Mission Grove Apartments Project

Draft Environmental Impact Report
SCH#2022100610

Appendix H: Noise and Vibration Impact Analysis

NOISE AND VIBRATION IMPACT ANALYSIS

MISSION GROVE APARTMENTS PROJECT

RIVERSIDE, CALIFORNIA

LSA

April 2023

NOISE AND VIBRATION IMPACT ANALYSIS

MISSION GROVE APARTMENTS PROJECT

RIVERSIDE, CALIFORNIA

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LIST OF ABBREVIATIONS AND ACRONYMS

ADT	average daily traffic
ALUC	Airport Land Use Commission
CalEEMod	California Emissions Estimator Model
CBC	California Building Code
CCR	California Code of Regulations
City	City of Riverside
CNEL	Community Noise Equivalent Level
dB	decibels
dBA	A-weighted decibels
EPA	United States Environmental Protection Agency
FHWA	Federal Highway Administration
ft	foot/feet
FTA	Federal Transit Administration
HVAC	heating, ventilation, and air conditioning
in/sec	inches per second
L_{dn}	day-night average noise level
L_{eq}	equivalent continuous sound level
L_{max}	maximum instantaneous noise level
MARB/IPA	March Air Reserve Base/Inland Port Airport
PPV	peak particle velocity
project	Mission Grove Apartments Project
RCALUC	Riverside County Airport Land Use Commission
RMS	root-mean-square (velocity)
sf	square foot/feet
SPL	sound power level
VdB	vibration velocity decibels

NOISE AND VIBRATION IMPACT ANALYSIS

INTRODUCTION

This noise and vibration impact analysis has been prepared to evaluate the potential noise and vibration impacts and reduction measures associated with the Mission Grove Apartments Project (project) in Riverside, Riverside County, California. This report is intended to satisfy City of Riverside (City) requirements for a project-specific noise and vibration impact analysis by examining the short-term and long-term noise and vibration impacts on sensitive uses adjacent to the project site and evaluating reduction measures required by the proposed project.

PROJECT LOCATION

The 9.92-acre project site is located within the Mission Grove Shopping Center at the northwest side of the intersection of Mission Grove Parkway and Mission Village Drive. The project is within the Mission Grove Specific Plan, formerly known as the Alessandro Heights Specific Plan. Figure 1 shows the project location and vicinity.

PROJECT DESCRIPTION

The proposed project would demolish the existing vacant 104,321-square-foot (sf) building and parking lot to accommodate a new, 347-unit apartment complex with a swimming pool, a 2,580 sf fitness center, and a 5,100 sf clubhouse. The site is currently zoned as CR-SP – Commercial Retail and Specific Plan (Mission Grove) Overlay Zones and is proposed to change to MU-U-SP – Mixed-Use Urban and Specific Plan (Mission Grove) Overlay Zones. As a project design feature, the construction of the proposed project will use light construction equipment such as small rubber-tired dozers within 15 ft of the existing commercial building located immediately west of the project construction boundary. In addition, heavy construction equipment such as large track bulldozers and loaded trucks will not operate within 15 ft of the existing commercial building located immediately west of the project construction boundary. Construction of the proposed project is anticipated to start in the spring of 2025 and would be completed in 2027. Figure 2 shows the site plan.

CHARACTERISTICS OF SOUND

Sound is increasing in the environment and can affect quality of life. Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep.

To the human ear, sound has two significant characteristics: pitch and loudness. Pitch is generally an annoyance, while loudness can affect the ability to hear. Pitch is the number of complete vibrations (or cycles per second) of a wave, resulting in the tone's range from high to low. Loudness is the strength of a sound and describes a noisy or quiet environment; it is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound waves combined with the reception characteristics of the human ear. Sound intensity is the average rate of sound energy transmitted through a unit area perpendicular to the direction in which the sound waves are traveling. This characteristic of sound can be precisely measured with instruments.

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LEGEND

Project Site

FIGURE 1

N

0 200 400

FEET

SOURCE: Google Earth 2021

Mission Grove Apartments

Project Location and Vicinity

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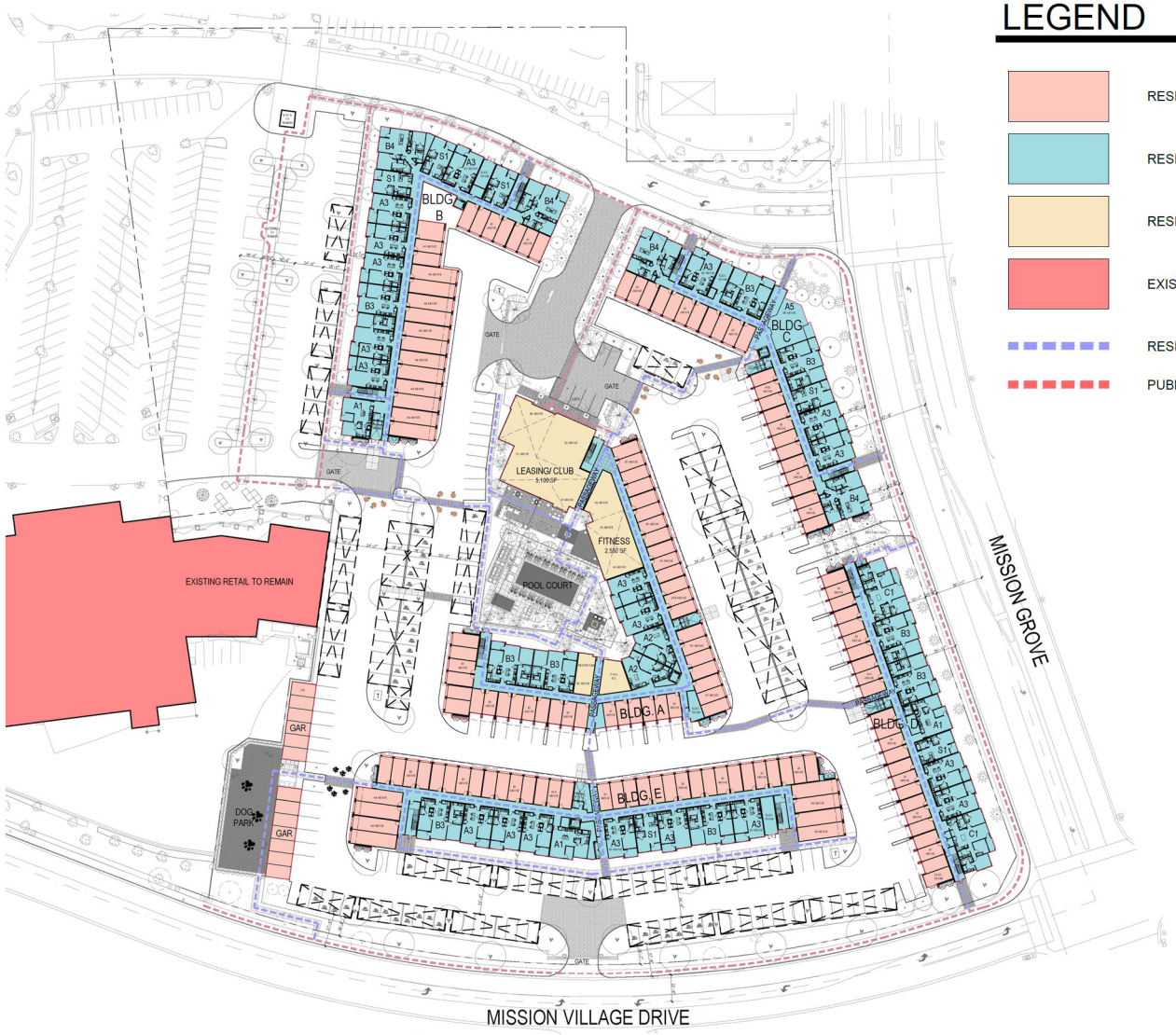

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FIGURE 2

0 20 40

FEET

SOURCE: AO Architecture

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Mission Grove Apartments

Site Plan

The analysis of a project defines the noise environment of the project area in terms of sound intensity and its effect on adjacent sensitive land uses.

Measurement of Sound

Sound intensity is measured through the A-weighted scale to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound similar to the human ear's de-emphasis of these frequencies. Decibels (dB), unlike the linear scale (e.g., inches or pounds), is a scale based on powers of 10.

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

Sound levels are generated from a source, and their decibel level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. For a single point source, sound levels decrease approximately 6 dB for each doubling of distance from the source. This drop-off rate is appropriate for noise generated by stationary equipment. If noise is produced by a line source, such as highway traffic or railroad operations, the sound decreases 3 dB for each doubling of distance in a hard site environment. Line source noise in a relatively flat environment with absorptive vegetation decreases 4.5 dB for each doubling of distance.

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

Other noise rating scales of importance, when assessing the annoyance factor, include the maximum instantaneous noise level (L_{max}), which is the highest exponential time-averaged sound level that occurs during a stated time period. The noise environments discussed in this analysis are specified in terms of L_{max} for short-term noise impacts. L_{max} reflects peak operating conditions and addresses the annoying aspects of intermittent noise. Another noise scale often used together with L_{max} in noise ordinances for enforcement purposes is noise standards in terms of percentile noise levels. For example, the L_{10} noise level represents the noise level exceeded 10 percent of the time during a stated period. The L_{50} noise level represents the median noise level. Half of the time the

noise level exceeds this level, and half of the time it is less than this level. The L_{90} noise level represents the noise level exceeded 90 percent of the time and is considered the background noise level during a monitoring period. For a relatively constant noise source, L_{eq} and L_{50} are approximately the same.

Noise impacts can be described in three categories. The first is audible impacts, which refer to increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3 dB or greater since this level has been found to be barely perceptible in exterior environments. The second category, potentially audible, refers to a change in the noise level between 1 and 3 dB. This range of noise levels has been found to be noticeable only in laboratory environments. The last category is changes in noise level of less than 1 dB, which are inaudible to the human ear. Only audible changes in existing ambient or background noise levels are considered potentially significant.

Physiological Effects of Noise

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

Table A lists definitions of acoustical terms, and Table B shows common sound levels and their noise sources.

FUNDAMENTALS OF VIBRATION

Vibration refers to ground-borne noise and perceptible motion. Ground-borne vibration is almost exclusively a concern inside buildings and is rarely perceived as a problem outdoors, where the motion may be discernible, but without the effects associated with the shaking of a building there is less adverse reaction. Vibration energy propagates from a source through intervening soil and rock layers to the foundations of nearby buildings. The vibration then propagates from the foundation throughout the remainder of the structure. Building vibration may be perceived by occupants as the motion of building surfaces, the rattling of items sitting on shelves or hanging on walls, or a low-frequency rumbling noise. The rumbling noise is caused by the vibration of walls, floors, and ceilings that radiate sound waves. Although the perceptibility threshold is approximately 65 vibration velocity decibels (VdB), human response to vibration is not usually substantial unless the vibration exceeds 70 VdB. A vibration level that causes annoyance is well below the damage risk threshold for typical buildings.

Table A: Definitions of Acoustical Terms

Term	Definition
Decibel, dB	A unit of noise level that denotes the ratio between two quantities that are proportional to power; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
Frequency, Hz	Of a function periodic in time, the number of times that the quantity repeats itself in 1 second (i.e., number of cycles per second).
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very-low-frequency and very-high-frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. (All sound levels in this report are A-weighted unless reported otherwise.)
L_2, L_8, L_{50}, L_{90}	The fast A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 2 percent, 8 percent, 50 percent, and 90 percent of a stated time period.
Equivalent Continuous Sound Level, L_{eq}	The level of a steady sound that, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound.
Community Noise Equivalent Level, CNEL	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 5 dB to sound levels occurring in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 dB to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
Day/Night Average Noise Level, L_{dn}	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 dB to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
L_{max}, L_{min}	The maximum and minimum A-weighted sound levels measured on a sound level meter during a designated time interval using fast time averaging.
Ambient Noise Level	The all-encompassing noise associated with a given environment at a specified time; usually a composite of sound from many sources from many directions, near and far; no particular sound is dominant.
Intrusive	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, time of occurrence, and tonal or informational content, as well as the prevailing ambient noise level.

Source: *Handbook of Acoustical Measurement and Noise Control* (Harris 1991).

Table B: Common Sound Levels and Their Noise Sources

Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Evaluations
Near Jet Engine	140	Deafening	128 times as loud
Civil Defense Siren	130	Threshold of Pain	64 times as loud
Hard Rock Band	120	Threshold of Feeling	32 times as loud
Accelerating Motorcycle a Few Feet Away	110	Very Loud	16 times as loud
Pile Driver; Noisy Urban Street/Heavy City Traffic	100	Very Loud	8 times as loud
Ambulance Siren; Food Blender	95	Very Loud	—
Garbage Disposal	90	Very Loud	4 times as loud
Freight Cars; Living Room Music	85	Loud	—
Pneumatic Drill; Vacuum Cleaner	80	Loud	2 times as loud
Busy Restaurant	75	Moderately Loud	—
Near-Freeway Auto Traffic	70	Moderately Loud	Reference Level
Average Office	60	Quiet	½ as loud
Suburban Street	55	Quiet	—
Light Traffic; Soft Radio Music in Apartment	50	Quiet	¼ as loud
Large Transformer	45	Quiet	—
Average Residence without Stereo Playing	40	Faint	⅛ as loud
Soft Whisper	30	Faint	—
Rustling Leaves	20	Very Faint	—
Human Breathing	10	Very Faint	Threshold of Hearing
—	0	Very Faint	—

Source: Compiled by LSA Associates, Inc. (2004).

Typical sources of ground-borne vibration are construction activities (e.g., blasting, pile driving, and operating heavy-duty earthmoving equipment), steel-wheeled trains, and occasional traffic on rough roads. Problems with both ground-borne vibration and noise from these sources are usually localized to areas within approximately 100 feet (ft) from the vibration source, although there are examples of ground-borne vibration causing interference out to distances greater than 200 ft (*Transit Noise and Vibration Impact Assessment Manual* [FTA 2018]). When roadways are smooth, vibration from traffic, even heavy trucks, is rarely perceptible. It is assumed for most projects that the roadway surface will be smooth enough that ground-borne vibration from street traffic will not exceed the impact criteria; however, both construction of the project and freight train operations could result in ground-borne vibration that may be perceptible and annoying.

Ground-borne noise is not likely to be a problem because noise arriving via the normal airborne path will usually be greater than ground-borne noise. Ground-borne vibration has the potential to disturb people and damage buildings. Although it is very rare for train-induced ground-borne vibration to cause even cosmetic building damage, it is not uncommon for construction processes (e.g., blasting and pile driving) to cause vibration of sufficient amplitudes to damage nearby buildings (FTA 2018). Ground-borne vibration is usually measured in terms of vibration velocity, either the root-mean-square (RMS) velocity or peak particle velocity (PPV). The RMS velocity is best for characterizing human response to building vibration, and PPV is used to characterize potential for damage. Decibel notation acts to compress the range of numbers required to describe vibration. The vibration velocity level in decibels is defined as the following:

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

where L_v is the vibration velocity in decibels (VdB), V is the RMS velocity amplitude, and V_{ref} is the reference velocity amplitude, or 1 x 10^{-6} inches/second (in/sec) used in the United States.

REGULATORY SETTING

Federal Guidelines

Federal Transit Administration

Noise. Though the City does not have daytime construction noise level limits for activities that occur within the specified hours of Section 7.35.020(G), to determine potential construction noise impacts, construction noise was assessed using criteria from the *Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual* (FTA 2018). Table C shows the FTA's Detailed Assessment Daytime Construction Noise Criteria based on the composite noise levels for each construction phase.

Vibration. Vibration standards included in the FTA *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018) were used in this analysis because the City of Riverside does not have vibration standards. Table D provides the criteria for assessing the potential for interference or annoyance from vibration levels in a building while Table E lists the potential vibration building damage criteria associated with construction activities.

Table C: Detailed Assessment Daytime Construction Noise Criteria

Land Use	Daytime 1-hour L_{eq} (dBA)
Residential	80
Commercial	85
Industrial	90

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
dBA = A-weighted decibels
L_{eq} = equivalent continuous sound level

Table D: Interpretation of Vibration Criteria for Detailed Analysis

Land Use	Max L_V (VdB)[1]	Description of Use
Workshop	90	Vibration that is distinctly felt. Appropriate for workshops and similar areas not as sensitive to vibration.
Office	84	Vibration that can be felt. Appropriate for offices and similar areas not as sensitive to vibration.
Residential Day	78	Vibration that is barely felt. Adequate for computer equipment and low-power optical microscopes (up to 20X).
Residential Night and Operating Rooms	72	Vibration is not felt, but ground-borne noise may be audible inside quiet rooms. Suitable for medium-power microscopes (100X) and other equipment of low sensitivity.

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
[1] As measured in 1/3-octave bands of frequency over the frequency range 8 to 80 Hz.
FTA = United States Federal Transit Administration
Hz = hertz
L_V = velocity in decibels
Max = maximum
VdB = vibration velocity decibels

Table E: Construction Vibration Damage Criteria

Building Category	PPV (in/sec)	Approximate L_V (VdB)[1]
Reinforced concrete, steel, or timber (no plaster)	0.50	102
Engineered concrete and masonry (no plaster)	0.30	98
Nonengineered-timber and masonry buildings	0.20	94
Buildings extremely susceptible to vibration damage	0.12	90

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
[1] RMS vibration velocity in decibels (VdB) is 1 µin/sec.
µin/sec = microinches per second
FTA = Federal Transit Administration
in/sec = inches per second
L_V = velocity in decibels
PPV = peak particle velocity
RMS = root-mean-square
VdB = vibration velocity decibels

State Regulations

Title 24

The State's Noise Insulation Standards (California Building Code [CBC]/California Code of Regulations [CCR] Title 24, Part 2) establishes standards for interior noise attributable to outside noise sources

and requires the preparation of acoustical studies wherever a residential building is proposed within the 60 dBA CNEL noise contour created by a freeway, expressway, parkway, major street, thoroughfare, rail line, rail transit line, or industrial noise source. The acoustical study must show that the building has been designed to limit the intrusion of exterior noise such that interior noise levels do not exceed 45 dBA CNEL.

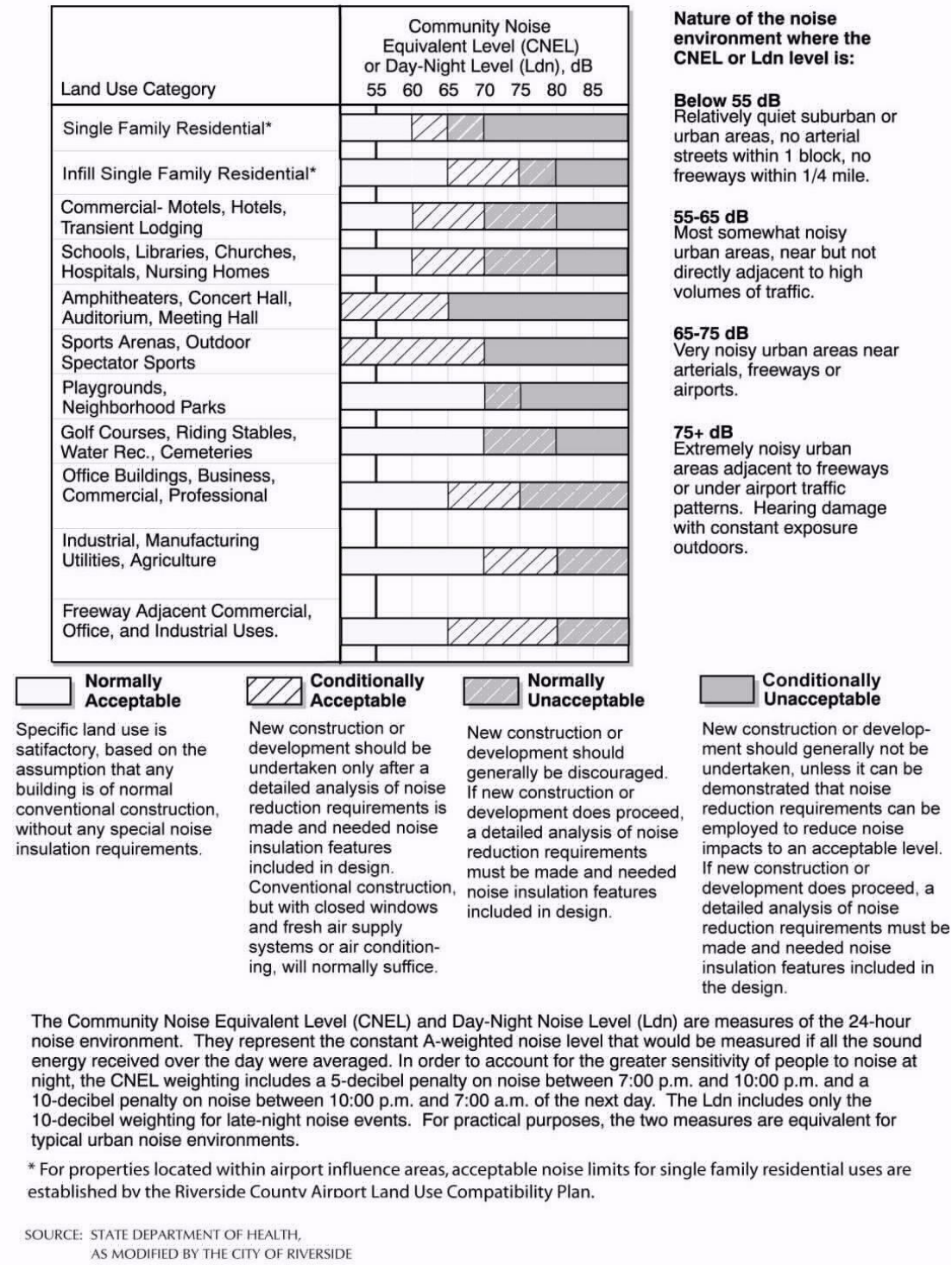
Local Regulations

City of Riverside

Noise Element of the General Plan. The City addresses noise in the Noise Element of its General Plan and lists policies required to meet the City's noise-related objectives. The applicable objectives and policies for the proposed project are listed below.

- **Objective N-1:** Minimize noise levels from point sources throughout the community and, wherever possible, mitigate the effects of noise to provide a safe and healthful environment.
    - **Policy N-1.1:** Continue to enforce noise abatement and control measures particularly within residential neighborhoods.
    - **Policy N-1.2:** Require the inclusion of noise-reducing design features in development consistent with standards in Table F (City of Riverside Noise/Land Use Compatibility Criteria), Title 24 of the California Code of Regulations, and Title 7 of the Municipal Code.
    - **Policy N-1.3:** Enforce the City Noise Control Code to ensure that stationary noise and noise emanating from construction activities, private developments/residences, and special events are minimized.
    - **Policy N–1-5**: Avoid locating noise-sensitive land uses in existing and anticipated noise-impacted areas.
- **Objective N-2:** Minimize the adverse effects of airport-related noise through proper land use planning.
    - **Policy N-2.1:** Ensure that new development can be made compatible with the noise environment by using noise/land use compatibility standards (Table F) and the airport noise contour maps (found in the Riverside County Airport Land Use Compatibility Plan) as guides to future planning and development decisions.
    - **Policy N-2.2:** Avoid placing noise-sensitive land uses (e.g., residential uses, hospitals, assisted-living facilities, group homes, schools, and day care centers) within the high noise impact areas (over 60 dB CNEL) for Riverside Municipal Airport and Flabob Airport in accordance with the Riverside County Airport Land Use Compatibility Plan.
- **Objective N-3:** Ensure the viability of March Air Reserve Base/March Inland Port.
    - **Policy N-3.1:** Avoid placing noise-sensitive land uses (e.g., residential uses, hospitals, assisted-living facilities, group homes, schools, and day care centers) within the high noise impact areas (over 65 dB CNEL) for March Air Reserve Base/March Inland Port in accordance with the Riverside County Airport Land Use Compatibility Plan.

Table F: City of Riverside Noise/Land Use Noise Compatibility Criteria



Source: General Plan 2025, Noise Element, Figure N-10 (City of Riverside 2007).

- **Objective N-4:** Minimize ground transportation–related noise impacts.
    - **Policy N-4.1:** Ensure that noise impacts generated by vehicular sources are minimized through the use of noise reduction features (e.g., earthen berms, landscaped walls, lowered streets, and improved technology).

To achieve Objective N-1, the proposed residential project is an infill residential project and was assessed using the Noise/Land Use Noise Compatibility Criteria shown in Table F. As shown in this table, a noise level of up to 65 dBA CNEL is the upper limit of what is considered a "normally acceptable" noise environment, and noise levels between 65 and 75 dBA CNEL are considered a "conditionally acceptable" noise environment for infill single-family residential uses. New development should generally be discouraged within the "unacceptable" category. However, if new development does proceed, a detailed analysis of the noise reduction requirements must be made, and the necessary noise insulation features must be included in the design.

Municipal Code. Sections 7.25.010 and 7.30.015 of the City's Municipal Code establish the maximum permissible noise level that may intrude into a neighbor's property. Table G provides the City's maximum noise standards based on the type of land use, the location of the noise (exterior/ interior), and the time period. The noise metric used for stationary sources is defined as noise levels that cannot be exceeded for certain percentages of time, or L_n.

Section 7.35.020(G) of the City's Municipal Code exempts noise sources associated with construction, repair, remodeling, or grading of any real property from the noise limits specified in Sections 7.25.010 and 7.30.015 of the City's Municipal Code, provided the following requirements are met:

a. A permit has been obtained from the City as required.

b. Activities do not take place between the hours of 7:00 p.m. and 7:00 a.m. on weekdays, between the hours of 5:00 p.m. and 8:00 a.m. on Saturdays, or at any time on Sunday or a federal holiday.

Mission Grove Specific Plan

The following mitigation measures from the Mission Grove Specific Plan are applicable to the proposed project:

- Construction activities will take place only during those days and hours specified in the City Noise Ordinance to reduce noise impacts during more sensitive times periods.
- The use and proper maintenance of noise reducing devices on construction equipment will minimize construction-related noise.

March Air Reserve Base/Inland Port Airport

Below are the applicable noise compatibility policies from the March Air Reserve Base/Inland Port Airport (MARB/IPA) Land Use Compatibility Plan (Riverside County Airport Land Use Commission [RCALUC] 2014), which was adopted by RCALUC.

Table G: City of Riverside Maximum Noise Level Standards

Type of Land Use	Exterior/ Interior	Time Period	L_{50} (30 minutes)	L_{25} (15 minutes)	L_8 (5 minutes)	L_2 (1 minute)	L_{max} (Anytime)
Residential	Exterior	7:00 AM to 10:00 PM	55–60	60	65	70	75
		10:00 PM to 7:00 AM	45–50	50	55	60	65
	Interior	7:00 AM to 10:00 PM	—	—	45–50	50	55
		10:00 PM to 7:00 AM	—	—	35–40	40	45
School	Interior	7:00 AM to 10:00 PM (while school is in session)	—	—	45–50	50	55
Hospital	Interior	Anytime	—	—	45–50	50	55
Office/Commercial	Exterior	Anytime	65–70	70	75	80	85
Industrial	Exterior	Anytime	70–75	75	80	85	90
Community Support	Exterior	Anytime	60–65	65	70	75	80
Public Recreation Facility	Exterior	Anytime	65–70	70	75	80	85
Nonurban	Exterior	Anytime	70–75	75	80	85	90

Source: City of Riverside Municipal Code (2023).
dBA = A-weighted decibel
L_{max} = maximum instantaneous noise level
L_2 (exterior) = The exterior noise standard plus 15 dBA for a cumulative period of more than 1 minute in any hour.
L_8 (exterior) = The exterior noise standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour.
L_{25} (exterior) = The exterior noise standard plus 5 dBA for a cumulative period of more than 15 minutes in any hour.
L_{50} (exterior) = The exterior noise standard plus up to 5 dBA for a cumulative period of more than 30 minutes in any hour.
L_{max} (exterior) = The exterior noise standard plus 20 dBA or the maximum measured ambient noise level for any period of time.
L_2 (interior) = The interior noise standard plus 5 dBA for a cumulative period of more than 1 minute in any hour.
L_8 (interior) = The interior noise standard plus up to 5 dBA for a cumulative period of more than 5 minutes in any hour.
L_{max} (interior) = The interior noise standard plus 10 dBA or the maximum measured ambient noise level for any period of time.

- **Countywide Policy 4.1.5.** The CNEL considered normally acceptable for new residential land uses in the vicinity of March ARB/IPA is 65 dBA.

- **Countywide Policy 4.1.6.** Single-event noise levels from aircraft operations can be particularly intrusive at night. Compared to other airports in the county, current and projected nighttime activity by large aircraft at March ARB/IPA warrants a greater degree of sound attenuation for the interiors of buildings housing certain uses as cited below.

    - The maximum, aircraft-related, interior noise level that shall be considered acceptable shall be 40 dBA CNEL for all new residences, schools, libraries, museums, hotels and motels, hospitals and nursing homes, places of worship, and other noise-sensitive uses. For office uses, the interior standard shall be CNEL 45 dB, the same as the countywide criterion.

    - To ensure compliance with these criteria, an acoustical study shall be required to be completed for any development proposed to be situated where the aviation-related noise exposure is more than 20 dB above the interior standard (e.g., within the CNEL 60 dB contour where the interior standard is CNEL 40 dB). Standard building construction is presumed to provide adequate sound attenuation where the difference between the exterior noise exposure and the interior standard is 20 dB or less.

EXISTING SETTING

Overview of the Existing Noise Environment

The primary existing noise sources in the project area are transportation facilities. Traffic on Mission Grove Parkway, Mission Village Drive, and other local streets contribute to the ambient noise levels in the project vicinity. Noise from motor vehicles is generated by engines, the interaction between the tires and the road, and vehicle exhaust systems. Other sources of noise in the project area include commercial activity and aircraft noise from MARB/IPA.

Land Uses in the Project Vicinity

Land uses in the vicinity of the project area include residences and commercial uses. Single-family residences are located south of the project site. Commercial uses are located to the east across Mission Grove Parkway and immediately north and west of the project site. Also, MARB/IPA is located approximately 3.2 miles southeast of the project site.

Ambient Noise Measurements

Short-Term Noise Measurements

Short-term (20-minute) noise level measurements were conducted on Monday, June 28, and Tuesday, June 29, 2022, using a Larson Davis Model 831 Type 1 sound level meter. Table H shows the results of the short-term noise level measurements along with a description of the measurement location and noise sources that occurred during the measurement. As shown in Table H, the measured average noise levels in the project area range from 55.1 to 61.1 dBA L_{eq}, and the instantaneous maximum noise levels range from 70.1 to 77.3 dBA L_{max}. The calculated CNEL noise levels at ST-1, ST-2, and ST-3 were calculated to be 62.9, 57.4, and 63.3 dBA, respectively, based on the noise level profiles from the long-term noise level measurements. The short-term noise level measurement survey sheets are provided in Appendix A. Figure 3 shows the short-term monitoring locations.

Long-Term Noise Measurements

Three long-term (24-hour) noise level measurements were conducted from Sunday, July 12, to Monday, July 13, 2022, using three Larson Davis Spark 706RC Dosimeters. Tables I, J, and K show the hourly L_{eq} , L_{max}, and L_{min} results from the long-term noise level measurements. Table L summarizes the results of the long-term noise level measurements along with a description of the measurement locations and noise sources that occurred during the measurements. As shown in Table L, the daytime noise levels ranged from 54.9 to 69.3 dBA L_{eq}, and the nighttime noise levels ranged from 45.2 to 63.7 dBA L_{eq}. The daytime maximum instantaneous noise levels ranged from 69.1 to 89.3 dBA L_{max} and the nighttime maximum instantaneous noise level ranged from 63.6 to 83.6 dBA L_{max}. Also, the calculated CNEL levels from the long-term noise level measurements at LT-1, LT-2, and LT-3 were 68.9, 60.7, and 60.3 dBA, respectively. The long-term noise level measurement survey sheets are provided in Appendix A. Figure 3 shows the long-term monitoring locations.

Table H: Short-Term Ambient Noise Level Measurements

Monitor No.	Location	Start Time	Noise Level (dBA)				Noise Source(s)
			L_{eq}	L_{max}	L_{min}	CNEL	
ST-1	Located at the northern edge of the project site. Near the main road entering/exiting the Mission Grove Shopping Center. Approximately 386 ft from Mission Grove Parkway centerline.	2:45 p.m.	61.1	77.3	52.8	62.9[1]	Traffic on the main road entering/exiting the Mission Grove Shopping Center. Faint radio music and noise from the car wash northeast of the project site.
ST-2	Located in front of a store at 1B E. Alessandro Boulevard, #341, Riverside, CA 92508. Approximately 520 ft from Mission Grove Parkway centerline and 380 ft from Mission Village Drive centerline.	11:39 a.m.	55.1	70.1	47.2	57.4[2]	Parking lot activity with light duty vehicles passing by. Landscaping activity from hedge cutting 18 minutes into the measurement.
ST-3	Located at the southeast corner of the project site. Northwestern corner of the Mission Grove Parkway and Mission Village Drive intersection. Approximately 75 ft from Mission Grove Parkway centerline and 60 ft from Mission Village Drive centerline.	12:40 p.m.	59.7	71.0	49.7	63.3[3]	Traffic noise at the intersection of Mission Village Drive and Mission Grove. Faint yard work (mower) activity noise at the beginning of the measurement. Leaf blower noise 10 minutes into the measurement.

Source: Compiled by LSA Associates, Inc. (2022).

[1] The CNEL noise level for ST-1 was calculated based on the noise level profile from the long-term noise level measurement at LT-1.
[2] The CNEL noise level for ST-2 was calculated based on the noise level profile from the long-term noise level measurement at LT-1.
[3] The CNEL noise level for ST-3 was calculated based on the noise level profile from the long-term noise level measurement at LT-2.

dBA = A-weighted decibel
L_{eq} = equivalent continuous sound level
L_{max} = maximum measured sound level
L_{min} = minimum measured sound level

LSA

LEGEND

- Project Site
- ST-1 Short-term Noise Monitoring Location
- LT-1 Long-term Noise Monitoring Location

0 125 250
FEET

SOURCE: Google Earth 2021

I:\ATO2202\G\Noise_Locs.ai (11/15/2022)

FIGURE 3

Mission Grove Apartments Project
Noise Monitoring Locations

Table I: Long-Term (24-Hour) Noise Level Measurement Results at LT-1

Start Time	Date	Noise Level (dBA)		
		L_{eq}	L_{max}	L_{min}
1:00 PM	7/12/22	67.1	82.8	50.6
2:00 PM	7/12/22	67.0	83.3	49.4
3:00 PM	7/12/22	67.0	81.9	49.2
4:00 PM	7/12/22	67.5	82.4	48.8
5:00 PM	7/12/22	67.5	81.3	51.0
6:00 PM	7/12/22	66.8	80.9	51.7
7:00 PM	7/12/22	65.9	83.3	47.3
8:00 PM	7/12/22	65.7	84.5	47.4
9:00 PM	7/12/22	64.1	89.3	45.5
10:00 PM	7/12/22	62.2	81.3	44.7
11:00 PM	7/12/22	60.5	83.6	44.0
12:00 AM	7/13/22	59.7	81.0	46.0
1:00 AM	7/13/22	55.1	75.0	43.4
2:00 AM	7/13/22	55.2	76.1	43.5
3:00 AM	7/13/22	55.6	75.6	43.1
4:00 AM	7/13/22	59.0	81.9	44.1
5:00 AM	7/13/22	60.6	77.6	46.4
6:00 AM	7/13/22	63.7	81.5	46.4
7:00 AM	7/13/22	66.2	84.8	48.4
8:00 AM	7/13/22	66.9	84.1	47.6
9:00 AM	7/13/22	69.3	89.0	49.1
10:00 AM	7/13/22	66.5	84.0	47.7
11:00 AM	7/13/22	66.5	84.9	48.2
12:00 PM	7/13/22	66.3	83.6	49.6

Source: Compiled by LSA Associates, Inc. (2022).
dBA = A-weighted decibel
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level
L_{min} = minimum measured sound level

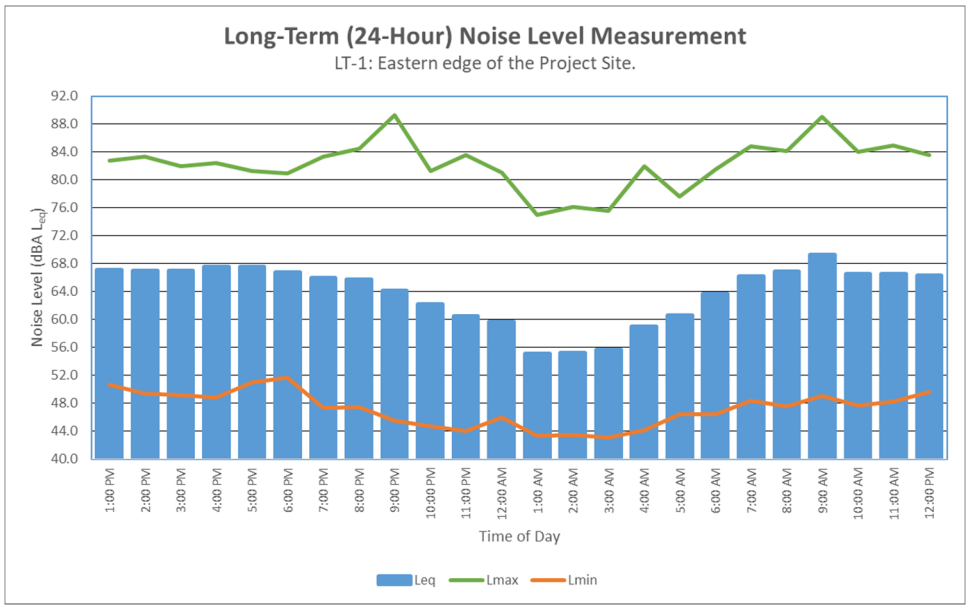


Table J: Long-Term (24-Hour) Noise Level Measurement Results at LT-2

Start Time	Date	Noise Level (dBA)		
		L_{eq}	L_{max}	L_{min}
1:00 PM	7/12/22	57.1	73.7	47.5
2:00 PM	7/12/22	57.9	78.5	47.0
3:00 PM	7/12/22	57.4	76.5	46.9
4:00 PM	7/12/22	57.7	72.6	47.5
5:00 PM	7/12/22	57.8	76.1	48.6
6:00 PM	7/12/22	56.9	71.2	48.0
7:00 PM	7/12/22	57.4	76.7	46.0
8:00 PM	7/12/22	56.8	78.5	44.9
9:00 PM	7/12/22	56.7	84.3	42.9
10:00 PM	7/12/22	53.6	75.1	42.2
11:00 PM	7/12/22	51.4	68.9	42.4
12:00 AM	7/13/22	51.0	67.4	44.0
1:00 AM	7/13/22	48.8	64.2	43.2
2:00 AM	7/13/22	47.7	65.5	40.9
3:00 AM	7/13/22	48.6	67.4	41.5
4:00 AM	7/13/22	51.9	71.4	42.5
5:00 AM	7/13/22	54.6	72.9	47.0
6:00 AM	7/13/22	55.3	68.4	45.2
7:00 AM	7/13/22	57.6	72.3	46.7
8:00 AM	7/13/22	59.2	78.5	46.6
9:00 AM	7/13/22	63.8	82.1	47.1
10:00 AM	7/13/22	58.5	72.8	46.3
11:00 AM	7/13/22	56.3	69.1	45.8
12:00 PM	7/13/22	57.1	70.8	46.2

Source: Compiled by LSA Associates, Inc. (2022).
dBA = A-weighted decibel
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level
L_{min} = minimum measured sound level

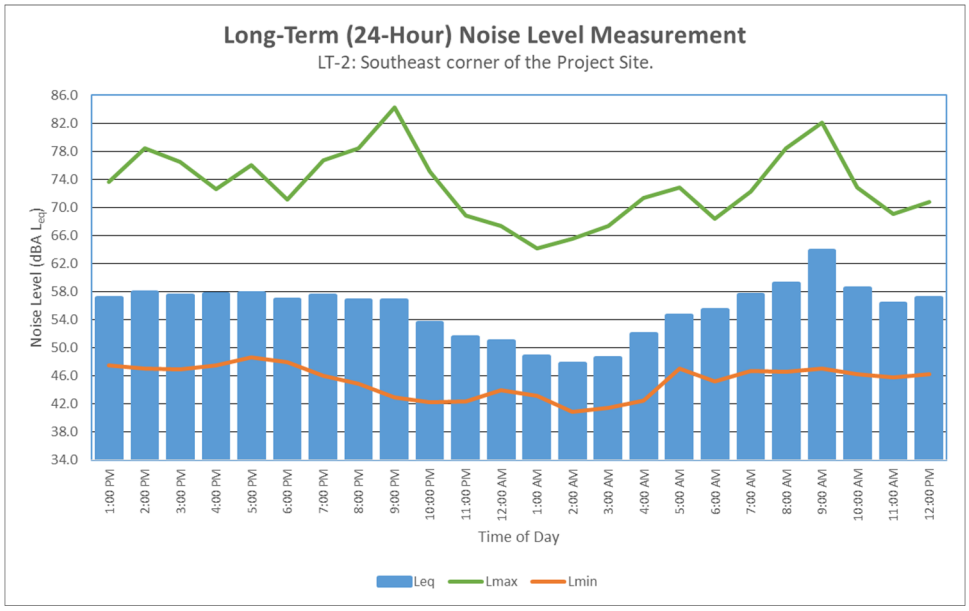


Table K: Long-Term (24-Hour) Noise Level Measurement Results at LT-3

Start Time	Date	Noise Level (dBA)		
		L_{eq}	L_{max}	L_{min}
1:00 PM	7/12/22	58.0	73.4	45.3
2:00 PM	7/12/22	57.5	74.5	44.1
3:00 PM	7/12/22	58.4	75.0	45.1
4:00 PM	7/12/22	58.6	71.1	45.7
5:00 PM	7/12/22	59.7	76.1	45.1
6:00 PM	7/12/22	58.5	71.2	45.6
7:00 PM	7/12/22	57.6	74.9	44.1
8:00 PM	7/12/22	56.6	72.1	42.8
9:00 PM	7/12/22	55.2	69.8	40.9
10:00 PM	7/12/22	53.1	70.1	40.8
11:00 PM	7/12/22	50.5	69.5	40.9
12:00 AM	7/13/22	49.7	68.9	42.1
1:00 AM	7/13/22	50.0	69.7	40.8
2:00 AM	7/13/22	45.2	66.7	39.3
3:00 AM	7/13/22	46.0	63.6	40.1
4:00 AM	7/13/22	53.6	75.0	41.5
5:00 AM	7/13/22	51.6	71.7	45.3
6:00 AM	7/13/22	53.0	72.1	43.3
7:00 AM	7/13/22	54.9	75.8	44.5
8:00 AM	7/13/22	61.0	81.2	44.4
9:00 AM	7/13/22	60.0	83.9	44.9
10:00 AM	7/13/22	63.1	81.1	42.7
11:00 AM	7/13/22	56.9	72.6	42.4
12:00 PM	7/13/22	58.6	73.7	43.3

Source: Compiled by LSA Associates, Inc. (2022).
dBA = A-weighted decibel
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level
L_{min} = minimum measured sound level

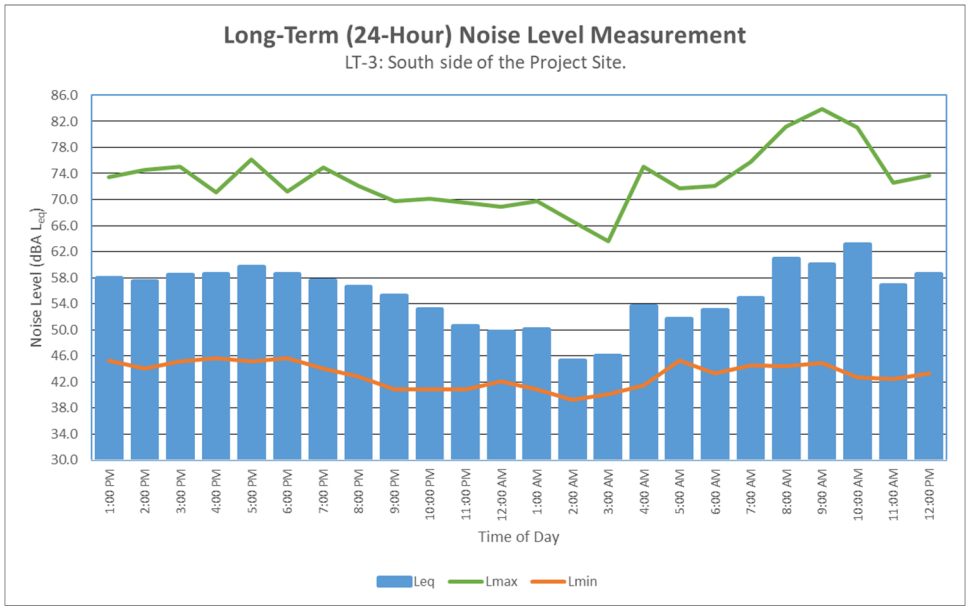


Table L: Long-Term Ambient Noise Monitoring Results

Monitor No.	Location	Noise Level (dBA)					Noise Sources
		Daytime		Nighttime		CNEL	
		L_{eq}	L_{max}	L_{eq}	L_{max}		
LT-1	Eastern edge of the project site along Mission Grove Parkway. On a palm tree approximately 50 ft from the Mission Grove Parkway centerline.	64.1–69.3 (66.8)[1]	80.9–89.3	55.1–63.7 (60.0)[2]	75.0–83.6	68.9	Traffic Mission Grove Parkway. Infrequent bus stop activity.
LT-2	Near the southeastern corner of the project site. On a light pole approximately 146 ft from Mission Grove Parkway centerline and 130 ft from Mission Village Drive centerline.	56.3–63.8 (58.4)[1]	69.1–84.3	47.7–55.3 (52.2)[2]	64.2–75.1	60.7	Traffic noise on Mission Grove Parkway. Intermittent parking activity.
LT-3	South side of the project site. East of the Sunset Recycling Center. On a light pole approximately 60 ft from Mission Village Drive centerline.	54.9–63.1 (58.8)[1]	69.8–83.9	45.2–53.6 (51.1)[2]	63.6–75.0	60.3	Traffic noise from Mission Village Drive and faint traffic on Mission Grove Parkway. Light chattering noise from the Sunset Recycling Center.

Source: Compiled by LSA Associates, Inc. (2022).
Note: Long-term (24-hour) noise level measurements were conducted from July 12, 2022, to July 13, 2022.
[1] Average daytime noise level.
[2] Average nighttime noise level.
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = foot/feet
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level

Existing Aircraft Noise

The closest airports to the project site are the March Air Reserve Base/Inland Port Airport (MARB/IPA), Riverside Municipal Airport, and Flabob Airport, which are located 3.2 miles southeast, 6.7 miles northwest, and 6.8 miles northwest of the project site, respectively. Although the project site is located in Zone C2 based on the RCALUC Compatibility Map (RCALUC 2014), the project site is outside the 60 dBA CNEL noise contour of the March Air Reserve Base based on the Riverside County Airport Land Use Compatibility Plan (RCALUC 2004) and the *Final Air Installations Compatible Use Zones Study, March Air Reserve Base, Riverside, California* (Air Force Reserve Command 2018). Therefore, the project site would not be exposed to aircraft noise exceeding the exterior noise standard of 65 dBA CNEL based on the Countywide Policy 4.1.5. In addition, the exterior noise level would not be more than 20 dBA above the interior standard of 40 dBA CNEL based on the Countywide Policy 4.1.5 and standard building construction, which would provide an exterior-to-interior attenuation of 20 dBA. Also, the project site is outside the 55 dBA CNEL noise contours of Riverside Municipal Airport and Flabob Airport based on the Riverside County Airport Land Use Compatibility Plan (Riverside County ALUC 2004). Figures showing the airport noise contours and the location of the project site are provided in Appendix B. There are no private airstrips located within the vicinity of the project site.

Therefore, the proposed project would not expose people residing or working in the project area to excessive noise levels, and this topic is not further discussed.

Existing Traffic Noise

The United States Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used to evaluate traffic-related noise conditions along roadway segments in the project vicinity. This model requires various parameters, including traffic volumes, vehicle mix, vehicle speed, and roadway geometry, to compute typical equivalent noise levels during daytime, evening, and nighttime hours. The resulting noise levels are weighted and summed over 24-hour periods to determine the CNEL values. The existing average daily traffic (ADT) volumes were obtained from traffic counts conducted on Wednesday, May 12 and Monday, May 17, 2022. The standard vehicle mix for Southern California roadways was used for roadways in the project vicinity. Table M lists the existing traffic noise levels on roadways in the project vicinity. These noise levels represent the worst-case scenario, which assumes that no shielding is provided between traffic and the location where the noise contours are drawn. The specific assumptions used in developing these noise levels and the model printouts are provided in Appendix C.

IMPACTS

Short-Term Construction Noise Impacts

Two types of short-term noise impacts could occur during construction on the project site. The first type would be from construction crew commutes and the transport of construction equipment and materials to the project site and would incrementally raise noise levels on roadways leading to the site. The pieces of construction equipment for construction activities would move on site, would remain for the duration of each construction phase, and would not add to the daily traffic volume in the project vicinity. Although there would be a relatively high single-event noise exposure potential causing intermittent noise nuisance (passing trucks at 50 ft would generate up to a maximum of 84 dBA), the effect on longer-term ambient noise levels would be small because the number of daily construction-related vehicle trips is small compared to existing daily traffic volume on Mission Grove Parkway and Mission Village Drive. Project construction would generate a maximum of 674 trips per day based on the California Emissions Estimator Model (CalEEMod) (Version 2020.4.0) results contained in Attachment B of the *Mission Grove Apartments Project Air Quality, Greenhouse Gas Emissions, and Energy Impact Analysis Memorandum* (LSA 2022). Roadways that would be used to access the project site are Mission Grove Parkway and Mission Village Drive. Based on Table M, Mission Grove Parkway and Mission Village Drive have estimated existing daily traffic volumes of 10,353 and 1,962, respectively, near the project site. Based on the information above, construction-related traffic would increase noise by up to 1.3 dBA. A noise level increase of less than 3 dBA would not be perceptible to the human ear in an outdoor environment. Therefore, no short-term, construction-related impacts associated with worker commutes and transport of construction equipment and material to the project site would occur, and no noise reduction measures would be required.

Table M: Existing Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (ft)	Centerline to 65 CNEL (ft)	Centerline to 60 CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane
Alessandro Boulevard Between Overlook Parkway-Canyon Crest Drive and Cannon Road	67,721	152	319	683	74.0
Alessandro Boulevard Between Cannon Road and Communications Center Drive	67,635	151	318	682	74.1
Alessandro Boulevard Between Communications Center Drive and Trautwein Road	54,009	132	275	587	73.0
Alessandro Boulevard Between Trautwein Road and Plaza Driveway 1	42,861	122	240	505	71.2
Alessandro Boulevard Between Plaza Driveway 1 and Mission Grove Parkway	42,347	120	237	501	71.2
Alessandro Boulevard Between Mission Grove Parkway and Northrop Drive	45,483	124	248	525	71.6
Alessandro Boulevard Between Northrop Drive and Barton Street	47,048	145	296	630	72.8
Trautwein Road Between Alessandro Boulevard and Mission Grove Parkway	33,787	96	201	430	71.6
Mission Village Drive Between Trautwein Road and Project Driveway 2-Bayou Lane	1,962	< 50	< 50	< 50	55.6
Mission Village Drive Between Project Driveway 2-Bayou Lane and Mission Grove Parkway	2,359	< 50	< 50	< 50	56.4
Mission Grove Parkway Between Alessandro Boulevard and Plaza Driveway 2	10,666	< 50	87	171	64.7
Mission Grove Parkway Between Plaza Driveway 2 and Mission Village Drive	10,353	< 50	86	168	64.6
Mission Grove Parkway Between Mission Village Drive and Trautwein Road	13,091	< 50	97	195	65.6

Source: Compiled by LSA Associates, Inc. (2022).
Note: Traffic noise within 50 ft of the roadway centerline should be evaluated with site-specific information.
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = foot/feet

The second type of short-term noise impact is related to noise generated from construction activities. Construction is performed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. The proposed project anticipates demolition, site preparation, grading, building construction, paving, and architectural coating phases of construction. These various sequential phases change the character of the noise generated on a project site. Therefore, the noise levels vary as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table N lists the L_{max}

Table N: Typical Construction Equipment Noise Levels

Equipment Description	Acoustical Usage Factor[1]	Maximum Noise Level (L_{max}) at 50 ft[2]
Backhoe	40	80
Compactor (ground)	20	80
Compressor	40	80
Crane	16	85
Dozer	40	85
Dump Truck	40	84
Excavator	40	85
Flatbed Truck	40	84
Forklift	20	85
Front-End Loader	40	80
Grader	40	85
Impact Pile Driver	20	95
Jackhammer	20	85
Pickup Truck	40	55
Pneumatic Tools	50	85
Pump	50	77
Rock Drill	20	85
Roller	20	85
Scraper	40	85
Tractor	40	84
Welder	40	73

Source: *FHWA Highway Construction Noise Handbook,* Table 9.1 (FHWA 2006).
Note: The noise levels reported in this table are rounded to the nearest whole number.
[1] Usage factor is the percentage of time during a construction noise operation that a piece of construction equipment is operating at full power.
[2] Maximum noise levels were developed based on Spec 721.560 from the CA/T program to be consistent with the City of Boston, Massachusetts, Noise Code for the "Big Dig" project.
CA/T = Central Artery/Tunnel
FHWA = Federal Highway Administration
ft = foot/feet
L_{max} = maximum instantaneous noise level

recommended for noise impact assessments for typical construction equipment included in the FHWA *Highway Construction Noise Handbook* (2006), based on a distance of 50 ft between the equipment and a noise receptor.

Table O provides an estimated construction schedule and lists the anticipated construction equipment for each construction phase based on the CalEEMod (Version 2020.4.0) results contained in Attachment B of the *Mission Grove Apartments Project Air Quality, Greenhouse Gas Emissions, and Energy Impact Analysis Memorandum* (LSA 2022). Table O shows the combined noise level at 50 ft from all of the equipment in each phase as well as the L_{eq} noise level for each equipment at 50 ft based on the quantity, reference instantaneous maximum (L_{max}) noise level at 50 ft, and the acoustical usage factor. As shown in Table O, construction noise levels would reach up to 89.2 L_{eq} at a distance of 50 ft.

Table O: Summary of Construction Phase, Equipment, and Noise Levels

Construction Phase	Start Date	End Date	Duration (Days)	Construction Equipment	Quantity	Reference Noise Level at 50 ft (dBA L_{max})	Acoustical Usage Factor[1] (%)	Noise Level at 50 ft (dBA)		
								L_{max}	L_{eq}	Combined (L_{eq})
Demolition	4/1/2025	8/4/2025	90	Concrete Saw	1	90	20	90.0	83.0	89.2
				Excavators	3	85	40	89.8	85.8	
				Bulldozers	2	85	40	88.0	84.0	
Site Preparation	8/5/2025	8/18/2025	10	Bulldozers	3	85	40	89.8	85.8	87.3
				Front-End Loaders	4	80	40	86.0	82.0	
Grading	8/19/2025	9/15/2025	20	Excavator	1	85	40	85.0	81.0	87.3
				Grader	1	85	40	85.0	81.0	
				Bulldozer	1	85	40	85.0	81.0	
				Front-End Loaders	3	80	40	84.8	80.8	
Building Construction	9/16/2025	7/15/2027	478	Crane	1	85	16	85.0	77.0	86.5 (86.9)[2]
				Forklifts	3	85	20	89.8	82.8	
				Generator	1	82	50	82.0	79.0	
				Front-End Loaders	3	80	40	84.8	80.8	
				Welders	1	73	40	73.0	69.0	
Paving	7/16/2027	8/12/2027	249	Pavers	2	85	50	88.0	85.0	87.6
				Paving Equipment	2	85	20	88.0	81.0	
				Rollers	2	85	20	88.0	81.0	
Architectural Coating	8/3/2026	7/15/2027	20	Air Compressors	1	80	40	80.0	76.0	76.0 (86.9)[2]

Source: Compiled by LSA Associates, Inc. (2023).

[1] The acoustical usage factor is the percentage of time during a construction noise operation that a piece of construction equipment operates at full power.

[2] Construction noise level when building construction and architectural coating are conducted at the same time.

dBA = A-weighted decibels

ft = foot/feet

L_{eq} = equivalent continuous sound level

L_{max} = maximum instantaneous noise level

Table P lists the closest residence and commercial use from the project site along with the distance from the average location of construction activities (distance from the center of the project site) to their property line, distance attenuation, noise level at the property line, whether or not noise levels exceed the FTA construction noise limit, and the ambient noise level increase. As shown in Table P, the closest residential and commercial property lines are located approximately 445 ft and 170 ft from the center of the project site and may be subject to short-term construction noise reaching 70.2 dBA L_{eq} and 78.6 dBA L_{eq}, respectively. Although the closest residence and commercial use may be subject to temporary substantial ambient noise level increases, short-term construction noise levels would not exceed the FTA construction noise criteria of 80 dBA L_{eq} for residences and 85 dBA L_{eq} for commercial uses. In addition, Section 7.35.010 of the City's Municipal Code exempts construction noise during the daytime between the hours of 7:00 a.m. and 7:00 p.m. on weekdays and between the hours of 8:00 a.m. and 5:00 p.m. on Saturdays. Compliance with the City's exempt hours of construction pursuant to Section 7.35.010 of the City's Municipal Code and the mitigation measure related to construction activities in the Mission Grove Specific Plan as well as the mitigation measure in the Mission Grove Specific Plan requiring the use and proper maintenance of noise-reducing devices on construction equipment would minimize construction-related noise and ensure construction noise would not be generated during the more sensitive nighttime hours. No additional noise reduction measures are required.

Table P: Construction Noise Levels

Land Use	Direction	Reference Noise Level at 50 ft (dBA L_{eq})	Distance[1] (ft)	Distance Attenuation (dBA)	Noise Level (dBA L_{eq})	FTA Construction Noise Criteria (dBA L_{eq})	Exceed?
Residence	South	89.2	445	19.0	70.2	80	No
Commercial	West	89.2	170	10.6	78.6	85	No

Source: Compiled by LSA Associates, Inc. (2023).
[1] Distance from the average location of construction activities (distance from the center of the project site) to the property line.
dBA = A-weighted decibel
ft = foot/feet
FTA = Federal Transit Administration
L_{eq} = equivalent continuous sound level

Short-Term Construction Vibration Impacts

This construction vibration impact analysis discusses the level of human annoyance using vibration levels in VdB and assesses the potential for building damage using vibration levels in PPV (in/sec). Vibration levels calculated in RMS velocity are best for characterizing human response to building vibration, whereas vibration levels in PPV are best for characterizing damage potential.

Table Q shows the reference vibration levels at a distance of 25 ft for each type of standard construction equipment from the *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018). Outdoor demolition and site preparation for the proposed project is expected to require the use of a large tracked bulldozer, small rubber-tire bulldozer, and loaded trucks, which would generate ground-borne vibration of up to 87 VdB (0.089 PPV [in/sec]), 58 VdB (0.003 PPV [in/sec]), and 86 VdB (0.076 PPV [in/sec] when measured at 25 ft, respectively.

Table Q: Vibration Source Amplitudes for Construction Equipment

Equipment	Reference PPV/L_V at 25 ft	
	PPV (in/sec)	L_V (VdB)[1]
Pile Driver (Impact), Typical	0.644	104
Pile Driver (Sonic), Typical	0.170	93
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large Bulldozer[2]	**0.089**	**87**
Caisson Drilling	0.089	87
Loaded Trucks[2]	**0.076**	**86**
Jackhammer	0.035	79
Small Bulldozer[2]	**0.003**	**58**

Sources: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
[1] RMS vibration velocity in decibels (VdB) is 1 µin/sec.
[2] Equipment shown in bold is expected to be used on site.
µin/sec = microinches per second
ft = foot/feet
FTA = Federal Transit Administration
in/sec = inches per second
L_V = velocity in decibels
PPV = peak particle velocity
RMS = root-mean-square
VdB = vibration velocity decibels

The greatest vibration levels are anticipated to occur during the site preparation and grading phase. All other phases are expected to result in lower vibration levels. The distance to the nearest buildings for vibration impact analysis is measured between the nearest off-site buildings and the project boundary (assuming the construction equipment would be used at or near the project boundary) because vibration impacts normally occur within the buildings.

The formula for vibration transmission is provided below:

$$L_vdB\ (D) = L_vdB\ (25\ ft) - 30\ Log\ (D/25)$$

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

Table R lists the projected vibration levels from various construction equipment expected to be used on the project site in the active construction area to the nearest buildings in the project vicinity. As shown in Table R, the closest commercial and residential buildings west and south of the project site approximately 80 ft and 130 ft, respectively, from the active project construction area near the center of the project site would experience vibration levels of up to 72 VdB and 66 VdB, respectively. These vibration levels would not result in community annoyance because they would not exceed the FTA community annoyance threshold of 84 VdB for uses that are not as sensitive to vibration and 78 VdB for daytime residences. Other building structures that surround the project site would experience lower vibration levels because they are farther away.

Table R: Potential Construction Vibration Annoyance

Land Use	Direction	Equipment/ Activity	Reference Vibration Level (VdB) at 25 ft	Distance to Structure (ft)[1]	Vibration Level (VdB)
Commercial (383 E Alessandro Boulevard)	North	Large bulldozers	87	110	68
		Loaded trucks	86	110	67
Commercial (7562 Mission Grove Parkway)	East	Large bulldozers	87	135	65
		Loaded trucks	86	135	64
Residence (Foxtail Lane)	South	Large bulldozers	87	130	66
		Loaded trucks	86	130	65
Commercial (Mission Grove Plaza)	West	Large bulldozers	87	80	72
		Small bulldozers	58	80[2]	43
		Loaded trucks	86	80[3]	71

Source: Compiled by LSA Associates, Inc. (2022).
Note: The FTA-recommended annoyance threshold of 84 VdB for offices (and other similar areas) and 78 VdB for residential homes was used to assess potential construction vibration annoyance.
[1] Distance from the active construction area near the center of the project site to the building structure.
[2] Small rubber-tired dozers will be used near the existing commercial building located immediately west of the project construction boundary as a project feature.
[3] Loaded trucks would not operate near the existing commercial building located immediately west of the project construction boundary as a project design feature.
ft = foot/feet
FTA = Federal Transit Administration
VdB = vibration velocity decibels

Similarly, Table S lists the projected vibration levels from various construction equipment expected to be used on the project site at the project construction boundary to the nearest buildings in the project vicinity. As shown in Table S, the closest commercial and residential buildings to the west and south of the project site are immediately west of the project construction boundary and approximately 85 ft, respectively, from the project construction boundary and would experience vibration levels of up to 0.191 PPV (in/sec) and 0.014 PPV (in/sec), respectively. Vibration levels at the closest commercial and residential building would not result in building damage because the commercial and residential buildings would be constructed equivalent to non-engineered timber and masonry, and vibration levels would not exceed the FTA vibration damage threshold of 0.20 PPV (in/sec).

Other building structures that surround the project site would experience lower vibration levels because they are farther away and would be constructed equivalent to non-engineered timber and masonry. Therefore, no construction vibration impacts would occur during project construction. No vibration reduction measures are required.

Table S: Potential Construction Vibration Damage

Land Use	Direction	Equipment/ Activity	Reference Vibration Level at 25 ft	Distance to Structure (ft)[1]	Vibration Level
			PPV (in/sec)		PPV (in/sec)
Commercial (383 E Alessandro Boulevard)	North	Large bulldozers	0.089	40	0.044
		Loaded trucks	0.076	40	0.038
Commercial (7562 Mission Grove Parkway)	East	Large bulldozers	0.089	120	0.008
		Loaded trucks	0.076	120	0.007
Residence (Foxtail Lane)	South	Large bulldozers	0.089	85	0.014
		Loaded trucks	0.076	85	0.012
Commercial (Mission Grove Plaza)	West	Large bulldozers	0.089	15[2]	0.191
		Small bulldozers	0.003	2[3]	0.133
		Loaded trucks	0.076	15[4]	0.164

Source: Compiled by LSA Associates, Inc. (2022).
Note: The FTA-recommended building damage threshold is 0.20 PPV [in/sec]) at the receiving non-engineered timber and masonry building.
[1] Distance from the project construction boundary to the building structure.
[2] Large tracked dozers will not operate within 15 ft of the existing commercial building located immediately west of the project construction boundary as a project feature.
[3] Small rubber-tired dozers will be used within 15 ft of the existing commercial building located immediately west of the project construction boundary as a project feature.
[4] Loaded trucks will not operate within 15 ft of the existing commercial building located immediately west of the project construction boundary as a project design feature.
ft = foot/feet
FTA = Federal Transit Administration
in/sec = inches per second
PPV = peak particle velocity
VdB = vibration velocity decibels

Long-Term Traffic Noise Impacts

The FHWA Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used to evaluate traffic-related noise conditions along street segments in the project vicinity. This model requires various parameters, including traffic volumes, vehicle mix, vehicle speed, and roadway geometry, to compute typical equivalent noise levels during daytime, evening, and nighttime hours. The resulting noise levels are weighted and summed over 24-hour periods to determine the CNEL values. The Existing (2022), Opening Year (2027), and Cumulative (2045) ADT volumes were obtained from traffic counts conducted on May 12 and 17, 2022, and calculated with the project trip generation and cumulative project information. The standard vehicle mix for Southern California roadways was used for roadways in the project vicinity. Tables T, U, and V list the traffic noise levels for the Existing (2022), Opening Year (2027), and Cumulative (2045) Without and With Project scenarios, respectively. These noise levels represent the worst-case scenario, which assumes that no shielding is provided between the traffic and the location where the noise contours are drawn. The specific assumptions used in developing these noise levels and the model printouts are provided in Appendix C.

Tables T, U, and V show that the proposed project would result in a project-related traffic noise increase of up to 0.6 dBA in the project vicinity. This noise level increase is below 3 dBA and would not be perceptible to the human ear in an outdoor environment. Therefore, no off-site traffic noise impacts would occur, and no noise reduction measures are required.

Table T: Existing (2022) Traffic Noise Levels Without and With Project

Roadway Segment	Without Project Traffic Conditions					With Project Traffic Conditions					
	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase from Baseline Conditions
Alessandro Boulevard Between Overlook Parkway-Canyon Crest Drive and Cannon Road	67,721	152	319	683	74.0	68,453	153	321	687	74.1	0.1
Alessandro Boulevard Between Cannon Road and Communications Center Drive	67,635	151	318	682	74.1	68,367	152	320	687	74.2	0.1
Alessandro Boulevard Between Communications Center Drive and Trautwein Road	54,009	132	275	587	73.0	54,741	133	277	593	73.1	0.1
Alessandro Boulevard Between Trautwein Road and Plaza Driveway 1	42,861	122	240	505	71.2	43,483	123	242	510	71.3	0.1
Alessandro Boulevard Between Plaza Driveway 1 and Mission Grove Parkway	42,347	120	237	501	71.2	42,786	121	239	504	71.3	0.1
Alessandro Boulevard Between Mission Grove Parkway and Northrop Drive	45,483	124	248	525	71.6	45,981	125	250	528	71.7	0.1
Alessandro Boulevard Between Northrop Drive and Barton Street	47,048	145	296	630	72.8	47,546	146	298	634	72.8	0.0
Trautwein Road Between Alessandro Boulevard and Mission Grove Parkway	33,787	96	201	430	71.6	33,897	97	201	431	71.6	0.0
Mission Village Drive Between Trautwein Road and Project Driveway 2-Bayou Lane	1,962	< 50	< 50	< 50	55.6	2,116	< 50	< 50	< 50	55.9	0.3
Mission Village Drive Between Project Driveway 2-Bayou Lane and Mission Grove Parkway	2,359	< 50	< 50	< 50	56.4	2,681	< 50	< 50	< 50	57.0	0.6
Mission Grove Parkway Between Alessandro Boulevard and Plaza Driveway 2	10,666	< 50	87	171	64.7	11,603	< 50	91	181	65.1	0.4
Mission Grove Parkway Between Plaza Driveway 2 and Mission Village Drive	10,353	< 50	86	168	64.6	10,630	< 50	87	171	64.7	0.1
Mission Grove Parkway Between Mission Village Drive and Trautwein Road	13,091	< 50	97	195	65.6	13,281	< 50	98	197	65.7	0.1

Source: Compiled by LSA Associates, Inc. (2022).
Note: Traffic noise within 50 ft of the roadway centerline should be evaluated with site-specific information.
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = foot/feet

Table U: Opening Year (2027) Traffic Noise Levels Without and With Project

Roadway Segment	Without Project Traffic Conditions					With Project Traffic Conditions					
	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase from Baseline Conditions
Alessandro Boulevard Between Overlook Parkway-Canyon Crest Drive and Cannon Road	78,713	167	352	754	74.7	79,445	168	354	759	74.7	0.0
Alessandro Boulevard Between Cannon Road and Communications Center Drive	78,738	166	352	755	74.8	79,470	167	354	759	74.8	0.0
Alessandro Boulevard Between Communications Center Drive and Trautwein Road	63,752	146	306	656	73.7	64,484	147	309	661	73.8	0.1
Alessandro Boulevard Between Trautwein Road and Plaza Driveway 1	51,153	134	268	567	72.0	51,775	135	270	572	72.0	0.0
Alessandro Boulevard Between Plaza Driveway 1 and Mission Grove Parkway	50,588	132	266	563	72.0	51,027	133	267	566	72.0	0.0
Alessandro Boulevard Between Mission Grove Parkway and Northrop Drive	54,359	137	278	590	72.4	54,857	138	280	594	72.4	0.0
Alessandro Boulevard Between Northrop Drive and Barton Street	56,081	161	332	707	73.5	56,579	162	334	712	73.6	0.1
Trautwein Road Between Alessandro Boulevard and Mission Grove Parkway	37,584	103	216	461	72.1	37,694	103	216	462	72.1	0.0
Mission Village Drive Between Trautwein Road and Project Driveway 2-Bayou Lane	2,171	< 50	< 50	< 50	56.1	2,325	< 50	< 50	< 50	56.4	0.3
Mission Village Drive Between Project Driveway 2-Bayou Lane and Mission Grove Parkway	2,638	< 50	< 50	< 50	56.9	2,960	< 50	< 50	< 50	57.4	0.5
Mission Grove Parkway Between Alessandro Boulevard and Plaza Driveway 2	12,345	< 50	94	188	65.4	13,282	< 50	98	197	65.7	0.3
Mission Grove Parkway Between Plaza Driveway 2 and Mission Village Drive	12,050	< 50	93	185	65.3	12,327	< 50	94	188	65.4	0.1
Mission Grove Parkway Between Mission Village Drive and Trautwein Road	14,957	< 50	105	213	66.2	15,147	< 50	106	214	66.3	0.1

Source: Compiled by LSA Associates, Inc. (2022).
Note: Traffic noise within 50 ft of the roadway centerline should be evaluated with site-specific information.
ADT = average daily traffic dBA = A-weighted decibel
CNEL = Community Noise Equivalent Level ft = foot/feet

Table V: Cumulative (2045) Traffic Noise Levels Without and With Project

Roadway Segment	Without Project Traffic Conditions					With Project Traffic Conditions					
	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase from Baseline Conditions
Alessandro Boulevard Between Overlook Parkway-Canyon Crest Drive and Cannon Road	82,649	172	363	779	74.9	83,381	173	365	784	74.9	0.0
Alessandro Boulevard Between Cannon Road and Communications Center Drive	82,675	172	363	779	75.0	83,407	173	365	784	75.0	0.0
Alessandro Boulevard Between Communications Center Drive and Trautwein Road	66,939	151	316	677	74.0	67,671	152	319	682	74.0	0.0
Alessandro Boulevard Between Trautwein Road and Plaza Driveway 1	53,711	138	276	586	72.2	54,333	138	278	590	72.2	0.0
Alessandro Boulevard Between Plaza Driveway 1 and Mission Grove Parkway	53,117	136	274	581	72.2	53,556	137	276	585	72.2	0.0
Alessandro Boulevard Between Mission Grove Parkway and Northrop Drive	57,077	141	287	610	72.6	57,575	142	288	613	72.6	0.0
Alessandro Boulevard Between Northrop Drive and Barton Street	58,885	166	342	731	73.8	59,383	167	344	735	73.8	0.0
Trautwein Road Between Alessandro Boulevard and Mission Grove Parkway	39,463	106	223	477	72.3	39,573	106	223	478	72.3	0.0
Mission Village Drive Between Trautwein Road and Project Driveway 2-Bayou Lane	4,345	< 50	< 50	65	59.1	4,499	< 50	< 50	67	59.2	0.1
Mission Village Drive Between Project Driveway 2-Bayou Lane and Mission Grove Parkway	4,742	< 50	< 50	69	59.4	5,064	< 50	< 50	71	59.7	0.3
Mission Grove Parkway Between Alessandro Boulevard and Plaza Driveway 2	12,962	< 50	97	194	65.6	13,899	< 50	101	203	65.9	0.3
Mission Grove Parkway Between Plaza Driveway 2 and Mission Village Drive	12,653	< 50	95	191	65.5	12,930	< 50	97	194	65.6	0.1
Mission Grove Parkway Between Mission Village Drive and Trautwein Road	15,705	< 50	108	219	66.4	15,895	< 50	109	221	66.5	0.1

Source: Compiled by LSA Associates, Inc. (2022).
Note: Traffic noise within 50 ft of the roadway centerline should be evaluated with site-specific information.
ADT = average daily traffic dBA = A-weighted decibel
CNEL = Community Noise Equivalent Level ft = foot/feet

Long-Term Stationary Source Noise Impacts

HVAC Equipment

The proposed project includes on-site rooftop heating, ventilation, and air conditioning (HVAC) units for the 347 residential units, leasing office, clubhouse, and fitness room. It is estimated that the proposed project would have a total of 354 HVAC units on site, which could potentially operate 24 hours per day. The HVAC equipment would generate a sound power level (SPL) of 76 dBA, which would be equivalent to 44.4 dBA L_{eq} at 50 ft. The specifications of typical HVAC equipment are provided in Appendix D. The rooftop HVAC units are located in mechanical wells based on the roof plan, which would provide a minimum noise reduction of 5 dBA.

Table W shows the noise levels generated by HVAC equipment at the property line of the closest off-site land use along with the total number of HVAC units, range of distances from the equipment to the property line, range of distance attenuation, and shielding from the roofline and parapet. As shown in Table W, noise levels generated from on-site HVAC units would not exceed the City's exterior daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) 30-minute (L_{50}) noise standards of 60 dBA and 50 dBA, respectively, for residential uses. Also, noise levels generated from on-site HVAC units would not exceed the City's exterior 30-minute (L_{50}) noise standard of 65 dBA for commercial uses. (The detailed HVAC noise analysis is provided in Appendix E.) Therefore, no off-site noise impacts from on-site HVAC equipment would occur. No noise reduction measures are required.

Table W: HVAC Noise Levels

Land Use	Direction	Total Number of HVAC Units	Distance[1] (ft)	Distance Attenuation (dBA)	Shielding[2] (dBA)	Noise Level[3] (dBA L_{eq})
Commercial (383 E Alessandro Boulevard)	North	354	105-545	6.4-20.7	5	52.0
Commercial (7562 Mission Grove Parkway)	East	354	155-495	9.8-19.9	5	50.7
Residential (Foxtail Lane)	South	354	195-700	11.8-22.9	5	49.4
Commercial (Mission Grove Plaza)	West	354	160-490	10.1-19.8	5	51.0

Source: Compiled by LSA Associates, Inc. (2022).
[1] Distance from the equipment to the property line.
[2] Noise reduction from roofline and parapet.
[3] The composite noise level at the property line.
dBA = A-weighted decibel
ft = foot/feet
HVAC = heating, ventilation, and air conditioning
L_{eq} = equivalent continuous sound level

Long-Term Ground-Borne Noise and Vibration from Vehicular Traffic

Once operational, the proposed project would not generate vibration. In addition, vibration levels generated from project-related traffic on the adjacent roadways (i.e., Mission Grove Parkway and Mission Village Drive) would be unusual for on-road vehicles because the rubber tires and suspension systems of on-road vehicles provide vibration isolation. Therefore, no vibration impacts from project-related traffic on the adjacent roadways would occur, and no vibration reduction measures are required.

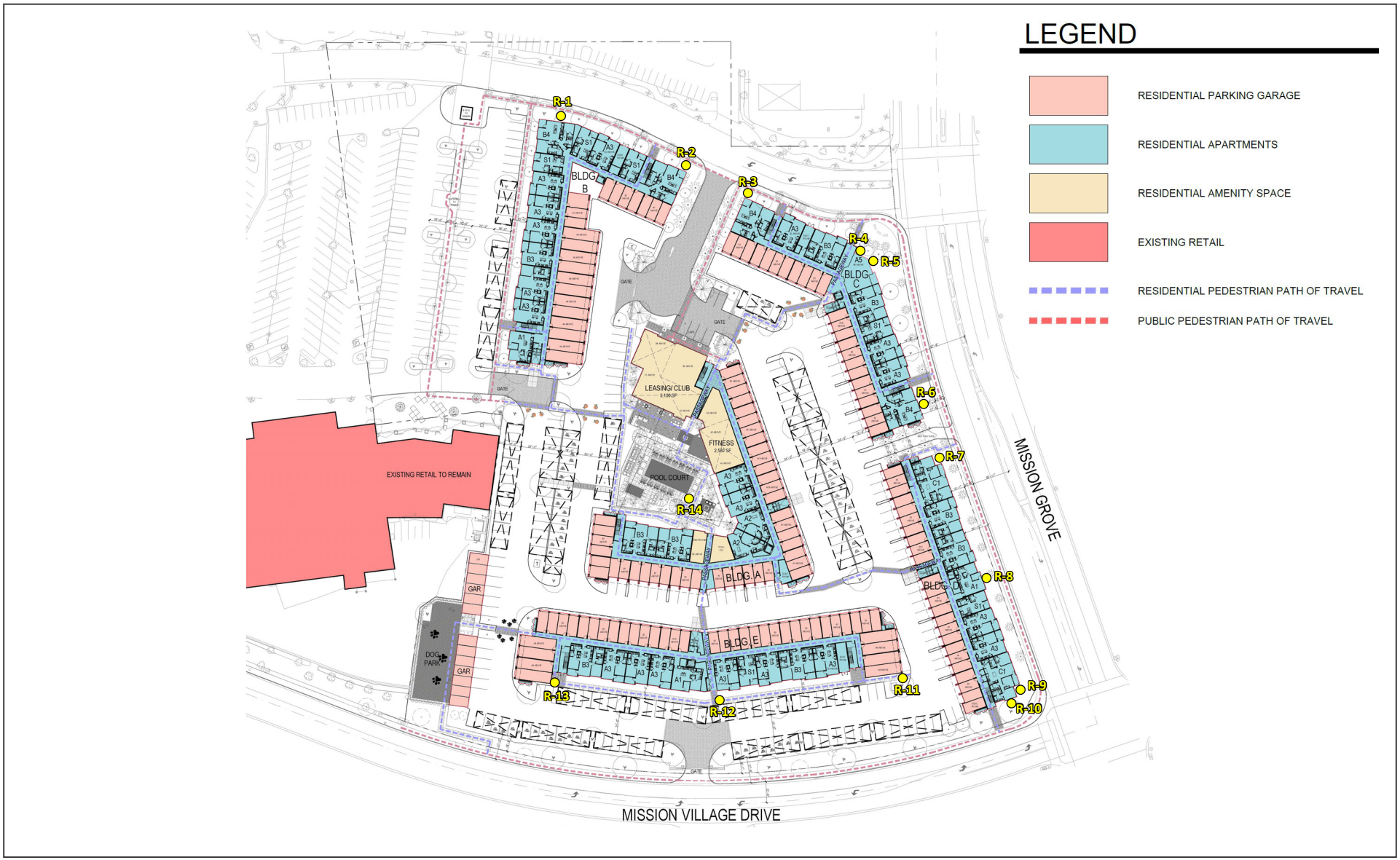
Land Use Compatibility Assessment

Exterior Noise Assessment

As discussed above, exterior noise levels in the project area include traffic on Mission Grove Parkway and Mission Village Drive. The project site is located well beyond the airport influence area of the closest airports, and the contribution of aircraft noise in the project area would be minimal to negligible. The FHWA Highway Traffic Noise Prediction Model (FHWA-RD-77-108) was used to evaluate the proposed on-site uses based on the cumulative (2045) with project traffic noise levels on Mission Grove Parkway and Mission Village Drive shown in Table V. Table X shows the cumulative (2045) with project exterior noise levels at the façade of the proposed residential building and at the courtyard/pool area represented by Receptors R-1 through R-14. The locations of the receptors are shown in Figure 4. The proposed residential building would shield the courtyard/pool area (Receptor R-14) from traffic on Mission Grove Parkway and Mission Village Drive and would provide a noise reduction of 17 dBA. The calculated noise reduction from shielding of the proposed residential building is provided in Appendix F. As shown in Table X, traffic noise levels at the façade of the proposed residential building and at the courtyard/pool use area would reach up to 69.2 dBA CNEL. The proposed project is an infill residential project and noise levels up to 65 dBA CNEL are the upper limit of what is considered a "normally acceptable" noise environment, and noise levels between 65 dBA CNEL and 75 dBA CNEL are considered a "conditionally acceptable" noise environment based on the City's Noise/Land Use Compatibility Criteria shown in Table F. Since exterior noise levels for on-site uses are below 75 dBA CNEL, the proposed project is considered "conditionally acceptable." Therefore, the proposed on-site exterior residential uses are considered compatible with the City's Noise/Land Use Compatibility Criteria. No noise reduction measures are required.

Interior Noise Assessment

Table Y shows the interior noise levels with windows and doors open at Receptors R-1 through R-13. Interior noise levels with windows and doors open were calculated using an exterior-to-interior noise reduction of 12 dBA based on the United States Environmental Protection Agency's (EPA) Protective Noise Levels (EPA 1978) and standard construction in California (warm climate) with a combination of exterior walls, doors, and windows. As shown in Table Y, interior noise levels with windows and doors open for all residential units on the project site would reach up to 57.2 dBA CNEL, which would exceed the interior noise standard of 45 dBA CNEL. Mechanical ventilation systems such as air conditioning would be required for all residential units so that windows and doors could remain closed for a prolonged period of time. As the project would include HVAC equipment for all residential units on the project site, and interior noise levels would not exceed standards with windows and doors closed, no additional measures would be required.



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LEGEND

R-* Receptor Locations

FIGURE 4

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SOURCE: AO Architecture

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Mission Grove Apartments

Receptor Locations

Table X: Cumulative (2045) With Project Exterior Noise Levels

Receptor No.	Mission Grove Parkway					Mission Village Drive					Combined Noise Level (dBA CNEL)
	Reference Noise Level (dBA CNEL)	Reference Distance (ft)	Distance[1] (ft)	Shielding (dBA)	Noise Level (dBA CNEL)	Reference Noise Level (dBA CNEL)	Reference Distance (ft)	Distance[1] (ft)	Shielding (dBA)	Noise Level (dBA CNEL)	
R-1	65	97	406.4	0.0	52.6	60.0	71.0	696.8	0.0	40.2	52.8
R-2	65	97	274.6	0.0	56.0	60.0	71.0	683.3	0.0	40.3	56.1
R-3	65	97	205.3	0.0	58.5	60.0	71.0	649.0	0.0	40.8	58.6
R-4	65	97	92.7	0.0	65.4	60.0	71.0	561.9	0.0	42.0	65.4
R-5	65	97	83.0	0.0	66.4	60.0	71.0	543.5	0.0	42.3	66.4
R-6	65	97	66.5	0.0	68.3	60.0	71.0	383.0	0.0	45.4	68.3
R-7	65	97	65.3	0.0	68.4	60.0	71.0	323.6	0.0	46.8	68.4
R-8	65	97	63.2	0.0	68.7	60.0	71.0	187.4	0.0	51.6	68.8
R-9	65	97	65.5	0.0	68.4	60.0	71.0	59.0	0.0	61.6	69.2
R-10	65	97	82.4	0.0	66.4	60.0	71.0	49.2	0.0	63.2	68.1
R-11	65	97	184.1	0.0	59.4	60.0	71.0	110.1	0.0	56.2	61.1
R-12	65	97	373.2	0.0	53.3	60.0	71.0	109.3	0.0	56.3	58.1
R-13	65	97	533.8	0.0	50.2	60.0	71.0	113.4	0.0	55.9	56.9
R-14	65	97	330.8	17.0[2]	37.3	60.0	71.0	330.2	17.0[2]	29.6	38.0

Source: Compiled by LSA Associates, Inc. (2022).

[1] Distance from receptor to roadway centerline.

[2] The calculated traffic noise reduction from shielding of the proposed residential building is provided in Appendix F.

CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = foot/feet

Table Y: Interior Noise Levels and Required Noise Reduction

Receptor No.	Combined Noise Level (dBA CNEL)	Interior Noise Level with Windows and Doors Open[1] (dBA CNEL)	Noise Reduction to Meet 45 dBA CNEL Interior Noise Standard
R-1	52.8	40.8	7.8
R-2	56.1	44.1	11.1
R-3	58.6	**46.6**[2]	13.6
R-4	65.4	**53.4**	20.4
R-5	66.4	**54.4**	21.4
R-6	68.3	**56.3**	23.3
R-7	68.4	**56.4**	23.4
R-8	68.8	**56.8**	23.8
R-9	69.2	**57.2**	24.2
R-10	68.1	**56.1**	23.1
R-11	61.1	**49.1**	16.1
R-12	58.1	**46.1**	13.1
R-13	56.9	44.9	11.9
R-14	38.0	--[3]	--

Source: Compiled by LSA Associates, Inc. (2022).

[1] Interior noise levels were calculated using an exterior-to-interior noise reduction of 12 dBA based on the EPA's Protective Noise Levels (EPA 1978) and standard construction in California (warm climate) with a combination of exterior walls, doors, and windows.

[2] Numbers shown in bold exceed the interior noise standard of 45 dBA CNEL.

[3] Interior noise levels with windows and doors open and the noise reduction to meet the 45 dBA CNEL interior noise standard was not calculated because this receptor represent the courtyard/pool area of the proposed project.

CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
EPA = United States Environmental Protection Agency

Also, Table Y shows that an exterior-to-interior noise reduction of 7.8 to 24.2 dBA is required for the residential units to meet the interior noise standard of 45 dBA CNEL. Since detailed architectural plans showing the exterior wall assembly and windows are not currently available, a standard exterior-to-interior noise reduction of 25 dBA with windows and doors closed based on the EPA's Protective Noise Levels (EPA 1978) and standard construction in California (warm climate) with a combination of exterior walls, doors, and windows was assumed, and standard construction would provide the necessary reduction to meet the interior noise standard of 45 dBA CNEL. Therefore, no interior noise impacts for on-site residential uses would occur based on the standard noise reduction from standard construction.

MINIMIZATION MEASURES

The following measure would minimize construction noise:

- The construction contractor shall limit construction activities to between the hours of 7:00 a.m. and 7:00 p.m. on weekdays and between the hours of 8:00 a.m. and 5:00 p.m. on Saturdays pursuant to Section 7.35.010 of the City's Municipal Code and the mitigation measure related to construction activities in the Mission Grove Specific Plan. Construction is prohibited outside these hours or at any time on Sundays and federal holidays.

- The construction contractor shall use and properly maintain noise-reducing devices on construction equipment pursuant to the mitigation measure related to construction activities in the Mission Grove Specific Plan.

REDUCTION MEASURES

Short-Term Construction Noise Impacts

No noise reduction measures are required.

Short-Term Construction Vibration Impacts

No vibration reduction measures are required.

Long-Term Aircraft Noise Impacts

No noise reduction measures are required.

Long-Term Traffic Noise Impacts

No noise reduction measures are required.

Long-Term Stationary Noise Impacts

No noise reduction measures are required.

Long-Term Vibration Impacts

No vibration reduction measures are required.

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APPENDIX A

NOISE MONITORING SURVEY SHEETS

Noise Measurement Survey

Project Number: ATO2202 Test Personnel: Kevin Nguyendo

Project Name: Mission Grove Apts. Equipment: Larson Davis 831

Site Number: ST-1 Date: 6/28/22 Time: From 2:45 p.m. To 3:05 p.m.

Site Location: Located at the northern edge of the project site. Near a parking lot entrance of the Mission Grove Shopping Center along Mission Grove Parkway.

Primary Noise Sources: Traffic on the main road entering/exiting the Mission Grove Shopping Center. Faint radio noise from the car wash northeast of the project site.

Measurement Results

	dBA
L_{eq}	61.1
L_{max}	77.3
L_{min}	52.8
L_{peak}	106.1
L_2	68.0
L_8	64.1
L_{25}	61.0
L_{50}	58.7
SEL	--

Atmospheric Conditions:

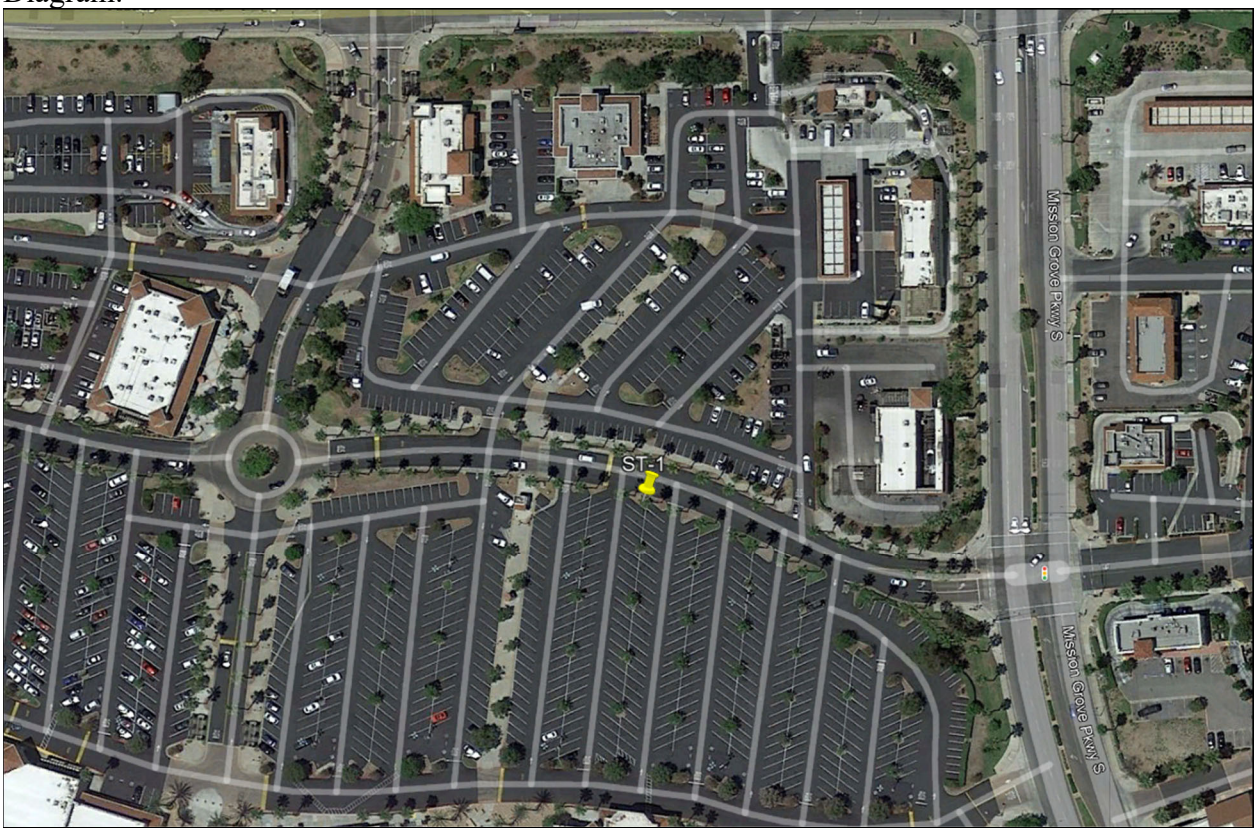
Maximum Wind Velocity (mph)	11.2
Average Wind Velocity (mph)	4.1
Temperature (F)	100.1
Relative Humidity (%)	20.5
Comments:	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Diagram:



Location Photo:

Noise Measurement Survey

Project Number: ATO2202 Test Personnel: Kevin Nguyendo

Project Name: Mission Grove Apts. Equipment: Larson Davis 831

Site Number: ST-2 Date: 6/29/22 Time: From 11:39 a.m. To 11:59 a.m.

Site Location: Located in front of a store at 1B E Alessandro Boulevard #341 Riverside, CA 92508.

Primary Noise Sources: Parking lot activity with light duty vehicles passing by. Landscaping Activity noise from hedge cutting 18 minutes into the measurement.

Measurement Results

	dBA
L_{eq}	55.1
L_{max}	70.1
L_{min}	47.2
L_{peak}	92.1
L_2	62.6
L_8	58.4
L_{25}	54.2
L_{50}	51.9
SEL	--

Atmospheric Conditions:

Maximum Wind Velocity (mph)	4.5
Average Wind Velocity (mph)	1.1
Temperature (F)	93
Relative Humidity (%)	27.5
Comments:	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Diagram:

Location Photo:

Noise Measurement Survey

Project Number: ATO2202 Test Personnel: Kevin Nguyendo

Project Name: Mission Grove Apts. Equipment: Larson Davis 831

Site Number: ST-3 Date: 6/29/22 Time: From 12:40 p.m. To 1:00 p.m.

Site Location: Located at the southeast corner of the project site. Northwestern corner of the Mission Grove Parkway and Mission Village Drive intersection.

Primary Noise Sources: Traffic noise at the intersection of Mission Village Drive and Mission Grove. Faint yard work (mower) activity noise at the beginning of the measurement. Leaf blower noise 10 minutes into the measurement.

Measurement Results

	dBA
L_{eq}	59.7
L_{max}	71.0
L_{min}	49.7
L_{peak}	94.6
L_2	66.1
L_8	64.1
L_{25}	60.4
L_{50}	57.3
SEL	--

Atmospheric Conditions:

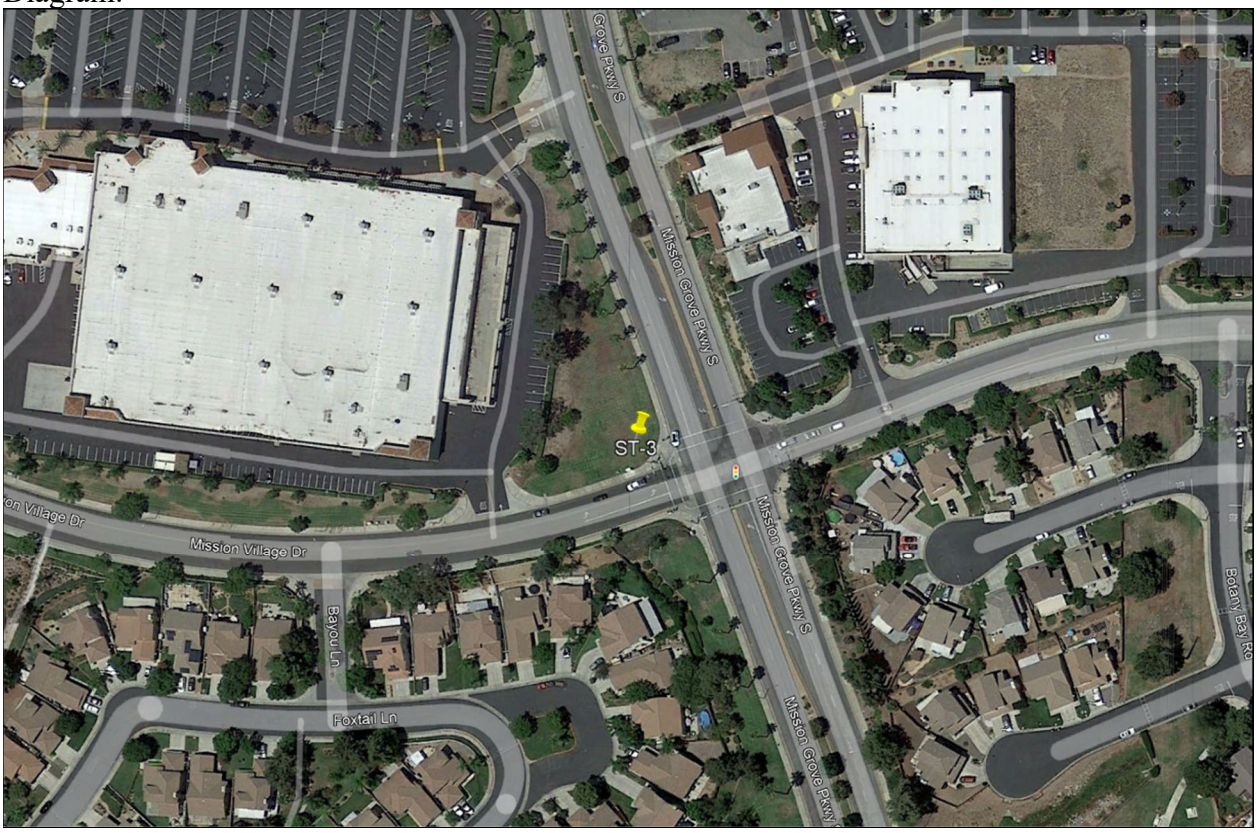
Maximum Wind Velocity (mph)	7.1
Average Wind Velocity (mph)	2.1
Temperature (F)	95.5
Relative Humidity (%)	22.5
Comments:	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Diagram:



Location Photo:

Noise Measurement Survey – 24 HR

Project Number: ATO2202
Project Name: Mission Grove Apts.

Test Personnel: Kevin Nguyendo
Equipment: Spark 706RC (SN:18905)

Site Number: LT-1 Date: 7/12/2022

Time: From 1:00 p.m. To 1:00 p.m.

Site Location: Eastern edge of the project site along Mission Grove Parkway. On a palm tree.

Primary Noise Sources: Traffic on Mission Grove Parkway. Bus stop activity noise.

Comments:

Photo:

Noise Measurement Survey – 24 HR

Project Number: ATO2202
Project Name: Mission Grove Apts.

Test Personnel: Kevin Nguyendo
Equipment: Spark 706RC (SN:18906)

Site Number: LT-2 Date: 7/12/2022

Time: From 1:00 p.m. To 1:00 p.m.

Site Location: Near the southeastern corner of the project site. On a light pole.

Primary Noise Sources: Traffic noise on Mission Grove Parkway. Parking lot activity noise.

Comments:

Photo:

Noise Measurement Survey – 24 HR

Project Number: ATO2202
Project Name: Mission Grove Apts.

Test Personnel: Kevin Nguyendo
Equipment: Spark 706RC (SN:18907)

Site Number: LT-3 Date: 7/12/2022

Time: From 1:00 p.m. To 1:00 p.m.

Site Location: South side the project site. On a light pole. East of the Sunset Recycling Center.

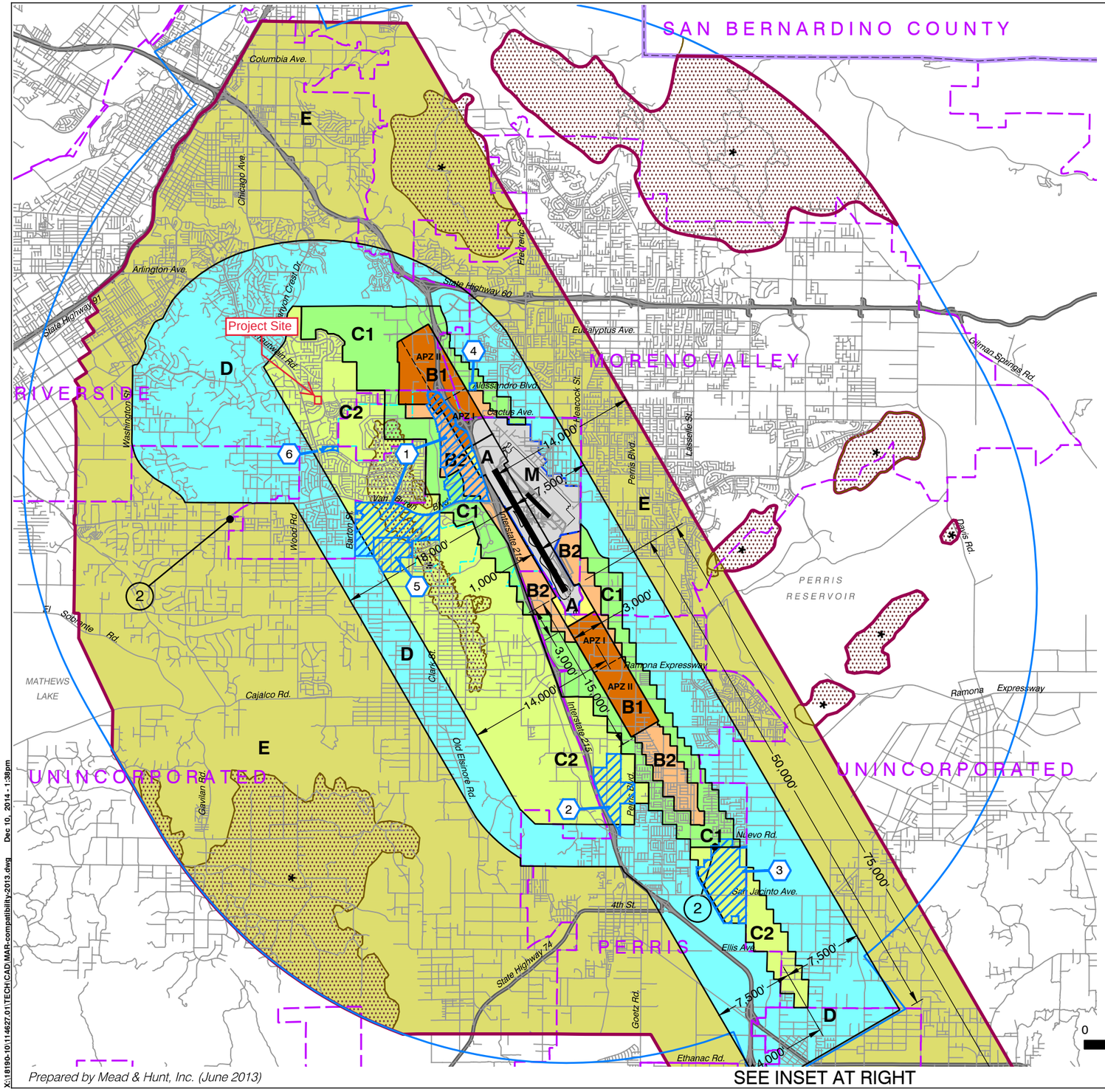
Primary Noise Sources: Traffic noise from Mission Village Drive and faint traffic noise on Mission Grove Parkway. Faint operation noise from the Sunset Recycling Center.

Comments:

Photo:

APPENDIX B

AIRPORT NOISE CONTOUR AND AIRPORT COMPATIBILITY ZONE FIGURES



LEGEND

Compatibility Zones

- Airport Influence Area Boundary
- Zone A
- Zone B1
- Zone B2
- Zone C1
- Zone C2
- Zone D
- Zone E
- Zone M
- High Terrain Zone
- FAR Part 77 Military Outer Horizontal Surface Limits
- FAR Part 77 Notification Area

Boundary Lines

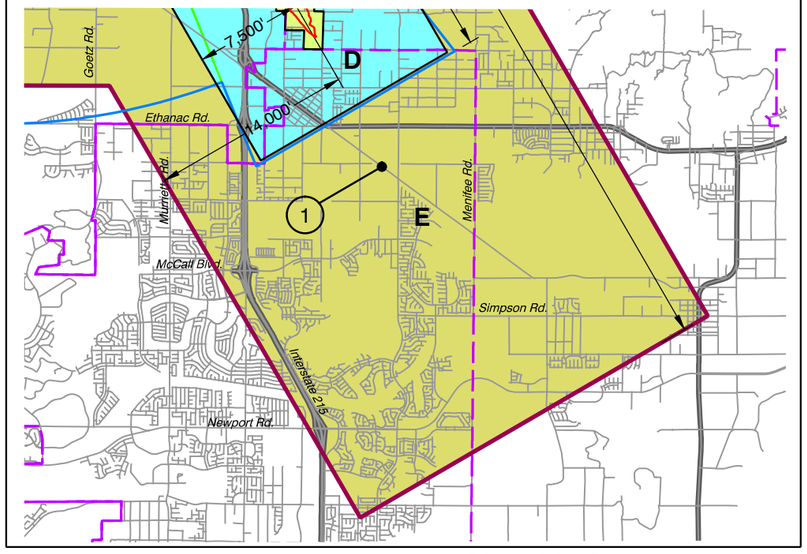
- March Air Reserve Base / Air Force Property
- March Joint Powers Authority Property Line
- County Boundary
- City Limits
- Site-Specific Exceptions (existing local agency commitments to development projects)

1. March JPA: March Business Center/Meridian
2. Perris: Harvest Landing
3. Perris: Park West
4. Moreno Valley: Affordable Housing
5. March JPA: Ben Clark Training Center
6. Riverside: Ridge Crest Subdivision

(1) Point at which aircraft on Runway 32 ILS approach descend below 3,000 feet above runway end. Airport Elevation is 1,535 feet MSL.

(2) Point at which departing aircraft typically reach 3,000 feet above runway end.

INSET



Note:
All dimensions are measured from runway ends and centerlines.

N

0 2 4 MILES

Base map source: County of Riverside 2013

Prepared by Mead & Hunt, Inc. (June 2013)

X:\18190-10\114627.01\TECH\CAD\MAR-compatibility2013.dwg Dec 10, 2014 - 1:38pm

Riverside County
Airport Land Use Commission

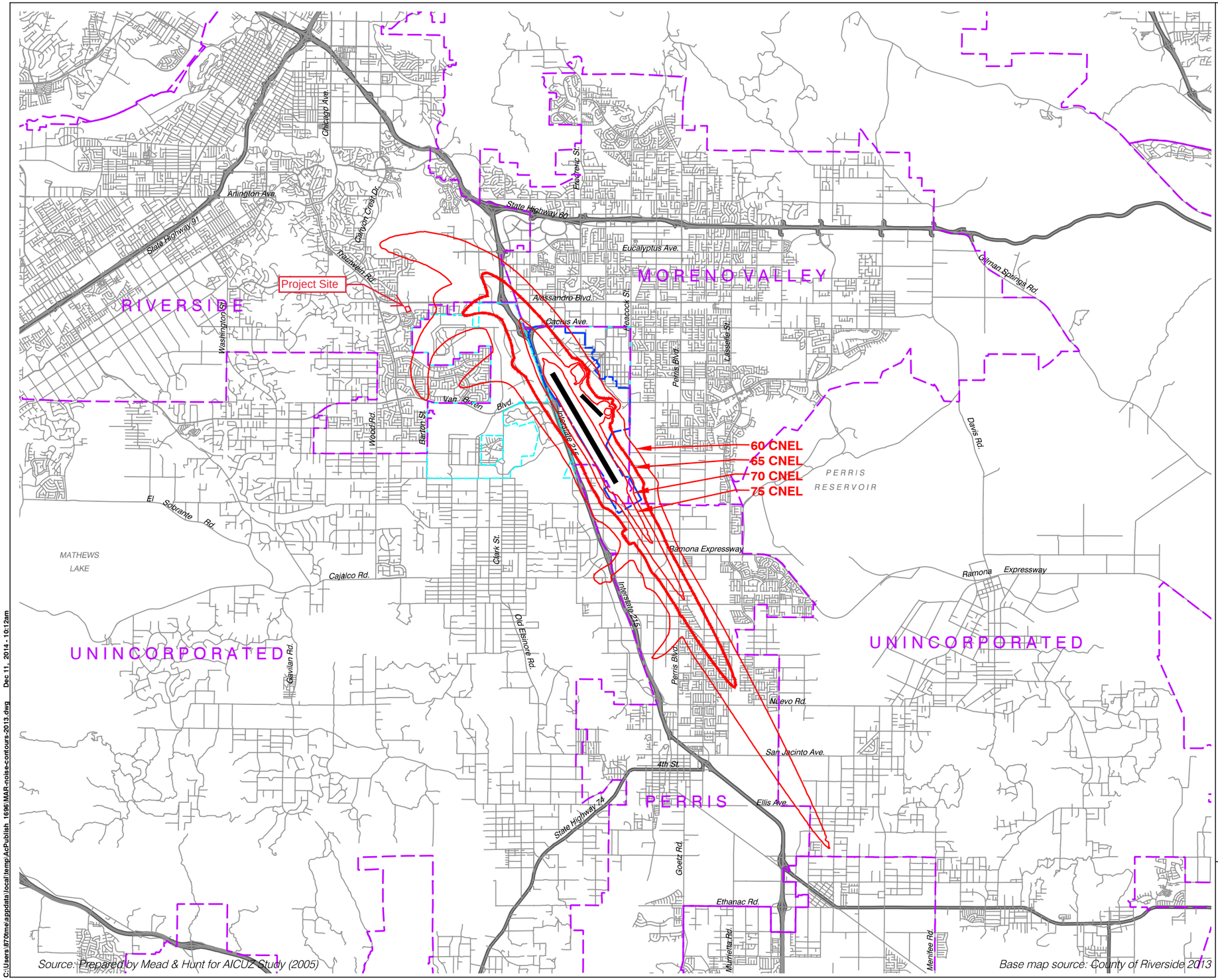
March Air Reserve Base / Inland Port Airport
Land Use Compatibility Plan

(Adopted November 13, 2014)

Map MA-1

Compatibility Map

March Air Reserve Base / Inland Port Airport



Source: Prepared by Mead & Hunt for AICUZ Study (2005)

Base map source: County of Riverside 2013

C:\Users\870me\appdata\local\temp\AcPublish_1696\MAR-noise-contours-2013.dwg Dec 11, 2014 - 10:12am

LEGEND

Noise Contours

- 60 dB CNEL
- 65 dB CNEL
- 70 dB CNEL
- 75 dB CNEL

Projected Activity Level (75,104 operations)

Boundary Lines

- March Air Reserve Base / Inland Port Airport
- March Joint Powers Authority Property Line
- City Limits

Projected Activity Level

Annual Operations	75,104
Average Annual Day	206

Note:

Contours represent composite of noise contours from four sources:

- Forecasts and noise contours from Air Installation Compatible Use Study for March Air Reserve Base (August 2005).
- Environmental Assessment for Proposed Military Construction and Total Force Integration at March Air Reserve Base (Air Force Reserve Command, June 2010); Environmental Impact Report for March Inland Port General Aviation Facilities Development (March Joint Powers Authority, August 2012).
- F-15 Aircraft Conversion Environmental Impact Statement 144th Fighter Wing California Air National Guard Fresno-Yosemite International Airport (National Guard Bureau, March 2013).

N

2 MILES

0 MILES 4 MILES

Riverside County Airport Land Use Commission

March Air Reserve Base / Inland Port Airport Land Use Compatibility Plan

(Adopted November 13, 2014)

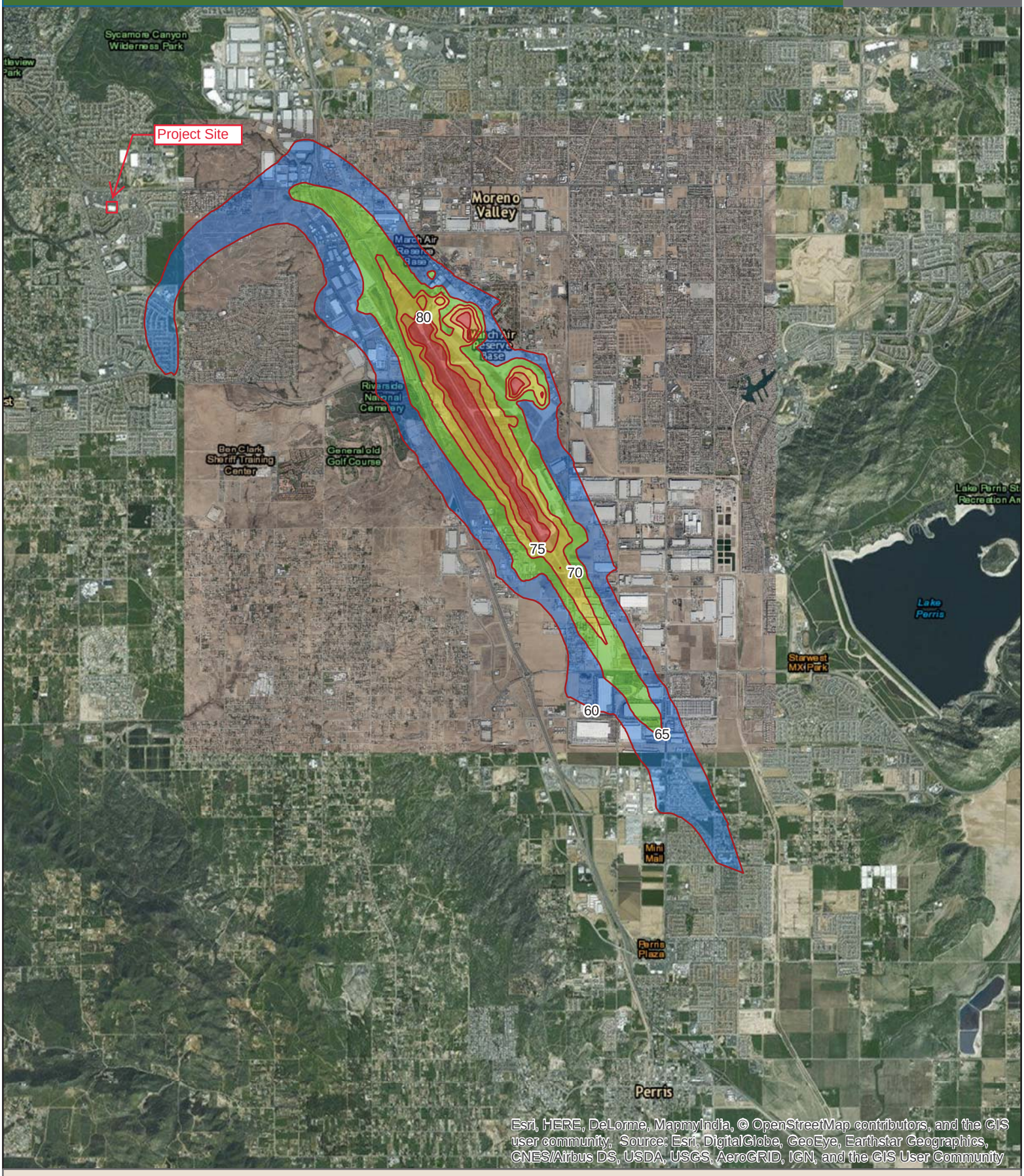
Exhibit MA-4

Noise Impact Area

March Air Reserve Base / Inland Port Airport

March ARB 2018 AICUZ Noise Contours

Figure 4-2



Legend

March ARB 2018 Noise Contours

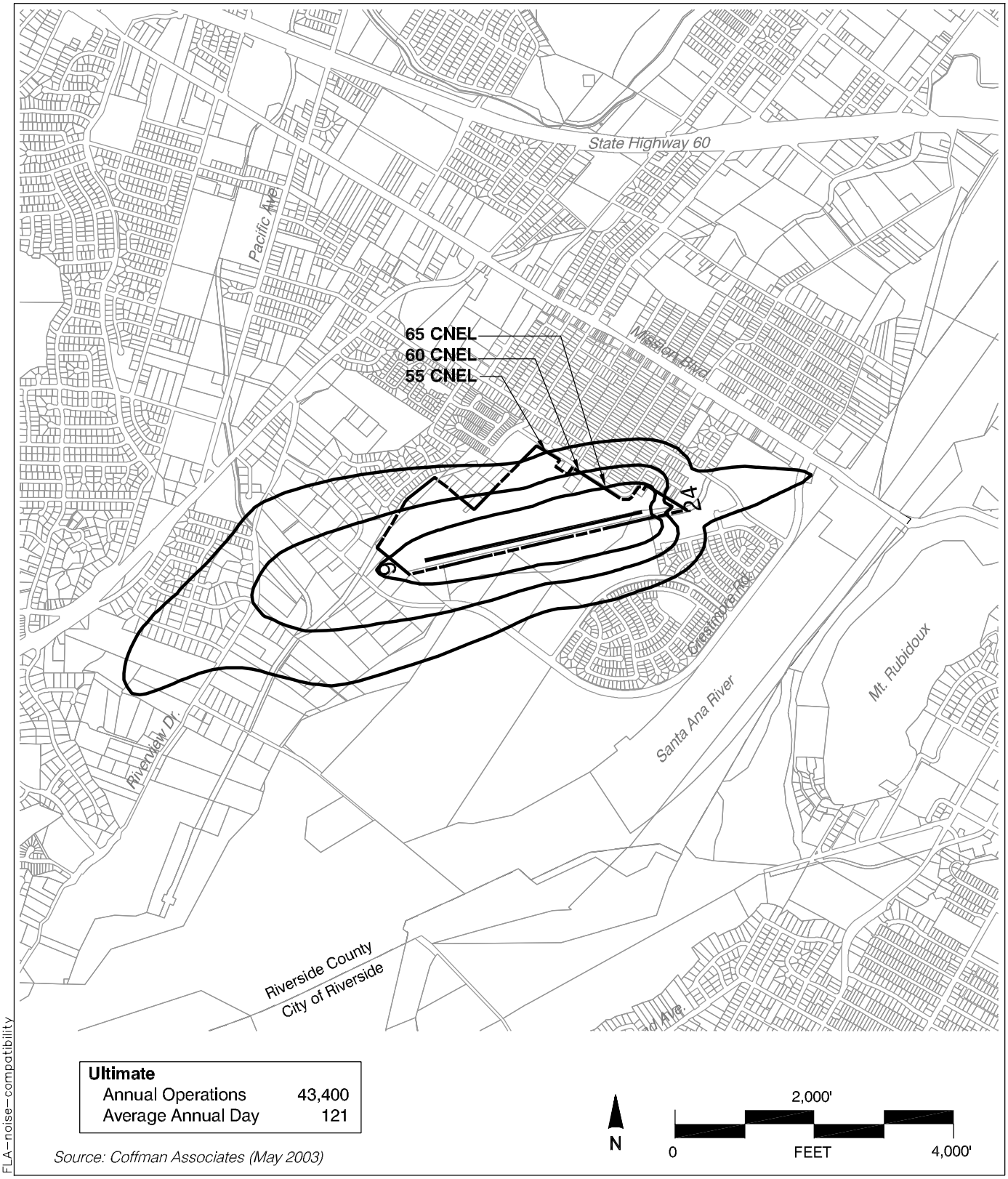
Noise Contour Levels (CNEL)

60dB 65dB 70dB 75dB 80dB

N

0 1.95 Miles

1 inch = 1.29 miles



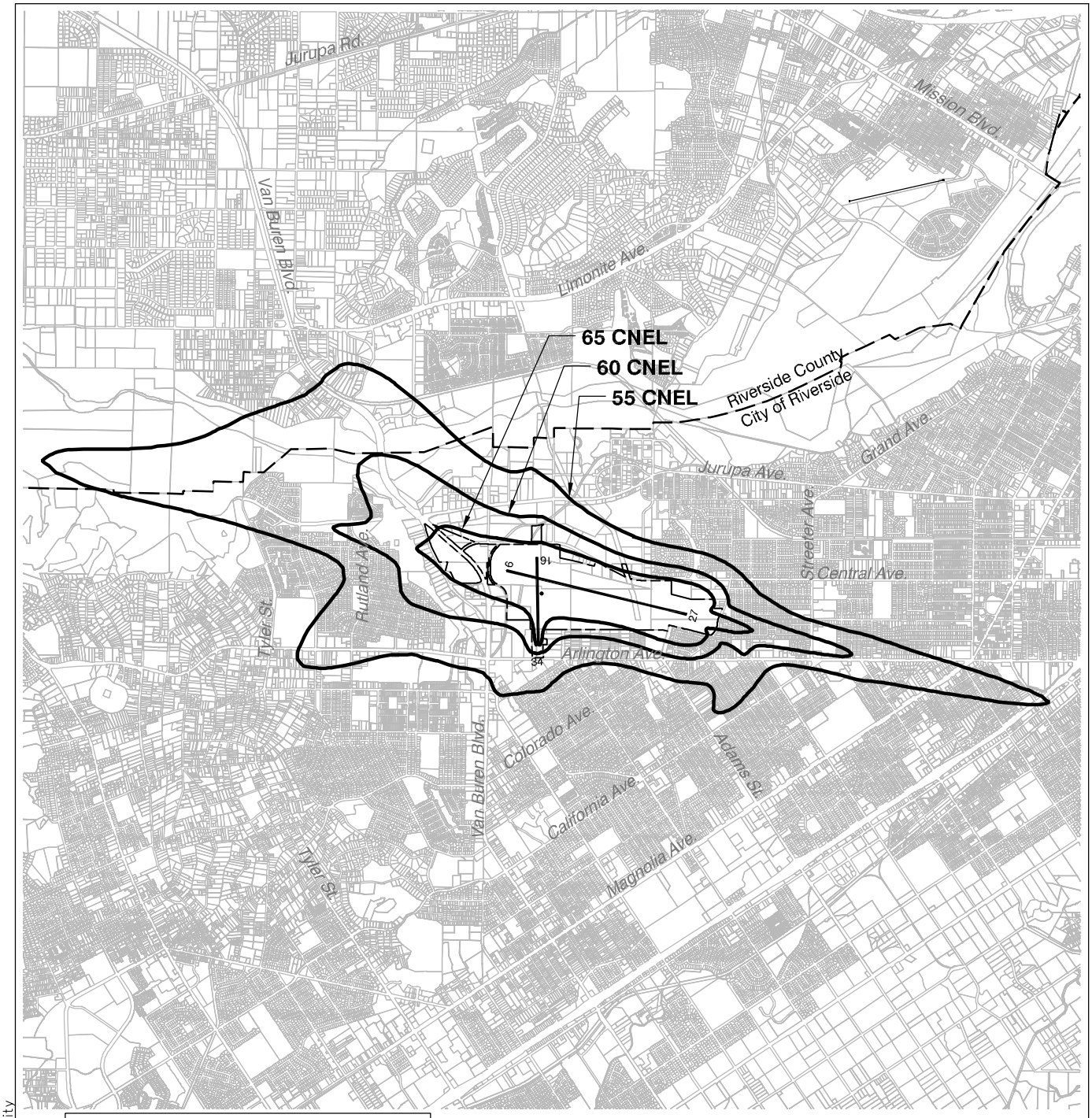
Source: Coffman Associates (May 2003)

FLA–noise–compatibility

Exhibit FL-5

Future Noise Impacts

Flabob Airport



Source: Coffman Associates (August 2003)

RAL–noise–compatibility

Exhibit RI-6

Ultimate Noise Impacts

Riverside Municipal Airport

APPENDIX C

FHWA HIGHWAY TRAFFIC NOISE MODEL PRINTOUTS

TABLE Existing (2022)-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Overlook Parkway-Canyon Crest Drive and Cannon Road
NOTES: Mission Grove Apartments - Existing (2022)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 67721 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 38 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.01

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
151.7	318.7	682.6	1468.5

TABLE Existing (2022)-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Cannon Road and Communications Center Drive
NOTES: Mission Grove Apartments - Existing (2022)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 67635 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.11

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
151.1	318.2	682.0	1467.4

TABLE Existing (2022)-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Communications Center Drive and Trautwein Road
NOTES: Mission Grove Apartments - Existing (2022)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 54009 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 38 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.03

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
131.9	274.7	587.3	1263.1

TABLE Existing (2022)-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Trautwein Road and Plaza Driveway 1
NOTES: Mission Grove Apartments - Existing (2022)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 42861 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 56 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.20

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
121.8	239.5	504.8	1082.1

TABLE Existing (2022)-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Plaza Driveway 1 and Mission Grove Parkway
NOTES: Mission Grove Apartments - Existing (2022)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 42347 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 54 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.23

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
120.1	237.3	500.7	1073.5

TABLE Existing (2022)-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Mission Grove Parkway and Northtrop Drive
NOTES: Mission Grove Apartments - Existing (2022)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 45483 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 52 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.62

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
124.0	247.9	524.7	1125.8

TABLE Existing (2022)-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Northrop Drive and Barton Street
NOTES: Mission Grove Apartments - Existing (2022)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 47048 SPEED (MPH): 55 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 53 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.78

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
145.2	296.1	629.7	1352.6

TABLE Existing (2022)-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Trautwein Road Between Alessandro Boulevard and Mission Grove Parkway
NOTES: Mission Grove Apartments - Existing (2022)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 33787 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 27 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.62

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	96.3	201.0	430.0	924.7

TABLE Existing (2022)-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Village Drive Between Trautwein Road and Project Driveway 2-Bayou Lane
NOTES: Mission Grove Apartments - Existing (2022)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1962 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 55.62

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	80.6

TABLE Existing (2022)-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Village Drive Between Project Driveway 2-Bayou Lane and Mission Grove Parkway
NOTES: Mission Grove Apartments - Existing (2022)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2359 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 56.42

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	0.0	0.0	0.0	90.2

TABLE Existing (2022)-11
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Grove Parkway Between Alessandro Boulevard and Plaza Driveway 2
NOTES: Mission Grove Apartments - Existing (2022)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10666 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 40 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.73

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	87.1	171.3	361.1

TABLE Existing (2022)-12
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Grove Parkway Between Plaza Driveway 2 and Mission Village Drive
NOTES: Mission Grove Apartments - Existing (2022)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10353 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 40 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.60

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	85.7	168.1	354.1

TABLE Existing (2022)-13
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Grove Parkway Between Mission Village Drive and Trautwein Road
NOTES: Mission Grove Apartments - Existing (2022)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13091 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 40 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.62

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	97.3	195.1	413.3

TABLE Existing (2022) With Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Overlook Parkway-Canyon Crest Drive and Cannon Road
NOTES: Mission Grove Apartments - Existing (2022) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 68453 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 38 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.06

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
152.7	320.9	687.5	1479.1

TABLE Existing (2022) With Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Cannon Road and Communications Center Drive
NOTES: Mission Grove Apartments - Existing (2022) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 68367 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.16

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
152.2	320.5	686.9	1478.0

TABLE Existing (2022) With Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Communications Center Drive and Trautwein Road
NOTES: Mission Grove Apartments - Existing (2022) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 54741 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 38 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.09

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
133.0	277.2	592.6	1274.4

TABLE Existing (2022) With Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Trautwein Road and Plaza Driveway 1
NOTES: Mission Grove Apartments - Existing (2022) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 43483 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 56 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.26

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
122.7	241.7	509.6	1092.5

TABLE Existing (2022) With Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Plaza Driveway 1 and Mission Grove Parkway
NOTES: Mission Grove Apartments - Existing (2022) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 42786 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 54 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.27

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
120.8	238.9	504.1	1080.9

TABLE Existing (2022) With Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Mission Grove Parkway and Northtrop Drive
NOTES: Mission Grove Apartments - Existing (2022) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 45981 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 52 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.67

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
124.7	249.6	528.5	1134.0

TABLE Existing (2022) With Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Northrop Drive and Barton Street
NOTES: Mission Grove Apartments - Existing (2022) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 47546 SPEED (MPH): 55 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 53 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.82

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
146.1	298.1	634.1	1362.1

TABLE Existing (2022) With Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Trautwein Road Between Alessandro Boulevard and Mission Grove Parkway
NOTES: Mission Grove Apartments - Existing (2022) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 33897 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 27 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.64

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	96.5	201.5	430.9	926.7

TABLE Existing (2022) With Project-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Village Drive Between Trautwein Road and Project Driveway 2-Bayou Lane
NOTES: Mission Grove Apartments - Existing (2022) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2116 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 55.95

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	84.4

TABLE Existing (2022) With Project-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Village Drive Between Project Driveway 2-Bayou Lane and Mission Grove Parkway
NOTES: Mission Grove Apartments - Existing (2022) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2681 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 56.97

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	97.7

TABLE Existing (2022) With Project-11
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Grove Parkway Between Alessandro Boulevard and Plaza Driveway 2
NOTES: Mission Grove Apartments - Existing (2022) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11603 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 40 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.10

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	91.1	180.7	381.7

TABLE Existing (2022) With Project-12
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Grove Parkway Between Plaza Driveway 2 and Mission Village Drive
NOTES: Mission Grove Apartments - Existing (2022) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10630 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 40 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.72

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	86.9	171.0	360.3

TABLE Existing (2022) With Project-13
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Grove Parkway Between Mission Village Drive and Trautwein Road
NOTES: Mission Grove Apartments - Existing (2022) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13281 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 40 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.68

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	98.0	196.9	417.3

TABLE Opening Year (2027)-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Overlook Parkway-Canyon Crest Drive and Cannon Road
NOTES: Mission Grove Apartments - Opening Year (2027)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 78713 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 38 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.66

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
166.8	351.8	754.4	1623.3

TABLE Opening Year (2027)-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Cannon Road and Communications Center Drive
NOTES: Mission Grove Apartments - Opening Year (2027)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 78738 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.77

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
166.4	351.7	754.5	1623.8

TABLE Opening Year (2027)-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Communications Center Drive and Trautwein Road
NOTES: Mission Grove Apartments - Opening Year (2027)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 63752 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 38 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.75

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
146.1	306.3	655.7	1410.6

TABLE Opening Year (2027)-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Trautwein Road and Plaza Driveway 1
NOTES: Mission Grove Apartments - Opening Year (2027)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 51153 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 56 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.97

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
133.9	268.0	567.2	1217.2

TABLE Opening Year (2027)-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Plaza Driveway 1 and Mission Grove Parkway
NOTES: Mission Grove Apartments - Opening Year (2027)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 50588 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 54 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.00

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
132.3	265.7	563.0	1208.3

TABLE Opening Year (2027)-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Mission Grove Parkway and Northtrop Drive
NOTES: Mission Grove Apartments - Opening Year (2027)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 54359 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 52 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.40

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
137.0	277.9	590.3	1267.6

TABLE Opening Year (2027)-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Northrop Drive and Barton Street
NOTES: Mission Grove Apartments - Opening Year (2027)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 56081 SPEED (MPH): 55 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 53 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.54

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
161.0	331.7	707.4	1520.3

TABLE Opening Year (2027)-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Trautwein Road Between Alessandro Boulevard and Mission Grove Parkway
NOTES: Mission Grove Apartments - Opening Year (2027)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 37584 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 27 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.09

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	102.9	215.6	461.5	992.7

TABLE Opening Year (2027)-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Village Drive Between Trautwein Road and Project Driveway 2-Bayou Lane
NOTES: Mission Grove Apartments - Opening Year (2027)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2171 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 56.06

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	85.7

TABLE Opening Year (2027)-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Village Drive Between Project Driveway 2-Bayou Lane and Mission Grove Parkway
NOTES: Mission Grove Apartments - Opening Year (2027)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2638 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 56.90

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	96.7

TABLE Opening Year (2027)-11
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Grove Parkway Between Alessandro Boulevard and Plaza Driveway 2
NOTES: Mission Grove Apartments - Opening Year (2027)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12345 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 40 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.37

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	94.2	188.0	397.6

TABLE Opening Year (2027)-12
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Grove Parkway Between Plaza Driveway 2 and Mission Village Drive
NOTES: Mission Grove Apartments - Opening Year (2027)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12050 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 40 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.26

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	92.9	185.1	391.3

TABLE Opening Year (2027)-13
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Grove Parkway Between Mission Village Drive and Trautwein Road
NOTES: Mission Grove Apartments - Opening Year (2027)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 14957 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 40 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.20

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	104.8	212.5	451.4

TABLE Opening Year (2027) With Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Overlook Parkway-Canyon Crest Drive and Cannon Road
NOTES: Mission Grove Apartments - Opening Year (2027) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 79445 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 38 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.70

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
167.7	354.0	759.0	1633.3

TABLE Opening Year (2027) With Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Cannon Road and Communications Center Drive
NOTES: Mission Grove Apartments - Opening Year (2027) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 79470 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.81

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
167.4	353.9	759.2	1633.9

TABLE Opening Year (2027) With Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Communications Center Drive and Trautwein Road
NOTES: Mission Grove Apartments - Opening Year (2027) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 64484 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 38 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.80

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
147.2	308.6	660.7	1421.4

TABLE Opening Year (2027) With Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Trautwein Road and Plaza Driveway 1
NOTES: Mission Grove Apartments - Opening Year (2027) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 51775 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 56 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.02

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
134.8	270.0	571.8	1227.0

TABLE Opening Year (2027) With Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Plaza Driveway 1 and Mission Grove Parkway
NOTES: Mission Grove Apartments - Opening Year (2027) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 51027 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 54 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.04

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
132.9	267.2	566.2	1215.3

TABLE Opening Year (2027) With Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Mission Grove Parkway and Northtrop Drive
NOTES: Mission Grove Apartments - Opening Year (2027) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 54857 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 52 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.44

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
137.7	279.5	593.9	1275.3

TABLE Opening Year (2027) With Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Northrop Drive and Barton Street
NOTES: Mission Grove Apartments - Opening Year (2027) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 56579 SPEED (MPH): 55 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 53 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.58

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
161.8	333.6	711.5	1529.3

TABLE Opening Year (2027) With Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Trautwein Road Between Alessandro Boulevard and Mission Grove Parkway
NOTES: Mission Grove Apartments - Opening Year (2027) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 37694 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 27 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.10

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
103.1	216.0	462.4	994.7

TABLE Opening Year (2027) With Project-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Village Drive Between Trautwein Road and Project Driveway 2-Bayou Lane
NOTES: Mission Grove Apartments - Opening Year (2027) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2325 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 56.35

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	89.4

TABLE Opening Year (2027) With Project-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Village Drive Between Project Driveway 2-Bayou Lane and Mission Grove Parkway
NOTES: Mission Grove Apartments - Opening Year (2027) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2960 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.40

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	104.0

TABLE Opening Year (2027) With Project-11
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Grove Parkway Between Alessandro Boulevard and Plaza Driveway 2
NOTES: Mission Grove Apartments - Opening Year (2027) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13282 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 40 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.68

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	98.0	196.9	417.3

TABLE Opening Year (2027) With Project-12
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Grove Parkway Between Plaza Driveway 2 and Mission Village Drive
NOTES: Mission Grove Apartments - Opening Year (2027) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12327 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 40 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.36

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	0.0	94.1	187.8	397.2

TABLE Opening Year (2027) With Project-13
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Grove Parkway Between Mission Village Drive and Trautwein Road
NOTES: Mission Grove Apartments - Opening Year (2027) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 15147 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 40 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.25

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	105.6	214.3	455.1

TABLE Cumulative (2045)-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Overlook Parkway-Canyon Crest Drive and Cannon Road
NOTES: Mission Grove Apartments - Cumulative (2045)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 82649 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 38 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.88

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
172.0	363.3	779.2	1676.9

TABLE Cumulative (2045)-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Cannon Road and Communications Center Drive
NOTES: Mission Grove Apartments - Cumulative (2045)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 82675 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.98

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
171.6	363.3	779.4	1677.5

TABLE Cumulative (2045)-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Communications Center Drive and Trautwein Road
NOTES: Mission Grove Apartments - Cumulative (2045)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 66939 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 38 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.96

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
150.6	316.2	677.3	1457.2

TABLE Cumulative (2045)-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Trautwein Road and Plaza Driveway 1
NOTES: Mission Grove Apartments - Cumulative (2045)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 53711 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 56 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.18

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
137.6	276.5	585.8	1257.3

TABLE Cumulative (2045)-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Plaza Driveway 1 and Mission Grove Parkway
NOTES: Mission Grove Apartments - Cumulative (2045)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 53117 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 54 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.21

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
136.0	274.1	581.4	1248.2

TABLE Cumulative (2045)-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Mission Grove Parkway and Northtrop Drive
NOTES: Mission Grove Apartments - Cumulative (2045)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 57077 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 52 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.61

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	140.9	286.8	609.7	1309.4

TABLE Cumulative (2045)-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Northrop Drive and Barton Street
NOTES: Mission Grove Apartments - Cumulative (2045)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 58885 SPEED (MPH): 55 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 53 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.75

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
165.8	342.4	730.6	1570.5

TABLE Cumulative (2045)-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Trautwein Road Between Alessandro Boulevard and Mission Grove Parkway
NOTES: Mission Grove Apartments - Cumulative (2045)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 39463 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 27 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.30

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
106.1	222.6	476.7	1025.5

TABLE Cumulative (2045)-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Village Drive Between Trautwein Road and Project Driveway 2-Bayou Lane
NOTES: Mission Grove Apartments - Cumulative (2045)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 4345 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.07

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	65.2	132.9

TABLE Cumulative (2045)-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Village Drive Between Project Driveway 2-Bayou Lane and Mission Grove Parkway
NOTES: Mission Grove Apartments - Cumulative (2045)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 4742 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.45

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	68.6	140.6

TABLE Cumulative (2045)-11
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Grove Parkway Between Alessandro Boulevard and Plaza Driveway 2
NOTES: Mission Grove Apartments - Cumulative (2045)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12962 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 40 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.58

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	96.7	193.9	410.6

TABLE Cumulative (2045)-12
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Grove Parkway Between Plaza Driveway 2 and Mission Village Drive
NOTES: Mission Grove Apartments - Cumulative (2045)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12653 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 40 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.47

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	95.5	190.9	404.1

TABLE Cumulative (2045)-13
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Grove Parkway Between Mission Village Drive and Trautwein Road
NOTES: Mission Grove Apartments - Cumulative (2045)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 15705 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 40 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.41

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	107.8	219.3	466.2

TABLE Cumulative (2045) With Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Overlook Parkway-Canyon Crest Drive and Cannon Road
NOTES: Mission Grove Apartments - Cumulative (2045) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 83381 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 38 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.91

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
173.0	365.4	783.8	1686.8

TABLE Cumulative (2045) With Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Cannon Road and Communications Center Drive
NOTES: Mission Grove Apartments - Cumulative (2045) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 83407 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 75.02

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
172.6	365.4	784.0	1687.4

TABLE Cumulative (2045) With Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Communications Center Drive and Trautwein Road
NOTES: Mission Grove Apartments - Cumulative (2045) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 67671 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 38 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.01

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
151.7	318.5	682.2	1467.8

TABLE Cumulative (2045) With Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Trautwein Road and Plaza Driveway 1
NOTES: Mission Grove Apartments - Cumulative (2045) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 54333 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 56 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.23

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
138.5	278.5	590.3	1267.0

TABLE Cumulative (2045) With Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Plaza Driveway 1 and Mission Grove Parkway
NOTES: Mission Grove Apartments - Cumulative (2045) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 53556 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 54 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.25

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
136.6	275.6	584.6	1255.0

TABLE Cumulative (2045) With Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Mission Grove Parkway and Northtrop Drive
NOTES: Mission Grove Apartments - Cumulative (2045) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 57575 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 52 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.65

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	141.6	288.4	613.2	1317.0

TABLE Cumulative (2045) With Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Alessandro Boulevard Between Northrop Drive and Barton Street
NOTES: Mission Grove Apartments - Cumulative (2045) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 59383 SPEED (MPH): 55 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 53 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.79

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
166.6	344.3	734.7	1579.3

TABLE Cumulative (2045) With Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Trautwein Road Between Alessandro Boulevard and Mission Grove Parkway
NOTES: Mission Grove Apartments - Cumulative (2045) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 39573 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 27 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.31

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
106.3	223.0	477.6	1027.4

TABLE Cumulative (2045) With Project-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Village Drive Between Trautwein Road and Project Driveway 2-Bayou Lane
NOTES: Mission Grove Apartments - Cumulative (2045) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 4499 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.22

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	66.6	135.9

TABLE Cumulative (2045) With Project-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Village Drive Between Project Driveway 2-Bayou Lane and Mission Grove Parkway
NOTES: Mission Grove Apartments - Cumulative (2045) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5064 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.73

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	71.3	146.7

TABLE Cumulative (2045) With Project-11
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Grove Parkway Between Alessandro Boulevard and Plaza Driveway 2
NOTES: Mission Grove Apartments - Cumulative (2045) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13899 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 40 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.88

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	100.6	202.7	430.0

TABLE Cumulative (2045) With Project-12
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Grove Parkway Between Plaza Driveway 2 and Mission Village Drive
NOTES: Mission Grove Apartments - Cumulative (2045) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12930 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 40 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.57

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	96.6	193.6	409.9

TABLE Cumulative (2045) With Project-13
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 12/02/2022
ROADWAY SEGMENT: Mission Grove Parkway Between Mission Village Drive and Trautwein Road
NOTES: Mission Grove Apartments - Cumulative (2045) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 15895 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 40 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.46

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	108.5	221.0	469.9

APPENDIX D

HVAC EQUIPMENT SPECIFICATIONS

The new degree of comfort.™

Rheem *Classic*® Series Air Conditioners

RA14 Series

Efficiencies up to 14 SEER/11.5 EER
Nominal Sizes 1½ to 5 Ton [5.28 to 17.6 kW]
Cooling Capacities 17.3 to 60.5 kBTU
[5.7 to 17.7 kW]

"Proper sizing and installation of equipment is critical to achieve optimal performance. Split system air conditioners and heat pumps must be matched with appropriate coil components to meet Energy Star. Ask your Contractor for details or visit www.energystar.gov."

- Composite base pan – dampens sound, captures louver panels, eliminates corrosion and reduces number of fasteners needed
- Powder coat paint system – for a long lasting professional finish
- Scroll compressor – uses 70% fewer moving parts for higher efficiency and increased reliability
- Modern cabinet aesthetics – increased curb appeal with visually appealing design
- Curved louver panels – provide ultimate coil protection, enhance cabinet strength, and increased cabinet rigidity
- Optimized fan orifice – optimizes airflow and reduces unit sound
- Rust resistant screws – confirmed through 1500-hour salt spray testing
- PlusOne™ **Expanded Valve Space** – 3"-4"-5" service valve space – provides a minimum working area of 27-square inches for easier access
- PlusOne™ **Triple Service Access** – 15" wide, industry leading corner service access – makes repairs easier and faster. The two fastener removable corner allows optimal access to internal unit components. Individual louver panels come out once fastener is removed, for faster coil cleaning and easier cabinet reassembly
- Diagnostic service window with two-fastener opening – provides access to the high and low pressure.
- External gauge port access – allows easy connection of "low-loss" gauge ports
- Single-row condenser coil – makes unit lighter and allows thorough coil cleaning to maintain "out of the box" performance
- 35% fewer cabinet fasteners and fastener-free base – allow for faster access to internal components and hassle-free panel removal
- Service trays – hold fasteners or caps during service calls
- QR code – provides technical information on demand for faster service calls
- Fan motor harness with extra long wires allows unit top to be removed without disconnecting fan wire.

TABLE OF CONTENTS

Standard Feature Table

STANDARD FEATURES							
Feature	**18**	**24**	**30**	**36**	**42**	**48**	**60**
R-410a Refrigerant	√	√	√	√	√	√	√
Maximum SEER	15.5	15	15.5	15.5	15	15	14
Maximum EER	13	13	13	13	13	13	12
Scroll Compressor	√	√	√	√	√	√	√
Field Installed Filter Drier	√	√	√	√	√	√	√
Front Seating Service Valves	√	√	√	√	√	√	√
Internal Pressure Relief Valve	√	√	√	√	√	√	√
Internal Thermal Overload	√	√	√	√	√	√	√
Long Line capability	√	√	√	√	√	√	√
Low Ambient capability with Kit	√	√	√	√	√	√	√
3-4-5 Expanded Valve Space	√	√	√	√	√	√	√
Composite Basepan	√	√	√	√	√	√	√
2 Screw Control Box Access	√	√	√	√	√	√	√
15" Access to Internal Components	√	√	√	√	√	√	√
Quick release louver panel design	√	√	√	√	√	√	√
No fasteners to remove along bottom	√	√	√	√	√	√	√
Optimized Venturi Airflow	√	√	√	√	√	√	√
Single row condenser coil	√	√	√	√	√	√	√
Powder coated paint	√	√	√	√	√	√	√
Rust resistant screws	√	√	√	√	√	√	√
QR code	√	√	√	√	√	√	√
External gauge ports	√	√	√	√	√	√	√
Service trays	√	√	√	√	√	√	√

√ = Standard

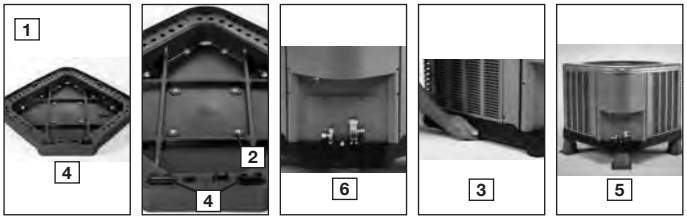
Available SKUs

Available Models	Description
RA1418AJ1NA	*Classic*® Series 1 1/2 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1418AJ1NB	*Classic*® Series 1 1/2 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1424BJ1NA	*Classic*® Series 2 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1424BJ1NB	*Classic*® Series 2 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1430AJ1NA	*Classic*® Series 2 1/2 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1430AJ1NB	*Classic*® Series 2 1/2 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1436AC1NB	*Classic*® Series 3 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1436AD1NB	*Classic*® Series 3 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-460/3/60
RA1436AJ1NA	*Classic*® Series 3 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1436AJ1NB	*Classic*® Series 3 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1442AD1NB	*Classic*® Series 3 1/2 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-460/3/60
RA1442CC1NB	*Classic*® Series 3 1/2 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1442CJ1NA	*Classic*® Series 3 1/2 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1442CJ1NB	*Classic*® Series 3 1/2 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1448AC1NB	*Classic*® Series 4 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1448AD1NB	*Classic*® Series 4 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-460/3/60
RA1448AJ1NA	*Classic*® Series 4 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1448AJ1NB	*Classic*® Series 4 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1460AD1NB	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-460/3/60
RA1460BC1NB	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1460BJ1NA	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1460BJ1NB	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1460CC1NB	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1460CD1NB	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-460/3/60
RA1460CJ1NA	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1460CJ1NB	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60

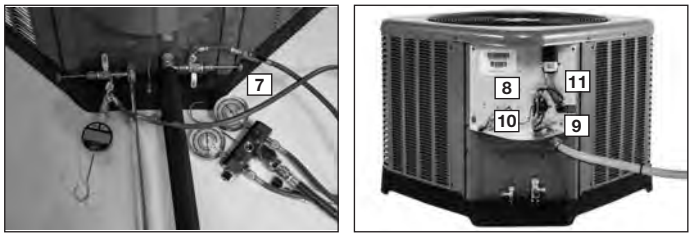
Introduction to RA14 Air Conditioner

The RA14 is our 14 SEER air conditioner and is part of the Rheem air conditioner product line that extends from 13 to 20 SEER. This highly featured and reliable air conditioner is designed for years of reliable, efficient operation when matched with Rheem indoor aluminum evaporator coils and furnaces or air handler units with aluminum evaporators.

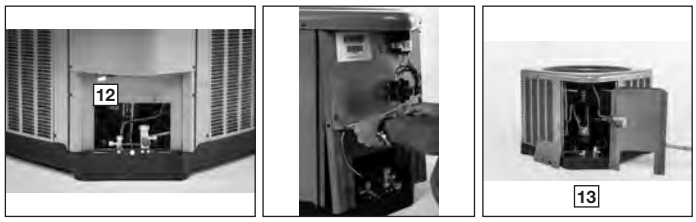
Our unique composite base (1) reduces sound emission, eliminates rattles, significantly reduces fasteners, eliminates corrosion and has integrated brass compressor attachment inserts (2). Furthermore it has incorporated into the design, water management features, means for hand placement (3) for unit maneuvering, screw trays (4) and inserts for lifting off unit pad. (5)



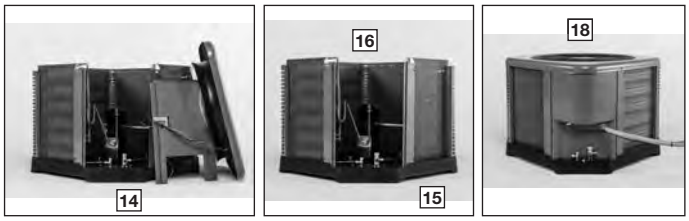
Service Valves (6) are rigidly mounted in the composite base with 3" between suction and discharge valves, 4" clearance below service valves and a minimum of 5" above the service valves, creating industry leading installation ease. The minimum 27 square-inches around the service valves allows ample room to remove service valve schrader prior to brazing, plenty of clearance for easy brazing of the suction and discharge lines to service valve outlets, easy access and hookup of low loss refrigerant gauges (7), and access to the service valve caps for opening. For applications with long-line lengths up to 250 feet total equivalent length, up to 200 feet condenser above evaporator, or up to 80 feet evaporator above condenser, the long-line instructions in the installation manual should be followed.



Controls are accessed from the corner of the unit by removing only two fasteners from the control access cover, revealing the industry's largest 15" wide and 14" tall control area (8). With all this room in the control area the high voltage electrical whip (9) can easily be inserted through the right size opening in the bottom of the control area. Routing it leads directly to contractor lugs for connection. The low voltage control wires (10) are easily connected to units low voltage wiring. If contactor or capacitor (11) needs to be replaced there is more than adequate space to make the repair. Furthermore, if high pressure and low pressure model was not purchased but is desired to be installed in the field, the service window (12) can be removed by removing two screws, to access the high and low side schrader fittings for easy field installation. The entire corner can be removed providing ultimate access to install the high and low pressure switch. (13)



If in the rare event, greater access is needed to internal components, such as the compressor, the entire corner of the unit can be removed along with the top cover assembly to have unprecedented access to interior of the unit (14). Extra wire length is incorporated into each outdoor fan and compressor so top cover and control panel can be positioned next to the unit. With minimal effort the plug can be removed from the compressor and the outdoor fan wires can be removed from the capacitor to allow even more uncluttered access to the interior of the unit (15). Outdoor coil heights range from as short as 22" to 32", aiding access to the compressor. Disassembly to this degree and complete reassembly only takes a first time service technician less than 10 minutes. (15)

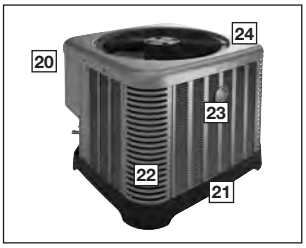


All units utilize strong formed louver panels which provide industry leading coil protection. Louver removal for coil cleaning is accomplished by removing one screw and lifting the panel out of the composite base pan. (17) All RA14 units utilize single row coils (16) making cleaning easy and complete, restoring the performance of the air conditioner back to out of the box performance levels year after year.

The outdoor fan motor has sleeve bearings and is inherently protected. The motor is totally enclosed for maximum protection from weather, dust and corrosion. Access to the outdoor fan is made by removing four fasteners from the fan grille. The outdoor fan can be removed from the fan grille by removing 4 fasteners in the rare case outdoor fan motor fails.

Each cabinet has optimized composite (19) fan orifice assuring efficient and quiet airflow.

The entire cabinet has powder post paint (20) achieving 1000 hour salt spray rating, allowing the cabinet to retain its aesthetics throughout its life.



Scroll compressors with standard internal pressure relief and internal thermal overload are used on all capacities assuring longevity of high efficient and quiet operation for the life of the product.

Each unit is shipped with filter drier for field installation and will trap any moisture or dirt that could contaminate the refrigerant system.

All cabinets have industry leading structural strength due to the composite base pan (21), interlocking corner post (22), formed curved louver panels (23) and drawn top cover (24) making it the most durable cabinet on the market today.

Each RA14 capacity has undergone rigorous psychometric testing to assure performance ratings of capacity, SEER and EER per AHRI Standard 210/240 rating conditions. Also each unit bears the UL mark and each unit is certified to UL 1995 safety standards.

Each unit has undergone specific strain and modal testing to assure tubing (25) is outside the units natural frequency and that the suction and discharge lines connected to the compressor withstand any starting, steady state operation or shut down forces imposed by the compressor.

All units have been sound tested in sound chamber to AHRI 270 rating conditions, and A-weighted Sound Power Level tables produced, assuring units have acceptable noise qualities (see page 9). Each unit has been ran in cooling operation at 95°F and 82°F and sound ratings for the RA14 range from as low as 74 dBA to 77 dBA.

All units have been ship tested to assure units meet stringent “over the road” shipping conditions.

As manufactured all units in the RA14 family have cooling capability to 55 °F. Addition of low ambient control will allow the unit to operate down to 0°F. Factory testing is performed on each unit. All component parts meet well defined specification and continually go through receiving inspections. Each component installed on a unit is scanned, assuring correct component utilization for a given unit capacity and voltage. All condenser coils are leak tested with pressurization test to 550#’s and once installed and assembled, each units’ complete refrigerant system is helium leak tested. All units are fully charged from the factory for up to 15 feet of piping. All units are factory run tested. The RA14 has a 10-year conditional compressor and parts warranty (registration required).

Optional Accessories
(Refer to accessory chart for model #)

Compressor Crankcase Heater
Protects against refrigerant migration that can occur during low ambient operation

Compressor Sound Cover
- Reinforced vinyl compressor cover containing a 1½ inch thick batt of fiberglass insulation
- Open edges are sealed with a one-inch wide hook and loop fastening tape

Compressor Hard Start Kit
- Single-phase units are equipped with a PSC compressor motor, this type of motor normally does not need a potential relay and start capacitor
- Kit may be required to increase the compressor starting torque, in conditions such as low voltage

Low Ambient Kit
- Air conditioners operate satisfactorily in the cooling mode down to 55°F outdoor air temperature without any additional controls
- This Kit can be added in the field enabling unit to operate properly down to 0° in the cooling mode
- Crankcase heater and freezestat should be installed on compressors equipped with a low ambient kit

3"/6"/12"
- Gray high density polyethylene feet are available to raise unit off of mounting surface away from moisture

Low Pressure
- Can be added in field enabling the unit to shut off compressor on loss of charge

NOTE: Unit can be purchased with high and low pressure installed at factory. (Refer to SKU list)

High Pressure
- Can be added in field enabling unit to shut off compressor if unit loses outdoor fan operation.

NOTE: Unit can be purchased with high and low pressure installed at factory. (Refer to SKU list)

Decorative Top
- Can be installed on fan grille

Air Conditioners*

R	A	14	24	A	J	1	N	A	*
Brand	**Product Category**	**SEER**	**Capacity BTU/HR**	**Major Series***	**Voltage**	**Type**	**Controls**	**Minor Series****	**Option Code**
Rheem	A - Air Conditioners	14 - 14 SEER	18 - 18,000 [5.28 kW] 24 - 24,000 [7.03 kW] 30 - 30,000 [8.79 kW] 36 - 36,000 [10.55 kW] 42 - 42,000 [12.31 kW] 48 - 48,000 [14.07 kW] 60 - 60,000 [17.58 kW]	A - 1st Design B - 2nd Design	J - 1ph, 208-230/60 C - 3ph, 208-230/60 D - 3ph, 460/60	1 - Single-stage	N - Non-Communicating	A - 1st Design B - 2nd Design	N/A

*See page 3 for available SKU's.

Heat Pumps (For Reference)**

R	P	14	24	A	J	1	N	A	*
Brand	**Product Category**	**SEER**	**Capacity BTU/HR**	**Major Series***	**Voltage**	**Type**	**Controls**	**Minor Series****	**Option Code**
Rheem	P - Heat Pump	13 - 13 SEER 14 - 14 SEER 16 - 16 SEER 17 - 17 SEER 20 - 20 SEER	18 - 18,000 [5.28 kW] 24 - 24,000 [7.03 kW] 30 - 30,000 [8.79 kW] 36 - 36,000 [10.55 kW] 42 - 42,000 [12.31 kW] 48 - 48,000 [14.07 kW] 60 - 60,000 [17.58 kW]	A - 1st Design	J - 1ph, 208-230/60 C - 3ph, 208-230/60 D - 3ph, 460/60	1 - Single-stage 2 - Two-stage V - Inverter P - Piston	C - Communicating N - Non-Communicating	A - 1st Design	N/A

Furnace Coils (For Reference)**

R	C	F	24	17	S	T	A	M	C	A	*
Brand	**Product Category**	**Type**	**Capacity BTU/HR**	**Width**	**Efficiency**	**Metering Device**	**Major Series***	**Orientation**	**Casing**	**Minor Series****	**Option Code**
Rheem	C - Evap Coil	F - Furn Coil H - Air-Handler Coil	24 - 24,000 [7.03 kW] 36 - 36,000 [10.55 kW] 48 - 48,000 [14.07 kW] 60 - 60,000 [17.58 kW]	14 - 14" 17 - 17.5" 21 - 21" 24 - 24.5"	S- Standard Eff. M- Mid Eff. H- High Eff.	T-TXV E-EEV P-Piston	A - 1st Design	M - Multipoise V - Vertical only/ convertible H - Ded. Horizontal only	C - Cased U - Uncased	A - 1st Design	N/A

**Model number ID's are for reference only. Available SKU's are listed on the standard features/available SKU page of model spec sheets.

[ ] Designates Metric Conversions

90%+ AFUE Gas Furnaces (For Reference)**

R	96	V	A	70	2	3	17	M	S	A
Brand	**Series**	**Motor**	**Major Rev**	**Input BTU/HR**	**Stages**	**Air Flow**	**Cabinet Width**	**Configuration**	**Nox**	**Minor Rev**
Rheem	90 - 90 AFUE 92 - 92 AFUE 95 - 95 AFUE 96 - 96 AFUE 97 - 97 AFUE	V - Variable speed T - Constant Torque (X-13) P - PSC	A - 1st Design	040 - 42,000 [12.31 kW] 060 - 56,000 [16.41 kW] 070 - 70,000 [20.51 kW] 085 - 84,000 [24.62 kW] 100 - 98,000 [28.72 kW] 115 - 112,000 [32.82 kW]	1 - Single-stage 2 - Two-stage M - Modulating	3 - up to 3 ton 5 - 3 1/2 up to 5 ton	14 - 14" 17 - 17.5" 21 - 21" 24 - 24.5"	M - Multi	X - Low Nox S - Standard	A - 1st Design

80% AFUE Gas Furnaces (For Reference)**

R	80	2	V	A	075	3	17	M	S	A
Brand	**Series**	**Stages**	**Motor**	**Major Rev**	**Input BTU/HR**	**Air Flow**	**Cabinet Width**	**Configuration**	**Nox**	**Minor Rev**
Rheem	80 - 80+ AFUE	1 - Single-stage 2 - Two-stage	V - Variable speed T - Constant Torque (X-13) P - PSC premium S - PSC standard	A - 1st Design	050 - 50,000 [15 kW] 075 - 75,000 [22 kW] 100 - 100,000 [29 kW] 125 - 125,000 [37 kW] 150 - 150,000 [44 kW]	3 - up to 3 ton 4 - 2 1/2 to 4 ton 5 - 3 1/2 up to 5 ton	14 - 14" 17 - 17.5" 21 - 21" 24 - 24.5"	M - Multi D - Down Z - Down & zero clearance down flow	X - Low Nox S - Standard	A - 1st Design

Air Handlers (For Reference)**

R	H	1	T	36	17	S	T	A	N	A	A	000	*
Brand	**Product Category**	**Stages of Airflow**	**Motor Type**	**Capacity BTU/HR**	**Width**	**Coil Size**	**Metering Device**	**Major Series***	**Controls**	**Voltage**	**Minor Series****	**Factory Heat Cap**	**Option Code**
Rheem	H - Air Handler	1 - Single-Stage 2 - Two-Stage M - Modulating	V - Variable Speed T - Constant Torque P - PSC	24 - 24,000 [7.03 kW] 36 - 36,000 [10.55 kW] 48 - 48,000 [14.07 kW] 60 - 60,000 [17.58 kW]	14 - 14" 17 - 17.5" 21 - 21" 24 - 24.5"	S - Standard Eff. M - Mid Eff. H - High Eff.	T - TEV E - EEV P - Piston	A - 1st Design	C -Communicating N -Non-comm	A - 1ph, 115/60 J - 1ph, 208-240/60 D - 3ph, 480/60	A - 1st Design	00 - no factory heat with option code	*TBD

**Model number ID's are for reference only. Available SKU's are listed on the standard features/available SKU page of model spec sheets.

[ ] Designates Metric Conversions

Physical Data

PHYSICAL DATA							
Model No.	**RA1418**	**RA1424**	**RA1430**	**RA1436**	**RA1442**	**RA1448**	**RA1460**
Nominal Tonnage	1.5	2.0	2.5	3.0	3.5	4.0	5.0
Valve Connections							
Liquid Line O.D. – in.	3/8	3/8	3/8	3/8	3/8	3/8	3/8
Suction Line O.D. – in.	3/4	3/4	3/4	3/4	7/8	7/8	7/8
Refrigerant (R410A) furnished oz.[1]	68	80	87	106	134	129	201
Compressor Type	Scroll						
Outdoor Coil							
Net face area – Outer Coil	9.1	11.1	12.1	14.8	17.3	18.9	32.3
Net face area – Inner Coil	—	—	—	—	—	—	—
Tube diameter – in.	3/8	3/8	3/8	3/8	3/8	3/8	3/8
Number of rows	1	1	1	1	1	1	1
Fins per inch	22	22	22	22	22	22	22
Outdoor Fan							
Diameter – in.	20	20	20	24	24	26	26
Number of blades	2	2	2	3	3	2	3
Motor hp	1/10	1/8	1/8	1/6	1/5	1/5	1/3
CFM	2225	2295	2605	3105	4105	4264	4775
RPM	1075	1121	1075	850	833	820	795
watts	130	138	142	173	236	236	239
Shipping weight – lbs.	143	148	158	178	207	232	247
Operating weight – lbs.	122	141	151	171	200	221	240

Electrical Data

Line Voltage Data (Volts-Phase-Hz)	**208/230-1-60**	**208/230-1-60**	**208/230-1-60**	**208/230-1-60**	**208/230-1-60**	**208/230-1-60**	**208/230-1-60**
Maximum overcurrent protection (amps)[2]	20	25	25	30	35	45	50
Minimum circuit ampacity[3]	13	15	17	19	23	27	34
Compressor							
Rated load amps	9.7	10.9	12.8	14.1	16.7	19.9	23.7
Locked rotor amps	48	62.9	64	77	109	109	152.5
Condenser Fan Motor							
Full load amps	0.6	0.8	0.8	0.8	1.2	1.2	3.5
Locked rotor amps	1.1	1.5	1.4	1.5	2.0	2.3	-
Line Voltage Data (Volts-Phase-Hz)	—	—	—	**208/230-3-60**	**208/230-3-61**	**208/230-3-62**	**208/230-3-63**
Maximum overcurrent protection (amps)[2]	—	—	—	20	25	30	35
Minimum circuit ampacity[3]	—	—	—	13	16	18	24
Compressor							
Rated load amps	—	—	—	9	11.2	13.1	15.9
Locked rotor amps	—	—	—	71	84	83.1	110
Condenser Fan Motor							
Full load amps	—	—	—	0.8	1.2	1.2	3.5
Locked rotor amps	—	—	—	1.5	3.0	2.3	-
Line Voltage Data (Volts-Phase-Hz)	—	—	—	**480-3-60**	**480-3-60 RA1442AD**	**480-3-60**	**480-3-60 RA1460AD**
Maximum overcurrent protection (amps)[2]	—	—	—	15	—	15	15
[3]Minimum circuit ampacity	—	—	—	8	—	9	10
Compressor							
Rated load amps	—	—	—	5.6	—	6.1	7.1
Locked rotor amps	—	—	—	38	—	41	52
Condenser Fan Motor							
Full load amps	—	—	—	0.5	—	0.6	0.5
Locked rotor amps	—	—	—	1.1	—	1.6	1.4

[1]Refrigerant charge sufficient for 15 ft. length of refrigerant lines. For longer line set requirements see the installation instructions for information about set length and additional refrigerant charge required.
[2]HACR type circuit breaker of fuse.
[3]Refer to National Electrical Code manual to determine wire, fuse and disconnect size requirements.

Accessories

Model No.		RA1418	RA1424	RA1430	RA1436	RA1442	RA1448	RA1460
Compressor crankcase heater*		44-17402-44	44-17402-44	44-17402-44	44-17402-44	44-17402-45	44-17402-45	44-17402-45
Low ambient control		RXAD-A08	RXAD-A08	RXAD-A08	RXAD-A08	RXAD-A08	RXAD-A08	RXAD-A08
Compressor sound cover		68-23427-26	68-23427-26	68-23427-26	68-23427-26	68-23427-25	68-23427-25	68-23427-25
Compressor hard start kit		SK-A1	SK-A1	SK-A1	SK-A1	SK-A1	SK-A1	SK-A1
Compressor time delay		RXMD-B01	RXMD-B01	RXMD-B01	RXMD-B01	RXMD-B01	RXMD-B01	RXMD-B01
Low pressure control		RXAC-A07	RXAC-A07	RXAC-A07	RXAC-A07	RXAC-A07	RXAC-A07	RXAC-A07
High pressure control		RXAB-A07	RXAB-A07	RXAB-A07	RXAB-A07	RXAB-A07	RXAB-A07	RXAB-A07
Liquid Line Solenoid (24 VAC, 50/60 Hz)	Solenoid Valve	200RD2T3TVLC	200RD2T3TVLC	200RD2T3TVLC	200RD2T3TVLC	200RD2T3TVLC	200RD3T3TVLC	200RD3T3TVLC
	Solenoid Coil	61-AMG24V	61-AMG24V	61-AMG24V	61-AMG24V	61-AMG24V	61-AMG24V	61-AMG24V
Liquid Line Solenoid (120/240 VAC, 50/60 Hz)	Solenoid Valve	200RD2T3TVLC	200RD2T3TVLC	200RD2T3TVLC	200RD2T3TVLC	200RD2T3TVLC	200RD3T3TVLC	200RD3T3TVLC
	Solenoid Coil	61-AMG120/240V	61-AMG120/240V	61-AMG120/240V	61-AMG120/240V	61-AMG120/240V	61-AMG120/240V	61-AMG120/240V
Classic Top Cap w/Label		91-101123-21	91-101123-21	91-101123-21	91-101123-21	91-101123-21	91-101123-21	91-101123-21

*Crankcase Heater recommended with Low Ambient Kit.

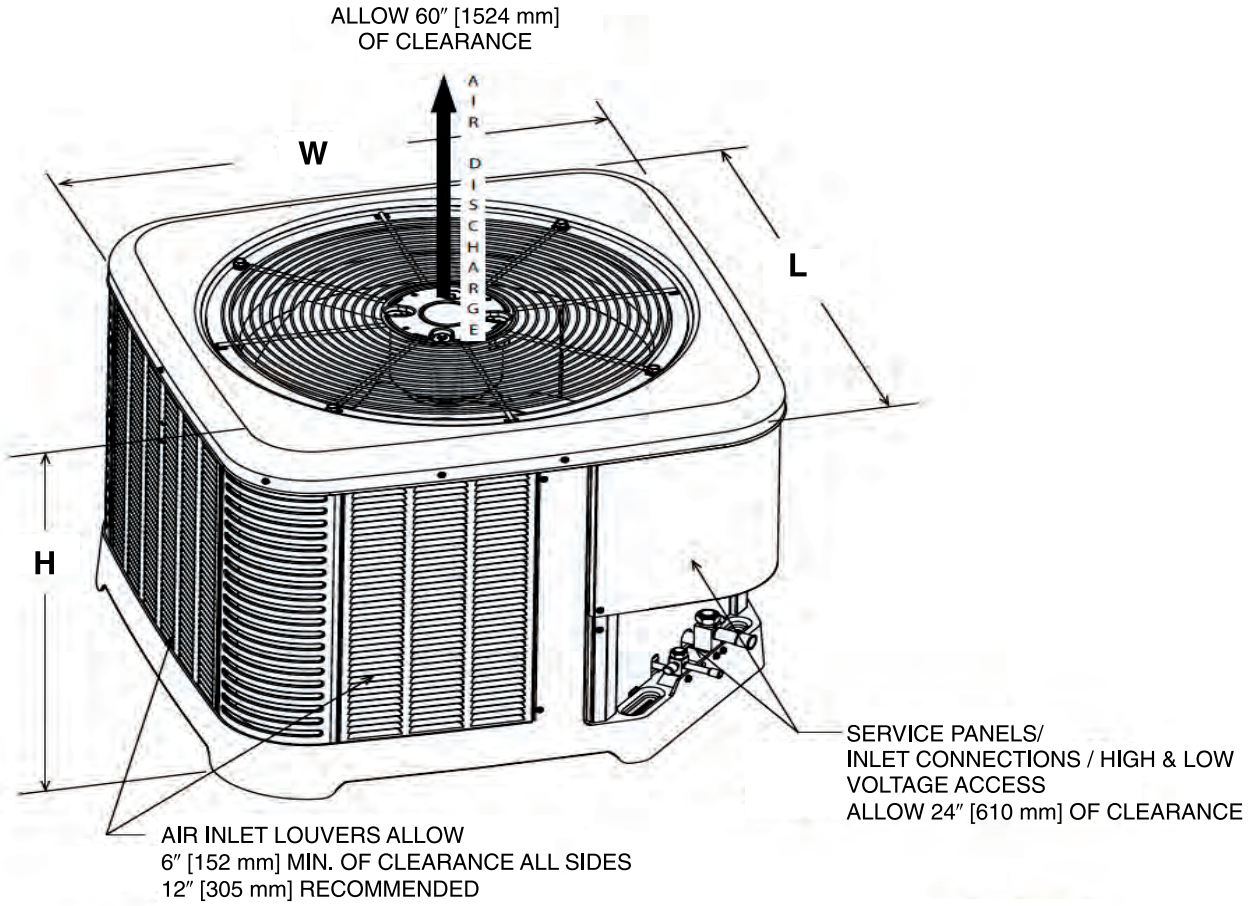
Weighted Sound Power Level (dBA)

A-WEIGHTED SOUND POWER LEVEL (dBA)								
Unit Size - Voltage, Series	Standard Rating (dBA)	TYPICAL OCTAVE BAND SPECTRUM (dBA without tone adjustment)						
		125	250	500	1000	2000	4000	8000
RA1418	76.0	51.4	59.6	65.2	65.9	64.3	58.5	53.7
RA1424	75.0	50.0	59.5	63.2	64.4	61.4	56.8	52.6
RA1430	74.0	48.8	57.5	63.5	64	61.9	56.1	51
RA1436	76.0	52.2	61.3	65.4	65.3	62.4	57.3	53.1
RA1442	73.0	51.5	54.7	63.5	63.3	59.4	54.9	48.4
RA1448	76.0	52.3	59.1	66.7	65.7	62.4	59.3	55.9
RA1460	74.6	50.1	55.1	65.6	64.8	63.2	57.4	56.4

NOTE: Tested in accordance with AHRI Standard 270-08 (not listed in AHRI)

Unit Dimensions

MODEL NO.	OPERATING						SHIPPING					
	H (Height)		L (Length)		W (Width)		H (Height)		L (Length)		W (Width)	
	INCHES	mm	INCHES	mm	INCHES	mm	INCHES	mm	INCHES	mm	INCHES	mm
RA1418	25	635	29.75	755	29.75	755	26.75	679	32.38	822	32.38	822
RA1424	25	635	29.75	755	29.75	755	26.75	679	32.38	822	32.38	822
RA1430	27	685	29.75	755	29.75	755	28.75	730	32.38	822	32.38	822
RA1436	27	685	33.75	857	33.75	857	28.75	730	36.38	924	36.38	924
RA1442	35	889	33.75	857	33.75	857	36.75	933	36.38	924	36.38	924
RA1448	31	787	35.75	908	35.75	908	32.75	832	38.38	975	38.38	975
RA1460	51	1295	35.75	908	35.75	908	51.38	1305	38.38	975	38.38	975



[ ] Designates Metric Conversions

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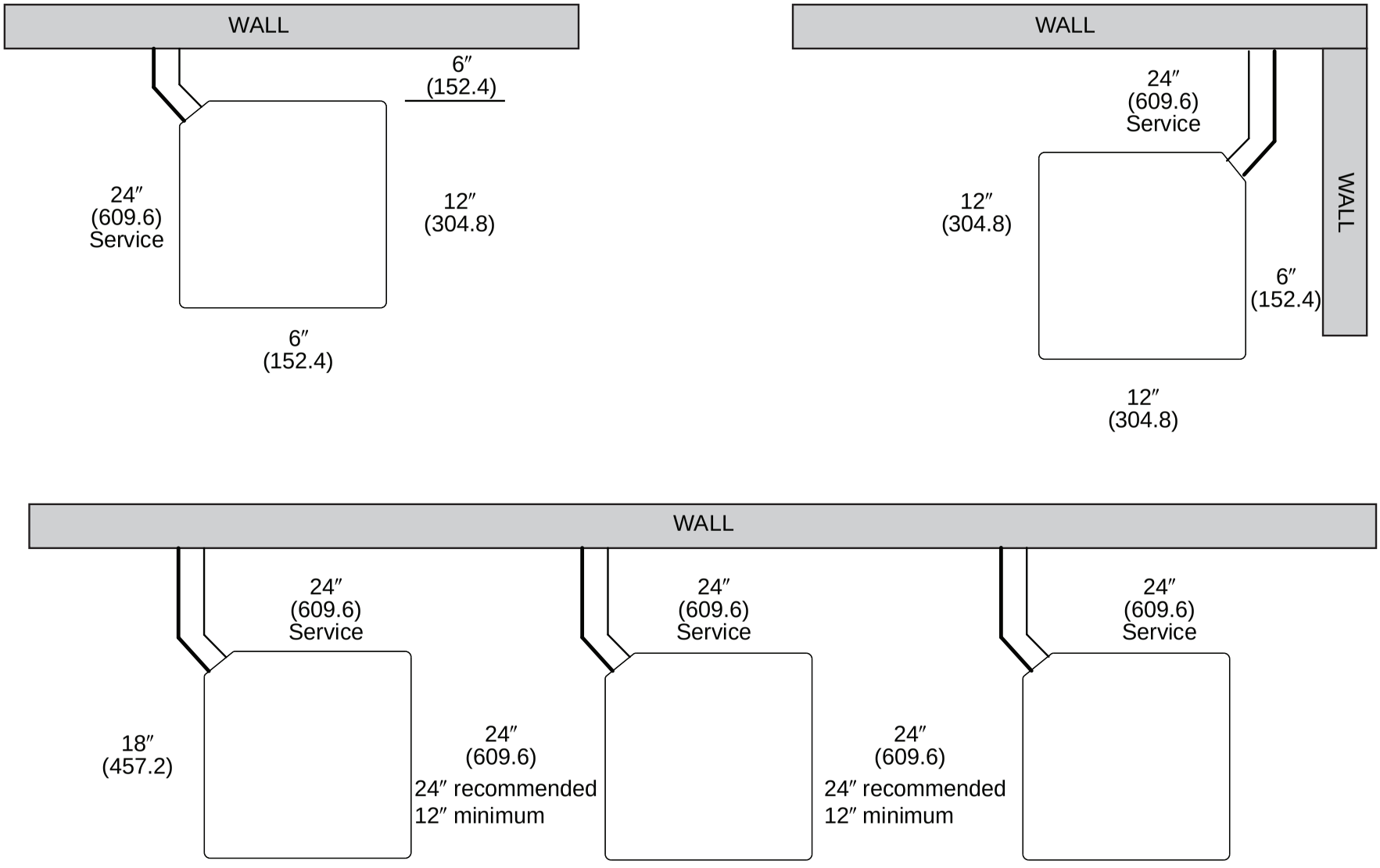
CLEARANCES



NOTE: NUMBERS IN () = mm

IMPORTANT: When installing multiple units in an alcove, roof well or partially enclosed area, ensure there is adequate ventillation to prevent re-circulation of discharge air.

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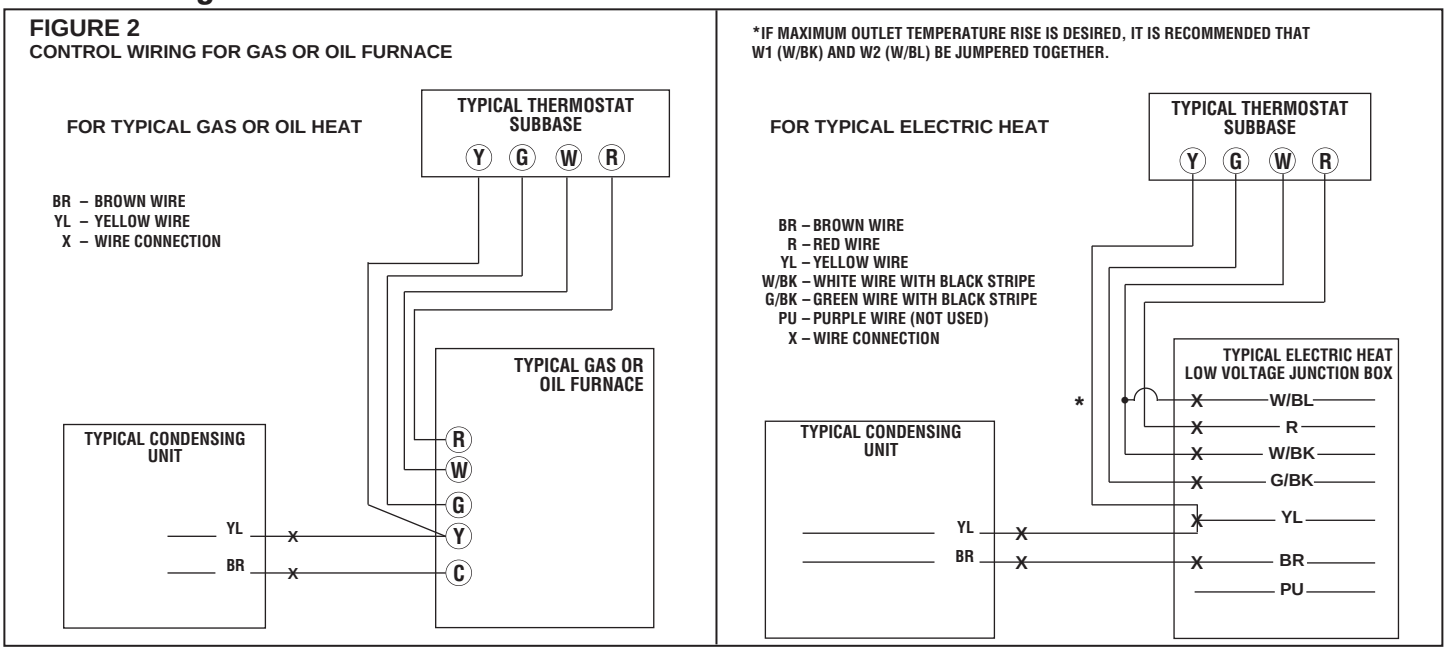
Control Wiring

FIGURE 2
CONTROL WIRING FOR GAS OR OIL FURNACE



Application Guidelines

1. Intended for outdoor installation with free air inlet and outlet. Outdoor fan external static pressure available is less than 0.01 -in. wc.
2. Minimum outdoor operation air temperature for cooling mode without low-ambient operation accessory is 55°F (12.8°C).
3. Maximum outdoor operating air temperature is 125°F (51.7°C).
4. For reliable operation, unit should be level in all horizontal planes.
5. Use only copper wire for electric connections at unit. Aluminum and clad aluminum are not acceptable for the type of connector provided.
6. Do not apply capillary tube indoor coils to these units.
7. Factory – supplied filter drier must be installed.

Refrigerant Line Size Information

13 - 16 SEER Single-Stage Air-Conditioners																
Unit Size	Allowable Liquid Line Size	Allowable Suction Line Size	Apply Long Line Guidelines if Linear Line Length Exceeds Those Shown Below (Feet)				Equivalent Length (Feet)									
							< 25	26-50	51-75	76-100	101-125	126-150	151-175	176-200	201-225	226-250
			(-)A13	(-)A14 A/B	(-)A14 W	(-)A16	Maximum Vertical Rise (Outdoor Unit Below Indoor Unit) * / Capacity Multiplier									
1.5 Ton **SEE NOTE 3	1/4"	5/8"	N/R	N/R	N/R	N/R	25 / 1.00	50 / 0.99	62 / 0.98	43 / 0.98	24 / 0.97	5 / 0.97	N/R	N/R	N/R	N/R
	5/16"	5/8"	N/R	223	198	188	25 / 1.00	50 / 0.99	75 / 0.98	98 / 0.98	93 / 0.97	88 / 0.97	83 / 0.96	78 / 0.96	73 / 0.95	68 / 0.94
	3/8"	5/8"	178	148	132	125	25 / 1.00	50 / 0.99	75 / 0.98	100 / 0.98	100 / 0.97	100 / 0.97	100 / 0.96	100 / 0.96	100 / 0.95	100 / 0.94
	1/4"	3/4"**	N/R	N/R	N/R	N/R	25 / 1.00	50 / 1.00	62 / 0.99	43 / 0.99	24 / 0.99	5 / 0.99	N/R	N/R	N/R	N/R
	5/16"	3/4"**	N/R	223	198	188	25 / 1.00	50 / 1.00	75 / 0.99	98 / 0.99	93 / 0.99	88 / 0.99	83 / 0.99	78 / 0.98	73 / 0.98	68 / 0.98
	3/8"	3/4"**	178	148	132	125	25 / 1.00	50 / 1.00	75 / 1.00	100 / 0.99	100 / 0.99	100 / 0.99	100 / 0.99	100 / 0.98	100 / 0.98	100 / 0.98
2 Ton	1/4"	5/8"	N/R	N/R	N/R	N/R	25 / 0.99	50 / 0.98	21 / 0.97	N/R	N/R	N/R	N/R	N/R	N/R	N/R
	5/16"	5/8"	243	193	175	175	25 / 0.99	50 / 0.98	75 / 0.97	87 / 0.96	77 / 0.95	69 / 0.94	61 / 0.93	53 / 0.92	45 / 0.91	37 / 0.90
	3/8"	5/8"	162	128	117	117	25 / 0.99	50 / 0.98	75 / 0.97	100 / 0.96	100 / 0.95	100 / 0.94	98 / 0.93	95 / 0.92	92 / 0.91	89 / 0.90
	1/4"	3/4"	N/R	N/R	N/R	N/R	25 /1.00	50 / 1.00	21 / 0.99	N/R	N/R	N/R	N/R	N/R	N/R	N/R
	5/16"	3/4"	243	193	175	175	25 /1.00	50 / 1.00	75 / 0.99	87 / 0.99	77 / 0.98	69 / 0.98	61 / 0.98	53 / 0.97	45 / 0.97	37 / 0.96
	3/8"	3/4"	162	128	117	117	25 / 1.00	50 / 1.00	75 / 0.99	100 / 0.99	100 / 0.98	100 / 0.98	98 / 0.98	95 / 0.97	93 / 0.97	90 / 0.96
2.5 Ton	5/16"	5/8"	N/R	N/R	110	110	25 / 0.99	50 / 0.98	75 / 0.96	70 / 0.94	59 / 0.93	48 / 0.91	36 / 0.90	N/R	N/R	N/R
	3/8"	5/8"	142	117	73	73	25 / 0.99	50 / 0.98	75 / 0.96	100 / 0.94	98 / 0.93	94 / 0.91	90 / 0.90	N/R	N/R	N/R
	5/16"	3/4"	213	175	110	110	25 / 1.00	50 / 0.99	75 / 0.99	70 / 0.98	59 / 0.98	48 / 0.97	36 / 0.96	25 / 0.96	13 / 0.95	N/R
	3/8"	3/4"	142	117	73	73	25 / 1.00	50 / 0.99	75 / 0.99	100 / 0.98	98 / 0.98	94 / 0.97	90 / 0.96	86 / 0.96	82 / 0.95	78 / 0.95
3 Ton	5/16"	5/8"	N/R	N/R	N/R	N/R	25 / 0.99	50 / 0.97	66 / 0.94	49 / 0.92	32 / 0.90	N/R	N/R	N/R	N/R	N/R
	3/8"	5/8"	108	85	90	82	25 / 0.99	50 / 0.97	75 / 0.94	95 / 0.92	89 / 0.90	N/R	N/R	N/R	N/R	N/R
	5/16"	3/4"	N/R	128	135	123	25 / 1.00	50 / 0.99	66 / 0.98	49 / 0.98	32 / 0.97	15 / 0.96	N/R	N/R	N/R	N/R
	3/8"	3/4"	108	85	90	82	25 / 1.00	50 / 0.99	75 / 0.98	95 / 0.98	89 / 0.97	84 / 0.96	78 / 0.95	72 / 0.94	67 / 0.93	61 / 0.93
	1/2"	3/4"	54	43	45	41	25 / 1.00	50 / 0.99	75 / 0.98	100 / 0.98	100 / 0.97	100 / 0.96	100 / 0.95	100 / 0.94	100 / 0.93	100 / 0.93
	5/16"	7/8"	N/R	128	135	123	25 / 1.00	50 / 1.00	66 / 1.00	49 / 0.99	32 / 0.99	15 / 0.99	N/R	N/R	N/R	N/R
	3/8"	7/8"	108	85	90	82	25 / 1.00	50 / 1.00	75 / 1.00	95 / 0.99	89 / 0.99	84 / 0.99	78 / 0.98	72 / 0.98	67 / 0.98	61 / 0.97
	1/2"	7/8"	54	43	45	41	25 / 1.00	50 / 1.00	75 / 1.00	100 / 0.99	100 / 0.99	100 / 0.99	100 / 0.98	100 / 0.98	100 / 0.98	100 / 0.97
3.5 Ton	3/8"	3/4"	150	102	75	75	25 / 0.99	50 / 0.98	75 / 0.97	88 / 0.96	80 / 0.95	72 / 0.94	65 / 0.92	57 / 0.91	49 / 0.90	N/R
	1/2"	3/4"	75	51	38	38	25 / 0.99	50 / 0.98	75 / 0.97	100 / 0.96	100 / 0.95	100 / 0.94	100 / 0.92	100 / 0.91	100 / 0.90	N/R
	3/8"	7/8"	150	102	75	75	25 / 1.00	50 / 1.00	75 / 0.99	88 / 0.99	80 / 0.99	72 / 0.98	65 / 0.97	57 / 0.97	49 / 0.96	42 / 0.96
	1/2"	7/8"	75	51	38	38	25 / 1.00	50 / 1.00	75 / 0.99	100 / 0.99	100 / 0.99	100 / 0.98	100 / 0.97	100 / 0.97	100 / 0.96	100 / 0.96

NOTES:
1. Do not exceed 200 ft linear line length.
2. *Do not exceed 100 ft vertical separation if outdoor unit is above indoor unit.
3. **3/4" suction line should only be used for 1.5 ton systems if outdoor unit is below or at same level as indoor to assure proper oil return.
4. Always use the smallest liquid line allowable to minimize refrigerant charge.
5. Applications shaded in light gray indicate capacity multipliers between 0.90 and 0.96 which are not recommended, but are allowed.
6. Applications shaded in dark gray are not recommended due to excessive liquid or suction pressure drop.

NOTE: Values based on 105°F liquid temperature and 45°F evaporator temperature in cooling mode depending on size

Refrigerant Line Size Information (con't.)

13 - 16 SEER Single-Stage Air-Conditioners																
Unit Size	Allowable Liquid Line Size	Allowable Suction Line Size	Apply Long Line Guidelines if Linear Line Length Exceeds Those Shown Below (Feet)				Equivalent Length (Feet)									
							< 25	26-50	51-75	76-100	101-125	126-150	151-175	176-200	201-225	226-250
			(-)A13	(-)A14 A/B	(-)A14 W	(-)A16	Maximum Vertical Rise (Outdoor Unit Below Indoor Unit) * / Capacity Multiplier									
4 Ton	3/8"	3/4"	148	110	N/R	35	25 / 0.99	50 / 0.98	75 / 0.96	77 / 0.95	67 / 0.93	57 / 0.92	46 / 0.91	N/R	N/R	N/R
	1/2"	3/4"	74	55	N/R	18	25 / 0.99	50 / 0.98	75 / 0.96	100 / 0.95	100 / 0.93	100 / 0.92	100 / 0.91	N/R	N/R	N/R
	3/8"	7/8"	148	110	N/R	35	25 / 1.00	50 / 0.99	75 / 0.99	77 / 0.98	67 / 0.97	57 / 0.97	46 / 0.96	36 / 0.96	26 / 0.95	15 / 0.95
	1/2"	7/8"	74	55	N/R	18	25 / 1.00	50 / 0.99	75 / 0.99	100 / 0.98	100 / 0.97	100 / 0.97	100 / 0.96	100 / 0.96	99 / 0.95	97 / 0.95
5 Ton	3/8"	3/4"	78	0	N/R	0	25 / 0.99	50 / 0.97	75 / 0.94	61 / 0.92	46 / 0.90	N/R	N/R	N/R	N/R	N/R
	1/2"	3/4"	39	0	N/R	0	25 / 0.99	50 / 0.97	75 / 0.94	100 / 0.92	100 / 0.90	N/R	N/R	N/R	N/R	N/R
	3/8"	7/8"	78	0	N/R	0	25 / 1.00	50 / 0.99	75 / 0.98	61 / 0.97	46 / 0.96	32 / 0.95	18 / 0.94	N/R	N/R	N/R
	1/2"	7/8"	39	0	N/R	0	25 / 1.00	50 / 0.99	75 / 0.98	100 / 0.97	100 /0.96	100 / 0.95	97 / 0.94	95 / 0.94	92 / 0.93	89 / 0.92
	3/8"	1-1/8"	78	0	N/R	0	25 / 1.01	50 / 1.01	75 / 1.00	61 / 1.00	46 / 0.99	32 / 0.99	18 / 0.99	N/R	N/R	N/R
	1/2"	1-1/8"	39	0	N/R	0	25 / 1.01	50 / 1.01	75 / 1.00	100 /1.00	100 / 0.99	100 / 0.99	97 / 0.99	95 / 0.99	92 / 0.99	89 / 0.98

NOTES:
1. Do not exceed 200 ft linear line length.
2. *Do not exceed 100 ft vertical separation if outdoor unit is above indoor unit.
3. **3/4" suction line should only be used for 1.5 ton systems if outdoor unit is below or at same level as indoor to assure proper oil return.
4. Always use the smallest liquid line allowable to minimize refrigerant charge.
5. Applications shaded in light gray indicate capacity multipliers between 0.90 and 0.96 which are not recommended, but are allowed.
6. Applications shaded in dark gray are not recommended due to excessive liquid or suction pressure drop.

NOTE: Values based on 105°F liquid temperature and 45°F evaporator temperature in cooling mode depending on size

Refrigerant Line Size Information (con't.)

13 - 16 SEER Single-Stage Air-Conditioners																
Unit Size	Allowable Liquid Line Size mm [in.]	Allowable Suction Line Size mm [in.]	Apply Long Line Guidelines if Linear Line Length Exceeds Those Shown Below (Feet)				Equivalent Length (Meters)									
							< 8	8-15	16-23	24-30	31-38	39-46	47-53	54-61	62-69	70-76
			(-)A13	(-)A14 A/B	(-)A14 W	(-)A16	Maximum Vertical Rise (Outdoor Unit Below Indoor Unit) * / Capacity Multiplier									
5.3 KW [1.5 Ton] **SEE NOTE 3	6.35 [1/4]	15.88 [5/8]	N/R	N/R	N/R	N/R	8 / 1.00	15 / 0.99	19 / 0.98	13 / 0.98	7 / 0.97	2 / 0.97	N/R	N/R	N/R	N/R
	7.94 [5/16]	15.88 [5/8]	N/R	68	60	57	8 / 1.00	15 / 0.99	23 / 0.98	30 / 0.98	28 / 0.97	27 / 0.97	25 / 0.96	24 / 0.96	22 / 0.95	21 / 0.94
	9.53 [3/8]	15.88 [5/8]	54	45	40	38	8 / 1.00	15 / 0.99	23 / 0.98	30 / 0.98	30 / 0.97	30 / 0.97	30 / 0.96	30 / 0.96	30 / 0.95	30 / 0.94
	6.35 [1/4]	19.05 [3/4]**	N/R	N/R	N/R	N/R	8 / 1.00	15 / 1.00	19 / 0.99	13 / 0.99	7 / 0.99	2 / 0.99	N/R	N/R	N/R	N/R
	7.94 [5/16]	19.05 [3/4]**	N/R	68	60	57	8 / 1.00	15 / 1.00	23 / 0.99	30 / 0.99	28 / 0.99	27 / 0.99	25 / 0.99	24 / 0.98	22 / 0.98	21 / 0.98
	9.53 [3/8]	19.05 [3/4]**	54	45	40	38	8 / 1.00	15 / 1.00	23 / 0.99	30 / 0.99	30 / 0.99	30 / 0.99	30 / 0.99	30 / 0.98	30 / 0.98	30 / 0.98
7.0 KW [2 Ton]	6.35 [1/4]	15.88 [5/8]	N/R	N/R	N/R	N/R	8 / 0.99	15 / 0.98	6 / 0.97	N/R	N/R	N/R	N/R	N/R	N/R	N/R
	7.94 [5/16]	15.88 [5/8]	74	59	53	53	8 / 0.99	15 / 0.98	23 / 0.97	27 / 0.96	23 / 0.95	21 / 0.94	19 / 0.93	16 / 0.92	14 / 0.91	11 / 0.90
	9.53 [3/8]	15.88 [5/8]	49	39	36	36	8 / 0.99	15 / 0.98	23 / 0.97	30 / 0.96	30 / 0.95	30 / 0.94	30 / 0.93	29 / 0.92	28 / 0.91	27 / 0.90
	6.35 [1/4]	19.05 [3/4]	N/R	N/R	N/R	N/R	8 / 1.00	15 / 1.00	6 / 0.99	N/R	N/R	N/R	N/R	N/R	N/R	N/R
	7.94 [5/16]	19.05 [3/4]	74	59	53	53	8 / 1.00	15 / 1.00	23 / 0.99	27 / 0.99	23 / 0.98	21 / 0.98	19 / 0.98	16 / 0.97	14 / 0.97	11 / 0.96
	9.53 [3/8]	19.05 [3/4]	49	39	36	36	8 / 1.00	15 / 1.00	23 / 0.99	30 / 0.99	30 / 0.98	30 / 0.98	30 / 0.98	29 / 0.97	28 / 0.97	27 / 0.96
8.8 KW [2.5 Ton]	7.94 [5/16]	15.88 [5/8]	N/R	N/R	34	34	8 / 0.99	15 / 0.98	23 / 0.96	21 / 0.94	18 / 0.93	15 / 0.91	11 / 0.90	N/R	N/R	N/R
	9.53 [3/8]	15.88 [5/8]	43	36	22	22	8 / 0.99	15 / 0.98	23 / 0.96	30 / 0.94	30 / 0.93	29 / 0.91	27 / 0.90	N/R	N/R	N/R
	7.94 [5/16]	19.05 [3/4]	65	53	34	34	8 / 1.00	15 / 0.99	23 / 0.99	21 / 0.98	18 / 0.98	15 / 0.97	11 / 0.96	8 / 0.96	4 / 0.95	N/R
	9.53 [3/8]	19.05 [3/4]	43	36	22	22	8 / 1.00	15 / 0.99	23 / 0.99	30 / 0.98	30 / 0.98	29 / 0.97	27 / 0.96	26 / 0.96	25 / 0.95	24 / 0.95
10.6 KW [3 Ton]	7.94 [5/16]	15.88 [5/8]	N/R	N/R	N/R	N/R	8 / 0.99	15 / 0.97	20 / 0.94	15 / 0.92	10 / 0.90	N/R	N/R	N/R	N/R	N/R
	9.53 [3/8]	15.88 [5/8]	33	26	27	25	8 / 0.99	15 / 0.97	23 / 0.94	29 / 0.92	27 / 0.90	N/R	N/R	N/R	N/R	N/R
	7.94 [5/16]	19.05 [3/4]	N/R	39	41	37	8 / 1.00	15 / 0.99	20 / 0.98	15 / 0.98	10 / 0.97	5 / 0.96	N/R	N/R	N/R	N/R
	9.53 [3/8]	19.05 [3/4]	33	26	27	25	8 / 1.00	15 / 0.99	23 / 0.98	29 / 0.98	27 / 0.97	26 / 0.96	24 / 0.95	22 / 0.94	20 / 0.93	19 / 0.93
	12.70 [1/2]	19.05 [3/4]	17	13	14	12	8 / 1.00	15 / 0.99	23 / 0.98	30 / 0.98	30 / 0.97	30 / 0.96	30 / 0.95	30 / 0.94	30 / 0.93	30 / 0.93
	7.94 [5/16]	22.23 [7/8]	N/R	39	41	37	8 / 1.00	15 / 1.00	20 / 1.00	15 / 0.99	10 / 0.99	5 / 0.99	N/R	N/R	N/R	N/R
	9.53 [3/8]	22.23 [7/8]	33	26	27	25	8 / 1.00	15 / 1.00	23 / 1.00	29 / 0.99	27 / 0.99	26 / 0.99	24 / 0.98	22 / 0.98	20 / 0.98	19 / 0.97
	12.70 [1/2]	22.23 [7/8]	17	13	14	12	8 / 1.00	15 / 1.00	23 / 1.00	30 / 0.99	30 / 0.99	30 / 0.99	30 / 0.98	30 / 0.98	30 / 0.98	30 / 0.97
12.3 KW [3.5 Ton]	9.53 [3/8]	19.05 [3/4]	46	31	23	23	8 / 0.99	15 / 0.98	23 / 0.97	27 / 0.96	24 / 0.95	22 / 0.94	20 / 0.92	17 / 0.91	15 / 0.90	N/R
	12.70 [1/2]	19.05 [3/4]	23	15	11	11	8 / 0.99	15 / 0.98	23 / 0.97	30 / 0.96	30 / 0.95	30 / 0.94	30 / 0.92	30 / 0.91	30 / 0.90	N/R
	9.53 [3/8]	22.23 [7/8]	46	31	23	23	8 / 1.00	15 / 1.00	23 / 0.99	27 / 0.99	24 / 0.99	22 / 0.98	20 / 0.97	17 / 0.97	15 / 0.96	13 / 0.96
	12.70 [1/2]	22.23 [7/8]	23	15	11	11	8 / 1.00	15 / 1.00	23 / 0.99	30 / 0.99	30 / 0.99	30 / 0.98	30 / 0.97	30 / 0.97	30 / 0.96	30 / 0.96

NOTES:
1. Do not exceed 61 meters linear line length.
2. *Do not exceed 30 meters vertical separation if outdoor unit is above indoor unit.
3. **19.05 mm [3/4 in.] suction line should only be used for 1.5 ton systems if outdoor unit is below or at same level as indoor to assure proper oil return.
4. Always use the smallest liquid line allowable to minimize refrigerant charge.
5. Applications shaded in light gray indicate capacity multipliers between 0.90 and 0.96 which are not recommended, but are allowed.
6. Applications shaded in dark gray are not recommended due to excessive liquid or suction pressure drop.

[ ] Designates Metric Conversions

Refrigerant Line Size Information (con't.)

13 - 16 SEER Single-Stage Air-Conditioners																
Unit Size	Allowable Liquid Line Size	Allowable Suction Line Size	Apply Long Line Guidelines if Linear Line Length Exceeds Those Shown Below (Feet)				Equivalent Length (Meters)									
							< 8	8-15	16-23	24-30	31-38	39-46	47-53	54-61	62-69	70-76
			(-)A13	(-)A14 A/B	(-)A14 W	(-)A16	Maximum Vertical Rise (Outdoor Unit Below Indoor Unit) * / Capacity Multiplier									
14.1 KW [4 Ton]	9.53 [3/8]	19.05 [3/4]	45	34	N/R	11	8 / 0.99	15 / 0.98	23 / 0.96	24 / 0.95	20 / 0.93	17 / 0.92	14 / 0.91	NR	NR	NR
	12.7 [1/2]	19.05 [3/4]	23	17	N/R	5	8 / 0.99	15 / 0.98	23 / 0.96	30 / 0.95	30 / 0.93	30 / 0.92	30 / 0.91	NR	NR	NR
	9.53 [3/8]	22.23 [7/8]	45	34	N/R	11	8 / 1.00	15 / 0.99	23 / 0.99	24 / 0.98	20 / 0.97	17 / 0.97	14 / 0.96	11 / 0.96	8 / 0.95	5 / 0.95
	12.7 [1/2]	22.23 [7/8]	23	17	N/R	5	8 / 1.00	15 / 0.99	23 / 0.99	30 / 0.98	30 / 0.97	30 / 0.97	30 / 0.96	30 / 0.96	30 / 0.95	30 / 0.95
17.6 KW [5 Ton]	9.53 [3/8]	19.05 [3/4]	24	17	N/R	0	8 / 0.99	15 / 0.97	23 / 0.94	19 / 0.92	14 / 0.90	NR	NR	NR	NR	NR
	12.7 [1/2]	19.05 [3/4]	12	8	N/R	0	8 / 0.99	15 / 0.97	23 / 0.94	30 / 0.92	30 / 0.90	NR	NR	NR	NR	NR
	9.53 [3/8]	22.23 [7/8]	24	17	N/R	0	8 / 1.00	15 / 0.99	23 / 0.98	19 / 0.97	14 / 0.96	10 / 0.95	5 / 0.94	NR	NR	NR
	12.7 [1/2]	22.23 [7/8]	12	8	N/R	0	8 / 1.00	15 / 0.99	23 / 0.98	30 / 0.97	30 /0.96	30 / 0.95	30 / 0.94	29 / 0.94	28 / 0.93	27 / 0.92
	9.53 [3/8]	28.58 [1-1/8]	24	17	N/R	0	8 / 1.01	15 / 1.01	23 / 1.00	19 / 1.00	14 / 0.99	10 / 0.99	5 / 0.99	NR	NR	NR
	12.7 [1/2]	28.58 [1-1/8]	12	8	N/R	0	8 / 1.01	15 / 1.01	23 / 1.00	30 / 1.00	30 / 0.99	30 / 0.99	30 / 0.99	29 / 0.99	28 / 0.99	27 / 0.98

NOTES:

1. Do not exceed 61 meters linear line length.
2. *Do not exceed 30 meters vertical separation if outdoor unit is above indoor unit.
3. **19.05 mm [3/4 in.] suction line should only be used for 1.5 ton systems if outdoor unit is below or at same level as indoor to assure proper oil return.
4. Always use the smallest liquid line allowable to minimize refrigerant charge.
5. Applications shaded in light gray indicate capacity multipliers between 0.90 and 0.96 which are not recommended, but are allowed.
6. Applications shaded in dark gray are not recommended due to excessive liquid or suction pressure drop.

[ ] Designates Metric Conversions

Performance Data @ AHRI Standard Conditions – Cooling

Tested Combination							
Outdoor Unit	**Indoor Coil**	**Total Capacity BTU/H [kW]**	**Net Sensible BTU/H [kW]**	**Net Latent BTU/H [kW]**	**SEER**	**EER**	**Indoor CFM [L/s]**
RA1418AJ1	RCF2417STA+RXMD-C04	17800 [5.2]	12100 [3.5]	5700 [1.7]	14.00	11.50	600 [283.2]
RA1424BJ1	RCF2417STA+RXMD-C04	23200 [6.8]	17500 [5.2]	5700 [1.7]	14.00	11.50	800 [376.0]
RA1430AJ1	RCF3617STA+RXMD-C04	28800 [8.4]	19500 [5.7]	9300 [2.7]	14.00	11.50	1000 [471.9]
RA1436AJ1	RCF3617STA+RXMD-C04	34200 [10.0]	23200 [6.8]	11000 [3.2]	14.00	11.50	1050 [495.5]
RA1436AC1	RCF3617STA+RXMD-C04	34200 [10.0]	23200 [6.8]	11000 [3.2]	14.00	11.50	1050 [495.5]
RA1436AD1	RCF3617STA+RXMD-C04	34200 [10.0]	23200 [6.8]	11000 [3.2]	14.00	11.50	1050 [495.5]
RA1442CJ1	RCF4821STA+RXMD-C04	39500 [11.6]	28900 [8.5]	10600 [3.1]	14.00	11.50	1350 [634.5]
RA1442CC1	RCF4821STA+RXMD-C04	39500 [11.6]	28900 [8.5]	10600 [3.1]	14.00	11.50	1350 [634.5]
RA1448AJ1	RCF4821STA+RXMD-C04	46000 [13.5]	31200 [9.1]	14800 [4.3]	14.00	11.70	1450 [684.3]
RA1448AC1	RCF4821STA+RXMD-C04	46000 [13.5]	31200 [9.1]	14800 [4.3]	14.00	11.70	1450 [684.3]
RA1448AD1	RCF4821STA+RXMD-C04	46000 [13.5]	31200 [9.1]	14800 [4.3]	14.00	11.70	1450 [684.3]
RA1460BJ1	RCF6024STA+RXMD-C04	55500 [16.3]	38100 [11.2]	17400 [5.1]	14.00	11.70	1525 [716.8]
RA1460AD1	RCF6024STA+RXMD-C04	55500 [16.3]	38100 [11.2]	17400 [5.1]	14.00	11.70	1525 [716.8]
RA1460BC1	RCF6024STA+RXMD-C04	55500 [16.3]	38100 [11.2]	17400 [5.1]	14.00	11.70	1525 [716.8]

Note: Additional ratings and system match ups can be accessed on MyRheem.com at: https://my.rheem.com/static/private/ahriresidential.html
Additional ratings and system match ups and downloadable ratings certificates can be accessed from the AHRI website: www.ahridirectory.org

[ ] Designates Metric Conversions

GUIDE SPECIFICATIONS

General

System Description

Outdoor-mounted, air-cooled, split-system air conditioner composite base pan unit suitable for ground or rooftop installation. Unit consists of a hermetic compressor, an air-cooled coil, propeller-type condenser fan, suction and legend line service valve, and a control box. Unit will discharge supply air upward as shown on contract drawings. Unit will be used in a refrigeration circuit to match up to a coil unit.

Quality Assurance

- — Unit will be rated in accordance with the latest edition of AHRI Standard 210.
- — Unit will be certified for capacity and efficiency, and listed in the latest AHRI directory.
- — Unit construction will comply with latest edition of ANSI/ASHRAE and with NEC.
- — Unit will be constructed in accordance with UL standards and will carry the UL label of approval. Unit will have c-UL-us approval.
- — Unit cabinet will be capable of withstanding ASTM B117 1000-hr salt spray test.
- — Air-cooled condenser coils will be leak tested at 150 psig and pressure tested at 550 psig.
- — Unit constructed in ISO9001 approved facility.

Delivery, Storage, and Handling

- — Unit will be shipped as single package only and is stored and handled per unit manufacturer's recommendations.

Warranty (for inclusion by specifying engineer) — U.S. and Canada only.

Products

Equipment

Factory assembled, single piece, air-cooled air conditioner unit. Contained within the unit enclosure is all factory wiring, piping, controls, compressor, refrigerant charge R-410A, and special features required prior to field start-up.

Unit Cabinet

- — Unit cabinet will be constructed of galvanized steel, bonderized, and coated with a powder coat paint.
- — All units constructed with louver coil protection and corner post. Louver can be removed by removing one fastener per louver panel.

AIR-COOLED, SPLIT-SYSTEM AIR CONDITIONER
RA14
1-1/2 TO 5 NOMINAL TONS

Fans

- — Condenser fan will be direct-drive propeller type, discharging air upward.
- — Condenser fan motors will be totally enclosed, 1-phase type with class B insulation and permanently lubricated bearings. Shafts will be corrosion resistant.
- — Fan blades will be statically and dynamically balanced.
- — Condenser fan openings will be equipped with coated steel wire safety guards.

Compressor

- — Compressor will be hermetically sealed.
- — Compressor will be mounted on rubber vibration isolators.

Condenser Coil

- — Condenser coil will be air cooled.
- — Coil will be constructed of aluminum fins mechanically bonded to copper tubes.

Refrigeration Components

- — Refrigeration circuit components will include liquid-line shutoff valve with sweat connections, vapor-line shutoff valve with sweat connections, system charge of R-410A refrigerant, and compressor oil.
- — Unit will be equipped with filter drier for R-410A refrigerant for field installation.

Operating Characteristics

- — The capacity of the unit will meet or exceed _____ Btuh at a suction temperature of _____ °F/°C. The power consumption at full load will not exceed _____ kW.
- — Combination of the unit and the evaporator or fan coil unit will have a total net cooling capacity of _____ Btuh or greater at conditions of _____ CFM entering air temperature at the evaporator at _____ °F/°C wet bulb and _____ °F/°C dry bulb, and air entering the unit at _____ °F/°C.
- — The system will have a SEER of _____ Btuh/watt or greater at DOE conditions.

Electrical Requirements

- — Nominal unit electrical characteristics will be _____ v, single phase, 60 hz. The unit will be capable of satisfactory operation within voltage limits of _____ v to _____ v.
- — Nominal unit electrical characteristics will be _____ v, three phase, 60 hz. The unit will be capable of satisfactory operation within voltage limits of _____ v to _____ v.
- — Unit electrical power will be single point connection.
- — Control circuit will be 24v.

Special Features

- — Refer to section of this literature identifying accessories and descriptions for specific features and available enhancements.

GENERAL TERMS OF LIMITED WARRANTY*

Rheem will furnish a replacement for any part of this product which fails in normal use and service within the applicable period stated, in accordance with the terms of the limited warranty.

***For complete details of the Limited and Conditional Warranties, including applicable terms and conditions, contact your local contractor or the Manufacturer for a copy of the product warranty certificate.**

Conditional Parts
(Registration Required) .....Ten (10) Years

The new degree of comfort.™

In keeping with its policy of continuous progress and product improvement, Rheem reserves the right to make changes without notice.

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INTEGRATED HOME COMFORT

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APPENDIX E

HVAC NOISE CALCULATIONS

HVAC Noise Calculations

Land Use	Direction	No. of Units	Reference Noise Level (dBA L_{eq})	Total Reference Noise Level (dBA L_{eq})	Reference Distance (ft)	Distance (ft)	Distance Attenuation	Shielding (dBA)	Noise Level (dBA L_{eq})	Composite Noise Level (dBA L_{eq})
Commercial	North	60	44.4	62.2	50	345.0	16.8	5	40.4	52.2
		20	44.4	57.4	50	445.0	19.0	5	33.4	
		60	44.4	62.2	50	225.0	13.1	5	44.1	
		20	44.4	57.4	50	125.0	8.0	5	44.4	
		40	44.4	60.4	50	105.0	6.4	5	49.0	
		20	44.4	57.4	50	210.0	12.5	5	39.9	
		54	44.4	61.7	50	470.0	19.5	5	37.2	
		40	44.4	60.4	50	535.0	20.6	5	34.8	
		40	44.4	60.4	50	545.0	20.7	5	34.7	
Commercial	East	60	44.4	62.2	50	310.0	15.8	5	41.4	50.8
		20	44.4	57.4	50	405.0	18.2	5	34.2	
		60	44.4	62.2	50	465.0	19.4	5	37.8	
		20	44.4	57.4	50	405.0	18.2	5	34.2	
		40	44.4	60.4	50	225.0	13.1	5	42.3	
		20	44.4	57.4	50	155.0	9.8	5	42.6	
		54	44.4	61.7	50	155.0	9.8	5	46.9	
		40	44.4	60.4	50	340.0	16.7	5	38.7	
		40	44.4	60.4	50	495.0	19.9	5	35.5	
Residential	South	60	44.4	62.2	50	390.0	17.8	5	39.4	49.5
		20	44.4	57.4	50	290.0	15.3	5	37.1	
		60	44.4	62.2	50	585.0	21.4	5	35.8	
		20	44.4	57.4	50	700.0	22.9	5	29.5	
		40	44.4	60.4	50	620.0	21.9	5	33.5	
		20	44.4	57.4	50	500.0	20.0	5	32.4	
		54	44.4	61.7	50	230.0	13.3	5	43.4	
		40	44.4	60.4	50	200.0	12.0	5	43.4	
		40	44.4	60.4	50	195.0	11.8	5	43.6	
Commercial	West	60	44.4	62.2	50	265.0	14.5	5	42.7	51.1
		20	44.4	57.4	50	215.0	12.7	5	39.7	
		60	44.4	62.2	50	160.0	10.1	5	47.1	
		20	44.4	57.4	50	285.0	15.1	5	37.3	
		40	44.4	60.4	50	350.0	16.9	5	38.5	
		20	44.4	57.4	50	395.0	18.0	5	34.4	
		54	44.4	61.7	50	490.0	19.8	5	36.9	
		40	44.4	60.4	50	340.0	16.7	5	38.7	
		40	44.4	60.4	50	200.0	12.0	5	43.4	

APPENDIX F

NOISE REDUCTION CALCULATION

Traffic Noise Reduction Calculation

Receptor No.	Land Use	Roadway	Building	Building Height (ft)	Wall Base Elevation	Recepter Base Elevation	Receptor Height (ft)	Source Base Elevation	Source Height (ft)	Source to Barrier Distance (ft)	Receptor to Source Distance (ft)	Receptor to Barrier Distance (ft)	d1	d2	d3	delta	N	Noise Reduction	Noise Reduction Applied to Noise Analysis
R-14	Recreation	Mission Grove Parkway	Building A	40	0	0	5	0	3	30	330	300	330.0061	302.0348	47.63402	19.66273	19.2384	17.1	17
R-14	Recreation	Mission Village Drive	Building A	40	0	0	5	0	3	30	113	83	113.0177	90.07774	47.63402	24.69407	24.16117	17.1	17