Appendix J

Noise Technical Report



Rocas Grandes II

Noise Technical Report

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1 Project Description and Impact Summary

1.1 Introduction

This study analyzes the potential noise and vibration impacts associated with the construction and operation of the proposed Rocas Grandes II project (hereafter referred to as proposed project or project) located in the City of Moreno Valley (City) in Riverside County (County), California. Rincon Consultants, Inc. (Rincon) prepared this study under contract to the project applicant Emri Group for the City of Moreno Valley in support of the environmental documentation being prepared pursuant to the California Environmental Quality Act (CEQA). Table 1 provides a summary of project impacts.

Table 1 Summary of Impacts

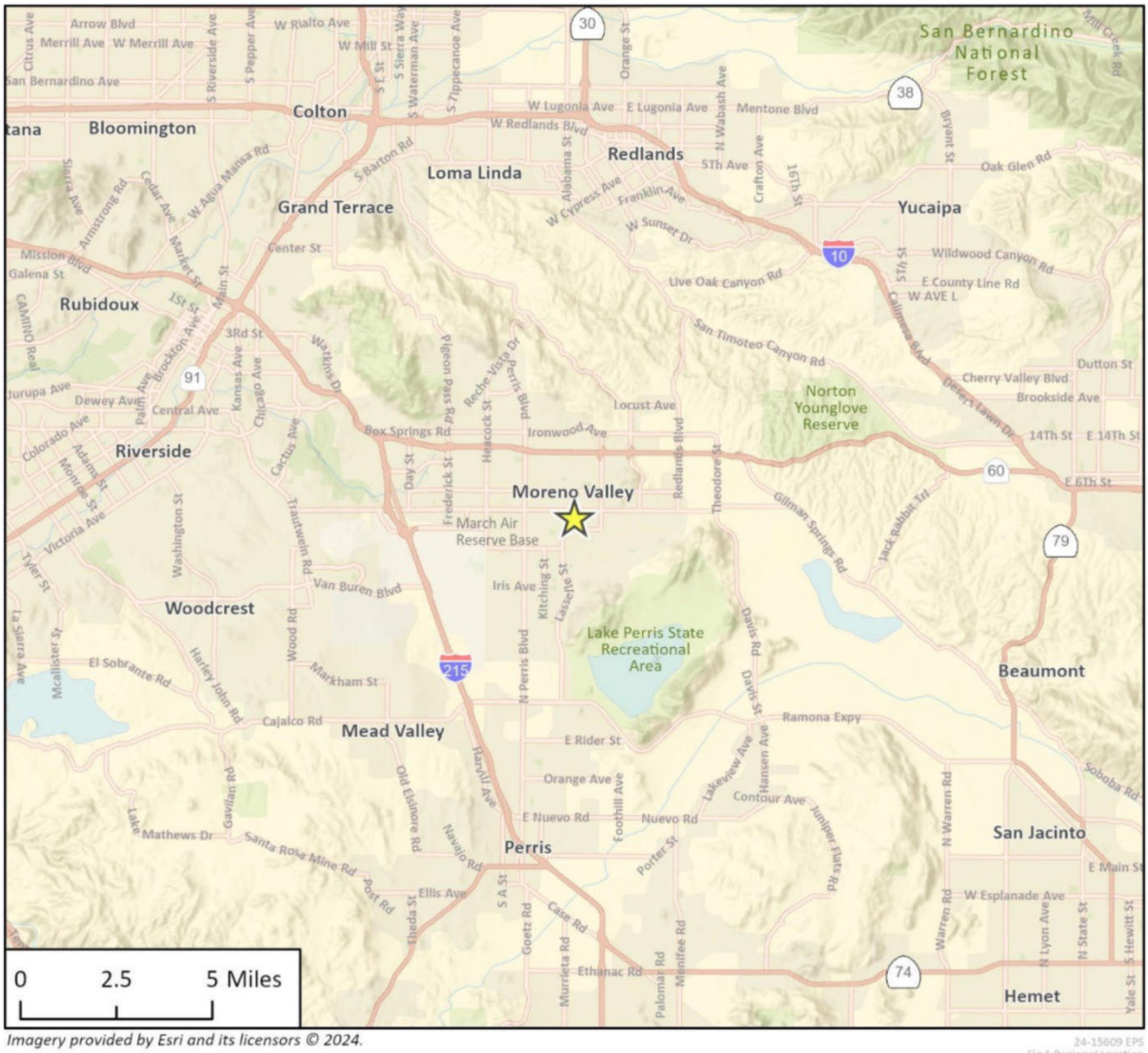
Impact Statements	Proposed Project's Level of Significance
Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	Less than significant impact
Would the project result in the exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	Less than significant impact
For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	No impact

1.2 Project Summary

Project Location

The project site encompasses approximately 20 acres in the City of Moreno Valley, located on an undeveloped and vacant lot comprised of Assessor's Parcel Numbers (APNs) 486-280-062 and 486-280-063. The project site is bounded to the north by Alessandro Boulevard, to the east by undeveloped and vacant land, to the south by the future extension of Brodiaea Avenue and undeveloped land, and to the west by Darwin Drive. Access to the site is currently available via an entrance off of Alessandro Boulevard at the northwest corner of the site. Figure 1 shows the regional location of the project site and Figure 2 depicts the project boundary.

Figure 1 Regional Project Location



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Fig 1 Regional Location

★ Project Location

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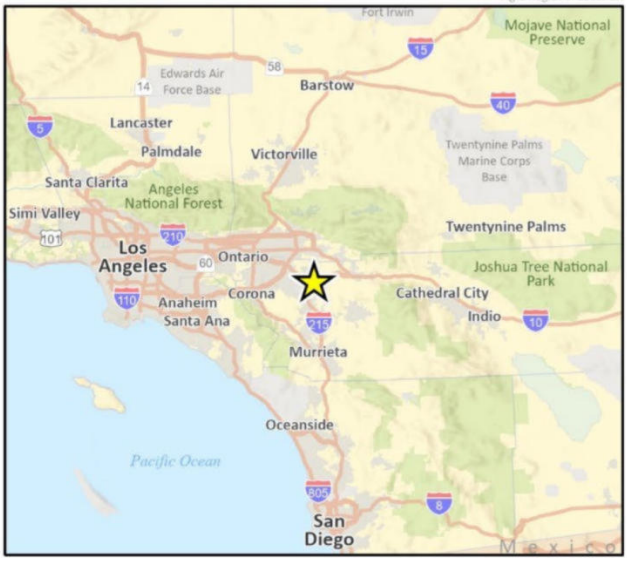
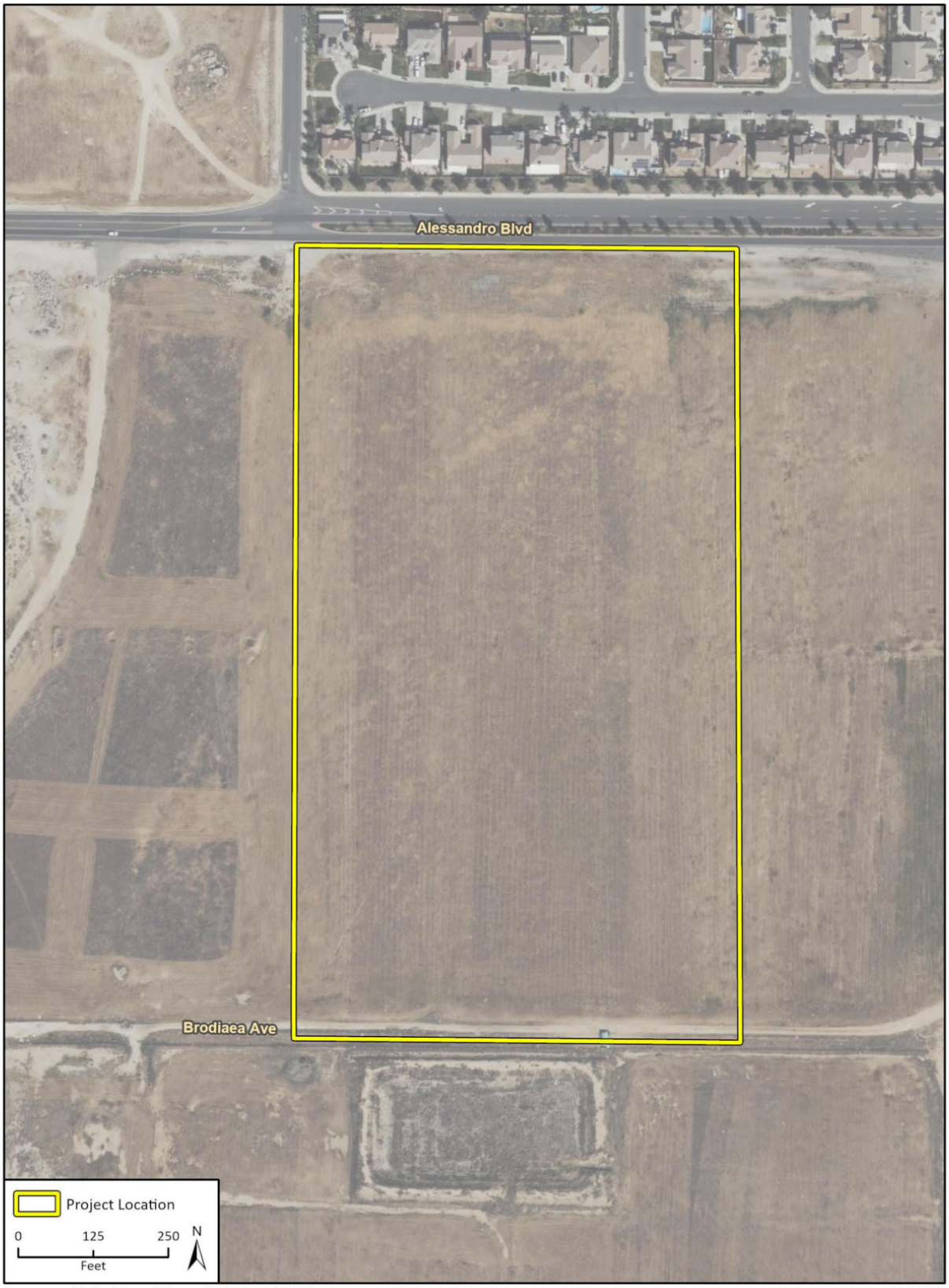


Figure 2 Project Site Boundary



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CRFig 2 Project Site

Project Description

The project would include the construction of a residential community consisting of 19 buildings containing a total of 460 residential units (80 townhome units and 380 residential stacked flats). All residential buildings would be three stories tall and would feature a private deck or patio. Onsite amenities include a recreational area with a clubhouse and co-work area, swimming pool and spa, fitness center and family room, a dog park, as well as additional common open spaces. Parking would be provided via garages, covered carports, and surface lots. The proposed site plan for the project is shown in Figure 3.

Construction

Construction activities would include grading, building construction, paving, and architectural coating. Construction of the project is anticipated to take approximately one year, beginning in March 2026 and ending in March 2027. Construction would primarily take place six days a week, occurring between the hours of 7:00 a.m. to 6:00 p.m. Mondays through Saturdays. No blasting or pile driving activities would be performed.

Figure 3 Conceptual Site Plan



Source: MJS Landscape Architects 2026

2 Background

2.1 Overview of Sound

Sound is a vibration that transmits through a medium (such as a gas, liquid, or solid) created by a moving or vibrating source, which is capable of being detected by the hearing organs. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired and may therefore be classified as a more specific group of sounds. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment (California Department of Transportation [Caltrans] 2013).

Noise levels are commonly measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels so that they are consistent with the human hearing response, which is most sensitive to frequencies around 4,000 hertz (Hz) and less sensitive to frequencies around and below 100 Hz (Kinsler, et al. 1999). Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used to measure earthquake magnitudes. A doubling of the energy of a noise source, such as the doubling of vehicle traffic volumes, results in a noise level increase of 3 dB, whereas dividing the energy in half results in a 3 dB decrease (Crocker 2007).

Human perception of noise has no simple correlation with sound energy, i.e., the perception of sound is not linear in terms of dBA or in terms of sound energy. Two sources, each containing the same sound energy, do not “sound twice as loud” as one source. It is widely accepted that the average healthy human ear can detect changes (either increases or decreases) of 3 dBA, which is recognized as being barely perceptible to most people. Similarly, a change of 5 dBA is readily perceptible and a change of 10 dBA sounds twice (or half) as loud (Crocker 2007).

The level and frequency content of sound change as it travels from the source to a receiver. The most obvious change is the decrease in level as the distance from the source increases. The manner by which sound is reduced with distance depends on factors such as the type of source (e.g., a point or line source), the path the sound travels, site conditions, and the presence of intervening structures or other obstacles. Noise from a point source (e.g., construction equipment, industrial machinery, ventilation units) typically is reduced at a rate of 6 dBA per each doubling of distance away from the source. Noise from a line source (e.g., roadway, pipeline, railroad) typically is reduced at a rate of 3 dBA per each doubling of distance away from the source (Caltrans 2013). The propagation of noise is also affected by the absorption characteristics of the ground: a hard site, such as a parking lot or smooth body of water, provides no absorption/attenuation and the changes in noise levels with distance result simply from the geometric spreading of the source (i.e., 3 or 6 dBA reduction per doubling of distance for a point source or line source, respectively). Conversely, a soft site, such as soft dirt, grass, or scattered bushes and trees, may provide additional absorption/attenuation, potentially reducing noise levels an additional 1.5 dBA per doubling of distance away from the source (Caltrans 2013). Noise levels may also be reduced by intervening structures. The amount of reduction provided by the “shielding” of these features depends on the size of the structure/s, the location of the structure/s relative to the noise source and receivers, and the frequency content of the noise levels. Natural terrain features, such as hills and dense woods, and man-made features, such as buildings and walls, can significantly alter noise levels. Generally, any large structure blocking the line of sight between a noise source and receiver will provide at

least a 5-dBA reduction in source noise levels at the receiver (Federal Highway Administration [FHWA] 2011). The presence of building structures can substantially reduce noise levels from the exterior to the interior as well. The FHWA's guidelines indicate that modern building construction generally provides an exterior-to-interior noise level reduction of 20 to 35 dBA with closed windows.

The impact of noise is not a function of loudness alone. The time of day at which noise occurs and the duration of the noise are also important factors when considering potential noise impacts. Most noise that lasts for more than a few seconds is variable in its amplitude, i.e., the noise level continuously fluctuates over time. Consequently, a variety of noise descriptors have been developed. One of the most frequently used noise metrics is the equivalent continuous sound level (L_{eq}), which considers both duration and the sound power level of the source. The L_{eq} is defined as the single steady A-weighted level equivalent to the same amount of energy as that contained in the actual fluctuating levels over time.

The sound level that is exceeded "n" percent of time during a given sample period in the percentile noise level (L_n). For example, the L_{50} level is the statistical indicator of the time-varying noise signal that is exceeded 50 percent of the time (during each sampling period); that is, half of the sampling time, the changing noise levels are above this value and half of the time they are below it. This is called the "median sound level." The L_{10} level, likewise, is the value that is exceeded 10 percent of the time (i.e., near the maximum) and this is often known as the "intrusive sound level." The L_{90} is the sound level exceeded 90 percent of the time and is often considered the "effective background level" or "residual noise level."

Noise that occurs at night tends to be more disturbing than that which occurs during the day. Community noise is usually measured using the Day-Night Average Level (L_{dn}), which is the 24-hour average noise level with a +10 dBA penalty for noise occurring during nighttime hours (10:00 p.m. to 7:00 a.m.) hours. It is also measured using the Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with a +5 dBA penalty for noise occurring during evening hours (7:00 p.m. to 10:00 p.m.) and a +10 dBA penalty for noise occurring during nighttime hours (10:00 p.m. to 7:00 a.m.) (Caltrans 2013). Noise levels described by the L_{dn} and CNEL usually differ by about 1 dBA. The relationship between the peak-hour L_{eq} value and the L_{dn}/CNEL depends on the distribution of traffic during the day, evening, and night.

2.2 Overview of Vibration

Groundborne vibration of concern in environmental analysis consists of the oscillatory waves that move from a source through the ground to adjacent structures. The number of cycles per second of oscillation makes up the vibration frequency, described in terms of Hz. The frequency of a vibrating object describes how rapidly it oscillates. The normal frequency range of most groundborne vibration that can be felt by the human body ranges between less than 1 Hz to 200 Hz (Crocker 2007).

While people have varying sensitivities to vibrations at different frequencies, in general they are most sensitive to low-frequency vibration. Vibration in buildings, such as that from nearby construction activities, may cause windows, items on shelves, and pictures on walls to rattle. Vibration of building components can also take the form of an audible low-frequency rumbling noise, referred to as groundborne noise. Groundborne noise is usually only a problem when the originating vibration spectrum is dominated by frequencies in the upper end of the range (60 to 200 Hz), or when foundations or utilities, such as sewer and water pipes, physically connect the structure and the vibration source (FTA 2018). Although groundborne vibration is sometimes

noticeable in outdoor environments, it is almost never annoying to people who are outdoors. The primary concern of vibration is that it can be intrusive and annoying to building occupants and vibration-sensitive land uses.

Vibration amplitudes are usually expressed in peak particle velocity (PPV), or root mean squared (RMS) vibration velocity. The PPV and RMS velocity are normally described in inches per second (in/sec). PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is often used in monitoring of blasting vibration because it is related to the stresses that are experienced by buildings (Caltrans 2020).

2.3 Sensitive Receptors

Noise exposure thresholds for various types of land uses reflect the varying noise sensitivities associated with those uses. The City of Moreno Valley 2006 General Plan identifies schools, hospitals, churches, and residential (single- and multi-family) uses as sensitive uses within the City (City of Moreno Valley 2006).

Sensitive receptors in the vicinity of the project site include single-family residences to the north across from Alessandro Boulevard; single-family residences, the Valley Christian Academy, and Country Squires Mobile Estates mobile home park to the east; the Riverside University Health System Medical Center to the southeast; the Villa Annette Apartments to the south; and multifamily residential buildings currently under construction on the adjacent parcel of land to the west.

2.4 Project Noise Setting

Onsite Noise Measurements

The most prominent source of noise in the project site vicinity is vehicular traffic on nearby roadways (primarily Alessandro Boulevard, Darwin Drive, and Lasselle Street). To characterize ambient noise levels in the project vicinity, two short-term (15-minute) noise level measurements were conducted on February 11, 2025. Approximate noise measurement locations are shown in Figure 4. Short-term noise measurement 1 (ST 1) was conducted along the western project boundary to capture noise levels attributable to Darwin Drive and Lasselle Street, while ST 2 was conducted along the northern project site boundary to capture noise levels attributable to Alessandro Boulevard.

Table 2 summarizes the results of the short-term noise measurements and Table 3 lists the recorded traffic volumes observed during the short-term noise measurements.

Table 2 Noise Measurement Results

Measurement Location	Location Description	Sample Times[1]	Approximate Distance to Primary Noise Source	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)
ST 1	At western project site boundary along Darwin Drive	11:38 – 11:53 a.m.	Approximately 45 feet from centerline of Darwin Drive	46.0	37.0	66.9
ST 2	At northern project site boundary along Alessandro Boulevard	12:03 – 12:18 p.m.	Approximately 40 feet from centerline of Alessandro Boulevard eastbound travel lane	62.9	39.9	79.3

dBA = A-weighted decibels; L_{eq} = equivalent continuous sound level; L_{min} = minimum sound level, L_{max} = maximum sound level

[1] All short-term measurements were collected on February 11, 2025.

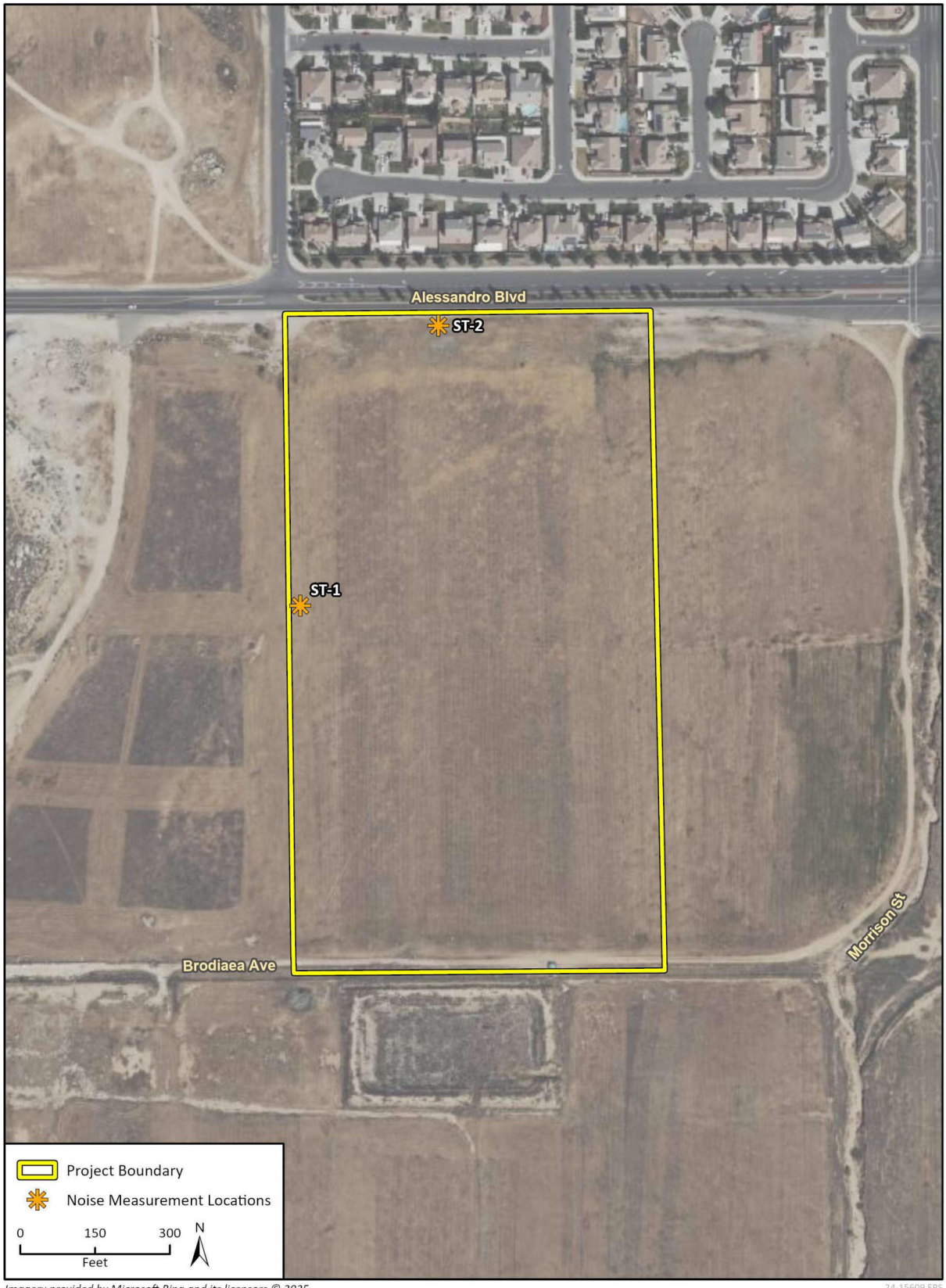
Approximate noise measurement locations shown in Figure 4. Detailed sound level measurement data are included in Appendix A.

Table 3 Traffic Counts Collected During Noise Measurements

Measurement Location	Roadway	Traffic Count Metric	Traffic Counts (Number of Vehicles)		
			Autos	Medium Trucks	Heavy Trucks
ST 1	Darwin Drive	15-minute count	5	0	0
		One-hour equivalent	20	0	0
Percent			**100%**	**0%**	**0%**
ST 2	Alessandro Boulevard	15-minute count	107	2	2
		One-hour equivalent	428	8	8
Percent			**96%**	**2%**	**2%**

Approximate noise measurement locations shown in Figure 4. Field notes and traffic counts collected during noise measurements are included in Appendix A.

Figure 4 Approximate Noise Measurement Locations



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Fig X Noise Measurement Locations

City of Moreno Valley General Plan Noise Contours

The City of Moreno Valley General Plan (GP) Safety Element (City of Moreno Valley 2006) presents roadway noise contours throughout the City. These contours were referenced to establish the noise environment at the project site in terms of CNEL. Based on the buildout noise contours shown in Figure 6-2 of the Safety Element, noise levels at the project site range between 60 and 65 dBA CNEL.

2.5 Regulatory Setting

Federal

Federal Transit Administration Transit Noise and Vibration Impact Assessment Manual

The Federal Transit Administration (FTA) provides reasonable criteria for assessing construction noise and vibration impacts based on the potential for adverse community reaction in the *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018). The *Transit Noise and Vibration Impact Assessment Manual* specifies a daytime noise threshold of 80 dBA L_{eq} for an 8-hour period at residential land uses and a vibration threshold of 0.2 in/sec PPV at which potential minor architectural damage may occur to structures of typical construction.

State

California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires each county and city to adopt a General Plan that includes a Noise Element prepared per guidelines adopted by the Governor's Office of Planning and Research. The purpose of the Noise Element is to limit the exposure of the community to excessive noise levels. CEQA requires all known environmental effects of a project to be analyzed, including environmental noise impacts.

2022 California Building Code

The California Building Code is Title 24 of the California Code of Regulations. The 2022 California Building Code Part 2, Volume 1, Chapter 12, Section 1206.4, *Allowable interior noise levels*, requires that interior noise levels attributable to exterior sources shall not exceed 45 dB in any habitable room. The noise metric is evaluated as either the L_{dn} or the CNEL, consistent with the noise element of the local general plan.

Local

City of Moreno Valley General Plan Safety Element

The City of Moreno Valley 2006 GP Safety Element contains goals, objectives, and policies that aim to protect the City from natural and man-made hazards, including noise. Relative to the Rocas Grandes II project, relevant goals and policies identified in the Safety Element of the Moreno Valley 2006 GP are as follows:

Objective 6.3: Provide noise compatible land use relationships by establishing noise standards utilized for design and siting purposes.

Policy 6.3.1: The following uses shall require mitigation to reduce noise exposure where current or future exterior noise levels exceed 20 CNEL above the desired interior noise level:

a. Single and multiple family residential buildings shall achieve an interior noise level of 45 CNEL or less. Such buildings shall include sound-insulating windows, walls, roofs and ventilation systems. Sound barriers shall also be installed (e.g., masonry walls or walls with berms) between single-family residences and major roadways.

Policy 6.3.2: Discourage residential uses where current or projected exterior noise due to aircraft overflights will exceed 65 CNEL.

Policy 6.3.5: Enforce the California Administrative Code, Title 24 noise insulation standards for new multi-family housing developments, motels and hotels.

Policy 6.3.6: Building shall be limited in areas of sensitive receptors.

Objective 6.4: Review noise issues during the planning process and require noise attenuation measures to minimize acoustic impacts to existing and future surrounding land uses.

Policy 6.4.1: Site, landscape and architectural design features shall be encouraged to mitigate noise impacts for new developments, with a preference for noise barriers that avoid freeway sound barrier walls.

Objective 6.5: Minimize noise impacts from significant noise generators such as, but not limited to, motor vehicles, trains, aircraft, commercial, industrial, construction, and other activities.

Policy 6.5.1: Construction activities shall be operated in a manner that limits noise impacts on surrounding uses.

City of Moreno Valley Municipal Code

Chapter 11.80 of the City of Moreno Valley Municipal Code (MVMC) sets forth the City's noise standards for the purposes of securing and promoting the public health, safety, welfare, and quality of life of the City and its inhabitants. Section 11.008.030 specifies that "[n]o person shall maintain, create, operate or cause to be operated on private property any source of sound in such a manner as to create any non-impulsive sound which exceeds the limits set forth for the source land use category in [Table 4] when measured at a distance of 200 feet or more from the real property line of the source of the sound, if the sound occurs on privately owned property, or from the source of the sound, if the sound occurs on public right-of-way, public space or other publicly owned property" (City of Moreno Valley 2024).

Table 4 Maximum Sound Levels (in dBA) for Source Land Uses

Residential		Commercial	
Daytime[1]	Nighttime[2]	Daytime[1]	Nighttime[2]
60	55	65	60

[1] Daytime hours are between 8:00 a.m. and 10:00 p.m. on the same day.

[2] Nighttime hours are between 10:01 p.m. and 7:59 a.m. the following day.

Source: City of Moreno Valley Municipal Code, Section 11.80.030, Table 11.80.030-2.

In addition, Section 11.80.030 contains regulations regarding construction and demolition activities, prohibiting "the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between the hours of 8:00 p.m. and 7:00 a.m. the following day such that the sound there from creates a noise disturbance, except for emergency work by public service utilities or for other work approved by the city manager or designee" (City of Moreno Valley 2024).

Chapter 9.10 of the MVMC specifies performance standards for proposed development projects that may impact surrounding land uses. Section 9.10.170 states that "[n]o vibration shall be permitted which can be felt at or beyond the property line" (City of Moreno Valley 2024).

3 Methodology and Significance Thresholds

3.1 Methodology

Construction Noise

Construction noise was estimated using the FHWA Roadway Construction Noise Model (RCNM) (FHWA 2006). RCNM predicts construction noise levels for a variety of construction operations based on empirical data and the application of acoustical propagation formulas. Using RCNM, construction noise levels were estimated at noise-sensitive receptors near the project site. RCNM provides reference noise levels for standard construction equipment, with an attenuation rate of 6 dBA per doubling of distance for stationary equipment.

Variation in power imposes additional complexity in characterizing the noise source level from construction equipment. Power variation is accounted for by describing the noise at a reference distance from the equipment operating at full power and adjusting it based on the duty cycle of the activity to determine the L_{eq} of the operation (FHWA 2006). Each phase of construction has a specific equipment mix, depending on the work to be accomplished during that phase. Each phase also has its own noise characteristics; some have higher continuous noise levels than others, and some have more instantaneous, high-impact noise levels.

Construction activity would result in temporary noise in the project area, exposing surrounding sensitive receptors to increased noise levels. The project would involve grading, building construction, paving, and architectural coating phases. Construction noise would typically be higher during the heavier periods of initial construction (i.e., grading) and would be lower during the later construction phases (i.e., architectural coating). Construction activities that involve excavation and moving soil, such as site preparation and grading, typically produce the highest noise levels. Construction equipment is typically dispersed in various areas of the site, with only a limited amount of equipment operating near a given location at a particular time. The FTA *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018) document recommends evaluating construction noise impacts from the center of the construction site, stating that the distance variable in its recommended construction noise calculation “assumes that all equipment operates at the center of the project.” To present a conservative analysis, construction noise impacts were evaluated from the approximate center of each multifamily building footprint. Based on this assumption, construction may occur as close as approximately 200 feet from the residences under construction to the west of the project site and 250 feet from the existing residences to the north of the project site. Noise levels generated during each phase of construction were modeled in RCNM based on the construction equipment assumptions approved by the project applicant.

Additionally, construction activities would only be permitted to occur between the hours of 7:00 a.m. and 8:00 p.m. pursuant to Section 11.80.030 of the MVMC.

Construction Vibration

The project does not include any substantial vibration sources associated with operation. Thus, construction activities have the greatest potential to generate ground-borne vibration affecting nearby receptors, especially during grading and paving of the project site. The greatest vibratory

sources expected during construction of the project would be large earthmoving equipment (such as an excavator, dozer, grader, and backhoe) used for earthmoving activities and a vibratory roller used for paving activities. Neither blasting nor pile driving would be required for construction of the project. Construction vibration impacts are calculated based on typical vibration levels reported by the FTA for these equipment types, which are shown in Table 5 (FTA 2018).

Table 5 Typical Vibration Levels Measured during Construction Activities

Equipment	PPV at 25 feet (in/sec)
Vibratory Roller	0.21
Large Earthmoving Equipment[1] (Excavator, Dozer, Grader, or Backhoe)	0.089
Loaded Trucks	0.076
Small Bulldozer	0.003

PPV = peak particle velocity; in/sec = inches per second

[1] "Large earthmoving equipment" represents offroad equipment rated at 100 horsepower (hp) or more.

Source: FTA 2018

Operational Noise

Onsite Stationary Noise Sources

The primary onsite noise sources associated with the project during operation would be rooftop heating, ventilation, and air conditioning (HVAC) equipment and the dog park. The project is expected to generate other sources typical of residential development, including landscape maintenance, low-speed traffic on internal roadways, and the pool area; however, these other sources would be intermittent and considered typical of noise generated by neighboring residential land uses. Therefore, noise from these sources would not substantially contribute to overall ambient noise levels in the project vicinity and are not considered in this analysis.

HVAC units with the potential to generate the highest levels of noise at offsite sensitive receptors would be those situated on the rooftop of the stacked flats buildings located along the western project boundary. Each stacked flats building would contain 38 residential units, therefore it was assumed that up to 38 HVAC units would be located on the rooftop of each stacked flats building (i.e., one HVAC unit was assumed to serve each residential unit). The locations of rooftop HVAC units are not known, however were assumed to be distributed evenly across the rooftop; therefore, the noise levels generated by HVAC units would collectively emit from the approximate center of the rooftop. It was conservatively assumed that all units would be operating continuously and simultaneously. This analysis assumes the use of a typical HVAC system for a multi-family residential building, which is a 2.5-ton Carrier 24ABA4030 air conditioner with Puron refrigerant. Manufacturer's specifications (included as Appendix C) indicate this unit has a sound power level of 76 dBA, which results in a sound pressure level of approximately 68 dBA at three feet from the unit. Noise levels associated with rooftop HVAC equipment were calculated at the nearest project property line based on the horizontal and vertical distances.

The proposed project would include a dog park area located near the southwest corner of the site, west of the leasing office building. The dog park would be situated approximately 130 feet from the western property line and just south of Building 15. Noise levels associated with the proposed dog park were based on reference data collected previously for noise studies conducted according to CEQA guidelines. Based on previous noise measurement data, use of dog parks generated noise

levels up to approximately 58 dBA L_{eq} at a distance of 25 feet when between 5 and 11 dogs were present (GEPermit 2019).

Offsite Mobile Noise Sources

Once operational, the proposed project would introduce additional offsite vehicle trips on nearby roadways – primarily Alessandro Boulevard – due to residents, visitors, and workers traveling to and from the site, which would result in an increase in traffic noise. Existing and project-generated traffic counts were obtained from the Traffic Impact Analysis prepared for the proposed project (Translutions, Inc. 2024) and were assumed to occur primarily on Alessandro Boulevard. Existing, project, and combined daily traffic volumes used in this analysis are shown in Table 6.

Table 6 Existing, Project, and Combined Roadway ADT Volumes

Roadway	Segment	Existing Daily Volume	Project Daily Trip Generation	Existing Daily Volume + Project Daily Trip Distribution
Alessandro Boulevard	Between Darwin Drive and Morrison Street	10,151	3,100	13,251

Source: Translutions, Inc. 2024.

To assess the increase in ambient noise levels at receptors along Alessandro Boulevard, the following formula was used:

$$Traffic\ Noise\ Increase = 10 * LOG(\frac{Existing + Project - Generated\ Traffic\ Volume}{Existing\ Traffic\ Volume})$$

3.2 Significance Thresholds

Appendix G of the CEQA Guidelines states noise impacts of the project would be significant if the project would:

a) Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
b) Generate excessive groundborne vibration or groundborne noise levels.
c) For a project located within the vicinity of a private airstrip or an airport or public use airport, expose people residing or working in the project area to excessive noise levels.

Construction Noise

As described previously in Section 0, the MVMC prohibits construction between 8:00 p.m. and 7:00 a.m. the following day. Therefore, if project construction occurs during these prohibited hours, a significant impact would be identified.

Because the City does not have quantitative noise limits for assessing construction noise impacts, the criteria established by the FTA in the *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018) for assessing construction noise impacts were used. These noise limits are presented below in Table 7. Based on the FTA criteria shown in Table 7, a significant impact would occur if project-generated construction noise exceeds 80 dBA L_{eq} noise limit at the nearest residential land uses in the vicinity of the project site.

Table 7 FTA Construction Noise Criteria

	L_{eq}, Equip (8 hr), dBA	
Land Use	**Day (7:00 a.m. to 10:00 p.m.)**	**Night (10:00 p.m. to 7:00 a.m.)**
Residential	80	70
Commercial	85	85
Industrial	90	90

Source: FTA 2018, Table 7-3.

Construction Vibration

The City of Moreno Valley has not adopted quantitative thresholds for assessment of construction vibration impacts, therefore, the vibration criteria established in *The Transit Noise and Vibration Assessment Manual* (FTA 2018) were used to evaluate potential construction vibration impacts related to potential damage of surrounding buildings. These thresholds are presented below in Table 8. As shown in Table 8, vibration impacts from construction of the project would be significant if vibration levels exceed 0.2 in/sec PPV at nearby residential structures. This is the limit where minor cosmetic (i.e., non-structural) damage may occur to these buildings and represents a conservative analysis of potential vibration impacts.

Table 8 Criteria for Vibration Damage Potential

Building Category	PPV (in/sec)
I. Reinforced concrete, steel, or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Nonengineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

in/sec = inches per second; PPV = peak particle velocity

Source: FTA 2018

Operational Noise

Noise generated by operation of the project is governed by the exterior noise standards stated in the MVMC (shown in Table 4). These limits are 60 dBA during daytime hours (8:00 a.m. to 10:00 p.m. the same day) and 55 dBA during nighttime hours (10:01 p.m. to 7:59 a.m. the following day). To present a conservative analysis, a significant impact would occur if noise levels generated by the project's onsite stationary operational sources (e.g., dog park, HVAC equipment) exceed these noise limits at nearby receiving property lines.

Off-Site Traffic Noise

A project would typically result in a permanent noise impact if its implementation would substantially increase the ambient noise levels above a certain threshold for adjoining areas (i.e., cause a noise level increase due to an increased number of project-related vehicle trips on surrounding roadways). The following thresholds of significance, similar to those recommended by the Federal Aviation Administration (FAA) (FAA 2020), are used to assess traffic noise impacts at sensitive receptor locations. A significant impact would occur if traffic noise were to increase the existing noise environment by the following:

- 1.5 dBA or more for ambient noise environments of 65 dBA CNEL and higher.
- 3 dBA or more for ambient noise environments of 60 to 64 CNEL.
- 5 dBA or more for ambient noise environments of less than 60 dBA CNEL.

As discussed in Section 2.4, the existing noise level at the project site ranges between approximately 60 and 65 dBA CNEL. Therefore, off-site traffic noise impacts associated with the proposed project would be considered significant if they were to increase the ambient noise environment by 1.5 dBA CNEL or more.

On-Site Land Use Compatibility

As a result of the Supreme Court decision regarding the assessment of the environment's impacts on projects (*California Building Industry Association (CBIA) v. Bay Area Air Quality Management District (BAAQMD)*, 62 Cal. 4th 369 (No. S 213478) issued December 17, 2015), it is generally no longer the purview of the CEQA process to evaluate the impact of existing environmental conditions on any given project. As a result, while the noise from existing sources (e.g., adjacent roadways) is taken into account as part of the baseline condition, the direct effects of exterior noise from nearby noise sources relative to land use compatibility of a proposed project is typically no longer a required topic for impact evaluation under CEQA. Generally, no determination of significance is required except for certain school projects, projects affected by airport noise, and projects that would exacerbate existing conditions (i.e., projects that would have a significant operational impact).

4 Impact Analysis

Threshold 1:	Would the project expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Impact N-1 CONSTRUCTION ACTIVITIES WOULD TEMPORARILY INCREASE NOISE LEVELS AT NEARBY SENSITIVE RECEPTORS; HOWEVER, CONSTRUCTION NOISE LEVELS WOULD NOT EXCEED APPLICABLE THRESHOLDS. SIMILARLY, OPERATIONAL NOISE LEVELS ASSOCIATED WITH THE PROPOSED PROJECT WOULD NOT EXCEED CITY NOISE THRESHOLDS. CONSTRUCTION AND OPERATIONAL NOISE IMPACTS ASSOCIATED WITH THE PROJECT WOULD BE LESS THAN SIGNIFICANT.

Construction

Following the methodology discussed in Section 3.1, construction noise levels were estimated at nearby sensitive receptors during each phase of construction. Table 9 presents the expected noise levels at the closest sensitive receptors during each phase of construction.

Table 9 Estimated Construction Noise Levels at Sensitive Receptors by Phase

	dBA L_{eq} (8-hour)				
Construction Phase	**RCNM Reference Noise Level**	**Residences under Construction to the West**	**Existing Residences to the North**	**Existing Residences to the Southwest**	**Riverside University Health System Medical Center to the Southeast**
Distance (feet)	**50**	**200**	**250**	**1,120**	**2,100**
Grading	87[1]	75	73	60	55
Building Construction	85[2]	73	71	58	53
Architectural Coating	87[3]	74	73	59	54
Paving	79[4]	67	65	52	47

dBA = A-weighted decibel; L_{eq} = equivalent continuous sound level; RCNM = Roadway Construction Noise Model

Numbers in bold would exceed the FTA construction noise threshold.

[1] Grading phase reference noise level was calculated based on simultaneous operation of an excavator, grader, dozer, scraper, and backhoe.

[2] Building Construction phase reference noise level was calculated based on simultaneous operation of a crane, forklift, generator, backhoe, tractor, and welder.

[3] Architectural Coating phase reference noise level was calculated based on simultaneous operation of two pavers and two rollers.

[4] Paving phase reference noise level was calculated based on simultaneous operation of two air compressors.

See Appendix B for construction noise modeling outputs.

As shown in Table 9, construction noise levels generated during all phases of construction would not exceed the FTA's threshold of 80 dBA L_{eq} (8-hour) at sensitive receptors nearest to the project site. Therefore, temporary noise impacts associated with construction of the project would be less than significant.

Operation

Onsite Stationary Noise Sources

HVAC Equipment

Following the methodology discussed in Section 3.1, noise levels associated with the project's rooftop HVAC equipment were estimated based on the horizontal and vertical distances from the equipment to the nearest project property line. Assuming that noise generated by rooftop HVAC units would collectively emit from the center of the rooftop, noise levels at the western property line generated by 38 HVAC units would be approximately 50 dBA. Noise levels would continue to decrease with distance from the HVAC units and would be even lower at sensitive receptors located even farther away. Note that this is a conservative analysis because it does not account for acoustical shielding provided by the rooftop parapet walls or from the rooftop edge blocking the line of sight between the HVAC equipment and nearby sensitive receptors. Therefore, noise generated by HVAC equipment would not exceed the City's daytime or nighttime noise limits of 60 or 55 dBA, respectively, at the nearest sensitive receptors and noise impacts associated with the proposed project's HVAC equipment would be less than significant.

Dog Park

The dog park would be situated approximately 130 feet from the western property line and just south of Building 15. Based on reference noise measurement data discussed in Section 3.1, dog parks generate noise levels up to approximately 58 dBA L_{eq} at a distance of 25 feet. At a distance of 130 feet, noise levels associated with the proposed dog park would attenuate to approximately 44 dBA L_{eq}. This noise level would continue to decrease with distance and would be further reduced at other offsite sensitive receptors. Therefore, noise associated with the proposed project's dog park would not exceed the City's daytime or nighttime noise limits of 60 or 55 dBA, respectively, at nearby sensitive receptors, and noise impacts associated with the proposed project's dog park would be less than significant.

Combined Onsite Stationary Noise Impacts

The project's onsite stationary noise sources may operate simultaneously and combine to increase operational noise levels at nearby sensitive receptors. To account for this, the combined noise levels from operation of HVAC equipment and use of the dog park were calculated at the nearest project property line. It is assumed that the dog park would be used only during daytime hours, while HVAC units may operate during both daytime and nighttime hours; therefore, combined operation of the project's onsite stationary noise sources would occur only during daytime hours. When accounting for the simultaneous operation of all rooftop HVAC units atop one stacked flats building and use of the dog park, the combined noise level at the nearest project property line to the west would be approximately 51 dBA, which would not exceed the City's daytime noise limit of 60 dBA. Combined operational noise impacts associated with the project's onsite stationary noise sources would be less than significant.

Offsite Mobile Noise Sources

VEHICLE TRAFFIC NOISE

The project is not expected to substantially change the vehicle classification mix on surrounding roadways; therefore, the primary factor affecting off-site noise levels would be increased traffic volumes, assumed to occur primarily on Alessandro Boulevard. The project is anticipated to generate 3,100 new daily vehicle trips according to the Traffic Impact Analysis prepared for the project (Translutions, Inc. 2024). As shown previously in Table 6, the daily traffic volume on Alessandro Boulevard would increase from 10,151 vehicles to 13,251 vehicles due to project-generated traffic. This increase in traffic on Alessandro Boulevard would result in a noise increase of approximately 1.2 dBA CNEL, which would not exceed the significance threshold of 1.5 dBA CNEL identified in Section 3.2. Therefore, traffic noise impacts associated with the proposed project would be less than significant.

Mitigation Measures

No mitigation measures would be required.

Threshold 2:	Would the project result in generation of excessive groundborne vibration or groundborne noise levels?

Impact N-2 VIBRATION LEVELS GENERATED DURING CONSTRUCTION OF THE PROPOSED PROJECT WOULD NOT EXCEED APPLICABLE THRESHOLDS AT NEARBY OFFSITE STRUCTURES. ADDITIONALLY, OPERATION OF THE PROJECT WOULD NOT INCLUDE ANY SUBSTANTIAL SOURCES OF VIBRATION. THEREFORE, VIBRATION IMPACTS WOULD BE LESS THAN SIGNIFICANT.

Construction

The greatest anticipated sources of vibration during project construction would be large offroad equipment (such as an excavator, dozer, grader, and backhoe) for earthmoving activities and a vibratory roller used during paving activities. Based on the site plan, earthmoving activities may occur as close as 75 feet from the nearest offsite structures (i.e., multifamily residences under construction to the west), while paving activities may occur as close as 115 feet from the nearest offsite structure (i.e., multifamily residences under construction to the west). Large offroad equipment typically generates vibration levels up to 0.089 in/sec PPV at a reference distance of 25 feet, while a vibratory roller generates a vibration level of approximately 0.21 in/sec PPV at a distance of 25 feet (FTA 2018).

At a distance of 75 feet, large earthmoving equipment would generate a vibration level of 0.017 in/sec PPV, which would not exceed the FTA's recommended threshold of 0.2 in/sec PPV. At a distance of 115 feet, a vibratory roller would generate a vibration level of 0.021 in/sec PPV, which would also not exceed the FTA's threshold of 0.2 in/sec PPV. Therefore, temporary vibration impacts associated with construction of the proposed project would not exceed applicable thresholds and would be less than significant.

Operation

Operation of the proposed project would not include any substantial vibration sources (e.g., rail operations, heavy truck movements, industrial operations, etc.). Therefore, operational vibration impacts would be less than significant.

Mitigation Measures

No mitigation measures would be required.

Threshold 3:	For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

Impact N-3 THE PROJECT IS NOT LOCATED WITHIN THE VICINITY OF A PRIVATE AIRSTRIP OR AN AIRPORT INFLUENCE AREA. THE PROJECT SITE IS NOT LOCATED WITHIN THE NOISE CONTOURS OF THE NEAREST AIRPORT (MARCH AIR RESERVE BASE/INLAND PORT AIRPORT). THEREFORE, THE PROJECT WOULD NOT EXPOSE PEOPLE RESIDING OR WORKING IN THE PROJECT AREA TO EXCESSIVE AVIATION-RELATED NOISE LEVELS AND THE PROJECT WOULD HAVE NO IMPACT.

The project site is not located within an airport land use plan, or within two miles of a public or private airport. The closest airport is the March Air Reserve Base/Inland Port Airport (RIV), which is located approximately three and a half miles southwest of the project site. The project site is not located within the noise contours of this airport (Mead & Hunt 2014); therefore, the project would result in no impacts related to exposure of future residents and employees to excessive aircraft noise.

Mitigation Measures

No mitigation measures would be required.

5 Conclusion

The project would generate both temporary construction-related noise and long-term noise associated with operation. However, construction noise levels would not exceed applicable thresholds at the nearest sensitive receptors due to large distances between proposed construction activity at the site and nearby surrounding receptors. Therefore, noise impacts associated with construction of the project would be less than significant.

The project's onsite stationary noise sources (e.g., HVAC units and dog park) would not exceed the City's noise standards at the nearest project property lines. The project's offsite mobile noise sources (e.g., vehicle traffic) would not increase the ambient noise environment by applicable thresholds. Therefore, noise impacts associated with the operation of the project would be less than significant.

The project would generate groundborne vibration during construction only. However, vibration levels would not exceed applicable thresholds at the nearest offsite structures, and construction-related vibration impacts would be less than significant.

The project site is not within two miles of any public airport or public use airport and is not located within the noise contours of the nearest airport (March Air Reserve Base/Inland Port Airport). Therefore, the project would not expose people residing or working in the project area to excessive aircraft-related noise.

Conclusively, the project would result in less than significant noise and vibration impacts.

6 References

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Appendix A

Noise Measurement Data

Appendix B

Construction Noise Modeling Results

Appendix C

HVAC Equipment Specs

2 Background

2.1 Overview of Sound

Sound is a vibration that transmits through a medium (such as a gas, liquid, or solid) created by a moving or vibrating source, which is capable of being detected by the hearing organs. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired and may therefore be classified as a more specific group of sounds. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment (California Department of Transportation [Caltrans] 2013).

Noise levels are commonly measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels so that they are consistent with the human hearing response, which is most sensitive to frequencies around 4,000 hertz (Hz) and less sensitive to frequencies around and below 100 Hz (Kinsler, et al. 1999). Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used to measure earthquake magnitudes. A doubling of the energy of a noise source, such as the doubling of vehicle traffic volumes, results in a noise level increase of 3 dB, whereas dividing the energy in half results in a 3 dB decrease (Crocker 2007).

Human perception of noise has no simple correlation with sound energy, i.e., the perception of sound is not linear in terms of dBA or in terms of sound energy. Two sources, each containing the same sound energy, do not “sound twice as loud” as one source. It is widely accepted that the average healthy human ear can detect changes (either increases or decreases) of 3 dBA, which is recognized as being barely perceptible to most people. Similarly, a change of 5 dBA is readily perceptible and a change of 10 dBA sounds twice (or half) as loud (Crocker 2007).

The level and frequency content of sound change as it travels from the source to a receiver. The most obvious change is the decrease in level as the distance from the source increases. The manner by which sound is reduced with distance depends on factors such as the type of source (e.g., a point or line source), the path the sound travels, site conditions, and the presence of intervening structures or other obstacles. Noise from a point source (e.g., construction equipment, industrial machinery, ventilation units) typically is reduced at a rate of 6 dBA per each doubling of distance away from the source. Noise from a line source (e.g., roadway, pipeline, railroad) typically is reduced at a rate of 3 dBA per each doubling of distance away from the source (Caltrans 2013). The propagation of noise is also affected by the absorption characteristics of the ground: a hard site, such as a parking lot or smooth body of water, provides no absorption/attenuation and the changes in noise levels with distance result simply from the geometric spreading of the source (i.e., 3 or 6 dBA reduction per doubling of distance for a point source or line source, respectively). Conversely, a soft site, such as soft dirt, grass, or scattered bushes and trees, may provide additional absorption/attenuation, potentially reducing noise levels an additional 1.5 dBA per doubling of distance away from the source (Caltrans 2013). Noise levels may also be reduced by intervening structures. The amount of reduction provided by the “shielding” of these features depends on the size of the structure/s, the location of the structure/s relative to the noise source and receivers, and the frequency content of the noise levels. Natural terrain features, such as hills and dense woods, and man-made features, such as buildings and walls, can significantly alter noise levels. Generally, any large structure blocking the line of sight between a noise source and receiver will provide at

least a 5-dBA reduction in source noise levels at the receiver (Federal Highway Administration [FHWA] 2011). The presence of building structures can substantially reduce noise levels from the exterior to the interior as well. The FHWA's guidelines indicate that modern building construction generally provides an exterior-to-interior noise level reduction of 20 to 35 dBA with closed windows.

The impact of noise is not a function of loudness alone. The time of day at which noise occurs and the duration of the noise are also important factors when considering potential noise impacts. Most noise that lasts for more than a few seconds is variable in its amplitude, i.e., the noise level continuously fluctuates over time. Consequently, a variety of noise descriptors have been developed. One of the most frequently used noise metrics is the equivalent continuous sound level (L_{eq}), which considers both duration and the sound power level of the source. The L_{eq} is defined as the single steady A-weighted level equivalent to the same amount of energy as that contained in the actual fluctuating levels over time.

The sound level that is exceeded "n" percent of time during a given sample period in the percentile noise level (L_n). For example, the L_{50} level is the statistical indicator of the time-varying noise signal that is exceeded 50 percent of the time (during each sampling period); that is, half of the sampling time, the changing noise levels are above this value and half of the time they are below it. This is called the "median sound level." The L_{10} level, likewise, is the value that is exceeded 10 percent of the time (i.e., near the maximum) and this is often known as the "intrusive sound level." The L_{90} is the sound level exceeded 90 percent of the time and is often considered the "effective background level" or "residual noise level."

Noise that occurs at night tends to be more disturbing than that which occurs during the day. Community noise is usually measured using the Day-Night Average Level (L_{dn}), which is the 24-hour average noise level with a +10 dBA penalty for noise occurring during nighttime hours (10:00 p.m. to 7:00 a.m.) hours. It is also measured using the Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with a +5 dBA penalty for noise occurring during evening hours (7:00 p.m. to 10:00 p.m.) and a +10 dBA penalty for noise occurring during nighttime hours (10:00 p.m. to 7:00 a.m.) (Caltrans 2013). Noise levels described by the L_{dn} and CNEL usually differ by about 1 dBA. The relationship between the peak-hour L_{eq} value and the L_{dn}/CNEL depends on the distribution of traffic during the day, evening, and night.

2.2 Overview of Vibration

Groundborne vibration of concern in environmental analysis consists of the oscillatory waves that move from a source through the ground to adjacent structures. The number of cycles per second of oscillation makes up the vibration frequency, described in terms of Hz. The frequency of a vibrating object describes how rapidly it oscillates. The normal frequency range of most groundborne vibration that can be felt by the human body ranges between less than 1 Hz to 200 Hz (Crocker 2007).

While people have varying sensitivities to vibrations at different frequencies, in general they are most sensitive to low-frequency vibration. Vibration in buildings, such as that from nearby construction activities, may cause windows, items on shelves, and pictures on walls to rattle. Vibration of building components can also take the form of an audible low-frequency rumbling noise, referred to as groundborne noise. Groundborne noise is usually only a problem when the originating vibration spectrum is dominated by frequencies in the upper end of the range (60 to 200 Hz), or when foundations or utilities, such as sewer and water pipes, physically connect the structure and the vibration source (FTA 2018). Although groundborne vibration is sometimes

noticeable in outdoor environments, it is almost never annoying to people who are outdoors. The primary concern of vibration is that it can be intrusive and annoying to building occupants and vibration-sensitive land uses.

Vibration amplitudes are usually expressed in peak particle velocity (PPV), or root mean squared (RMS) vibration velocity. The PPV and RMS velocity are normally described in inches per second (in/sec). PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is often used in monitoring of blasting vibration because it is related to the stresses that are experienced by buildings (Caltrans 2020).

2.3 Sensitive Receptors

Noise exposure thresholds for various types of land uses reflect the varying noise sensitivities associated with those uses. The City of Moreno Valley 2006 General Plan identifies schools, hospitals, churches, and residential (single- and multi-family) uses as sensitive uses within the City (City of Moreno Valley 2006).

Sensitive receptors in the vicinity of the project site include single-family residences to the north across from Alessandro Boulevard; single-family residences, the Valley Christian Academy, and Country Squires Mobile Estates mobile home park to the east; the Riverside University Health System Medical Center to the southeast; the Villa Annette Apartments to the south; and multifamily residential buildings currently under construction on the adjacent parcel of land to the west.

2.4 Project Noise Setting

Onsite Noise Measurements

The most prominent source of noise in the project site vicinity is vehicular traffic on nearby roadways (primarily Alessandro Boulevard, Darwin Drive, and Lasselle Street). To characterize ambient noise levels in the project vicinity, two short-term (15-minute) noise level measurements were conducted on February 11, 2025. Approximate noise measurement locations are shown in Figure 4. Short-term noise measurement 1 (ST 1) was conducted along the western project boundary to capture noise levels attributable to Darwin Drive and Lasselle Street, while ST 2 was conducted along the northern project site boundary to capture noise levels attributable to Alessandro Boulevard.

Table 2 summarizes the results of the short-term noise measurements and Table 3 lists the recorded traffic volumes observed during the short-term noise measurements.

Table 2 Noise Measurement Results

Measurement Location	Location Description	Sample Times[1]	Approximate Distance to Primary Noise Source	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)
ST 1	At western project site boundary along Darwin Drive	11:38 – 11:53 a.m.	Approximately 45 feet from centerline of Darwin Drive	46.0	37.0	66.9
ST 2	At northern project site boundary along Alessandro Boulevard	12:03 – 12:18 p.m.	Approximately 40 feet from centerline of Alessandro Boulevard eastbound travel lane	62.9	39.9	79.3

dBA = A-weighted decibels; L_{eq} = equivalent continuous sound level; L_{min} = minimum sound level, L_{max} = maximum sound level

[1] All short-term measurements were collected on February 11, 2025.

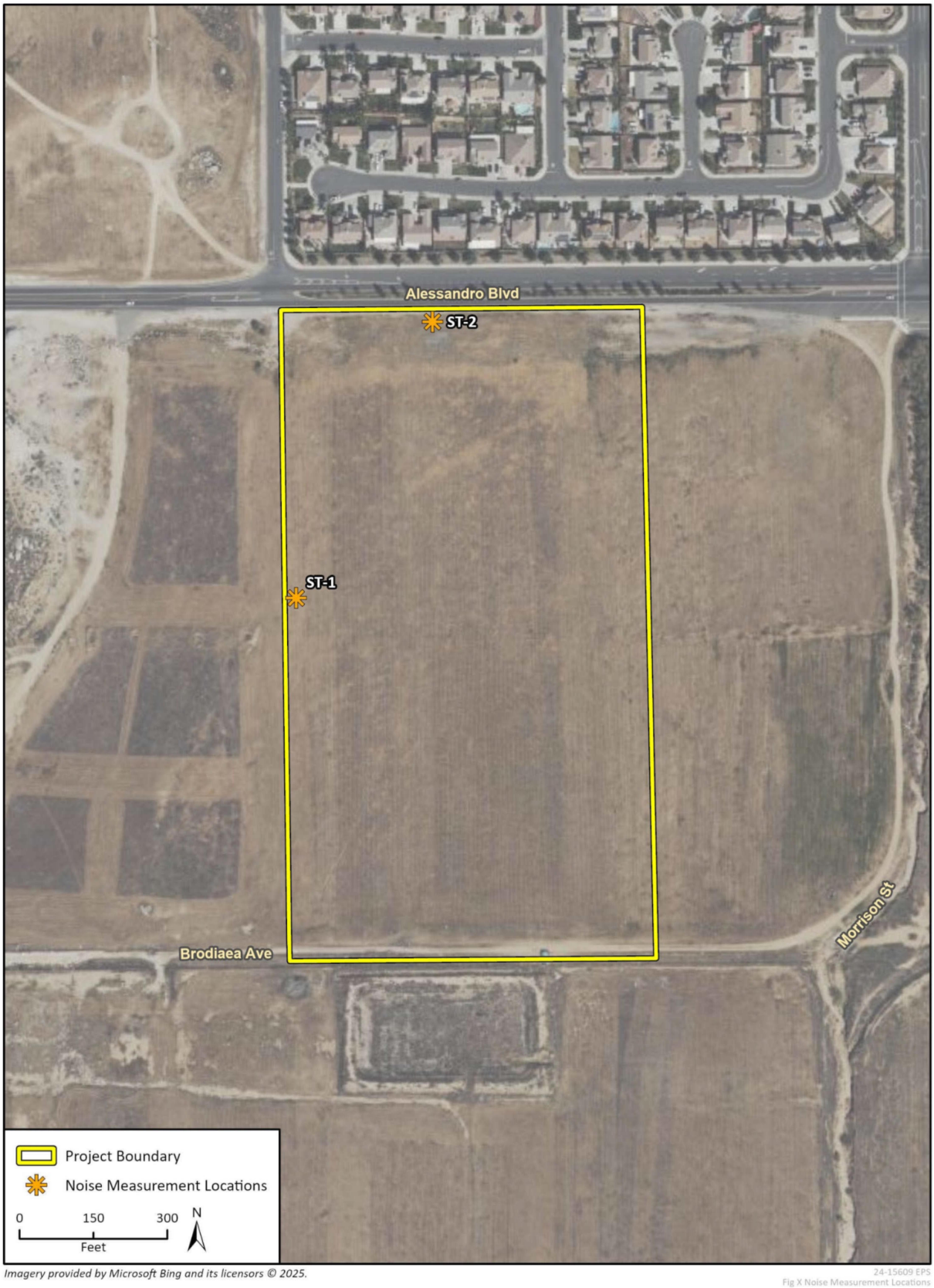
Approximate noise measurement locations shown in Figure 4. Detailed sound level measurement data are included in Appendix A.

Table 3 Traffic Counts Collected During Noise Measurements

Measurement Location	Roadway	Traffic Count Metric	Traffic Counts (Number of Vehicles)		
			Autos	Medium Trucks	Heavy Trucks
ST 1	Darwin Drive	15-minute count	5	0	0
		One-hour equivalent	20	0	0
Percent			**100%**	**0%**	**0%**
ST 2	Alessandro Boulevard	15-minute count	107	2	2
		One-hour equivalent	428	8	8
Percent			**96%**	**2%**	**2%**

Approximate noise measurement locations shown in Figure 4. Field notes and traffic counts collected during noise measurements are included in Appendix A.

Figure 4 Approximate Noise Measurement Locations



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24-15609 EPS
Fig X Noise Measurement Locations

City of Moreno Valley General Plan Noise Contours

The City of Moreno Valley General Plan (GP) Safety Element (City of Moreno Valley 2006) presents roadway noise contours throughout the City. These contours were referenced to establish the noise environment at the project site in terms of CNEL. Based on the buildout noise contours shown in Figure 6-2 of the Safety Element, noise levels at the project site range between 60 and 65 dBA CNEL.

2.5 Regulatory Setting

Federal

Federal Transit Administration Transit Noise and Vibration Impact Assessment Manual

The Federal Transit Administration (FTA) provides reasonable criteria for assessing construction noise and vibration impacts based on the potential for adverse community reaction in the *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018). The *Transit Noise and Vibration Impact Assessment Manual* specifies a daytime noise threshold of 80 dBA L_{eq} for an 8-hour period at residential land uses and a vibration threshold of 0.2 in/sec PPV at which potential minor architectural damage may occur to structures of typical construction.

State

California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires each county and city to adopt a General Plan that includes a Noise Element prepared per guidelines adopted by the Governor's Office of Planning and Research. The purpose of the Noise Element is to limit the exposure of the community to excessive noise levels. CEQA requires all known environmental effects of a project to be analyzed, including environmental noise impacts.

2022 California Building Code

The California Building Code is Title 24 of the California Code of Regulations. The 2022 California Building Code Part 2, Volume 1, Chapter 12, Section 1206.4, *Allowable interior noise levels*, requires that interior noise levels attributable to exterior sources shall not exceed 45 dB in any habitable room. The noise metric is evaluated as either the L_{dn} or the CNEL, consistent with the noise element of the local general plan.

Local

City of Moreno Valley General Plan Safety Element

The City of Moreno Valley 2006 GP Safety Element contains goals, objectives, and policies that aim to protect the City from natural and man-made hazards, including noise. Relative to the Rocas Grandes II project, relevant goals and policies identified in the Safety Element of the Moreno Valley 2006 GP are as follows:

Objective 6.3: Provide noise compatible land use relationships by establishing noise standards utilized for design and siting purposes.

Policy 6.3.1: The following uses shall require mitigation to reduce noise exposure where current or future exterior noise levels exceed 20 CNEL above the desired interior noise level:

a. Single and multiple family residential buildings shall achieve an interior noise level of 45 CNEL or less. Such buildings shall include sound-insulating windows, walls, roofs and ventilation systems. Sound barriers shall also be installed (e.g., masonry walls or walls with berms) between single-family residences and major roadways.

Policy 6.3.2: Discourage residential uses where current or projected exterior noise due to aircraft overflights will exceed 65 CNEL.

Policy 6.3.5: Enforce the California Administrative Code, Title 24 noise insulation standards for new multi-family housing developments, motels and hotels.

Policy 6.3.6: Building shall be limited in areas of sensitive receptors.

Objective 6.4: Review noise issues during the planning process and require noise attenuation measures to minimize acoustic impacts to existing and future surrounding land uses.

Policy 6.4.1: Site, landscape and architectural design features shall be encouraged to mitigate noise impacts for new developments, with a preference for noise barriers that avoid freeway sound barrier walls.

Objective 6.5: Minimize noise impacts from significant noise generators such as, but not limited to, motor vehicles, trains, aircraft, commercial, industrial, construction, and other activities.

Policy 6.5.1: Construction activities shall be operated in a manner that limits noise impacts on surrounding uses.

City of Moreno Valley Municipal Code

Chapter 11.80 of the City of Moreno Valley Municipal Code (MVMC) sets forth the City's noise standards for the purposes of securing and promoting the public health, safety, welfare, and quality of life of the City and its inhabitants. Section 11.008.030 specifies that "[n]o person shall maintain, create, operate or cause to be operated on private property any source of sound in such a manner as to create any non-impulsive sound which exceeds the limits set forth for the source land use category in [Table 4] when measured at a distance of 200 feet or more from the real property line of the source of the sound, if the sound occurs on privately owned property, or from the source of the sound, if the sound occurs on public right-of-way, public space or other publicly owned property" (City of Moreno Valley 2024).

Table 4 Maximum Sound Levels (in dBA) for Source Land Uses

Residential		Commercial	
Daytime[1]	Nighttime[2]	Daytime[1]	Nighttime[2]
60	55	65	60

[1] Daytime hours are between 8:00 a.m. and 10:00 p.m. on the same day.

[2] Nighttime hours are between 10:01 p.m. and 7:59 a.m. the following day.

Source: City of Moreno Valley Municipal Code, Section 11.80.030, Table 11.80.030-2.

In addition, Section 11.80.030 contains regulations regarding construction and demolition activities, prohibiting "the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between the hours of 8:00 p.m. and 7:00 a.m. the following day such that the sound there from creates a noise disturbance, except for emergency work by public service utilities or for other work approved by the city manager or designee" (City of Moreno Valley 2024).

Chapter 9.10 of the MVMC specifies performance standards for proposed development projects that may impact surrounding land uses. Section 9.10.170 states that "[n]o vibration shall be permitted which can be felt at or beyond the property line" (City of Moreno Valley 2024).

3 Methodology and Significance Thresholds

3.1 Methodology

Construction Noise

Construction noise was estimated using the FHWA Roadway Construction Noise Model (RCNM) (FHWA 2006). RCNM predicts construction noise levels for a variety of construction operations based on empirical data and the application of acoustical propagation formulas. Using RCNM, construction noise levels were estimated at noise-sensitive receptors near the project site. RCNM provides reference noise levels for standard construction equipment, with an attenuation rate of 6 dBA per doubling of distance for stationary equipment.

Variation in power imposes additional complexity in characterizing the noise source level from construction equipment. Power variation is accounted for by describing the noise at a reference distance from the equipment operating at full power and adjusting it based on the duty cycle of the activity to determine the L_{eq} of the operation (FHWA 2006). Each phase of construction has a specific equipment mix, depending on the work to be accomplished during that phase. Each phase also has its own noise characteristics; some have higher continuous noise levels than others, and some have more instantaneous, high-impact noise levels.

Construction activity would result in temporary noise in the project area, exposing surrounding sensitive receptors to increased noise levels. The project would involve grading, building construction, paving, and architectural coating phases. Construction noise would typically be higher during the heavier periods of initial construction (i.e., grading) and would be lower during the later construction phases (i.e., architectural coating). Construction activities that involve excavation and moving soil, such as site preparation and grading, typically produce the highest noise levels. Construction equipment is typically dispersed in various areas of the site, with only a limited amount of equipment operating near a given location at a particular time. The FTA *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018) document recommends evaluating construction noise impacts from the center of the construction site, stating that the distance variable in its recommended construction noise calculation “assumes that all equipment operates at the center of the project.” To present a conservative analysis, construction noise impacts were evaluated from the approximate center of each multifamily building footprint. Based on this assumption, construction may occur as close as approximately 200 feet from the residences under construction to the west of the project site and 250 feet from the existing residences to the north of the project site. Noise levels generated during each phase of construction were modeled in RCNM based on the construction equipment assumptions approved by the project applicant.

Additionally, construction activities would only be permitted to occur between the hours of 7:00 a.m. and 8:00 p.m. pursuant to Section 11.80.030 of the MVMC.

Construction Vibration

The project does not include any substantial vibration sources associated with operation. Thus, construction activities have the greatest potential to generate ground-borne vibration affecting nearby receptors, especially during grading and paving of the project site. The greatest vibratory

sources expected during construction of the project would be large earthmoving equipment (such as an excavator, dozer, grader, and backhoe) used for earthmoving activities and a vibratory roller used for paving activities. Neither blasting nor pile driving would be required for construction of the project. Construction vibration impacts are calculated based on typical vibration levels reported by the FTA for these equipment types, which are shown in Table 5 (FTA 2018).

Table 5 Typical Vibration Levels Measured during Construction Activities

Equipment	PPV at 25 feet (in/sec)
Vibratory Roller	0.21
Large Earthmoving Equipment[1] (Excavator, Dozer, Grader, or Backhoe)	0.089
Loaded Trucks	0.076
Small Bulldozer	0.003

PPV = peak particle velocity; in/sec = inches per second

[1] "Large earthmoving equipment" represents offroad equipment rated at 100 horsepower (hp) or more.

Source: FTA 2018

Operational Noise

Onsite Stationary Noise Sources

The primary onsite noise sources associated with the project during operation would be rooftop heating, ventilation, and air conditioning (HVAC) equipment and the dog park. The project is expected to generate other sources typical of residential development, including landscape maintenance, low-speed traffic on internal roadways, and the pool area; however, these other sources would be intermittent and considered typical of noise generated by neighboring residential land uses. Therefore, noise from these sources would not substantially contribute to overall ambient noise levels in the project vicinity and are not considered in this analysis.

HVAC units with the potential to generate the highest levels of noise at offsite sensitive receptors would be those situated on the rooftop of the stacked flats buildings located along the western project boundary. Each stacked flats building would contain 38 residential units, therefore it was assumed that up to 38 HVAC units would be located on the rooftop of each stacked flats building (i.e., one HVAC unit was assumed to serve each residential unit). The locations of rooftop HVAC units are not known, however were assumed to be distributed evenly across the rooftop; therefore, the noise levels generated by HVAC units would collectively emit from the approximate center of the rooftop. It was conservatively assumed that all units would be operating continuously and simultaneously. This analysis assumes the use of a typical HVAC system for a multi-family residential building, which is a 2.5-ton Carrier 24ABA4030 air conditioner with Puron refrigerant. Manufacturer's specifications (included as Appendix C) indicate this unit has a sound power level of 76 dBA, which results in a sound pressure level of approximately 68 dBA at three feet from the unit. Noise levels associated with rooftop HVAC equipment were calculated at the nearest project property line based on the horizontal and vertical distances.

The proposed project would include a dog park area located near the southwest corner of the site, west of the leasing office building. The dog park would be situated approximately 130 feet from the western property line and just south of Building 15. Noise levels associated with the proposed dog park were based on reference data collected previously for noise studies conducted according to CEQA guidelines. Based on previous noise measurement data, use of dog parks generated noise

levels up to approximately 58 dBA L_{eq} at a distance of 25 feet when between 5 and 11 dogs were present (GEPermit 2019).

Offsite Mobile Noise Sources

Once operational, the proposed project would introduce additional offsite vehicle trips on nearby roadways – primarily Alessandro Boulevard – due to residents, visitors, and workers traveling to and from the site, which would result in an increase in traffic noise. Existing and project-generated traffic counts were obtained from the Traffic Impact Analysis prepared for the proposed project (Translutions, Inc. 2024) and were assumed to occur primarily on Alessandro Boulevard. Existing, project, and combined daily traffic volumes used in this analysis are shown in Table 6.

Table 6 Existing, Project, and Combined Roadway ADT Volumes

Roadway	Segment	Existing Daily Volume	Project Daily Trip Generation	Existing Daily Volume + Project Daily Trip Distribution
Alessandro Boulevard	Between Darwin Drive and Morrison Street	10,151	3,100	13,251

Source: Translutions, Inc. 2024.

To assess the increase in ambient noise levels at receptors along Alessandro Boulevard, the following formula was used:

$$Traffic\ Noise\ Increase = 10 * LOG(\frac{Existing + Project - Generated\ Traffic\ Volume}{Existing\ Traffic\ Volume})$$

3.2 Significance Thresholds

Appendix G of the CEQA Guidelines states noise impacts of the project would be significant if the project would:

a) Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
b) Generate excessive groundborne vibration or groundborne noise levels.
c) For a project located within the vicinity of a private airstrip or an airport or public use airport, expose people residing or working in the project area to excessive noise levels.

Construction Noise

As described previously in Section 0, the MVMC prohibits construction between 8:00 p.m. and 7:00 a.m. the following day. Therefore, if project construction occurs during these prohibited hours, a significant impact would be identified.

Because the City does not have quantitative noise limits for assessing construction noise impacts, the criteria established by the FTA in the *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018) for assessing construction noise impacts were used. These noise limits are presented below in Table 7. Based on the FTA criteria shown in Table 7, a significant impact would occur if project-generated construction noise exceeds 80 dBA L_{eq} noise limit at the nearest residential land uses in the vicinity of the project site.

Table 7 FTA Construction Noise Criteria

	L_{eq}, Equip (8 hr), dBA	
Land Use	**Day (7:00 a.m. to 10:00 p.m.)**	**Night (10:00 p.m. to 7:00 a.m.)**
Residential	80	70
Commercial	85	85
Industrial	90	90

Source: FTA 2018, Table 7-3.

Construction Vibration

The City of Moreno Valley has not adopted quantitative thresholds for assessment of construction vibration impacts, therefore, the vibration criteria established in *The Transit Noise and Vibration Assessment Manual* (FTA 2018) were used to evaluate potential construction vibration impacts related to potential damage of surrounding buildings. These thresholds are presented below in Table 8. As shown in Table 8, vibration impacts from construction of the project would be significant if vibration levels exceed 0.2 in/sec PPV at nearby residential structures. This is the limit where minor cosmetic (i.e., non-structural) damage may occur to these buildings and represents a conservative analysis of potential vibration impacts.

Table 8 Criteria for Vibration Damage Potential

Building Category	PPV (in/sec)
I. Reinforced concrete, steel, or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Nonengineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

in/sec = inches per second; PPV = peak particle velocity

Source: FTA 2018

Operational Noise

Noise generated by operation of the project is governed by the exterior noise standards stated in the MVMC (shown in Table 4). These limits are 60 dBA during daytime hours (8:00 a.m. to 10:00 p.m. the same day) and 55 dBA during nighttime hours (10:01 p.m. to 7:59 a.m. the following day). To present a conservative analysis, a significant impact would occur if noise levels generated by the project's onsite stationary operational sources (e.g., dog park, HVAC equipment) exceed these noise limits at nearby receiving property lines.

Off-Site Traffic Noise

A project would typically result in a permanent noise impact if its implementation would substantially increase the ambient noise levels above a certain threshold for adjoining areas (i.e., cause a noise level increase due to an increased number of project-related vehicle trips on surrounding roadways). The following thresholds of significance, similar to those recommended by the Federal Aviation Administration (FAA) (FAA 2020), are used to assess traffic noise impacts at sensitive receptor locations. A significant impact would occur if traffic noise were to increase the existing noise environment by the following:

- 1.5 dBA or more for ambient noise environments of 65 dBA CNEL and higher.
- 3 dBA or more for ambient noise environments of 60 to 64 CNEL.
- 5 dBA or more for ambient noise environments of less than 60 dBA CNEL.

As discussed in Section 2.4, the existing noise level at the project site ranges between approximately 60 and 65 dBA CNEL. Therefore, off-site traffic noise impacts associated with the proposed project would be considered significant if they were to increase the ambient noise environment by 1.5 dBA CNEL or more.

On-Site Land Use Compatibility

As a result of the Supreme Court decision regarding the assessment of the environment's impacts on projects (*California Building Industry Association (CBIA) v. Bay Area Air Quality Management District (BAAQMD)*, 62 Cal. 4th 369 (No. S 213478) issued December 17, 2015), it is generally no longer the purview of the CEQA process to evaluate the impact of existing environmental conditions on any given project. As a result, while the noise from existing sources (e.g., adjacent roadways) is taken into account as part of the baseline condition, the direct effects of exterior noise from nearby noise sources relative to land use compatibility of a proposed project is typically no longer a required topic for impact evaluation under CEQA. Generally, no determination of significance is required except for certain school projects, projects affected by airport noise, and projects that would exacerbate existing conditions (i.e., projects that would have a significant operational impact).

4 Impact Analysis

Threshold 1:	Would the project expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Impact N-1 CONSTRUCTION ACTIVITIES WOULD TEMPORARILY INCREASE NOISE LEVELS AT NEARBY SENSITIVE RECEPTORS; HOWEVER, CONSTRUCTION NOISE LEVELS WOULD NOT EXCEED APPLICABLE THRESHOLDS. SIMILARLY, OPERATIONAL NOISE LEVELS ASSOCIATED WITH THE PROPOSED PROJECT WOULD NOT EXCEED CITY NOISE THRESHOLDS. CONSTRUCTION AND OPERATIONAL NOISE IMPACTS ASSOCIATED WITH THE PROJECT WOULD BE LESS THAN SIGNIFICANT.

Construction

Following the methodology discussed in Section 3.1, construction noise levels were estimated at nearby sensitive receptors during each phase of construction. Table 9 presents the expected noise levels at the closest sensitive receptors during each phase of construction.

Table 9 Estimated Construction Noise Levels at Sensitive Receptors by Phase

	dBA L_{eq} (8-hour)				
Construction Phase	**RCNM Reference Noise Level**	**Residences under Construction to the West**	**Existing Residences to the North**	**Existing Residences to the Southwest**	**Riverside University Health System Medical Center to the Southeast**
Distance (feet)	**50**	**200**	**250**	**1,120**	**2,100**
Grading	87[1]	75	73	60	55
Building Construction	85[2]	73	71	58	53
Architectural Coating	87[3]	74	73	59	54
Paving	79[4]	67	65	52	47

dBA = A-weighted decibel; L_{eq} = equivalent continuous sound level; RCNM = Roadway Construction Noise Model

Numbers in bold would exceed the FTA construction noise threshold.

[1] Grading phase reference noise level was calculated based on simultaneous operation of an excavator, grader, dozer, scraper, and backhoe.

[2] Building Construction phase reference noise level was calculated based on simultaneous operation of a crane, forklift, generator, backhoe, tractor, and welder.

[3] Architectural Coating phase reference noise level was calculated based on simultaneous operation of two pavers and two rollers.

[4] Paving phase reference noise level was calculated based on simultaneous operation of two air compressors.

See Appendix B for construction noise modeling outputs.

As shown in Table 9, construction noise levels generated during all phases of construction would not exceed the FTA's threshold of 80 dBA L_{eq} (8-hour) at sensitive receptors nearest to the project site. Therefore, temporary noise impacts associated with construction of the project would be less than significant.

Operation

Onsite Stationary Noise Sources

HVAC Equipment

Following the methodology discussed in Section 3.1, noise levels associated with the project's rooftop HVAC equipment were estimated based on the horizontal and vertical distances from the equipment to the nearest project property line. Assuming that noise generated by rooftop HVAC units would collectively emit from the center of the rooftop, noise levels at the western property line generated by 38 HVAC units would be approximately 50 dBA. Noise levels would continue to decrease with distance from the HVAC units and would be even lower at sensitive receptors located even farther away. Note that this is a conservative analysis because it does not account for acoustical shielding provided by the rooftop parapet walls or from the rooftop edge blocking the line of sight between the HVAC equipment and nearby sensitive receptors. Therefore, noise generated by HVAC equipment would not exceed the City's daytime or nighttime noise limits of 60 or 55 dBA, respectively, at the nearest sensitive receptors and noise impacts associated with the proposed project's HVAC equipment would be less than significant.

Dog Park

The dog park would be situated approximately 130 feet from the western property line and just south of Building 15. Based on reference noise measurement data discussed in Section 3.1, dog parks generate noise levels up to approximately 58 dBA L_{eq} at a distance of 25 feet. At a distance of 130 feet, noise levels associated with the proposed dog park would attenuate to approximately 44 dBA L_{eq}. This noise level would continue to decrease with distance and would be further reduced at other offsite sensitive receptors. Therefore, noise associated with the proposed project's dog park would not exceed the City's daytime or nighttime noise limits of 60 or 55 dBA, respectively, at nearby sensitive receptors, and noise impacts associated with the proposed project's dog park would be less than significant.

Combined Onsite Stationary Noise Impacts

The project's onsite stationary noise sources may operate simultaneously and combine to increase operational noise levels at nearby sensitive receptors. To account for this, the combined noise levels from operation of HVAC equipment and use of the dog park were calculated at the nearest project property line. It is assumed that the dog park would be used only during daytime hours, while HVAC units may operate during both daytime and nighttime hours; therefore, combined operation of the project's onsite stationary noise sources would occur only during daytime hours. When accounting for the simultaneous operation of all rooftop HVAC units atop one stacked flats building and use of the dog park, the combined noise level at the nearest project property line to the west would be approximately 51 dBA, which would not exceed the City's daytime noise limit of 60 dBA. Combined operational noise impacts associated with the project's onsite stationary noise sources would be less than significant.

Offsite Mobile Noise Sources

VEHICLE TRAFFIC NOISE

The project is not expected to substantially change the vehicle classification mix on surrounding roadways; therefore, the primary factor affecting off-site noise levels would be increased traffic volumes, assumed to occur primarily on Alessandro Boulevard. The project is anticipated to generate 3,100 new daily vehicle trips according to the Traffic Impact Analysis prepared for the project (Translutions, Inc. 2024). As shown previously in Table 6, the daily traffic volume on Alessandro Boulevard would increase from 10,151 vehicles to 13,251 vehicles due to project-generated traffic. This increase in traffic on Alessandro Boulevard would result in a noise increase of approximately 1.2 dBA CNEL, which would not exceed the significance threshold of 1.5 dBA CNEL identified in Section 3.2. Therefore, traffic noise impacts associated with the proposed project would be less than significant.

Mitigation Measures

No mitigation measures would be required.

Threshold 2:	Would the project result in generation of excessive groundborne vibration or groundborne noise levels?

Impact N-2 VIBRATION LEVELS GENERATED DURING CONSTRUCTION OF THE PROPOSED PROJECT WOULD NOT EXCEED APPLICABLE THRESHOLDS AT NEARBY OFFSITE STRUCTURES. ADDITIONALLY, OPERATION OF THE PROJECT WOULD NOT INCLUDE ANY SUBSTANTIAL SOURCES OF VIBRATION. THEREFORE, VIBRATION IMPACTS WOULD BE LESS THAN SIGNIFICANT.

Construction

The greatest anticipated sources of vibration during project construction would be large offroad equipment (such as an excavator, dozer, grader, and backhoe) for earthmoving activities and a vibratory roller used during paving activities. Based on the site plan, earthmoving activities may occur as close as 75 feet from the nearest offsite structures (i.e., multifamily residences under construction to the west), while paving activities may occur as close as 115 feet from the nearest offsite structure (i.e., multifamily residences under construction to the west). Large offroad equipment typically generates vibration levels up to 0.089 in/sec PPV at a reference distance of 25 feet, while a vibratory roller generates a vibration level of approximately 0.21 in/sec PPV at a distance of 25 feet (FTA 2018).

At a distance of 75 feet, large earthmoving equipment would generate a vibration level of 0.017 in/sec PPV, which would not exceed the FTA's recommended threshold of 0.2 in/sec PPV. At a distance of 115 feet, a vibratory roller would generate a vibration level of 0.021 in/sec PPV, which would also not exceed the FTA's threshold of 0.2 in/sec PPV. Therefore, temporary vibration impacts associated with construction of the proposed project would not exceed applicable thresholds and would be less than significant.

Operation

Operation of the proposed project would not include any substantial vibration sources (e.g., rail operations, heavy truck movements, industrial operations, etc.). Therefore, operational vibration impacts would be less than significant.

Mitigation Measures

No mitigation measures would be required.

Threshold 3:	For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

Impact N-3 THE PROJECT IS NOT LOCATED WITHIN THE VICINITY OF A PRIVATE AIRSTRIP OR AN AIRPORT INFLUENCE AREA. THE PROJECT SITE IS NOT LOCATED WITHIN THE NOISE CONTOURS OF THE NEAREST AIRPORT (MARCH AIR RESERVE BASE/INLAND PORT AIRPORT). THEREFORE, THE PROJECT WOULD NOT EXPOSE PEOPLE RESIDING OR WORKING IN THE PROJECT AREA TO EXCESSIVE AVIATION-RELATED NOISE LEVELS AND THE PROJECT WOULD HAVE NO IMPACT.

The project site is not located within an airport land use plan, or within two miles of a public or private airport. The closest airport is the March Air Reserve Base/Inland Port Airport (RIV), which is located approximately three and a half miles southwest of the project site. The project site is not located within the noise contours of this airport (Mead & Hunt 2014); therefore, the project would result in no impacts related to exposure of future residents and employees to excessive aircraft noise.

Mitigation Measures

No mitigation measures would be required.

5 Conclusion

The project would generate both temporary construction-related noise and long-term noise associated with operation. However, construction noise levels would not exceed applicable thresholds at the nearest sensitive receptors due to large distances between proposed construction activity at the site and nearby surrounding receptors. Therefore, noise impacts associated with construction of the project would be less than significant.

The project's onsite stationary noise sources (e.g., HVAC units and dog park) would not exceed the City's noise standards at the nearest project property lines. The project's offsite mobile noise sources (e.g., vehicle traffic) would not increase the ambient noise environment by applicable thresholds. Therefore, noise impacts associated with the operation of the project would be less than significant.

The project would generate groundborne vibration during construction only. However, vibration levels would not exceed applicable thresholds at the nearest offsite structures, and construction-related vibration impacts would be less than significant.

The project site is not within two miles of any public airport or public use airport and is not located within the noise contours of the nearest airport (March Air Reserve Base/Inland Port Airport). Therefore, the project would not expose people residing or working in the project area to excessive aircraft-related noise.

Conclusively, the project would result in less than significant noise and vibration impacts.

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Appendix A

Noise Measurement Data

Measurement Location	Start Date	Start Time	End Time	Duration	LZeq	LCeq	LAeq	LZSmax	LCSmax	LASmax	LZSmin	LCSmin	LASmin	LZE	LCE
ST 1	2/11/2025	11:38:25 AM	11:53:25 AM	0:15:00	64.6	60.9	46	76.4	72.6	66.9	57.3	54.4	37	94.1	90.4
ST 2	2/11/2025	12:03:00 PM	12:18:00 PM	0:15:00	72.2	71	62.9	91.4	91.1	79.3	58.4	56.1	39.9	101.7	100.5

Measurement Location	LAE	LZpk	LCpk	LApk	LAS1%	LAS2%	LAS5%	LAS8%	LAS10%	LAS25%	LAS50%	LAS90%	LAS95%	LAS99%	
ST 1	75.5	89.1	87.8	83.9	55.8	53.2	48.2	46.5	45.8	43.5	41.8	38.7	38.2	37.4	
ST 2	92.4	103.3	104.7	93.9	72.8	70.5	68.7	67.9	67.3	63.5	56.3	44.7	43	40.9	

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Ambient Noise Survey Data Sheet

Instructions: Document noise measurement locations with a photo of the site, including the noise meter. Additionally, take notes on general and secondary noise sources, including the instantaneous noise level if possible. As a reminder, A/C weighting should be set to "A". For additional information, please review the *Noise Measurement Protocol* in the pelican case.

Project Name: Rocas Grandes II - MF Residential **Job Number:** 24-15609

Date: 02/11/2025 **Operator Name:** Destiny Brenneisen

Measurement #1

Location: ST 1 **Begin time:** 1:45 **Finish time:** 12:00

Measurement No.: 001 **Wind (mph):** 6 **Direction:** W

Cloud Cover Class: Overcast (>80%) **Light (20-80%)** Sunny (<20%)

Calibration (dB): Start: 94.0 End: 94.0

Primary Noise Sources: Alessandro traffic **Distance:**

Secondary Noise Sources:

Notes: 54 Degrees

Traffic Count: Passenger Cars: 5

Medium Trucks (2 axles, 6 tires): Heavy Duty Trucks (3+ axles):

Instantaneous Noise Sources/Levels (e.g., airplane, bus airbrake, etc.): Plane at 11:48

Leq: **SEL:** **Lmax:** **Lmin:** **PK:**

L(05): **L(10):** **L(50):** **L(90):** **L(95):**

Response: **Slow** Fast Peak Impulse

Measurement #2

Location: ST 2 **Begin time:** 12:10 **Finish time:** 12:25

Measurement No.: 002 **Wind (mph):** 4 **Direction:** WNW

Cloud Cover Class: Overcast (>80%) **Light (20-80%)** Sunny (<20%)

Calibration (dB): Start: End:

Primary Noise Sources: Alessandro traffic **Distance:**

Secondary Noise Sources:

Notes:

Traffic Count: Passenger Cars: 107

Medium Trucks (2 axles, 6 tires): 2 Heavy Duty Trucks (3+ axles): 2

Instantaneous Noise Sources/Levels (e.g., airplane, bus airbrake, etc.):

Leq: **SEL:** **Lmax:** **Lmin:** **PK:**

L(05): **L(10):** **L(50):** **L(90):** **L(95):**

Response: **Slow** Fast Peak Impulse

Notes:

Appendix B

Construction Noise Modeling Results

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 02/19/2025
Case Description: Rocas Grandes II

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Grading	Residential	60.0	55.0	50.0

Description	Impact Device	Usage (%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40	85.0		50.0	0.0
Grader	No	40	85.0		50.0	0.0
Dozer	No	40	85.0		50.0	0.0
Scraper	No	40	85.0		50.0	0.0
Backhoe	No	40	80.0		50.0	0.0

Results

Noise Limits (dBA)

Noise Limit Exceedance (dBA)

Equipment	Calculated (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Excavator	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	80.0	76.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

| | | |

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 02/19/2025
Case Description: Rocas Grandes II

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Building Construction	Residential	60.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16	85.0		50.0	0.0
Man Lift	No	20	85.0		50.0	0.0
Generator	No	50	82.0		50.0	0.0
Backhoe	No	40	80.0		50.0	0.0
Tractor	No	40	84.0		50.0	0.0
Welder / Torch	No	40	73.0		50.0	0.0

Results

Noise Limits (dBA)

Noise Limit Exceedance (dBA)

Equipment	Calculated (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Crane	85.0	77.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	85.0	78.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	82.0	79.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	80.0	76.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Welder / Torch			73.0	69.0	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A				
		Total	85.0	85.3	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A				

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 02/19/2025
Case Description: Rocas Grandes II

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Paving	Residential	60.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50	85.0		50.0	0.0
Paver	No	50	85.0		50.0	0.0
Roller	No	20	85.0		50.0	0.0
Roller	No	20	85.0		50.0	0.0

Results

Noise Limits (dBA)

Noise Limit Exceedance (dBA)

Equipment	Day	Calculated (dBA) Evening	Night	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Lmax
Paver		85.0	82.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver		85.0	82.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller		85.0	78.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller		85.0	78.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	85.0	86.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 02/19/2025
Case Description: Rocas Grandes II

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Architectural Coating	Residential	60.0	55.0	50.0

Description	Impact Device	Usage (%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40	80.0		50.0	0.0
Compressor (air)	No	40	80.0		50.0	0.0

Results

Noise Limits (dBA)

Noise Limit Exceedance (dBA)

Equipment	Calculated (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Compressor (air)	80.0	76.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	80.0	76.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	80.0	79.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix C

HVAC Equipment Specs

24ABA4
Base Series 14 Air Conditioner with Puron Refrigerant
Sizes 18 to 60 (1–1/2 to 5 Nominal Tons)

Carrier®
Turn to the Experts.

Product Data



Puron™
the environmentally sound refrigerant

Carrier's Air Conditioners with Puron® refrigerant provide a collection of features unmatched by any other family of equipment. The 24ABA has been designed utilizing Carrier's Puron refrigerant. The environmentally sound refrigerant allows you to make a responsible decision in the protection of the earth's ozone layer. Carrier's air conditioning system with Puron refrigerant meets the Energy Star® guidelines for energy efficiency.

INDUSTRY LEADING FEATURES / BENEFITS

Efficiency

- 14 SEER/11 EER
- Microtube Technology™ refrigeration system
- Indoor air quality accessories available

Sound

- Sound level as low as 76 dBA

Comfort

- System supports Thermidistat™ or standard thermostat controls

Reliability

- Puron® refrigerant - environmentally sound, won't deplete the ozone layer and low lifetime servce cost.
- Front-seating service valves
- Scroll compressor
- Internal pressure relief valve
- Internal thermal overload
- Filter drier
- Balanced refrigeration system for maximum reliability

Durability

WeatherArmor™ protection package:

- Solid, Durable sheet metal construction
- Dense wire coil guard
- Baked-on, complete coverage, powder paint

Applications

- Long-line - up to 250 feet (76.20 m) total equivalent length, up to 200 feet (60.96 m) condenser above evaporator, or up to 80 ft. (24.38 m) evaporator above condenser (See Longline Guide for more information.)
- Low ambient (down to -20°F/-28.9°C) with accessory kit

Warranty

- 5 year limited compressor warranty
- 5 year limited parts warranty

MODEL NUMBER NOMENCLATURE

1	2	3	4	5	6	7	8	9	10	11	12	13
N	N	A	A	A/N	N	N	N	A/N	A/N	A/N	N	N
2	4	A	B	A	4	3	6	A	0	0	3	0
Product Series		Product Family	Tier	Major Series	SEER	Cooling Capacity		Variations	Open	Open	Voltage	Series
24=AC		A=RES AC	B=Base	A=Puron	4=14 SEER			A=Standard	0=Not Defined	0=Not Defined	3=208/230–1	0 = Original Series

24ABA4

Puron™ the environmentally sound refrigerant

ARI PERFORMANCE CERTIFIED™ ARI Standard 210/240 Unitary Air Conditioners

ISO 9001:2000 QMI REGISTERED

c UL® us

ENERGY STAR

This product has been designed and manufactured to meet Energy Star® criteria for energy efficiency when matched with appropriate coil components. However, proper refrigerant charge and proper air flow are critical to achieve rated capacity and efficiency. Installation of this product should follow all manufacturing refrigerant charging and air flow instructions. **Failure to confirm proper charge and air flow may reduce energy efficiency and shorten equipment life.**

STANDARD FEATURES

FEATURE	18	24	30	36	42	48	60
Puron Refrigerant	X	X	X	X	X	X	X
Maximum SEER Rating	15	15	15	15	15.5	15.5	14.5
Scroll Compressor	X	X	X	X	X	X	X
Dense Wire Coil Guard	X	X	X	X	X	X	X
Field Installed Filter Drier	X	X	X	X	X	X	X
Front Seating Service Valves	X	X	X	X	X	X	X
Internal Pressure Relief Valve	X	X	X	X	X	X	X
Internal Thermal Overload	X	X	X	X	X	X	X
Long Line capability	X	X	X	X	X	X	X
Low Ambient capability with Kit	X	X	X	X	X	X	X

PHYSICAL DATA

UNIT SIZE–VOLTAGE, SERIES	18–31	24–31	30–31	36–31	42–32	48–32	60–32
Operating Weight lb (kg)	171 (77.56)	185 (83.92)	188 (85.28)	191 (86.64)	225 (102.10)	231 (104.78)	272 (123.38)
Shipping Weight lb (kg)	199 (90.27)	214 (97.07)	217 (98.43)	225 (102.06)	263 (119.29)	269 (122.02)	310 (140.61)
Compressor Type	Scroll						
REFRIGERANT	Puron® (R–410A)						
Control	TXV (Puron® Hard Shutoff)						
Charge lb (kg)	5.7 (2.59)	7.25 (3.29)	7.1 (3.22)	7.25 (3.29)	8.7 (3.95)	9.5 (4.31)	11.4 (5.17)
COND FAN	Propeller Type, Direct Drive						
Air Discharge	Vertical						
Air Qty (CFM)	2235	2615	3170	3800	3800	3800	4050
Motor HP	1/12	1/10	1/5	1/5	1/5	1/5	1/5
Motor RPM	800	1100	1100	800	800	800	800
COND COIL							
Face Area (Sq ft)	19.40	23.71	23.71	22.63	25.15	25.15	25.15
Fins per In.	25	25	25	25	25	25	20
Rows	1	1	1	1	1	1	2
Circuits	3	4	4	5	6	7	7
VALVE CONNECT. (In. ID)							
Vapor	5/8	5/8	3/4	3/4	7/8	7/8	7/8
Liquid	3/8	3/8	3/8	3/8	3/8	3/8	3/8
REFRIGERANT TUBES* (In. OD)							
Vapor (0–80 Ft Tube Length)	5/8		3/4		7/8		1–1/8
Liquid (0–80 Ft Tube Length)	3/8						

* For tubing sets between 80 and 200 ft. (24.38 and 60.96 m) horizontal or 20 ft. (6.09 m) vertical differential, consult the Longline Guideline.

Note: See unit Installation Instruction for proper installation.

VAPOR LINE SIZING AND COOLING CAPACITY LOSS
1-STAGE AIR CONDITIONER APPLICATIONS

LONG LINE APPLICATION: An application is considered "Long line" when the total equivalent tubing length exceeds 80 ft. (24.38 m) or when there is more than 20 ft. (6.09 m) vertical separation between indoor and outdoor units. These applications require additional accessories and system modifications for reliable system operation. The maximum allowable total equivalent length is 250 ft. (76.2 m). The maximum vertical separation is 200 ft. (60.96 m) when outdoor unit is above indoor unit, and 80 ft. (24.38 m) when the outdoor unit is below the indoor unit. Refer to Accessory Usage Guideline below for required accessories. See Longline Application Guideline for required piping and system modifications. Also, refer to the table below for the acceptable vapor tube diameters based on the total length to minimize the cooling capacity loss.

Unit Nominal Size (Btuh)	Acceptable Vapor Line Diameters (In.) OD	Cooling Capacity Loss (%) Total Equivalent Line Length ft. (m)										
		Standard Application			Long Line Application Requires Accessories							
		25 (7.62)	50 (15.24)	80 (24.38)	80+ (24.38+)	100 (30.48)	125 (38.10)	150 (45.72)	175 (53.34)	200 (60.96)	225 (68.58)	250 (76.2)
18,000 1–Stage Puron AC	1/2	1	2	3	3	4	6	7	8	9	10	12
	5/8	0	0	1	1	1	1	2	2	3	3	3
24,000 1–Stage Puron AC	5/8	0	1	1	1	2	3	3	4	4	5	6
	3/4	0	0	0	0	0	1	1	1	1	1	2
	7/8	0	0	0	0	0	0	0	0	0	0	1
30,000 1–Stage Puron AC	5/8	1	2	3	3	3	4	5	6	7	8	9
	3/4	0	0	1	1	1	1	2	2	2	3	3
	7/8	0	0	0	0	0	1	1	1	1	1	1
36,000 1–Stage Puron AC	5/8	1	2	4	4	5	6	7	9	10	11	13
	3/4	0	0	1	1	1	2	2	3	3	4	4
	7/8	0	0	0	0	0	1	1	1	1	2	2
42,000 1–Stage Puron AC	3/4	0	1	2	2	2	3	4	4	5	6	6
	7/8	0	0	1	1	1	1	2	2	2	3	3
	1–1/8	0	0	0	0	0	0	0	0	0	0	1
48,000 1–Stage Puron AC	3/4	0	1	2	2	3	4	5	5	6	7	8
	7/8	0	0	1	1	1	2	2	2	3	3	4
	1–1/8	0	0	0	0	0	0	0	0	1	1	1
60,000 1–Stage Puron AC	3/4	1	2	4	4	5	6	7	9	10	11	12
	7/8	0	1	2	2	2	3	4	4	5	5	6
	1–1/8	0	0	0	0	1	1	1	1	1	1	2

Standard Length = 80 ft. (24.38 m) or less total equivalent length

Applications in this area are long line. Accessories are required as shown recommended on Long Line Application Guidelines

Applications in this area may have height restrictions that limit allowable total equivalent length, when outdoor unit is below indoor unit See Long Line Application Guidelines

ELECTRICAL DATA

UNIT SIZE	V/PH	OPER VOLTS*		COMPR		FAN	MCA	MIN WIRE SIZE† 60° C	MIN WIRE SIZE† 75° C	MAX LENGTH (FT)‡ 60° C	MAX LENGTH (FT)‡ 75° C	MAX FUSE** or BRK AMPS
		MAX	MIN	LRA	RLA	FLA						
18–31	208/230/1–60	253	197	48.0	9.0	0.5	11.7	14	14	67	64	15
24–31				58.3	13.5	0.7	17.6	14	14	45	43	25
30–31				73.0	14.1	1.1	18.7	14	14	42	40	30
36–31				79.0	16.7	1.2	22.0	12	12	57	54	35
42–32				112.0	17.9	1.2	23.6	10	10	85	80	40
48–32				117.0	21.8	1.2	28.4	10	10	70	67	40
60–32				134.0	26.4	1.2	34.2	8	8	91	86	50

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

† If wire is applied at ambient greater than 30° C (86° F), consult table 310–16 of the NEC (ANSI/NFPA 70). The ampacity of non–metallic–sheathed cable (NM), trade name ROMEX, shall be that of 60° C conditions, per the NEC (ANSI/NFPA 70) Article 336–26. If other than uncoated (no–plated), 60 or 75° C insulation, copper wire (solid wire for 10 AWG or smaller, stranded wire for larger than 10 AWG) is used, consult applicable tables of the NEC (ANSI/NFPA 70).

‡ Length shown is as measured 1 way along wire path between unit and service panel for voltage drop not to exceed 2%.

** Time–Delay fuse.

FLA – Full Load Amps

LRA – Locked Rotor Amps

MCA – Minimum Circuit Amps

RLA – Rated Load Amps

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

SOUND POWER

UNIT SIZE – VOLTAGE, SERIES	STANDARD RATING (dBA)	TYPICAL OCTAVE BAND SPECTRUM (dB, without tone adjustment)						
		125	250	500	1000	2000	4000	8000
18–31	76	56.0	60.0	65.0	72.0	65.0	60.5	53.5
24–31	76	52.5	62.5	66.0	69.5	66.5	62.0	57.0
30–31	76	53.5	64.5	69.0	70.0	68.5	66.0	59.5
36–31	76	52.0	60.0	65.5	69.5	64.0	63.0	56.0
42–32	77	55.0	62.0	66.0	70.5	65.5	60.0	54.0
48–32	78	51.5	62.0	67.5	73.5	69.0	64.5	62.0
60–32	78	57.0	62.5	69.0	73.0	66.0	62.0	57.5

SOUND POWER WITH ACCESSORY SOUND HOOD

UNIT SIZE – VOLTAGE, SERIES	STANDARD RATING (dBA)	TYPICAL OCTAVE BAND SPECTRUM (dB, without tone adjustment)						
		125	250	500	1000	2000	4000	8000
18–31	74	56.0	60.0	65.0	69.0	63.0	60.0	52.5
24–31	74	52.0	62.0	66.5	68.5	66.0	61.0	56.5
30–31	75	53.5	64.5	69.0	69.5	68.0	65.5	59.0
36–31	75	52.0	62.0	65.5	67.5	63.0	61.0	53.5
42–32	74	55.0	61.5	65.0	68.5	65.0	59.0	52.0
48–32	76	53.0	61.5	67.5	72.0	68.0	61.5	59.0
60–32	75	57.0	62.5	68.5	71.0	65.0	60.5	58.5

CHARGING SUBCOOLING (TXV-TYPE EXPANSION DEVICE)

UNIT SIZE–VOLTAGE, SERIES	REQUIRED SUBCOOLING °F (°C)
18–31	10 (5.6)
24–31	11 (6.1)
30–31	8 (4.4)
36–31	10 (5.6)
42–32	8 (4.4)
48–32	8 (4.4)
60–32	9 (5.0)

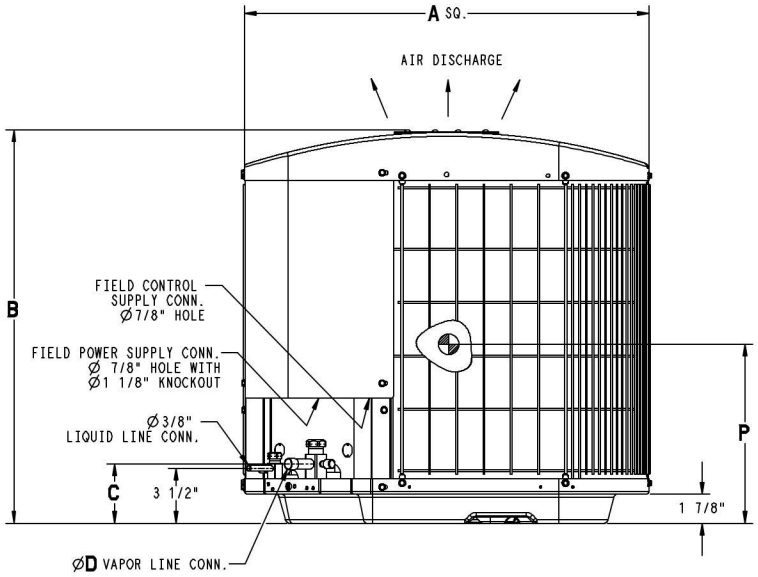
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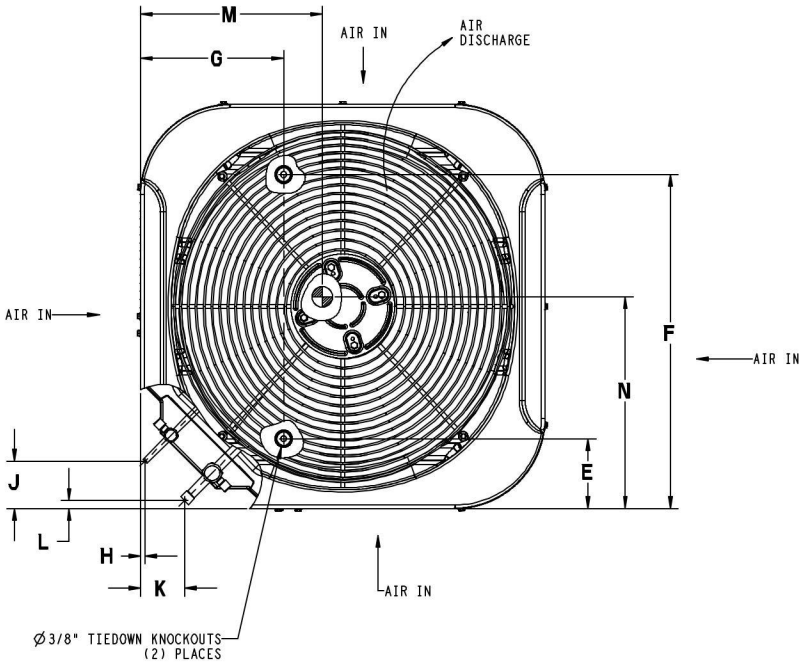
UNIT	SERIES	ELECTRICAL CHARACTERISTICS				A	B	C	D	E	F	G	H	J	K	L	M	N	P	OPERATING WEIGHT	SHIPPING WEIGHT	SHIPPING DIMENSIONS (L x W x H)
24ABA418	1	X	O	O	O	31 3/16"	35 3/4"	3 3/4"	5/8"	6 9/16"	24 11/16"	9 1/8"	5/16"	3"	2 13/16"	1/2"	16 1/4"	16"	16 5/8"	171#	199#	32 3/8" X 35 1/2" X 39 3/8"
24ABA424	1	X	O	O	O	31 3/16"	42 1/2"	3 3/4"	5/8"	6 9/16"	24 11/16"	9 1/8"	5/16"	3"	2 13/16"	1/2"	16"	16"	19"	185#	214#	32 3/8" X 35 1/2" X 46 3/16"
24ABA430	1	X	O	O	O	31 3/16"	42 1/2"	3 3/4"	3/4"	6 9/16"	24 11/16"	9 1/8"	5/16"	3"	2 13/16"	1/2"	14 7/8"	15 1/4"	19 3/8"	188#	217#	32 3/8" X 35 1/2" X 46 3/16"
24ABA436	1	X	O	O	O	35"	35 3/4"	3 3/4"	3/4"	6 9/16"	28 7/16"	9 1/8"	5/16"	3"	2 13/16"	1/2"	18 1/4"	18 1/2"	17 1/2"	191#	225#	36 1/8" X 39 5/16" X 39 3/8"
24ABA442	1	X	O	O	O	35"	45 15/16"	3 7/8"	7/8"	6 9/16"	28 7/16"	9 1/8"	5/16"	3"	2 15/16"	5/8"	18 3/4"	17"	20 7/8"	237#	272#	36 1/8" X 39 5/16" X 49 9/16"
	2	X	O	O	O	35"	39 1/8"	3 7/8"	7/8"	6 9/16"	28 7/16"	9 1/8"	5/16"	3"	2 15/16"	5/8"	18 1/2"	16 1/4"	16 1/2"	225#	263#	36 1/8" X 39 5/16" X 42 3/4"
24ABA448	1	X	O	O	O	35"	32 5/16"	3 7/8"	7/8"	6 9/16"	28 7/16"	9 1/8"	5/16"	3"	2 15/16"	5/8"	17 3/4"	18 3/4"	15 1/2"	239#	272#	36 1/8" X 39 5/16" X 35 15/16"
	2	X	O	O	O	35"	39 1/8"	3 7/8"	7/8"	6 9/16"	28 7/16"	9 1/8"	5/16"	3"	2 15/16"	5/8"	17 1/2"	16 1/2"	15"	231#	269#	36 1/8" X 39 5/16" X 42 3/4"
24ABA460	1	X	O	O	O	35"	45 15/16"	3 7/8"	7/8"	6 9/16"	28 7/16"	9 1/8"	5/16"	3"	2 15/16"	5/8"	17 7/8"	18 5/8"	20 1/4"	295#	330#	36 1/8" X 39 5/16" X 49 9/16"
	2	X	O	O	O	35"	39 1/8"	3 7/8"	7/8"	6 9/16"	28 7/16"	9 1/8"	5/16"	3"	2 15/16"	5/8"	16 1/2"	17"	16 1/4"	272#	310#	36 1/8" X 39 5/16" X 42 3/4"
		208-230-1-60	230-1-60	208/230-3-60	460-3-60																	

X = YES
O = NO

NOTES:

1. ALLOW 30" CLEARANCE TO SERVICE SIDE OF UNIT, 48" ABOVE UNIT, 6" ON ONE SIDE, 12" ON REMAINING SIDE, AND 24" BETWEEN UNITS FOR PROPER AIRFLOW.
2. MINIMUM OUTDOOR OPERATING AMBIENT IN COOLING MODE IS 55°F, MAX. 125°F.
3. SERIES DESIGNATION IS THE 13TH POSITION OF THE UNIT MODEL NUMBER.
4. CENTER OF GRAVITY ⊕.





UNIT SIZE	MINIMUM MOUNTING PAD DIMENSIONS
-	26" X 26"
18,24,30	31 1/2" X 31 1/2"
36,42,48,60	35" X 35"