THE TERRACES APARTMENT PROJECT

NOISE STUDY

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August 2022

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MURIETTA, CALIFORNIA
Noise Study

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NOISE STUDY

This report is an analysis of the potential noise impacts associated with The Terraces Apartment Project proposed for construction in the City of Murrieta, Riverside County. The report has been prepared by Birdseye Planning Group, LLC, under contract to the applicant to support the entitlement process and address a request from the City of Murrieta Planning Department. This study analyzes the potential for temporary impacts associated with construction activity, long-term impacts associated with traffic on neighboring roadways and operation of the various project elements described herein on a site located northwest of the Murrieta Hot Springs Road and Sparkman Court intersection in the City of Murrieta, California.

PROJECT DESCRIPTION

The proposed Project would construct 899 apartment units on a 38.7 gross (31.39 net) acre Site located north of Murrieta Hot Springs Road, west of Interstate 15, east of the existing Sparkman Court corridor and south of Vista Murrieta Road in the City of Murrieta, California (APNs 910-031-001, -002, -003, -004, -005, -007, -008, -009, -010, -015, -017, -018, -021, -022, -023, -024, -025 and -026; 949-190-012, -013, -014, -015, -016 -017, -018 and -019). The Site is bordered to the south by Murrieta Hot Springs Road and undeveloped land, to the west by the Interstate 15 corridor, to the north by Vista Murrieta Road and single-family residences, and to the east by Sparkman Court and office research park uses. See Figure 1 – Project Location.

The Project consists of 11, four-story apartment buildings and 12 two-story carriage unit buildings in two phases. Phase I consists of buildings B1 and B6-B11 containing 634 one-, two- and three-bedroom units ranging in size from 743 square feet to 1,292 square feet. A total of 24 two-story, one-bedroom/one-bathroom (1,052 square feet) carriage units will also be constructed in Phase I. A total of 1,135 parking spaces (312 garage spaces, 216 tandem spaces, 22 parallel and 585 open stall) will be provided. A leasing center, clubhouse, swimming pool and various walking paths and green space areas will be provided throughout the Project. A dog park and other outdoor open space area will be provided at the northeast corner of the Site. Phase 2 consists of 241 one- and two-bedroom units in Buildings B2-B5 and 379 parking spaces (86 garage, 86 tandem, 14 parallel and 193 open stalls). In total, the Project will provide 359 one-bedroom/one-bathroom units, 482 two-bedroom/two-bathroom units and 58 three-bedroom/two-bathroom units.

The main Project entrance will be on Monroe Avenue north of Murrieta Hot Springs Road. Secondary access will be provided from Vista Murrieta Road along the northern Site boundary. A 28-foot wide, paved and gated emergency vehicle access will be constructed along the southern Site boundary between Sparkman Court and the Interstate 15 northbound on-ramp. The Project will be required to construct a full width segment of Monroe Avenue in the

Figure 1 — Vicinity Map **- Project Site**

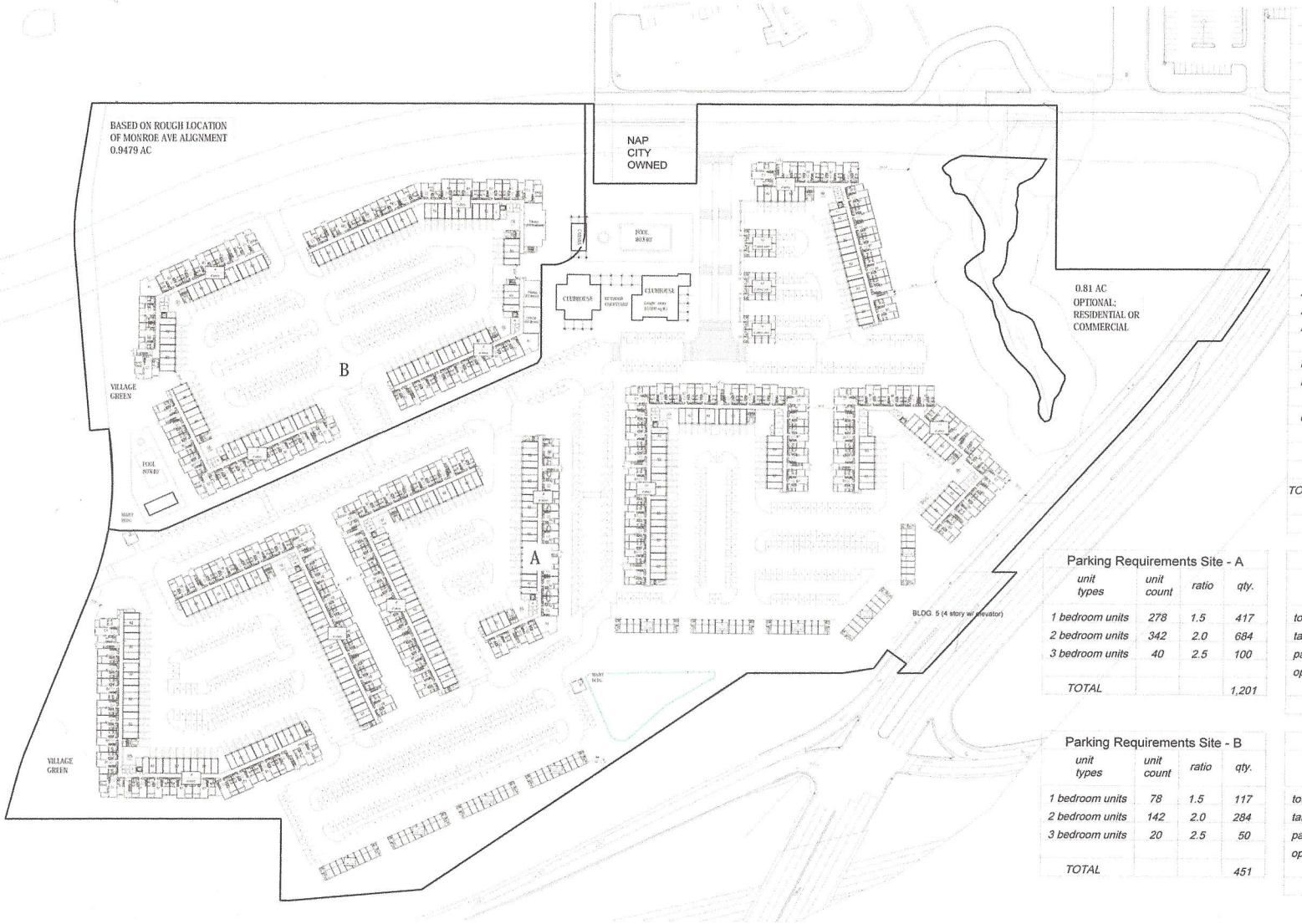
Sparkman Court corridor from Walsh Center Drive southeast to the existing Eastern Municipal Water District (EMWD) wastewater lift station and then half width improvements will be required from that point south. These improvements will terminate just north of the intersection with Murrieta Hot Springs Road. The Project will be required to pay a fair share of costs to install a new traffic signal at the intersection of Sparkman Court (Monroe Avenue) and Murrieta Hot Springs Road. Further, half width frontage improvements (i.e., paving the road and adding curb/gutter/sidewalk) along Vista Murrieta Road between old Monroe Avenue northwest of the Site to the new Monroe Avenue alignment at the northeast corner of the Site will be required.

Eastern Municipal Water District (EMWD) will provide water and sewer service to the Site. The Project will extend existing sewer lines to the Site from an existing mainline located north of Sparkman Court/Monroe Avenue lift station. A new 18" water main will be installed in the old Monroe Avenue alignment from the northwest corner of the Site at the Vista Murrieta Road intersection north to Los Alamos Road. Construction will utilize an open trench on either side of an existing at-grade jurisdictional crossing. Directional drilling will be used to install the waterline under the jurisdictional feature to avoid directly impacting this resource. Wet and dry utility improvements will occur while road improvements are being installed to minimize the need for road closure and overall construction-related impacts to neighboring residents.

Offsite runoff will be treated with modular wetland systems. Onsite Project runoff will be treated with a combination of modular wetland systems and biofiltration basins. Both off- and on-site stormwater will be mitigated for hydromodification with underground basins. The total area dedicated to an on-site stormwater management system will be approximately 0.38 acres.

The proposed Project contains two drainage features. Drainage 1 as it is referred to herein, is located at the southeastern corner of the Site. This area will not be affected by the Project. Drainage 2 is located in the northern portion of the Site. The Project will remove this drainage which totals 0.06 acres and 795 linear feet of US Army Corps of Engineers/Regional Board non-wetland waters and 0.06 acres and 795 linear feet of CDFW jurisdictional streambed/riparian habitat. The applicant will purchase mitigation credits through the Riverpark Mitigation Bank at a ratio of 3:1 for a total of 0.18 acres to compensate for the loss of non-wetland jurisdictional resources comprising Drainage 2.

Project construction is scheduled to begin in late 2023 with Phase I completed in early 2026. Build out of Phase II is expected by 2028. The proposed Site plan is shown on Figure 2 – Site Plan. Construction activities are expected to occur five days per week, 8 hours per day, between 8:00 am and 5:00 pm.



Project Description

SITE NET AREA	29.33 acres
SITE ADDRESS	
TOTAL UNITS	900 units
DENSITY ON GROSS AREA	30.70 DU/AC

Total Unit Mix

unit type		unit count	unit area
A1	1bed / 1bath	216	756 s.f.
A2	1bed / 1bath	116	804 s.f.
A3	1bed / 1bath	24	1052 s.f.
	total	356	39%
B1	2 bed / 2 bath	266	1,047 s.f.
B2	2 bed / 2 bath	218	1,060 s.f.
	total	484	54%
C1	3 bed / 2 bath	60	1,292 s.f.
	total	60	7%
TOTAL		900 UNITS	
		866,457 NRSF	
		962.7 AVG. NRSF	

Parking Requirements Site - A

unit types	unit count	ratio	qty.
1 bedroom units	278	1.5	417
2 bedroom units	342	2.0	684
3 bedroom units	40	2.5	100
TOTAL			1,201

Parking Provided Site - A

parking type	parking count	%	
total garage	312	27%	
tandem	216	19%	
parallel	22	2%	
open stall	604	52%	
TOTAL	1,154	1.7 spaces/du	

Parking Requirements Site - B

unit types	unit count	ratio	qty.
1 bedroom units	78	1.5	117
2 bedroom units	142	2.0	284
3 bedroom units	20	2.5	50
TOTAL			451

Parking Provided Site - B

parking type	parking count	%	
total garage	86	22%	
tandem	86	16%	
parallel	14	2%	
open stall	222	60%	
TOTAL	408	1.7 spaces/du	

NORTH

SCALE : 1"=60'
DATE: 01-15-212
JOB NO.: 2021-230

A1.2

The Terraces at Murrieta
GREYSTAR

MURRIETA, CA

PRELIMINARY SITE PLAN

AO ARCHITECTS
144 NORTH ORANGE ST., ORANGE, CA 92866
(714) 639-9860
Architecture. Design. Relationships.

Figure 2 — Site Plan

SETTING

Overview of Sound Measurement

Noise level (or volume) is generally 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 to be consistent with that of human hearing response, which is most sensitive to frequencies around 4,000 Hertz (about the highest note on a piano) and less sensitive to low frequencies (below 100 Hertz).

Sound pressure level is measured on a logarithmic scale with the 0 dB level based on the lowest detectable sound pressure level that people can perceive (an audible sound that is not zero sound pressure level). Based on the logarithmic scale, a doubling of sound energy is equivalent to an increase of 3 dBA, and a sound that is 10 dBA less than the ambient sound level has no effect on ambient noise. Because of the nature of the human ear, a sound must be about 10 dBA greater than the reference sound to be judged as twice as loud. In general, a 3 dBA change in community noise levels is noticeable, while 1-2 dB changes generally are not perceived. Quiet suburban areas typically have noise levels in the range of 40-50 dBA, while arterial streets are in the 50-60+ dBA range. Normal conversational levels are in the 60-65 dBA range, and ambient noise levels greater than 65 dBA can interrupt conversations. Noise levels typically attenuate (or drop off) at a rate of 6 dBA per doubling of distance from point sources (i.e., industrial machinery). Noise from lightly traveled roads typically attenuates at a rate of about 4.5 dBA per doubling of distance. Noise from heavily traveled roads typically attenuates at about 3 dBA per doubling of distance. Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. The manner in which older homes in California were constructed (approximately 30 years old or older) generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units and office buildings construction to California Energy Code standards is generally 30 dBA or more (HMMH, 2006).

In addition to the actual instantaneous measurement of sound levels, the duration of sound is important since sounds that occur over a long period of time are more likely to be an annoyance or cause direct physical damage or environmental stress. One of the most frequently used noise metrics that considers both duration and sound power level is the equivalent noise level (Leq). The Leq is defined as the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time (essentially, the average noise level). Typically, Leq is summed over a one-hour period. Lmax is the highest RMS (root mean squared) sound pressure level within the measuring period, and Lmin is the lowest RMS sound pressure level within the measuring period.

The time period in which noise occurs is also important since noise that occurs at night tends to be more disturbing than that which occurs during the day. Community noise is usually

measured using Day-Night Average Level (Ldn), which is the 24-hour average noise level with a 10-dBA penalty for noise occurring during nighttime (10 p.m. to 7 a.m.) hours, or Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with a 5 dBA penalty for noise occurring from 7 p.m. to 10 p.m. and a 10 dBA penalty for noise occurring from 10 p.m. to 7 a.m. Noise levels described by Ldn and CNEL usually do not differ by more than 1 dB. Daytime Leq levels are louder than Ldn or CNEL levels; thus, if the Leq meets noise standards, the Ldn and CNEL are also met. Table 1 shows sounds levels of typical noise sources in Leq.

Sensitive Receptors

Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with each of these uses. Urban areas contain a variety of land use and development types that are noise sensitive including residences, schools, churches, hospitals and convalescent care facilities. The closest sensitive receptors are single-family residences located north of the site and multi-family residences located adjacent to the northeastern corner of the site southeast of the Walsh Center Drive and Sparkman Court intersection.

Table 1. Sound Levels of Typical Noise Sources and Noise Environments

Noise Source (at Given Distance)	Noise Environment	A-Weighted Sound Level (Decibels)	Human Judgment of Noise Loudness (Relative to Reference Loudness of 70 Decibels*)
Military Jet Takeoff with Afterburner (50 ft)	Carrier Flight Deck	140	128 times as loud
Civil Defense Siren (100 ft)		130	64 times as loud
Commercial Jet Take-off (200 ft)		120	32 times as loud **Threshold of Pain**
Pile Driver (50 ft)	Rock Music Concert Inside Subway Station (New York)	110	16 times as loud
Ambulance Siren (100 ft) Newspaper Press (5 ft) Gas Lawn Mower (3 ft)		100	8 times as loud **Very Loud**
Food Blender (3 ft) Propeller Plane Flyover (1,000 ft) Diesel Truck (150 ft)	Boiler Room Printing Press Plant	90	4 times as loud
Garbage Disposal (3 ft)	Noisy Urban Daytime	80	2 times as loud

Passenger Car, 65 mph (25 ft) Living Room Stereo (15 ft) Vacuum Cleaner (10 ft)	Commercial Areas	70	Reference Loudness **Moderately Loud**
Normal Speech (5 ft) Air Conditioning Unit (100 ft)	Data Processing Center Department Store	60	1/2 as loud
Light Traffic (100 ft)	Large Business Office Quiet Urban Daytime	50	1/4 as loud
Bird Calls (distant)	Quiet Urban Nighttime	40	1/8 as loud **Quiet**
Soft Whisper (5 ft)	Library and Bedroom at Night Quiet Rural Nighttime	30	1/16 as loud
	Broadcast and Recording Studio	20	1/32 as loud **Just Audible**
		0	1/64 as loud **Threshold of Hearing**

Source: Compiled by dBF Associates, Inc., 2016

Project Site Setting

The project area is a mix of rural residential, commercial and office uses. Thus, the most common and primary sources of noise in the project site vicinity are motor vehicles (e.g., automobiles and trucks) on Murrieta Hot Springs Road, Vista Murrieta Road, Sparkman Court and Walsh Center Drive. Traffic noise from Interstate 15 (located adjacent to and west of the site) dominates the noise environment within the project area; and thus, significantly contributes to ambient conditions. Motor vehicle noise is of concern because where a high number of individual events occur, it can create a sustained noise level.

To gather data on the general noise environment at the project site, five weekday morning 15-minute noise measurements was taken on December 16, 2021. The monitoring sites were located along the northern and southern boundaries of the western portion of the site. The monitoring site was selected to approximate existing ambient noise conditions at both the project site and adjacent sensitive properties. The measurements were taken using an ANSI Type II integrating sound level meter. The predominant noise source was traffic. The temperature during monitoring was 40-45 degrees Fahrenheit with no perceptible wind. Monitoring locations 1-3 were along the western property boundary. Noise levels are dominated by traffic on Interstate 15 and the northbound on-ramp. Only traffic volumes on the ramp were counted. Noise from traffic operating on the I-15 was estimated using California Department of Transportation counts. Noise from Interstate 15 is screened at Site 4 by topography and distance. and contributes to background ambient conditions at Site 5.

During monitoring, 224 cars/light trucks, nine medium (two-axles and six wheels) and three heavy trucks (i.e., more than two-axles and six wheels) passed Site 1; 230 cars/light trucks, nine

medium trucks and zero heavy trucks passed by during measurements at Site 2 and 170 cars/light trucks, nine medium trucks and five heavy trucks passed during measurements at Site 3. During monitoring, two cars/light trucks, zero medium (two-axles and six wheels) and zero heavy trucks (i.e., more than two-axles and six wheels) passed Site 4; four cars/light trucks, zero medium trucks and zero heavy trucks passed by during measurements at Site 5. Table 2 identifies the noise measurement locations and measured noise level. The monitoring location is shown in Figure 3. As shown, the Leq was 70.2 dBA at Site 1 and 63.1 dBA at Site 2, 70.3 dBA at Site 3; 49 dBA at Site 4 and 54.2 dBA at Site 5. The monitoring data sheet is provided as Appendix A.

Regulatory Setting

In 1976, the California Department of Health, State Office of Noise Control published a recommended noise/land use compatibility matrix which many jurisdictions have adopted as a standard in their general plan noise elements. The California State Office of Planning and Research 2017 updates to the General Plan Guidelines, Appendix D Noise Element Guidelines, Figure 2, shows that exterior noise levels up to 60 dBA (CNEL or Ldn) are normally compatible in rural residential areas. Noise levels up to 70 dBA (CNEL or Ldn) are conditionally compatible.

Table 2
Noise Monitoring Results

Measurement Location	Primary Noise Source	Sample Time	Leq (dBA)
1. Near southwest corner of project site.	Traffic	Weekday morning	70.2
2. Near center of western site boundary.	Traffic	Weekday morning	63.1
3. Northwestern site boundary	Traffic	Weekday morning	70.3
4. Intersection of Vista Murrieta Road and Jackson Avenue	Traffic	Weekday morning	46.3
5. Intersection of Sparkman Court and Walsh Center Drive	Traffic	Weekday morning	54.2

Source: Field visit using ANSI Type II Integrating sound level meter.

City of Murrieta Noise Ordinance

Section 16.30.130 (A) of the Murrieta Municipal Code states the following:

Construction Noise. Violations of the noise ordinance are considered to occur when one more both of the following occur:

Figure 3 — Monitoring Locations ▭ **- Project Site** ● **- Monitoring Locations**

1. Operating or causing the operation of tools or equipment used in construction, drilling, repair, alteration, or demolition work between weekday hours of 7:00 p.m. and 7:00 a.m., or at any time on Sundays or holidays;

2. Maximum noise levels for nonscheduled, intermittent, short-term operation (less than ten days) of mobile equipment shall be conducted in a manner that the maximum noise levels at affected structures will not exceed an exterior level of 80-dBA at multifamily residences and 75-dBA at single-family residences between the hours of 7:00 a.m. and 8:00 p.m. daily except Sunday's and legal holidays.

Operation Noise. Section 16.30.090 of the Murrieta Municipal Code limits exterior noise levels at residential properties to 50-dBA from 7:00 a.m. to 10:00 p.m. and 45-dBA from 10:00 p.m. to 7:00 a.m.

Section 16.30.100 (B) limits interior noise levels in multifamily residential properties to 45-dBA from 7:00 a.m. to 10:00 p.m. and 40-dBA from 10:00 p.m. to 7:00 a.m.

Stationary Nonemergency Signaling Devices. Sounding or permitting the sounding of an electronically amplified signal from a stationary bell, chime, siren. whistle, or similar device intended primarily for nonemergency purposes, from any place, for more than ten consecutive seconds in any hourly period is prohibited.

City of Murrieta General Plan Noise Element

The State of California General Plan Guidelines, published by the state Governor's Office of Planning and Research (OPR), provides guidance for the acceptability of specific land use types within areas of specific noise exposure. Table 3, *Land Use Compatibility for Community Noise Environments*, presents guidelines for determining acceptable and unacceptable community noise exposure limits for various land use categories. The guidelines also present adjustment factors that may be used to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

Table 3
Land Use Compatibility for Community Noise Environments

Land Use	Normally Acceptable[a]	Conditionally Acceptable[b]	Normally Unacceptable[c]	Clearly Unacceptable[d]
Single-Family, Duplex, Mobile Homes	50-60	55-70	70-75	Above 70
Multifamily	50-65	60-70	70-75	Above 70
Transient Lodging – Hotels, Motels	50-65	60-70	70-80	Above 80
School, Libraries, Churches, Hospitals, Nursing Homes	50-70	60-70	70-80	Above 80
Auditoriums, Concert Halls, Amphitheaters	-	50-70	-	Above 65
Sports Arena, Outdoor Spectator Sports	-	50-75	-	Above 70
Playgrounds, Neighborhood Parks	50-70	-	67-75	Above 72

Golf Courses, Riding Stables, Water Recreation, Cemeteries	50-75	-	70-80	Above 80
Office Building, Business and Professional, Commercial	50-70	67-77	Above 75	-
Industrial, Manufacturing, Utilities, Agriculture	50-75	70-80	Above 75	-

[a] Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.
[b] Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning would normally suffice.
[c] Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
[d] Clearly Unacceptable: New construction or development should generally not be undertaken.

Note: Noise levels are provided in A-weighted decibels, CNEL.
Source: Office of Noise Control, California Department of Health

Ambient conditions are within the conditional compatible range shown above for single-family and multifamily residential referenced in Table 3; thus, whether a traffic-related noise impact would occur is based on whether project traffic, when added to the existing traffic, would cause noise to noticeably increase over ambient conditions (i.e., +3 dBA) and/or exceed the single- and multifamily residential compatibility criteria.

Vibration. Section 16.30.030 of the Murrieta Municipal Code provides a definition of vibration and stating that the minimum ground or structure-borne vibrational motion necessary to cause a normal person to be aware of the vibration including, but not limited to, sensation by touch or visual observations of moving objects. The perception threshold shall be presumed to be a motion velocity of 0.01 in/sec) (65 VdB) within the range of one to one hundred (100) Hertz. This is provided in the Municipal Code as guidance for discussions regarding this issue.

While the vibration velocity level threshold of perception for humans is approximately 65 VdB, a vibration velocity of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels for many people. The range of interest is from approximately 50 VdB, which is the typical background vibration velocity, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings.

With respect to potential ground-borne vibration impacts on structures, the Federal Transit Administration states that ground-borne vibration levels in excess of PPV 0.2 inches/second (100 VdB) could damage fragile buildings and levels in excess of PPV 0.12 inches/second (95 VdB) could damage extremely fragile historic buildings. No historic buildings occur on the site or are known to occur near the site. The closest receivers are not considered fragile or historic buildings; however, to conservatively estimate potential vibration impacts, a PPV of 0.2 inches per second (100 VdB) is used herein.

Construction activities such as blasting, pile driving, demolition, deep excavation and drilling have the potential to generate ground vibration levels that approximate PPV 0.12 in/sec (95

VdB) range. With the exception of demolishing or removing the existing manufactured home, the proposed project will not require these types of construction activities. Excavation, grading and compaction of soils will be required for the building slabs and foundations. Parking lot surface grading would also be required to prepare soils to accommodate the base material and asphalt pavement. Potential impacts are identified based on the use of typical grading equipment and distance from the neighboring structures.

IMPACT ANALYSIS

Methodology and Significance Thresholds

Construction noise estimates are based upon noise levels reported by the Federal Transit Administration, Office of Planning and Environment, and the distance to nearby sensitive receptors. Reference noise levels from that document were used to estimate noise levels at nearby sensitive receptors based on a standard noise attenuation rate of 6 dB per doubling of distance (free field propagation of sound attenuation).

The proposed project would be a new use; thus, noise levels associated with existing and future traffic were based on the difference in trip volumes between existing conditions and the proposed use as stated above. A doubling of traffic volumes would be required to cause a noticeable increase (3 dBA) in traffic noise. Baseline conditions currently exceed 70 dBA at the higher elevations on the western boundary of the project site and will remain at this level with the project. Noise levels interior to the site and at both multi- and single-family receivers proximal to the site are within the normally and conditionally acceptable range for single-family receivers located east and north of the site. Thus, the baseline and with project sound levels were calculated to determine whether the project would generate enough traffic to noticeably increase (+3 dBA or greater) the Leq over baseline conditions.

As noted, a noise increase greater than 3 dBA is readily perceptible to the average human ear; and thus, is the level considered a substantial noise increase related to traffic operations. For the purpose of this evaluation, the peak hour Leq is used for traffic noise as it provides a conservative estimate of potential noise levels. The impact determination is based on whether noise levels would exceed those levels considered acceptable for residential areas and whether the interior day (45 dBA) and nighttime (45 dBA) noise standard would be met.

Temporary Construction Noise

The primary noise sources during construction would include heavy machinery used during, grading and clearing the site, as well as equipment used during building construction and paving. It is important to note that during construction of Phase I, the site would be mass graded with building pads for both Phase I and II created. Construction of Phase II may require remedial grading; however, noise associated with heavy equipment operation would be most intensive during Phase I. Table 4 shows typical noise levels associated with heavy construction equipment. As shown, average noise levels associated with the use of heavy equipment at

construction sites can range from about 81 to 95 dBA at 25 feet from the source, depending upon the types of equipment in operation at any given time and phase of construction (Hanson, Towers, and Meister, May 2006).

Noise-sensitive uses near the project site are the existing residences located north of the site along Vista Murrieta Road and east of the site along Sparkman Court at the Walsh Center Drive intersection. During construction of Phase II, the Phase I units would also be considered noise sensitive. Table 5 shows typical maximum construction noise levels at various distances from construction activity based on a standard noise attenuation rate of 6 dBA per doubling of distance. The noise level used to estimate the maximum noise level that could occur is based on use of a bulldozer as it is likely to be the noisiest type of equipment used over a sustained period of time in proximity to neighboring residences during site preparation and grading activities. Actual noise levels will fluctuate throughout the day but may periodically reach or exceed 88 dBA at the property lines (or 25 feet from operating equipment) depending on the type and location of equipment used and whether multiple pieces of equipment are operating simultaneously in the same area.

With respect to noise associated with fill import, the project would require approximately 4,300 cubic yards of imported material. Assuming 16 cubic yards per truck, a total of 538 one-way truck trips would be required. The site preparation and grading phases, during which fill material will be delivered to the site, is projected to occur over 105 days. Assuming truck trips occur at the same rate each day, approximately 5 daily trips would be required to deliver the fill material. Murrieta Hot Springs Road would be the likely route of travel. The addition of 5 daily truck trips to Murrieta Hot Springs Road and Sparkman Court will not affect baseline noise levels.

As referenced, section 16.30.130 (A) of the Murrieta Municipal Code states that a violation of the noise ordinance could occur when construction activities occur between weekday hours of 7:00 p.m. and 7:00 a.m., or at any time on Sundays or holidays and/or if construction activities exceed 75-dBA at single-family residences between the hours of 7:00 a.m. and 8:00 p.m. daily except Sunday's and legal holidays.

Table 4
Typical Maximum Construction Equipment Noise Levels

Equipment Onsite	Typical Maximum Level (dBA) 25 Feet from the Source	Typical Maximum Level (dBA) 50 Feet from the Source	Typical Maximum Level (dBA) 100 Feet from the Source
Air Compressor	84	79	73
Backhoe	84	79	73
Bobcat Tractor	84	79	73
Concrete Mixer	85	78	72
Bulldozer	88	82	76
Jack Hammer	95	89	83

Table 4
Typical Maximum Construction Equipment Noise Levels

Equipment Onsite	Typical Maximum Level (dBA) 25 Feet from the Source	Typical Maximum Level (dBA) 50 Feet from the Source	Typical Maximum Level (dBA) 100 Feet from the Source
Pavement Roller	86	80	74
Street Sweeper	88	82	76
Man Lift	81	75	69
Dump Truck	82	76	70

Source: Noise levels based on FHWA Roadway Construction Noise Model (2006) Users Guide Table 1.
Noise levels based on actual maximum measured noise levels at 50 feet (Lmax).
Noise levels assume a noise attenuation rate of 6 dBA per doubling of distance.

Under existing conditions, the nearest sensitive properties are the Vista Pointe Apartments located adjacent to east of th3e site at the Sparkman Court/Walsh Center Drive intersection. Multiple single-family residences are also located along Vista Murrieta Road. The nearest buildings are approximately 100 feet east of the property line and 150 north of the property line. Construction in proximity to the residences would include clearing/grubbing and grading for the building pads and stormwater basins, installation of subsurface utilities, construction of the buildings, paving and related improvements. Construction noise at the neighboring properties would be audible and could exceed the 75-dBA threshold at the residences depending on the equipment used and the duration of use. Similarly, construction activities associated with Phase II would occur within 50 feet of Phase I units; thus, the 75-dBA threshold could also be exceeded.

Table 5
Typical Maximum Construction Noise Levels at Various Distances from Project Construction

Distance from Construction	Maximum Noise Level at Receptor (dBA)
25 feet	88
50 feet	82
100 feet	76
250 feet	70
500 feet	64
1,000 feet	58

Off-site improvements would include installation of a new water main along the old Monroe Avenue alignment between Vista Murrieta Road and Los Alamos Road; construct a full width segment of Monroe Avenue in the Sparkman Court corridor from Walsh Center Drive southeast to the existing EMWD wastewater lift station and then half width improvements will be

required from that point south. Construction noise levels could also exceed 75-dBA at adjacent receivers during construction of these improvements.

Grading activities at a distance of 100 feet or more would attenuate to below 75-dBA at the neighboring residences. Noise associated with building construction and paving would attenuate to below 75 dBA at shorter distances. To avoid a violation of the noise ordinance, implementation of the following mitigation measures is recommended during site preparation and grading activities requiring the use of a bulldozer or similar heavy equipment in proximity to the adjacent residences:

M-NOI-1 Construction Equipment. The Proposed Project applicant or its designee shall take those steps necessary to ensure that, whenever feasible, electrical power shall be used to run air compressors and similar power tools.

M-NOI-2 Internal Combustion Engines. The Proposed Project applicant or its designee shall require equipment be equipped with an exhaust muffler of a type recommended by the manufacturer, equipped with engine shrouds/operated per manufactures recommendations and properly maintained. . All diesel equipment should be operated with closed engine doors and should be equipped with factory-recommended mufflers. Construction equipment that continues to generate substantial noise at the project boundaries should be shielded with temporary noise barriers, such as barriers that meet a sound transmission class (STC) rating of 25, sound absorptive panels, or sound blankets on individual pieces of construction equipment.

M-NOI-3 Stationary Noise-Generating equipment. The Proposed Project applicant or its designee shall locate generators and compressors, as far as practically possible from the nearest residential property lines or internal residential as part of Phase I construction.

M-NOI-4 **Limit Operations Adjacent to Receivers**. The Proposed Project applicant or its designee shall limit the number of large pieces of equipment (i.e., bulldozers or concrete mixers) operating adjacent to receivers to one at any given time.

M-NOI-5 Neighbor Notification. The Proposed Project applicant or its designee shall provide notification to residential occupants adjacent to the project site at least two weeks prior to initiation of construction activities that could result in noise levels of 75-dBA at adjacent residences. This notification should include the anticipated hours and duration of construction and a description of noise reduction measures being implemented at the project site. The notification should include a telephone number to call to submit complaints associated with construction noise.

M-NOI-6 Noise Control Plan. The Proposed Project applicant or its designee shall require construction contractors to develop and submit to the City for approval prior to issuance of a grading permit. The noise control plan shall include a noise control

monitoring program to ensure sustained construction noise levels do not exceed 75 decibels at the adjacent single-family residence. The plan may include the following requirements:

- Contractor shall turn off idling equipment.
- Contractor shall perform noisier operation during the times least sensitive to receptors.
- All diesel equipment shall be operated with closed engine doors and shall be equipped with factory- recommended mufflers.
- Electrical power shall be used to run air compressors and similar power tools and to power any temporary structures, such as construction trailers or security staff facilities.
- For all noise-generating construction activities, additional noise attenuation techniques shall be employed as necessary to reduce noise levels. Such techniques shall include, but are not limited to, the use of sound blankets, noise shrouds and temporary sound barriers.

M-NOI-7 Equipment Storage. The Proposed Project applicant or its designee shall take those steps necessary to ensure that equipment staging areas are located as far as feasible from occupied residences and adjacent residential units.

The above mitigation measures would be implemented at the discretion of the City of Murrieta. The applicant and contractor would be responsible for preparing the Noise Control Plan for City review/approval and implementation throughout the duration of construction (both Phases 1 and II). The City of Murrieta Planning Department would be responsible for monitoring implementation and enforcing corrective action should that be required.

Temporary Construction-Related Vibration

This discussion focuses on temporary vibration caused by construction as the use of residential buildings do not cause vibration. The residential structures to the east (Vista Pointe Apartments) are located approximately 100 feet from the property line and active grading area. Based on the information presented in Table 6, vibration levels from operation of a large bulldozer would be approximately 79 VdB or less at 100 feet (Caltrans 2013). As discussed, a PPV of 0.2 inches/second (100 VdB) is the vibration energy required to damage fragile historic buildings. While vibration from grading may be perceived at neighboring residences north and east of the site, the vibration energy would be well below that required to cause structural damage. Temporary vibration impacts would be **less than significant.**

Table 6
Vibration Source Levels for Construction Equipment

Equipment	Approximate VdB				
	25 Feet	50 Feet	60 Feet	75 Feet	100 Feet
Large Bulldozer	91	85	83	82	79
Loaded Trucks	90	84	82	81	78
Jackhammer	94	88	86	85	82
Loader	86	80	78	77	74

Source: FTA, 2018

Operational Noise Exposure

Operation of the proposed project was evaluated for potential exterior traffic related impacts caused by increased traffic volumes associated with the project as well as interior noise levels caused by traffic.

Exterior Traffic Noise. Traffic is the primary noise source that would be generated by the proposed project. Existing measured noise levels are with the compatible or conditionally compatible range referenced above, with the exception of the western portion of the project site. Noise levels in this area are dominated by Interstate 15 and measured noise levels reach or slightly exceed the conditionally compatible limits. Thus, whether a traffic-related noise impact would occur is based on whether project traffic, when added to the existing traffic, would cause the Leq to noticeably increase (+3 dBA) or exceed the 55-70 dBA conditionally compatible exterior standard for residential properties referenced in the Murrieta General Plan Noise Element.

The adjacent roadway network (Interstate 15, Murrieta Hot Springs Road, Vista Murrieta Road and Sparkman Court (Monroe Avenue) was modeled using the Federal Highway Administration Traffic Noise Model (TNM) version 2.5 software to estimate project related traffic noise impacts. The model calculates traffic noise at receiver locations based on traffic volumes, travel speed, mix of vehicle types operating on the roadways (i.e., cars/trucks, medium trucks and heavy trucks) and related factors. Traffic volumes and vehicle mix on obtained during the monitoring period were used to calibrate TNM. The 15-minute counts were multiplied by four to obtain hourly traffic counts. The model was calibrated to calculate noise levels that are +/- 2 dBA those measured on-site (Birdseye Planning Group, January 2021). Traffic volumes along Murrieta Hot Springs Road and Vista Murrieta Road are based on 24-hour counts collected by the City of Murrieta (2018). To estimate the hourly Leq, 10 percent of the 24-hour volumes were used for modeling purposes.

Traffic volumes used for the existing and cumulative with project impact analysis were obtained from the Traffic Impact Analysis (Linscott, Law and Greenspan, Transportation

Engineers, Inc., January 2022). The project is estimated to generate approximately 384 morning peak hour trips with all trips assumed to distribute east and south to exit the project site. The 384 trips were distributed within the modeled road network as were cumulative trips on the Monroe Avenue extension and Vista Murrieta Road to determine the change in noise levels associated with the project at neighboring sensitive properties.

As stated, peak hour project trips were added to baseline conditions to determine whether the Leq at the following receivers would noticeably change or exceed the conditionally compatible criteria for the existing single-family residences located in proximity to the site or the at the project site. The following receiving properties were modeled:

1. Vista Pointe Apartments located at 46080 Walsh Center Drive east of the project site;
2. Residence located adjacent to and north of the site at 25200 Monroe Avenue;
3. Residence located northwest Vista Murrieta Road/Jackson Road intersection;
4. Project units at northwest corner of the site;
5. Carriage units located near the center of the site along the western boundary;
6. Carriage units located at the southwestern corner of the site; and
7. Project units along the proposed extension of Monroe Avenue southwest of Vista Murrieta Road and Monroe Avenue when extended.

As stated, traffic is the primary noise source that would be generated by the proposed project. Existing measured noise levels are within the compatible and conditionally compatible range at receivers proximal to the site. Noise levels along the western project boundary are on the line between conditionally compatible and normally incompatible. Thus, whether a traffic-related noise impact would occur is based on whether project traffic, when added to the existing traffic, would cause the Leq to noticeably increase (+3 dBA) or exceed the 55-70 dBA conditionally compatible exterior standard for residential properties referenced in the Murrieta Municipal Code. Because of the baseline conditions along the western project boundary, impacts at the units facing Interstate 15 are not considered significant if interior standards can be met. Noise impacts associated with the project would be concentrated at the above referenced receptors along Vista Murrieta Road and the Monroe Avenue extension. The receiver locations are shown in Figure 4. Existing noise levels are shown in Table 7.

Table 7
Modeled Noise Levels

Receptor	Existing Leq	Exceed Standard?	With Project Leq	dBA Change	Significant Impact
Receiver 1	57.6	No	60.4	+2.8	No
Receiver 2	55.8	No	58.4	+2.6	No
Receiver 3	58.1	No	59.1	+1.0	No
Receiver 4	70.3	Yes	72.0	+1.7	No
Receiver 5	64.3	No	67.0	+2.7	No
Receiver 6	71.1	Yes	71.2	-0.1	No
Receiver 7	57.9	No	58.4	+0.5	No

A project related noise impact would occur under conditions where the project causes the Leq to exceed the noise compatibility criteria shown in Table 2. As shown in Table 7, existing traffic

Figure 4 — Noise Receivers **- Project Site** **- Receivers**

related noise levels do not exceed the standards at existing receivers. Noise levels do exceed 70 dBA at the northwest and southwest corners of the site under existing conditions. Figure 5 shows the approximate contour lines for 70 dBA, 65 dBA and 60 dBA. The noise level at Receiver 5 is within the compatibility criteria; however, the elevation of this location is proximal to the adjacent freeway elevation which provides some shielding. While noise levels at Receivers 1, 2, 3 and 7 would increase, with project conditions would meet the normally or conditionally compatible criteria. Noise levels at Receivers 4, 5 and 6 would increase as a result of cumulative traffic on the Interstate 15 on-ramp and mainline north of the ramp. Exterior traffic noise levels at Receivers 4 and 6, which represent the carriage units along the western property boundary, would exceed 70 dBA. However, baseline noise levels exceed 70 dBA and the project would not cause a noticeable increase in exterior noise levels at the carriage units. Construction of a noise barrier along the western property line to attenuate freeway noise would not be a cost-effective solution given the number of units that would be west of the 70 dBA contour. Rather, implementation of mitigation M-NOI-8 would ensure the interior standards are met at the units located within the 70 dBA contour.

Interior Traffic Noise. California Energy Code Title 24 standards specify construction methods and materials that result in energy efficient structures and up to a 30 dBA reduction in exterior noise levels (assuming windows are closed). This includes operation of mechanical ventilation (e.g. heating and air conditioning), in combination with standard building construction that includes dual-glazed windows with a minimum Sound Transmission Class (STC) rating of 26 or higher. When windows are open, the insertion loss drops to about 10 dBA.

As stated above, Section 16.30.100 (B) of the Municipal Code limits interior noise levels in multifamily residential properties to 45-dBA from 7:00 a.m. to 10:00 p.m. and 40-dBA from 10:00 p.m. to 7:00 a.m. Section 16.30.090 of the Murrieta Municipal Code limits exterior noise levels at residential (single-family) properties to 50-dBA from 7:00 a.m. to 10:00 p.m. and 45-dBA from 10:00 p.m. to 7:00 a.m. It is unknown whether the existing residences were constructed consistent with current Title 24 standards and the interior decibel reduction may be less than the 30-dBA referenced above. However, noise levels with operation of the project would not exceed the compatibility criteria as stated. Regardless of the insertion loss associated with the building structures, interior noise levels at neighboring residences would not be adversely affected by project related traffic.

Noise levels at project units constructed interior to the site and along Monroe Avenue would be within the compatibility criteria. As stated, exterior noise levels at the carriage units facing Interstate 15 would exceed 70 dBA. The project would not affect exterior baseline noise conditions. Implementation of M-NOI-8 would ensure interior noise standards are met within the carriage units facing Interstate 15. Mitigation would require the use of building techniques and materials to provide an STC of 35 to ensure both day and nighttime interior standards are met.

M-NOI-8. Prior to issuance of building permits for each construction phase, the Proposed Project applicant or its designee shall demonstrate that interior noise levels will not exceed the

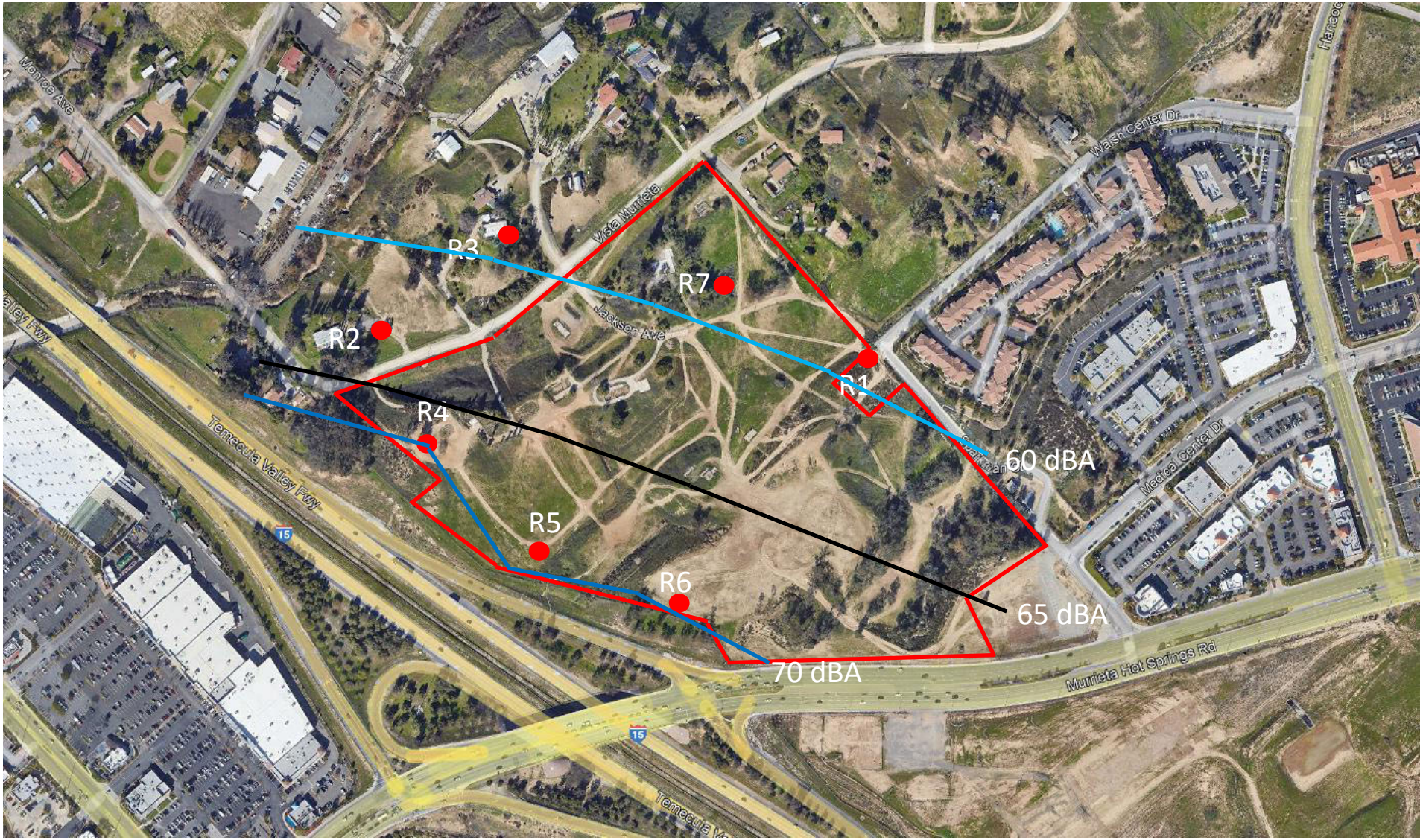


Figure 5 — Noise Contours **- Project Site** **- Receivers**

applicable noise ordinance standards. This may include that the project to ensure acoustical window treatments and exterior wall assemblies achieve a Sound Transmission Classification of 35 or greater with windows closed to reduce the highest estimated noise level along the western property to below 45 dBA inside each unit during the day and 40 dBA during nighttime hours. In addition, may be achieved by installation of structure setbacks, rated doors, exterior openings, landscaping, etc.

Heating, Ventilation and Air Conditioning. The HVAC system proposed for use on the site has not been specified and noise levels vary depending on the system size. However, multiple HVAC compressor units are typically installed on roof-tops to maximize system efficiency; thus, it is assumed that roof-top units would be installed on buildings located throughout the project. Further, it is presumed that HVAC systems would be installed in each residential unit with roof-top or enclosed interior systems installed to provide heating/cooling for common areas. Exterior HVAC noise levels can be expected to range from 60 to 70 dBA at 5 feet from the roof top equipment and ventilation openings (Birdseye Planning Group, 2020). Assuming HVAC units are installed at the center of the roof top and a reference noise level of 70-dBA, noise would attenuate to 52 dBA at 40 feet from the source. Roof-top **HVAC noise is expected to be less than the 65 dBA criteria at the project property line.**

It is possible that ground-level HVAC units may be installed. The locations are not identified; however, noise levels are dependent on the size and location of these units relative to existing properties located in proximity to the project and properties developed as part of the project. Section 16.30.130 (I) stipulates that noise levels must not exceed 50 dBA at the center of a neighboring patio, five feet above grade level, no closer than three feet from any wall.

The location and type of unit is unknown; thus, a project-specific evaluation cannot be performed. Implementation of Mitigation Measure M-NOI-9 would reduce the potential for operational noise levels associated with ground-level HVAC units to **less than significant**:

M-NOI-9: The design and installation of stationary noise sources for the Proposed Project applicant or its designee shall require the following:

- Implement best design considerations and shielding, including installing stationary noise sources associated with HVAC systems indoors in mechanical rooms.

- Prior to the issuance of a building permit and at the City's discretion, the Proposed Project Applicant or its designee shall prepare and obtain approval of the City for an acoustical study of proposed mechanical equipment, which shall identify all noise-generating equipment, predict noise levels at the nearest property lines from all identified equipment, and recommended mitigation to be implemented (e.g., enclosures, barriers, site orientation), as necessary, to comply with the City of Murrieta noise ordinance.

- Stationary Nonemergency Signaling Devices that is electronically amplified signal from a stationary bell, chime, siren. whistle, or similar device intended primarily for nonemergency purposes, from any place, for more than ten consecutive seconds in any hourly period is prohibited. Operational/on-site sources such as back up alarms, bells, wind chimes, barking dogs and so forth may periodically be audible is prohibited. As stated, Section 16.30.130 (F) of the City of Murrieta Municipal Code, prohibits use of noise making devices intended primarily for nonemergency purposes for more than ten consecutive seconds in any hourly period. The Proposed Project Applicant or its designee shall address this impact in rental agreements and enforced by apartment management personnel. With implementation of mitigation measures **M-NOI-1** through **M-NOI-9**, noise impacts would be **less than significant**.

CONCLUSION

The proposed project could have a temporary construction related noise impact at receivers located adjacent to the northeast and southwest corners of the property. With implementation of Mitigation Measures **M-NOI-1** through **M-NOI-7** if needed, temporary construction noise impacts would be reduced to less than significant.

Traffic associated with the project would increase noise levels at receivers proximal to the site. However, noise levels would not exceed the noise compatibility criteria referenced herein. Exterior noise levels at the western most units are projected to exceed 70 dBA; thus, exterior window and wall assemblies with an STC of 35 or better would be required to meet interior day and nighttime standards per **M-NOI-8**. Thus, a less than significant noise impact would occur.

No operational components of the Proposed Project would include significant noise or vibration sources; however M-NOI-9 would be implemented if needed to address stationary sources. With implementation of **M-NOI-1** through **M-NOI-9**, no significant cumulative noise increase would result from the Proposed Project impacts. Thus, the Proposed Project would be **less than significant.**

REFERENCES

City of Murrieta Municipal Code, Section 16.30.130 (A), Section 16.30.090, Section 16.30.030.

Federal Highway Administration. *Roadway Construction Noise Model. 2006.* Users Guide Table 1.

Federal Highway Administration, Transportation Noise Model Version 2.5, 2004.

Federal Transit Administration. *Transit Noise and Vibration Impact Assessment*. September 2018.

Hanson, Carl E., Towers, David A., and Meister, Lance D. (2006, May). *Transit Noise and Vibration Impact Assessment.* Federal Transit Administration, Office of Planning and Environment. http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf

Harris Miller Miller & Hanson Inc. T*ransit Noise and Vibration Impact Assessment*, *Final Report*. May 2006.

Linscott, Law and Greenspan, Traffic Engineers, The Terraces Traffic Impact Assessment, January 2022.

Appendix A

Monitoring Data Sheet and Modeling Results

NOISE MEASUREMENT DATA

Project Name: IAG TERRACES Page 1 of 2
Project #: Day / Date DEC. 16, 2021 My Name.

Sound Level Meter	Calibrator	Weather Meter
Model #: PIL01011	Model #	Model # Serial #
Serial #	Serial #	
Weighting: (A) / C / Flat	Pre-Test: ____ dBA SPL	Terrain: Hard / Soft / (Mixed)
Response: (Slow) / Fast / Impl	Post-Test: ____ dBA SPL	Topo: (Flat) / Hilly (describe)
Windscreen: (Yes) / No		Wind: (Steady) / Gusty

ID	Time Start	Time Stop	Leq	Lmin	Lmax	L10	L50	L90	Wind Spd/ Dir (mph)	Temp (°F)	RH (%)	Bar Psr (in Hg)	Cloud Cover (%)
1	7:05	7:20	70.2	65.6	77.5				0	40			10
2	7:35	7:50	63.1	56.9	67.7					40			10
3	8:00	8:15	70.3	65.2	75.9					40			10

Roadway Name: I-15 NB ON-RAMP
Speed (post/obs): 55
Number of Lanes: 2→1
Width (pave/row): 24→12
1- or 2- way: 1
Grade: -2%
Bus Stops: NO
Stoplights: NO
Street Parking: NO
Automobiles: 224
Medium Trucks: 9
Heavy Trucks: 3

Location(s) / GPS Reading(s):

I-15 NB ON RAMP
55
2→1
24→12
1
-2%
NO
NO
NO
230
9
0

170
5
5

I-15 dominant source. Topography reduces noise levels at lower elevation monitoring location.

Other Noise Sources: distant aircraft / roadway traffic / trains / landscaping / rustling leaves / children playing / dogs barking / birds vocalizing

Notes and Sketches on Reverse

NOISE MEASUREMENT DATA

Project Name:
Project #: Day / Date My Name. Page 1 of

Sound Level Meter	Calibrator	Weather Meter
Model #:	Model #	Model # Serial #
Serial #	Serial #	
Weighting: (A) / C / Flat	Pre-Test: ____ dBA SPL	Terrain: Hard / Soft / (Mixed)
Response: (Slow) / Fast / Impl	Post-Test: ____ dBA SPL	Topo: (Flat / Hilly) (describe)
Windscreen: (Yes) / No		Wind: (Steady) / Gusty

ID	Time Start	Time Stop	Leq	Lmin	Lmax	L10	L50	L90	Wind Spd/ Dir (mph)	Temp (°F)	RH (%)	Bar Psr (in Hg)	Cloud Cover (%)
4	8:30	8:45	49.0	46.3	61.4	-	-	-	0	45	-		10%
5	8:50	9:05	54.2	50.4	58.7				0	45			10%

		Location(s) / GPS Reading(s):
Roadway Name	VISTA MURRIETA / JACKSON	SPEARMAN CT / WALSH CENTER DR.
Speed (post/obs)	25	25
Number of Lanes	2	2
Width (pave/row)	24	24
1- or 2- way	2	2
Grade	+/- 2%	+/- 2%
Bus Stops	NO	NO
Stoplights	NO	NO
Street Parking	NO	NO
Automobiles	1	3
Medium Trucks	0	0
Heavy Trucks	0	0

UNPAVED ROAD WITH LOCAL RESIDENTIAL TRAFFIC. I-15 SCREENED BY TOPOGRAPHY BUT IS AUDIBLE AS BACKGROUND NOISE

I-15 DOMINANT NOISE SOURCE. MURRIETA HOT SPRINGS ROAD SECONDARY

Other Noise Sources: distant (aircraft) / (roadway traffic) / trains / landscaping / rustling leaves / children playing / dogs barking / birds vocalizing

Notes and Sketches on Reverse

Site 1

Start Date	12/16/2021
Start Time	7:06:43 AM
End Time	7:21:42 AM
Duration	00:14:59
Meas Mode	Single
Input Range	High
Input Type	Mic
SPL Time Weight	Slow
LN% Freq Weight	dBA
Overload	No
UnderRange	No
Sensitivity	18.44mV/Pa

LZeq	77.8
LCeq	76.6
LAeq	70.2
LZSmax	88.3
LCSmax	88.1
LASmax	77.5
LZSmin	72.5
LCSmin	71.2
LASmin	65.6
LZE	107.3
LCE	106.1
LAE	99.7
LZpeak	102.6
LCpeak	99.1
LApeak	95.5
1%	72.9
2%	72.4
5%	72.0
8%	71.7
10%	71.5
25%	70.7
50%	70.0
90%	68.7
95%	68.1
99%	66.6

Site 2

Start Date	12/16/2021
Start Time	7:35:17 AM
End Time	7:50:16 AM
Duration	00:14:59
Meas Mode	Single
Input Range	High
Input Type	Mic
SPL Time Weight	Slow
LN% Freq Weight	dBA
Overload	No
UnderRange	No
Sensitivity	18.44mV/Pa

LZeq	76.1
LCeq	74.0
LAeq	63.1
LZSmax	83.9
LCSmax	80.3
LASmax	67.7
LZSmin	70.8
LCSmin	69.0
LASmin	56.9
LZE	105.6
LCE	103.5
LAE	92.6
LZpeak	95.8
LCpeak	93.0
LApeak	83.0
1%	66.1
2%	65.7
5%	65.2
8%	65.0
10%	64.8
25%	64.0
50%	62.8
90%	60.6
95%	60.2
99%	58.6

Site 3

Start Date	12/16/2021
Start Time	8:02:11 AM
End Time	8:17:10 AM
Duration	00:14:59
Meas Mode	Single
Input Range	High
Input Type	Mic
SPL Time Weight	Slow
LN% Freq Weight	dBA
Overload	No
UnderRange	No
Sensitivity	18.44mV/Pa

LZeq	78.2
LCeq	76.6
LAeq	70.3
LZSmax	83.9
LCSmax	83.3
LASmax	75.9
LZSmin	72.8
LCSmin	71.5
LASmin	65.2
LZE	107.7
LCE	106.1
LAE	99.8
LZpeak	97.8
LCpeak	96.3
LApeak	92.5
1%	73.4
2%	73.0
5%	72.4
8%	72.1
10%	72.0
25%	71.1
50%	70.0
90%	67.9
95%	67.2
99%	65.8

Site 4

Start Date	12/16/2021
Start Time	8:28:22 AM
End Time	8:43:21 AM
Duration	00:14:59
Meas Mode	Single
Input Range	High
Input Type	Mic
SPL Time Weight	Slow
LN% Freq Weight	dBA
Overload	No
UnderRange	No
Sensitivity	18.44mV/Pa

LZeq	68.7
LCeq	65.5
LAeq	49.0
LZSmax	82.9
LCSmax	78.4
LASmax	61.4
LZSmin	64.9
LCSmin	62.1
LASmin	46.3
LZE	98.2
LCE	95.0
LAE	78.5
LZpeak	102.5
LCpeak	99.0
LApeak	89.8
1%	56.1
2%	53.3
5%	50.8
8%	50.1
10%	49.9
25%	49.0
50%	48.3
90%	47.5
95%	47.2
99%	46.7

Site 5

Start Date	12/16/2021
Start Time	9:02:50 AM
End Time	9:17:49 AM
Duration	00:14:59
Meas Mode	Single
Input Range	High
Input Type	Mic
SPL Time Weight	Slow
LN% Freq Weight	dBA
Overload	No
UnderRange	No
Sensitivity	18.44mV/Pa

LZeq	71.1
LCeq	68.3
LAeq	54.2
LZSmax	76.4
LCSmax	73.8
LASmax	58.7
LZSmin	66.8
LCSmin	64.8
LASmin	50.4
LZE	100.6
LCE	97.8
LAE	83.7
LZpeak	87.0
LCpeak	84.6
LApeak	74.7
1%	56.7
2%	56.2
5%	55.7
8%	55.5
10%	55.4
25%	54.9
50%	54.2
90%	52.4
95%	51.7
99%	51.2

RESULTS: SOUND LEVELS

<Project Name?>

<Organization?>
<Analysis By?>

10 January 2022
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: The Terraces - Existing
BARRIER DESIGN: INPUT HEIGHTS

ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Vista Pointe Apartments	1	1	0.0	57.6	66	57.6	10	----	57.6	0.0	8	-8.0
Residence at 25200 Monroe Avene	2	1	0.0	55.8	66	55.8	10	----	55.8	0.0	8	-8.0
NE of Vista Murrieta/Jackson Intersection	3	1	0.0	58.1	66	58.1	10	----	58.1	0.0	8	-8.0
CAL 1	4	1	0.0	70.3	66	70.3	10	Snd Lvl	70.3	0.0	8	-8.0
CAL 2	5	1	0.0	64.3	66	64.3	10	----	64.3	0.0	8	-8.0
CAL 3	6	1	0.0	71.0	66	71.0	10	Snd Lvl	71.0	0.0	8	-8.0
Northeastern Unit	8	1	0.0	57.9	66	57.9	10	----	57.9	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	7	0.0	0.0	0.0
All Impacted	2	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

RESULTS: SOUND LEVELS

<Project Name?>

<Organization?>
<Analysis By?>

10 January 2022
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: The Terraces - Existing
BARRIER DESIGN: INPUT HEIGHTS

ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Vista Pointe Apartments	1	1	0.0	60.4	66	60.4	10	----	60.4	0.0	8	-8.0
Residence at 25200 Monroe Avene	2	1	0.0	58.4	66	58.4	10	----	58.4	0.0	8	-8.0
NE of Vista Murrieta/Jackson Intersection	3	1	0.0	59.1	66	59.1	10	----	59.1	0.0	8	-8.0
CAL 1	4	1	0.0	72.0	66	72.0	10	Snd Lvl	72.0	0.0	8	-8.0
CAL 2	5	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
CAL 3	6	1	0.0	71.2	66	71.2	10	Snd Lvl	71.2	0.0	8	-8.0
Northwest Units	8	1	0.0	58.4	66	58.4	10	----	58.4	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	7	0.0	0.0	0.0
All Impacted	3	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0