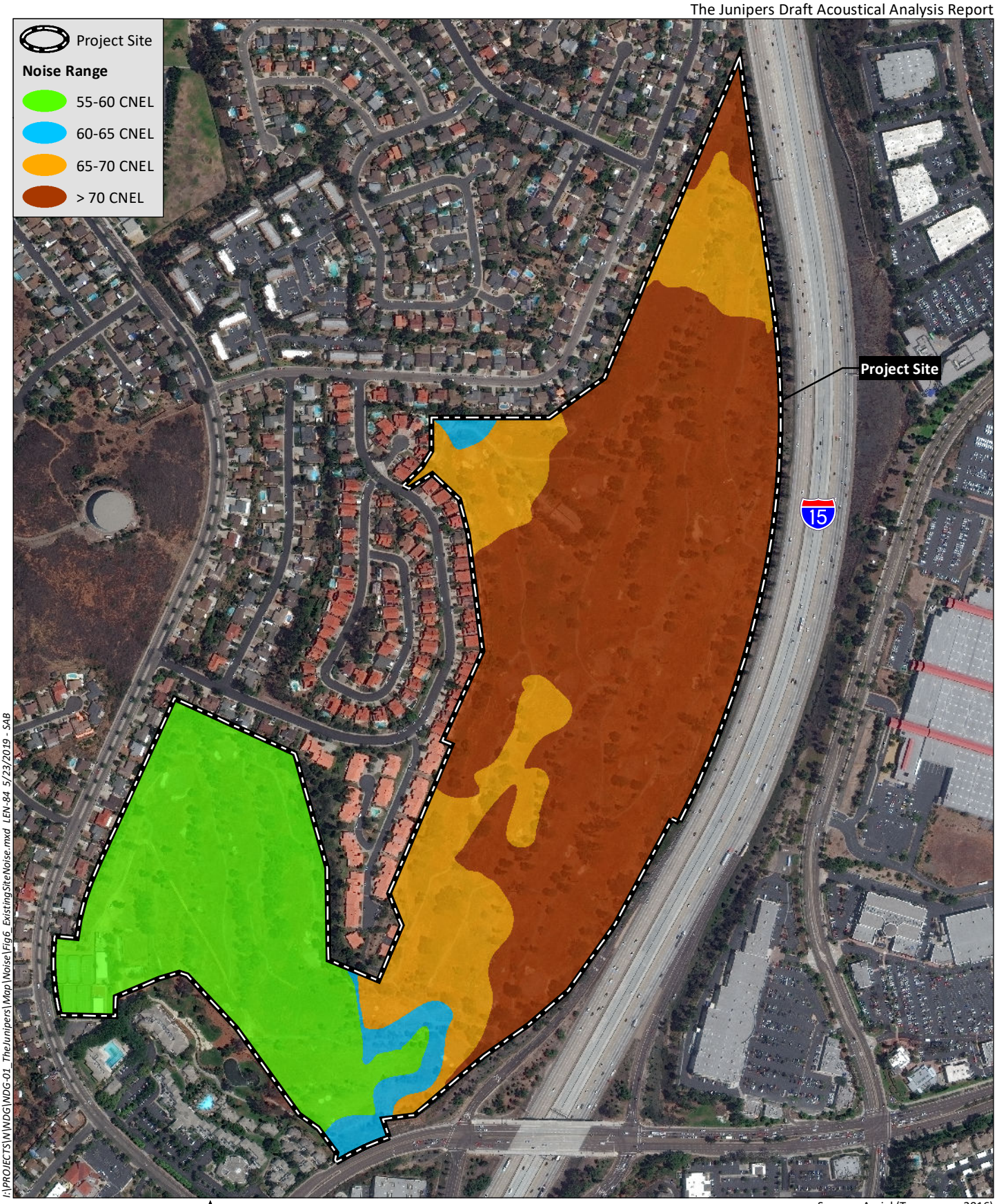
Noise levels at the project site were modeled in CadnaA using a height of approximately 5 feet above ground level for first stories, and 20 feet above ground level for second stories. All single detached, duplex, and six-plex residences proposed in the eastern portion of the project site would be exposed to exterior noise levels in excess of 60 CNEL. Additionally, modeling conducted at the affordable multi-family apartment structure's second and third floors indicates that units within that structure with a direct line-of-sight to the freeway would also be exposed to exterior noise levels in excess of 60 CNEL. Figure 8, *Residences Requiring Interior Use Area Mitigation*, displays these residences. At the residences indicated on the Figure 8, interior noise levels would exceed City Noise Element interior noise standards unless additional architectural attenuation is incorporated. Varying levels of noise attenuation would be required depending on proximity to I-15.

4.4.2 Noise Reduction Measures

Measure NOI-1 would reduce noise levels at private exterior use areas exposed to excessive noise. Approximate locations and heights for the noise barriers described in this noise reduction measure and incorporated into the project design are depicted in Figure 7.

NOI-1 **Exterior Use Area Noise Barriers**. Noise levels at the private exterior use areas of single detached, duplex, and six-plex residences are required to be reduced to 70 CNEL or below to comply with City standards. Residences with exterior use areas that would be exposed to noise levels exceeding 70 CNEL, and approximate noise barrier locations are depicted in red on Figure 7 of this acoustical analysis report. Barriers with a height of 6 feet, 8 feet, and 9 feet would be required to reduce noise levels at these designated residences. All such noise barriers shall replace the project's proposed privacy walls to ensure sufficient noise attenuation is achieved.

The noise barriers must be solid. They can be constructed of masonry, wood, plastic, fiberglass, steel, or a combination of those materials, as long as there are no cracks or gaps, through or below the walls. The walls can be made of composite wood with a solid lower section with a clear glass or plastic upper section to maintain views. Any seams or cracks must be filled or caulked. If wood is used, it can be tongue and groove and must be at least one-inch total thickness or have a density of at least 3½ pounds per square foot. Where architectural or aesthetic factors allow, glass or clear plastic 3/8 of an inch thick or thicker may be used on the upper portion, if it is desirable to preserve a view. Sheet metal of 18-gauge (minimum) may be used if it meets the other criteria and is properly supported and stiffened so that it does not rattle or create noise itself from vibration or wind. Any door(s) or gate(s) must be designed with overlapping closures on the bottom and sides and meet the minimum specifications of the wall materials described above. The gate(s) may be of one-inch thick or better wood, solid-sheet

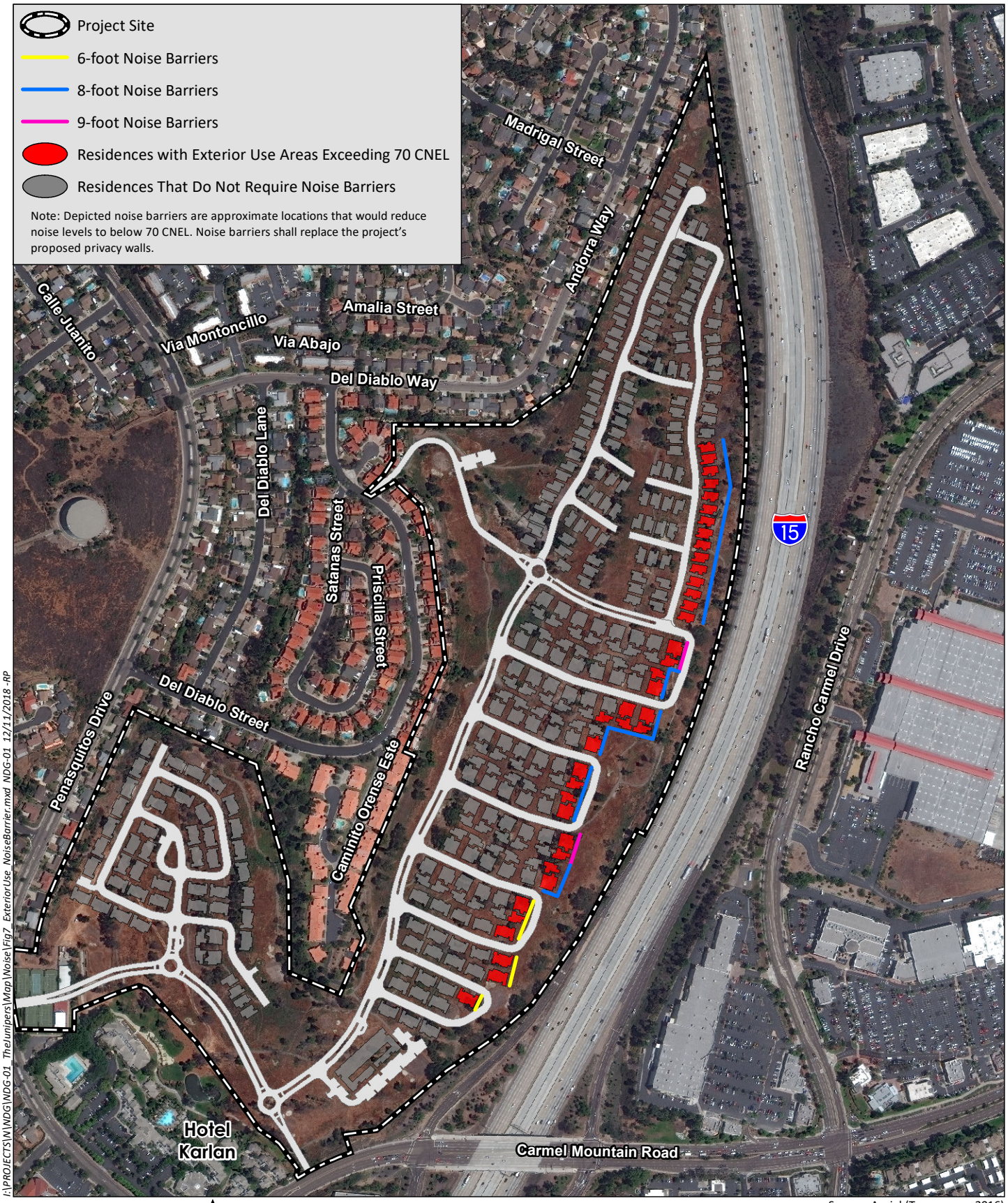


Source: Aerial (Terraserver 2016)

HELIX Environmental Planning

2050 I-15 Traffic Noise Levels- Existing Site

Figure 6



Source: Aerial (Terraserver, 2016)

HELIX Environmental Planning

Exterior Use Area Noise Barrier Requirements

Figure 7

HELIX Environmental Planning

Residences Requiring Interior Use Area Noise Attenuation

Figure 8

metal of at least 18-gauge metal, or an exterior-grade solid-core steel door with prefabricated doorjambs.

Measure NOI-2 would reduce noise levels at interior habitable spaces that may otherwise be exposed to excessive noise. This measure has been incorporated as part of the project design.

NOI-2 Exterior-to-Interior Analysis. Interior noise levels for the project's proposed residences shall be demonstrated to not exceed 45 CNEL. Once specific building plan information is available, additional exterior-to-interior noise analysis shall be conducted for all proposed residences that are exposed to an exterior noise level of 60 CNEL. Residences requiring analysis are depicted in blue, orange, and green on Figure 8 of this report.

The information in the analysis shall include wall heights and lengths, room volumes, window and door tables typical for a building plan, as well as information on any other openings in the building shell. With this specific building plan information, the analysis shall determine the predicted interior noise levels at the planned on-site residences. If predicted noise levels are found to be in excess of 45 CNEL, the report shall identify architectural materials or techniques that could be included to reduce noise levels to 45 CNEL in habitable rooms.

For the second and third-story residences with a direct line-of-sight to I-15 at the affordable multi-family residential units (depicted in blue on Figure 8), the following attenuation feature would provide sufficient noise reduction:

- Double-paned (dual glazed) windows, with two 1/4-inch thick glass panes separated by a 1/2-inch air gap.

For single detached, duplex, and six-plex units (depicted in green and orange on Figure 8), the following attenuation features would provide sufficient noise reduction:

- Dual-glazed windows with a Sound Transmission Class (STC) rating of 37. STC 37 rated windows include the following requirements:
  - 1/4-inch laminated glass
  - 1/2-inch air gap
  - 1/4-inch glass

For all single detached, duplex, and six-plex units exposed to the highest noise levels (depicted in orange on Figure 8), the following additional attenuation feature would provide sufficient noise reduction:

- Walls with an STC rating of 56. STC 56 rated materials include the following requirements:
  - Two layers of 5/8-inch drywall (interior surface).
  - Fiberglass batt insulation.
  - 1/2-inch OSB shear wall.
  - 7/8-inch cement plaster mix.

- 2 x 4 offset interlaced (or standard double stud) wood studs 16-inch on center so that the interior panel is disconnected from the exterior panel as a residential multi-family party wall.

Air conditioning or mechanical ventilation systems shall be installed to allow windows and doors to remain closed for extended intervals of time so that acceptable interior noise levels can be maintained. The mechanical ventilation system would meet the criteria of the International Building Code (Chapter 12, Section 1203.3 of the 2001 California Building Code).

4.4.3 Noise Level Compliance with Noise Reduction Measures

4.4.3.1 Exterior Noise Levels

Upon implementation of measure NOI-1 requiring the construction of noise barriers at residences along the eastern edge of the project, noise levels at all future private exterior use areas would be reduced to levels below 70 CNEL. Noise levels would be in compliance with City standards.

4.4.3.2 Interior Noise Levels

Upon implementation of measure NOI-2 requiring the use of an exterior-to-interior analysis analyzing the considered noise attenuating construction materials at all structures exposed to 60 CNEL, interior noise levels would be reduced to 45 CNEL or below. Noise levels would be in compliance with City standards.

5.0 LIST OF PREPARERS

Jason Runyan	Acoustic Analyst
Charles Terry	Principal Acoustician
Hunter Stapp	Acoustic Analyst
Joanne M. Dramko, AICP	Senior Technical Specialist, Quality Assurance Reviewer
Tammy Ching	Project Manager
Lisa Capper	Assistant Project Manager

6.0 REFERENCES

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Appendix A

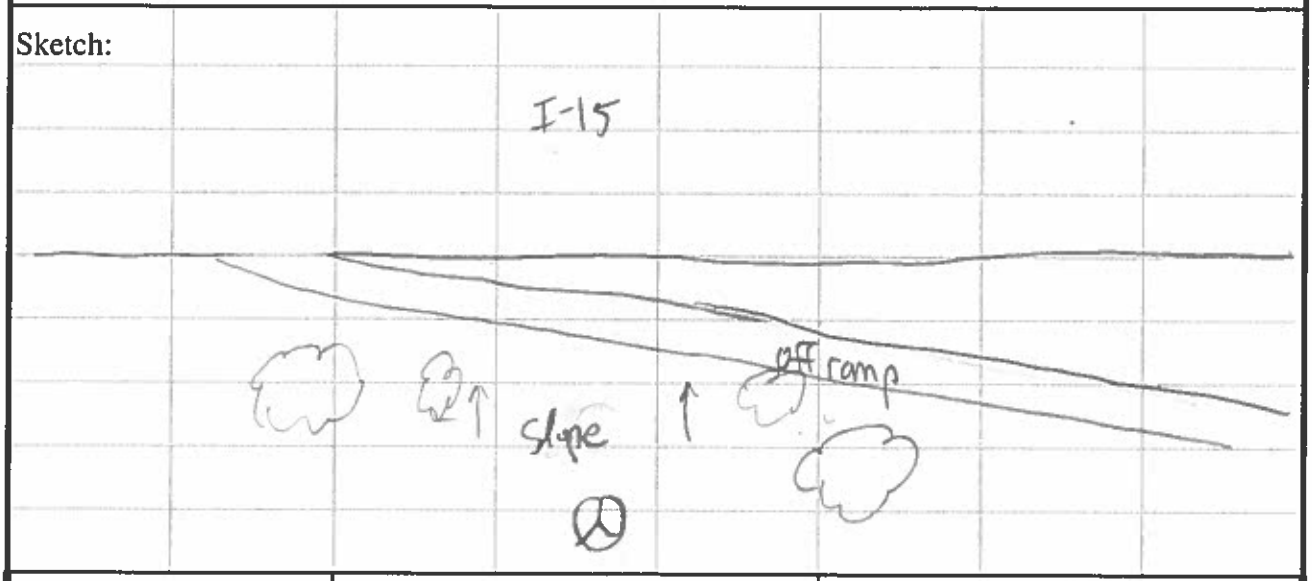
On-site Noise Measurement Sheets

Site Survey

Job # NDG-01	Project Name: The Junipers		
Date: 3/8/19	Site #: 1	Engineer: Hunter Stapp	
Address: 14455 Penasquitos Drive, San Diego, CA 92129			
5 Meter: LD LXT	Serial #: 001741	Calibrator: LD CA250	Serial #: 2621

Notes: Mostly sunny; direct line of sight to I-15; I-15 dominant noise source; at a higher elevation than I-15

Sketch:



Temp: 73°	Wind Spd: 10 mph	Humidity: 26 %
Start of Measurement: 1:31 pm	End of Measurement: 1:46 pm	70.1 dBA L_{EQ}

Cars (tally per 5 cars)	Medium Trucks (MT)	Heavy Trucks (HT)

Noise Measurement for Information Only

No Through Roadways

No Calibration Analysis Will Be Provided

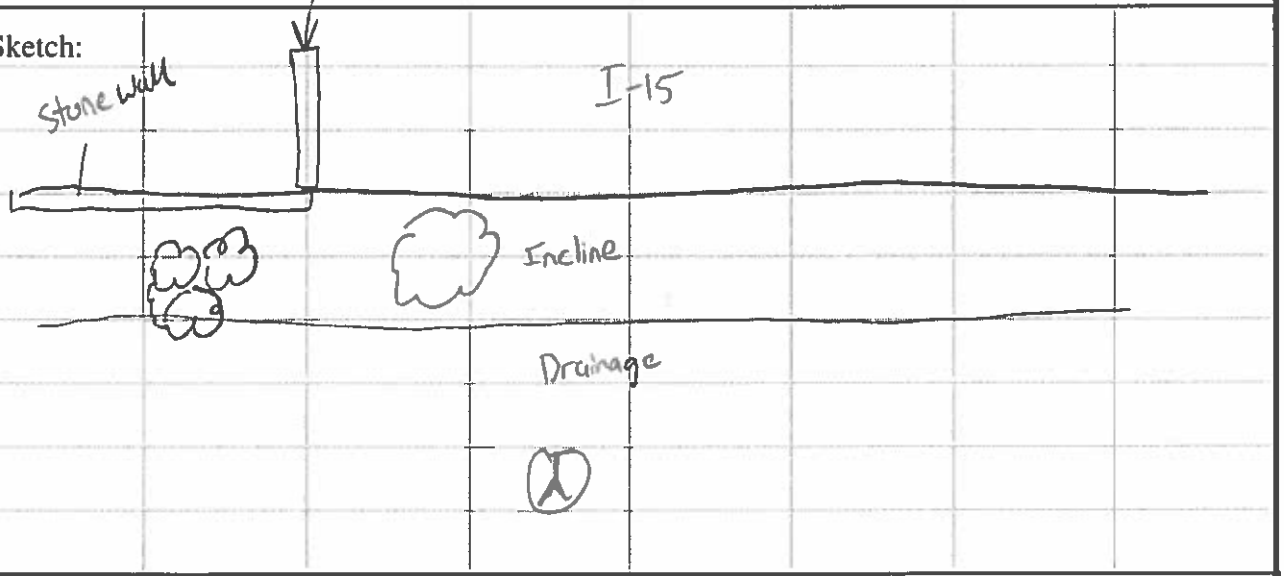
Site Survey

Job # NDF-01	Project Name: The Junipers		
Date: 3/8/18	Site #: 2	Engineer: Hunter Stapp	
Address: 14455 Penasquitos Drive, San Diego, CA 92129			
50 Meter: LD LXT	Serial #: 0001741	Calibrator: LD CA250	Serial #: 2621

Notes: Mostly sunny; I-15 dominant noise source; cars on I-15 visible from meter location; slightly lower elevation than I-15

Carmel Mountain Road Exit Sign

Sketch:



Temp: 73°	Wind Spd: 9 mph	Humidity: 25 %	
Start of Measurement: 1:04 pm	End of Measurement: 1:19 pm	69.3 dBA L_{EQ}	

Cars (tally per 5 cars)	Medium Trucks (MT)	Heavy Trucks (HT)

Noise Measurement for Information Only

No Through Roadways

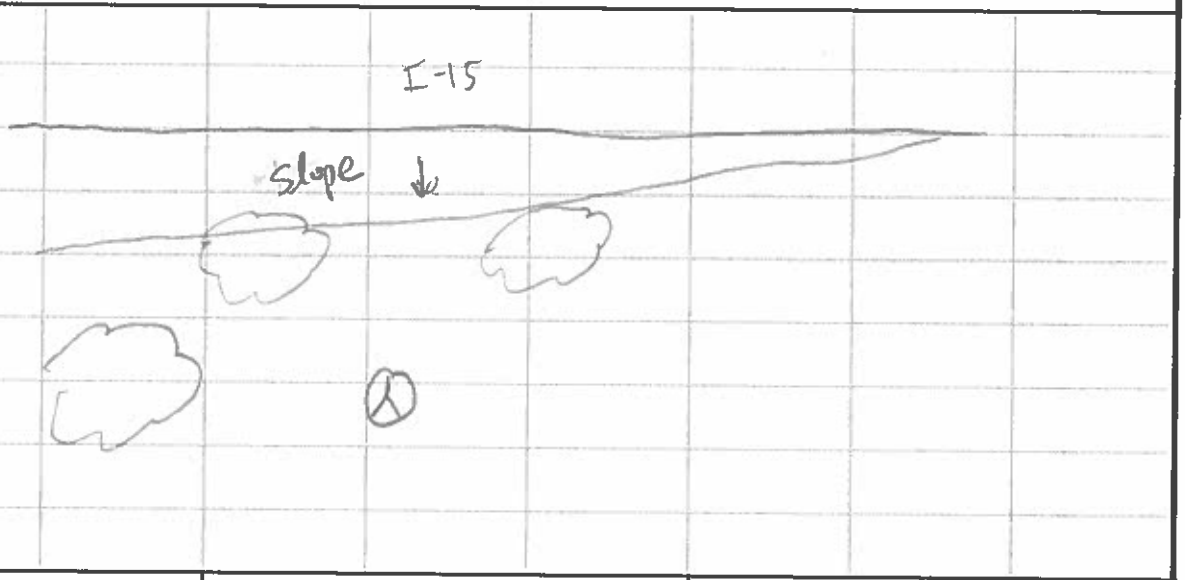
No Calibration Analysis Will Be Provided

Site Survey

Job # NDG-01	Project Name: The Junipers		
Date: 3/8/18	Site #: 3a (low)	Engineer: Hunter Stapp	
Address: 14455 Penasquitos Drive, San Diego, CA 92129			
49 Meter: LD LXT	Serial #: 0001741	Calibrator: LD CA250	Serial #: 2621

Notes: Partly cloudy; I-15 dominant noise source; no direct line of sight to cars on I-15; lower elevation than I-15

Sketch:



Temp: 73°	Wind Spd: 7 mph	Humidity: 24 %
Start of Measurement: 12:17 pm	End of Measurement: 12:32 pm	60.0 dBA L_{EQ}

Cars (tally per 5 cars)	Medium Trucks (MT)	Heavy Trucks (HT)

Noise Measurement for Information Only

No Through Roadways

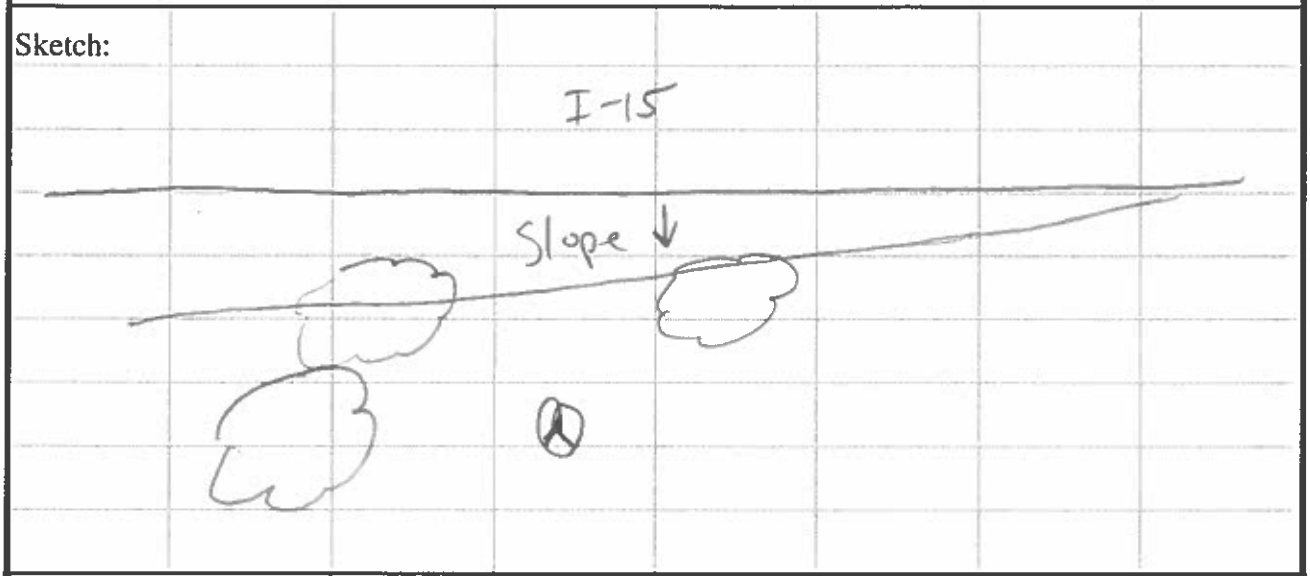
No Calibration Analysis Will Be Provided

Site Survey

Job # NDG-01	Project Name: The Junipers		
Date: 3/8/19	Site #: 3h (high)	Engineer: Hunter Stapp	
Address: 14455 Penasquitos Drive, San Diego, CA 92129			
23 Meter: LD 831	Serial #: 001390	Calibrator: LD CA250	Serial #: 2621

Notes: Partly cloudy; I-15 dominant noise source; meter microphone raised to second story height

Sketch:



Temp: 73°	Wind Spd: 7	mph	Humidity: 24	%	
Start of Measurement: 12:17 pm	End of Measurement: 12:32 pm		61.4	dBA L_{EQ}	

Cars (tally per 5 cars)	Medium Trucks (MT)	Heavy Trucks (HT)

Noise Measurement for Information Only

No Through Roadways

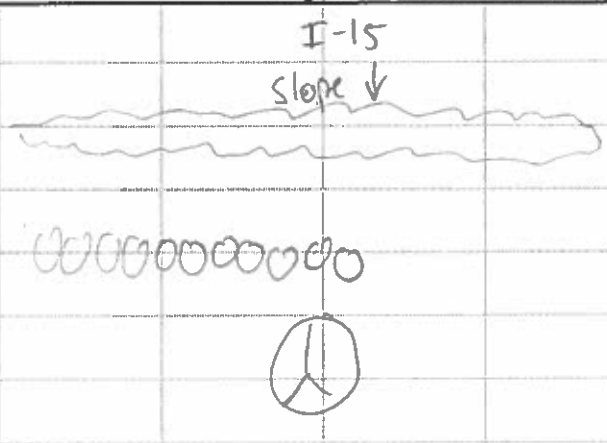
No Calibration Analysis Will Be Provided

Site Survey

Job # NDG-01	Project Name: The Junipers		
Date: 3/8/18	Site #: 4a (Lot)	Engineer: Hunter Stapp	
Address: 14455 Penasquitos Drive, San Diego, CA 92129			
48 Meter: LD LxT	Serial #: 001741	Calibrator: CA250	Serial #: 2621

Notes: Partly cloudy; 20 second pause for fighter jet fly-over; I-15 dominant noise source; no direct line of sight to cars on I-15; lower elevation than I-15

Sketch:



Temp: 72°	Wind Spd: 5	mph	Humidity: 24	%	
Start of Measurement: 11:36 am	End of Measurement: 11:51 am		61.5	dBA L_{EQ}	

Cars (tally per 5 cars)	Medium Trucks (MT)	Heavy Trucks (HT)

Noise Measurement for Information Only

No Through Roadways

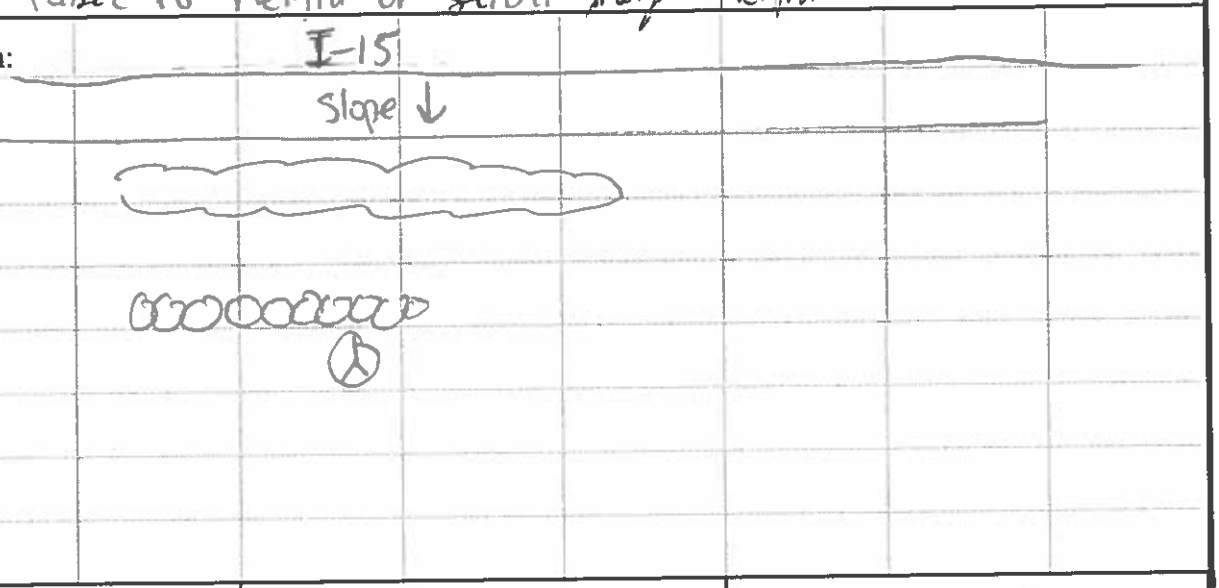
No Calibration Analysis Will Be Provided

Site Survey

Job # NDG-01	Project Name: The Junipers		
Date: 3/8/18	Site #: 46 (high)	Engineer: Hunter Stapp	
Address: 14455 Penasquitos Drive, San Diego, CA 92129			
22 Meter: LD 831	Serial #:	Calibrator:	Serial #:

Notes: Partly Cloudy; 20 second pause for fighter jet fly-over; I-15 dominant noise source; meter microphone raised to height of second story height

Sketch:



Temp: 72°	Wind Spd: 5 mph	Humidity: 24 %
Start of Measurement: 11:37am	End of Measurement: 11:52 am	63.5 dBA L_{EQ}

Cars (tally per 5 cars)	Medium Trucks (MT)	Heavy Trucks (HT)

Noise Measurement for Information Only

No Through Roadways

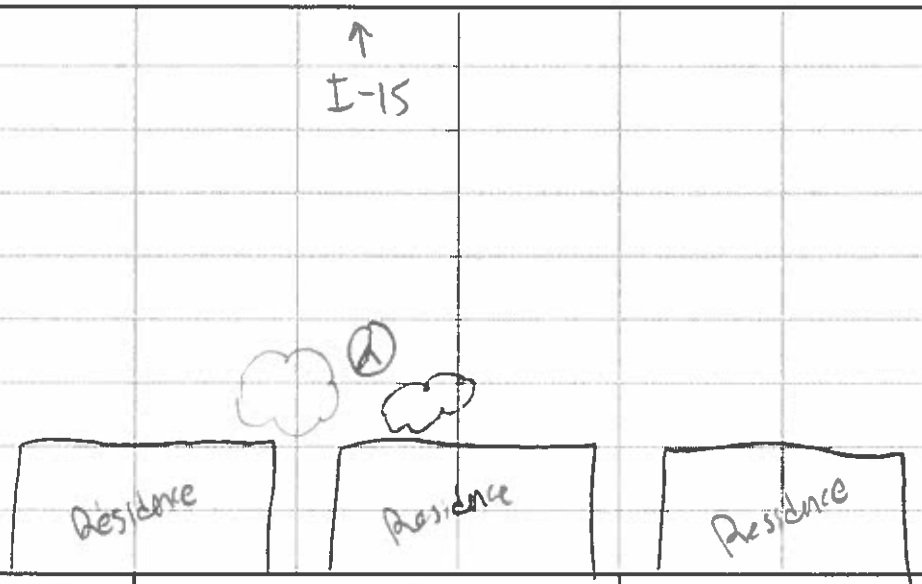
No Calibration Analysis Will Be Provided

Site Survey

Job # NDG-01	Project Name: The Junipers		
Date: 3/8/18	Site #: 5	Engineer: Hunter Stapp	
Address: 14455 Derasquitos Drive, San Diego CA 92129			
52 Meter: LD LxT	Serial #: 001741	Calibrator: LD CA250	Serial #: 2621

Notes: Partly cloudy; clear line of sight to I-15; at a higher elevation than I-15; at opposite end of site from I-15

Sketch:



Temp: 73°	Wind Spd: 10 mph	Humidity: 26 %
Start of Measurement: 1:55 pm	End of Measurement: 2:05 pm	56.9 dBA L_{EQ}

Cars (tally per 5 cars)	Medium Trucks (MT)	Heavy Trucks (HT)

Noise Measurement for Information Only

No Through Roadways

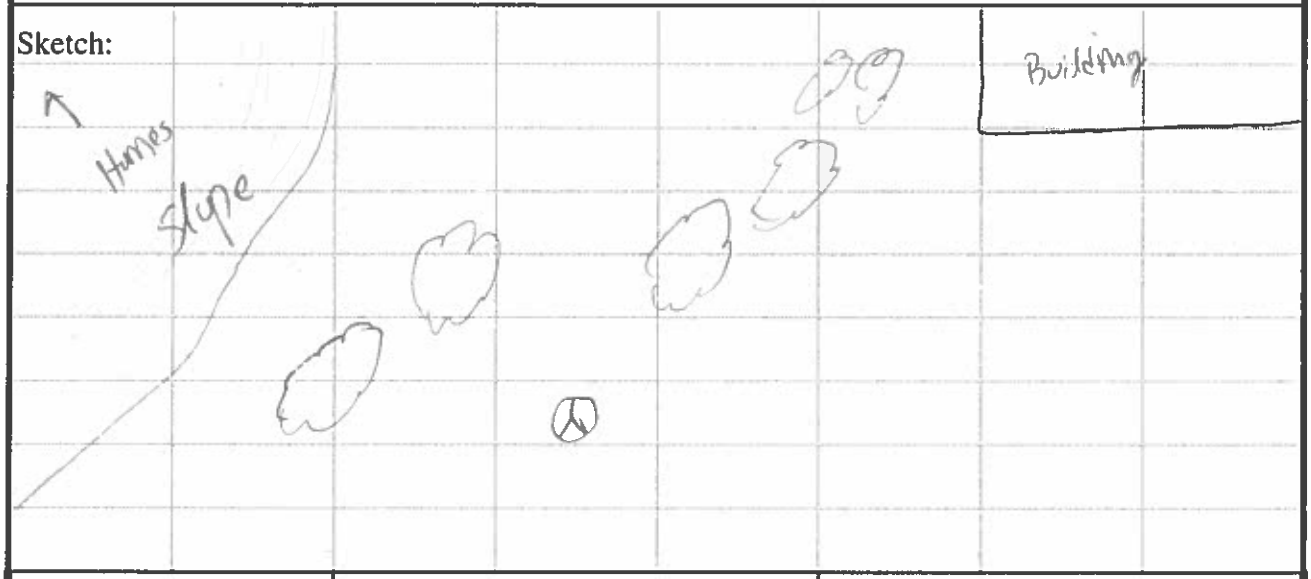
No Calibration Analysis Will Be Provided

Site Survey

Job # ND6-01	Project Name: The Junipers		
Date: 3/8/18	Site #: 6	Engineer: Hunter Stapp	
Address: 14455 Deracajuitos Drive, San Diego, CA 92129			
53 Meter: LD LxT	Serial #: 001741	Calibrator: LD CAL200	Serial #: 2621

Notes: Mostly cloudy; distant noise from I-15; birds chirping; leaves rustling

Sketch:



Temp: 73	Wind Spd: 10 mph	Humidity: 27 %
Start of Measurement: 2:45 PM	End of Measurement: 2:55 PM	47.2 dBA L_{EQ}

Cars (tally per 5 cars)	Medium Trucks (MT)	Heavy Trucks (HT)

Noise Measurement for Information Only

No Through Roadways

No Calibration Analysis Will Be Provided

Appendix B

Condenser Manufacturer's Specifications

ELECTRICAL DATA

38HDR UNIT SIZE	V–PH–Hz	VOLTAGE RANGE*		COMPRESSOR		OUTDOOR FAN MOTOR			MIN CKT AMPS	FUSE/ HACR BKR AMPS
		Min	Max	RLA	LRA	FLA	NEC Hp	kW Out		
018	208/230–1–60	187	253	9.0	48.0	0.80	0.125	0.09	12.1	20
024	208/230–1–60	187	253	12.8	58.3	0.80	0.125	0.09	16.8	25
030	208/230–1–60	187	253	14.1	73.0	1.45	0.25	0.19	19.1	30
036	208/230–1–60	187	253	14.1	77.0	1.45	0.25	0.19	19.1	30
	208/230–3–60	187	253	9.0	71.0	1.45	0.25	0.19	12.7	20
	460–3–60	414	506	5.6	38.0	0.80	0.25	0.19	7.8	15
048	208/230–1–60	187	253	21.8	117.0	1.45	0.25	0.19	28.7	50
	208/230–3–60	187	253	13.7	83.1	1.45	0.25	0.19	18.6	30
	460–3–60	414	506	6.2	41.0	0.80	0.25	0.19	8.6	15
060	208/230–1–60	187	253	26.4	134.0	1.45	0.25	0.19	34.5	60
	208/230–3–60	187	253	16.0	110.0	1.45	0.25	0.19	21.5	35
	460–3–60	414	506	7.8	52.0	0.80	0.25	0.19	10.6	15

* Permissible limits of the voltage range at which the unit will operate satisfactorily

FLA – Full Load Amps

HACR – Heating, Air Conditininng, Refrigeration

LRA – Locked Rotor Amps

NEC – National Electrical Code

RLA – Rated Load Amps (compressor)

NOTE: Control circuit is 24–V on all units and requires external power source. Copper wire must be used from service disconnect to unit. All motors/compressors contain internal overload protection.

SOUND LEVEL

Unit Size	Standard Rating (dB)	Typical Octave Band Spectrum (dBA) (without tone adjustment)						
		125	250	500	1000	2000	4000	8000
018	68	52.0	57.5	60.5	63.5	60.5	57.5	46.5
024	69	57.5	61.5	63.0	61.0	60.0	56.0	45.0
030	72	56.5	63.0	65.0	66.0	64.0	62.5	57.0
036	72	65.0	61.5	63.5	65.0	64.5	61.0	54.5
048	72	58.5	61.0	64.0	67.5	66.0	64.0	57.0
060	72	63.0	61.5	64.0	66.5	66.0	64.5	55.5

CHARGING SUBCOOLING (TXV-TYPE EXPANSION DEVICE)

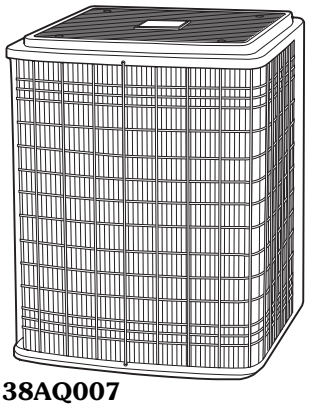
UNIT SIZE–VOLTAGE, SERIES	REQUIRED SUBCOOLING °F (°C)
018	12 (6.7)
024	12 (6.7)
030	12 (6.7)
036	12 (6.7)
048	12 (6.7)
060	12 (6.7)

Product Data

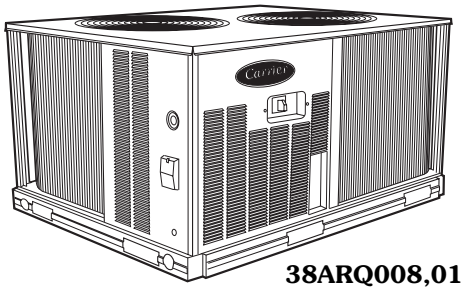
GEMINI™
38AQ007
38ARQ008,012
38AQS016
with 40RMQ008-028
Heat Pump Systems

6 to 25 Nominal Tons

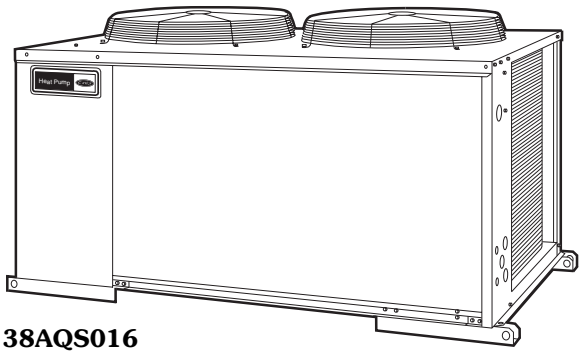
Carrier GEMINI SPLIT SYSTEMS



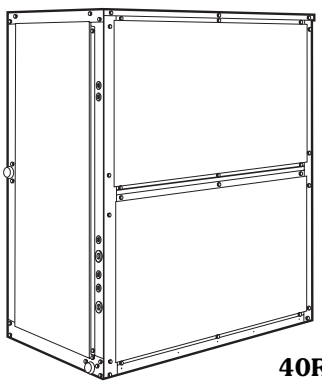
38AQ007



38ARQ008,012



38AQS016



40RMQ

ASHRAE 90.1 COMPLIANT

Gemini heat pump systems save energy and provide outstanding heating and cooling all year with:

- All-season comfort in any climate
- High energy savings capability
- Suitability for new construction or replacement

Features/Benefits

System indoor and outdoor sections offer outstanding performance in either the cooling or heating mode

Heat pump system energy savings opportunity

Electrical energy consumption is always a prime concern when selecting an air-conditioning system for a commercial application. An easy, effective way to save energy is to install a heat pump. When building plans call for a heat pump, consider a matched Carrier 38AQ,ARQ,AQS/40RMQ heat pump system. These systems not only offer highly efficient cooling, they also provide a clean, safe, efficient source of heat. In fact, they are capable of delivering more than 3 units of heat energy for each unit of electrical power consumed.

ARI* capacity ratings

OUTDOOR UNIT	INDOOR UNIT	COOLING			HEATING			
					Hi-Temp		Low-Temp	
		Net Capacity (Btuh)	EER	IPLV	Net Capacity (Btuh)	COP	Net Capacity (Btuh)	COP
38AQ007†	40RMQ008	75,000	10.3	N/A	71,000	3.2	39,500	2.0
38ARQ008†	40RMQ008	88,000	10.4	N/A	93,000	3.2	57,000	2.2
38ARQ012†	40RMQ012	105,000	10.1	N/A	100,000	3.2	67,000	2.2
38AQS016**	40RMQ016	174,000	9.0	11.3	172,000	3.1	100,000	2.1
38ARQ012 x2	40RMQ024	208,000	9.3	10.5	200,000	3.1	122.000	2.2
38AQS016 & 38ARQ012	40RMQ028	272,000	9.3	9.5	270,000	3.1	158,000	2.1

LEGEND

COP — Coefficient of performance = $\frac{\text{Btuh output}}{\text{Btuh input}}$ or

$\frac{\text{Btuh output}}{\text{Unit Power Input x 3.413}}$ (Based on ARI conditions)

EER — Energy Efficiency Ratio = $\frac{\text{Btuh}}{\text{Unit Power Input}}$ (Based on ARI conditions)

IPLV — Integrated Part-Load Value

*Air Conditioning & Refrigeration Institute.
†Energy Star compliant.
**Does not comply with ASHRAE 90.1 minimum efficiency requirement.

NOTES:
1. Standard ratings are net values, reflecting the effects of circulating fan heat. Supplementary electric heat is not included. Ratings are based on:

   Cooling Standard: 80 F db, 67 F wb (wet bulb) indoor entering-air temperature and 95 F db entering-air outdoor unit.

   Hi-Temp Heating Standard: 70 F db (dry bulb) indoor entering-air temperature and 47 F db/43 F wb entering-air outdoor unit.

   Lo-Temp Heating Standard: 70 F db indoor entering-air temperature and 17 F wb/15 F db entering-air outdoor unit.

   Unit combinations are rated in accordance with ARI standard 340-2000 as appropriate.
2. 38ARQ012 and 38AQS016 are connected to 40RMQ024,028 in duplex configurations.

SOUND POWER LEVELS (dB), 60 Hz

UNIT	OCTAVE BAND								
	63	125	250	500	1000	2000	4000	8000	dBA
38ARQ008	83.1	82.3	82.6	80.9	81.2	78.1	72.8	67.3	85.0
38ARQ012	88.7	82.3	82.6	81.2	81.2	79.2	73.8	67.8	86.0
38AQS016	N/A	93.0	86.0	83.0	80.0	78.0	73.0	71.0	86.0
40RMQ008	95.3	91.3	87.3	86.3	82.3	80.3	76.7	N/A	88.3
40RMQ012	99.0	95.0	91.0	90.0	86.0	84.0	80.0	N/A	92.0
40RMQ016	99.2	95.2	91.2	92.2	86.2	84.2	80.2	N/A	92.9
40RMQ024	102.6	98.6	94.6	95.6	89.6	87.6	83.6	N/A	96.4
40RMQ028	102.5	98.5	94.5	95.5	89.5	87.5	83.5	N/A	96.2

NOTES:
1. Estimated sound power levels, dB re 1 Picowatt.
2. 38ARQ and 38AQS data is based upon a limited amount of actual testing with the estimated sound power data being generated from this data in accordance with ARI standard 370 for large outdoor refrigerating and air-conditioning equipment.
3. 40RMQ data is based on the ASHRAE calculation approach from the ASHRAE handbook 1987 HVAC Systems & Applications, Chapter 52.
4. Since this data is estimated, the sound power levels should not be guaranteed or certified as being the actual sound power levels.
5. The acoustic center of the unit is located at the geometric center of the unit.

Appendix C

Project-Generated Traffic Noise Levels

Existing and Future Traffic Volumes																								
Roadway /Segment	Existing				Existing + Project				Existing + Cumulative Projects				Existing + Cumulative Projects + Project				Year 2050 No Project				Year 2050 With Project				Posted Speed (mph)
	Peak Hour Traffic	Traffic Breakdown			Peak Hour Traffic	Traffic Breakdown			Peak Hour Traffic	Traffic Breakdown			Peak Hour Traffic	Traffic Breakdown			Peak Hour Traffic	Traffic Breakdown			Peak Hour Traffic	Traffic Breakdown			
		Cars 96.0%	MT 2.0%	HT 2.0%		Cars 96.0%	MT 2.0%	HT 2.0%		Cars 96.0%	MT 2.0%	HT 2.0%		Cars 96.0%	MT 2.0%	HT 2.0%		Cars 96.0%	MT 2.0%	HT 2.0%		Cars 96.0%	MT 2.0%	HT 2.0%	
Carmel Mountain Road																									
Stoney Peak Dr. to Rancho Carmel Dr.	3261	3130	63	1	3299	3167	63	1	3289	3157	63	1	3327	3194	64	1	4470	4291	86	2	4508	4328	87	2	40
Rancho Carmel Dr. to I-15 NB Ramps	4616	4431	89	2	4679	4492	90	2	4644	4458	89	2	4707	4519	90	2	5120	4915	98	2	5183	4976	100	2	40
Future Dwy to Penasquitos Dr.	2546	2444	49	1	2626	2520	50	1	2664	2557	51	1	2743	2633	53	1	3370	3235	65	1	3449	3311	66	1	40
Penasquitos Dr. to Cuca St.	1282	1231	25	0	1325	1272	25	1	1422	1365	27	1	1465	1406	28	1	1570	1507	30	1	1612	1548	31	1	35
Cuca St. to Paseo Cardiel	1357	1302	26	1	1405	1349	27	1	1441	1383	28	1	1489	1430	29	1	1880	1805	36	1	1929	1851	37	1	35
Penasquitos Drive																									
Carmel Mountain Rd. to Cuca St.	1450	1392	28	1	1577	1514	30	1	1,455	1397	28	1	1582	1518	30	1	1590	1526	31	1	1717	1648	33	1	35
Cuca St. to Jamal Way	1139	1094	22	0	1272	1222	24	0	1,144	1098	22	0	1277	1226	25	0	1260	1210	24	0	1393	1337	27	1	35

Source: Linscott Law & Greenspan 2019

Existing and Future Traffic Noise Levels

Roadway/Segment	NSLU Distance (ft.)	Existing				Existing + Project					Existing + Cumulative Projects (No Project)				Existing + Cumulative Projects + Project					Year 2050 No Project				Year 2050 With Project				
		CNEL @ NSLU(dBA)	70 CNEL (ft.)	65 CNEL (ft.)	60 CNEL (ft.)	CNEL @ NSLU(dBA)	Δ at NSLU (dBA)	70 CNEL (ft.)	65 CNEL (ft.)	60 CNEL (ft.)	CNEL @ NSLU (dBA)	70 CNEL (ft.)	65 CNEL (ft.)	60 CNEL (ft.)	CNEL @ NSLU (dBA)	Δ at NSLU (dBA)	70 CNEL (ft.)	65 CNEL (ft.)	60 CNEL (ft.)	CNEL @ NSLU (dBA)	70 CNEL (ft.)	65 CNEL (ft.)	60 CNEL (ft.)	CNEL @ NSLU(dBA)	Δ at NSLU (dBA)	70 CNEL (ft.)	65 CNEL (ft.)	60 CNEL (ft.)
Carmel Mountain Road																												
Stoney Peak Dr. to Rancho Carmel Dr.	100	63.5	49	85	145	63.6	0.1	50	85	145	63.5	53	85	145	63.6	0.1	53	85	145	64.9	60	100	165	64.9	0.0	60.0	100	165
Rancho Carmel Dr. to I-15 NB Ramps	220	57.3	60	100	170	57.4	0.1	60	100	170	57.3	60	100	170	57.4	0.1	45	80	130	57.7	65	105	175	57.8	0.1	70.0	105	175
I-15 SB Ramps to Penasquitos Dr.	65	66.7	43	77	130	66.8	0.1	45	77	130	66.9	45	80	133	66.9	0.0	65	80	130	67.9	55	90	145	68	0.1	55.0	90	145
Penasquitos Dr. to Cuca St.	70	61.3	15	46	80	61.5	0.2	15	47	80	61.8	15	47	80	61.9	0.1	17	50	85	62.2	15	55	85	62.3	0.1	20.0	55	90
Cuca St. to Paseo Cardiel	65	62.3	15	50	80	62.5	0.2	15	50	85	62.6	15	50	85	62.7	0.1	17	52	85	63.7	25	57	95	63.8	0.1	20.0	57	95
Penasquitos Drive																												
Carmel Mountain Rd. to Cuca St.	90	59.4	17	51	85	59.8	0.4	18	53	89	59.5	15	50	85	59.8	0.3	20	53	87	60	20	55	90	60.3	0.3	20.0	55	90
Cuca St. to Jamal Way	60	62.3	15	43	75	62.8	0.5	15	45	80	62.3	15	43	75	62.8	0.5	15	47	80	62.7	15	45	80	63.2	0.5	15.0	50	85

Source: Traffic Noise Model (TNM), version 2.5
Traffic Source Data: Linscott Law & Greenspan 2019

Appendix D

Construction Noise Model Outputs

SELECT FROM LOOKUP TABLE
USER INPUT
FROM LOOKUP TABLE
CALCULATED VALUE

Equipment	dBA L_{MAX}	Percentage	Use Per Day	Ordinance Hour Day	L_{EQ} dBA (Daily)	Distance	L_{EQ} dBA (Daily)	Distance To (dBA):	Distance
Noise Sum	85.0	N/A	N/A	N/A	70.2	N/A	64.2	75	28.9
Scraper	85.0	40.00%	1	12	70.2	100.0	64.2	75	28.9

SELECT FROM LOOKUP TABLE
USER INPUT
FROM LOOKUP TABLE
CALCULATED VALUE

Equipment	dBA L_{MAX}	Percentage	Use Per Day	Ordinance Hour Day	L_{EQ} dBA (Daily)	Distance	L_{EQ} dBA (Daily)	Distance To (dBA):	Distance
Noise Sum	85.0	N/A	N/A	N/A	84.0	N/A	64.0	75	141.4
Scraper	85.0	40.00%	8	12	79.3	500.0	59.3	75	81.6
Scraper	85.0	40.00%	8	12	79.3	500.0	59.3	75	81.6
Scraper	85.0	40.00%	8	12	79.3	500.0	59.3	75	81.6