Appendix I

Noise Technical Report

Alexan Escondido Project

Noise Technical Report

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TABLE OF CONTENTS

TABLE OF CONTENTS (cont.)

LIST OF APPENDICES

LIST OF FIGURES

TABLE OF CONTENTS (cont.)

LIST OF TABLES

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ACRONYMS AND ABBREVIATIONS

µPa	micro-Pascals
ADT	average daily trips/traffic
ADU	accessory dwelling unit
ANSI	American National Standards Institute
APN	Assessor's Parcel Number
CadnaA	Computer Aided Noise Abatement
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
City	City of Escondido
CNEL	Community Noise Equivalent Level
CY	cubic yard
dB	decibel
dBA	A-weighted decibel
EIR	Environmental Impact Report
FTA	Federal Transit Administration
HVAC	Heating, ventilation, and air conditioning
Hz	Hertz
I-15	Interstate 15
kHz	kilohertz
L_{DN}	Day-Night level
L_{EQ}	equivalent sound level
LLG	Linscott, Law & Greenspan, Engineers
L_{MAX}	maximum noise level
LV	vibration velocity level
NSLU	noise-sensitive land use
PPV	peak particle velocity
PO	Planned Office land use designation
R-E	estate residential zoning designation
RCNM	Roadway Construction Noise Model
ROW	right of way

ACRONYMS AND ABBREVIATIONS (cont.)

SANDAG	San Diego Association of Government
SF	square feet
SPL	sound pressure level
S_{WL}	sound power level
TFIC	Transportation Forecast Information Center
TNM	Traffic Noise Model
USDOT	U.S. Department of Transportation
VdB	vibration decibel

EXECUTIVE SUMMARY

This report presents an assessment of noise and vibration impacts during the construction and operation of the proposed Alexan Escondido Project (project), located at 855 Brotherton Road in the City of Escondido (City), California. The project would develop 258 units of multi-family residential housing on approximately 8 acres. The project would require a General Plan Amendment to change the land use designation and a rezone to allow for multi-family residential density on-site.

The addition of project construction traffic would not result in a perceptible increase in ambient traffic noise levels. The calculated one-hour average project construction equipment noise levels would be less than the City standard measured at nearby residences. The noise from the project's heating, ventilation, and air conditioning systems would not exceed the City's Municipal Code limits at the nearest property lines. The project would add trips to nearby roadways but would not result in noise exceeding the City's allowable incremental increase or result in perceptible increases in traffic noise. Therefore, the project would not result in the generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project exceeding standards established in the local general plan or noise ordinance, or applicable standards of other agencies. Impacts would be less than significant.

Vibration from project construction equipment would not exceed thresholds for structural damage to buildings but may exceed thresholds for human disturbance measured at nearby residential buildings. A mitigation measure would restrict the use of vibratory rollers near occupied residential buildings. No permanent sources of substantial vibration would be installed by the project. With the implementation of mitigation, vibration impacts would be less than significant.

The project would not expose people working on the project site to excessive noise from aircraft or airport operations, and the impact would be less than significant.

Exterior noise levels on the project site would be compatible with the proposed uses of the project. However, residential units that would have clear line of sight to Felicita Road or Interstate 15 would be exposed to vehicular traffic noise, resulting in interior noise levels exceeding the state limit for multi-family residential buildings. Similarly, the church building and associated accessory dwelling units have the potential to be exposed to traffic noise levels, resulting in conflicts with the interior noise standard for new sensitive land uses. Mitigation measures would require exterior-to-interior noise analyses for the residential and church developments once final building plans are available to ensure interior noise levels would not exceed the applicable interior limit.

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1.0 INTRODUCTION

This report presents an assessment of noise and vibration impacts during the construction and operation of the proposed Alexan Escondido Project (project). Analysis within this report was prepared to support impact analysis pursuant to the California Environmental Quality Act (CEQA; Public Resources Code Sections 21000 et seq.), CEQA Guidelines (Title 14, Section 15000 et seq. of the California Code of Regulations).

1.1 PROJECT LOCATION

The project site is located at 855 Brotherton Road within the City of Escondido (City) and includes two parcels (Assessor's Parcel Numbers 236-333-41 and 236-333-53) that encompass 14.83 acres. The site is bounded by Felicita Road to the west, Brotherton Road to the north, residential development to the east, and residential development and agricultural use to the south (see Figure 1, *Regional Location*, and Figure 2, *Aerial Photograph*). The eastern edge of Interstate 15 (I-15), which is elevated along this segment of the freeway, is approximately 120 feet from the southwestern corner of the site.

1.2 PROJECT DESCRIPTION

The project would demolish the existing church building and parking lot and construct a multi-family residential development, a new church building, and associated improvements. The proposed residential development includes 258 multi-family residential apartments with a mix of one- to three-bedroom units. Thirteen apartments would be allocated as affordable housing units. Ten residential buildings would include three-story townhomes at an approximate height of 38 feet and four-story flats at-grade (no subterranean levels) at an approximate height of 49 feet. The project proposes 112 one-bedroom units ranging in size from approximately 700 to 800 SF, 122 two-bedroom units ranging between approximately 1,000 and 1,600 SF, and 24 three-bedroom units between 1,600 and 1,800 SF. The total residential building area would encompass 350,380 SF (including 173 ground-level garages). Proposed resident amenities include: an approximately 11,544 SF two-story clubhouse/leasing center building; an approximately 662 SF one-story building containing a pet spa and a maintenance garage; and a swimming pool. See Figure 3, *Residential Development Site Plan*.

A new two-story church building would be constructed on the east side of the project site adjacent to the two school buildings that would remain. The two school buildings are operated by the church and would be modified to connect to the new church building. The approximately 22,700 SF church building would have a 600-seat sanctuary, an entryway/foyer, as well as offices, meeting rooms, a kitchen, and storage. The church development would also construct three 500 SF accessory dwelling units (ADUs) for short-term stays in the eastern portion of the church site. An outdoor courtyard would also be constructed between the new church and the existing school buildings. See Figure 4, *Church Redevelopment Site Plan*.

Access to the residential development would be provided via two entries. The primary entry would be from Felicita Road with a secondary entry along Brotherton Road. Parking would be provided within resident garages and surface lots between the residential buildings. A total of 455 parking spaces would be provided, including 176 garage spaces, 184 open spaces, and 95 carport spaces. Internal circulation would be provided via a system of connected drive aisles between the project entries, residential garages, and parking areas. Additionally, accessible walkways would be provided throughout the site to

connect the common areas to the residential buildings, amenity buildings, and parking areas. Access to the church would continue to be provided via two entries from Brotherton Road but the parking lot and on-site circulation would be modified to accommodate the new facilities. Parking would be provided by 205 spaces in the surface lot surrounding the church building. A basketball court would also be constructed in the southeastern portion of the site.

Landscaping would be provided along the project frontages of Felicita Road and Brotherton Road, project entries, proposed buildings, clubhouse/leasing center, parking areas, and other common areas.

The project would include off-site improvements within the right of way (ROW) of Felicita Road and Brotherton Road. Improvements within the ROW would include a 17-foot widening of Felicita Road along the project frontage, sidewalks, curb and gutters, curb ramps, and driveway curb cuts.

The project would include connections to the existing utilities located in the Felicita Road and Brotherton Road ROWs. Additionally, the project proposes to install retaining walls on the project's northeastern corner, eastern boundary, and southern boundary. Retaining wall heights would vary, with the maximum height being approximately 13 feet.

The project site currently has a Planned Office (PO) land use designation and is zoned as estate residential (R-E). The project would require a General Plan Amendment to change the land use designation to Urban V, and a rezone to residential (R-5) to allow for multi-family residential development.

1.3 NOISE AND SOUND LEVEL DESCRIPTORS AND TERMINOLOGY

1.3.1 Descriptors

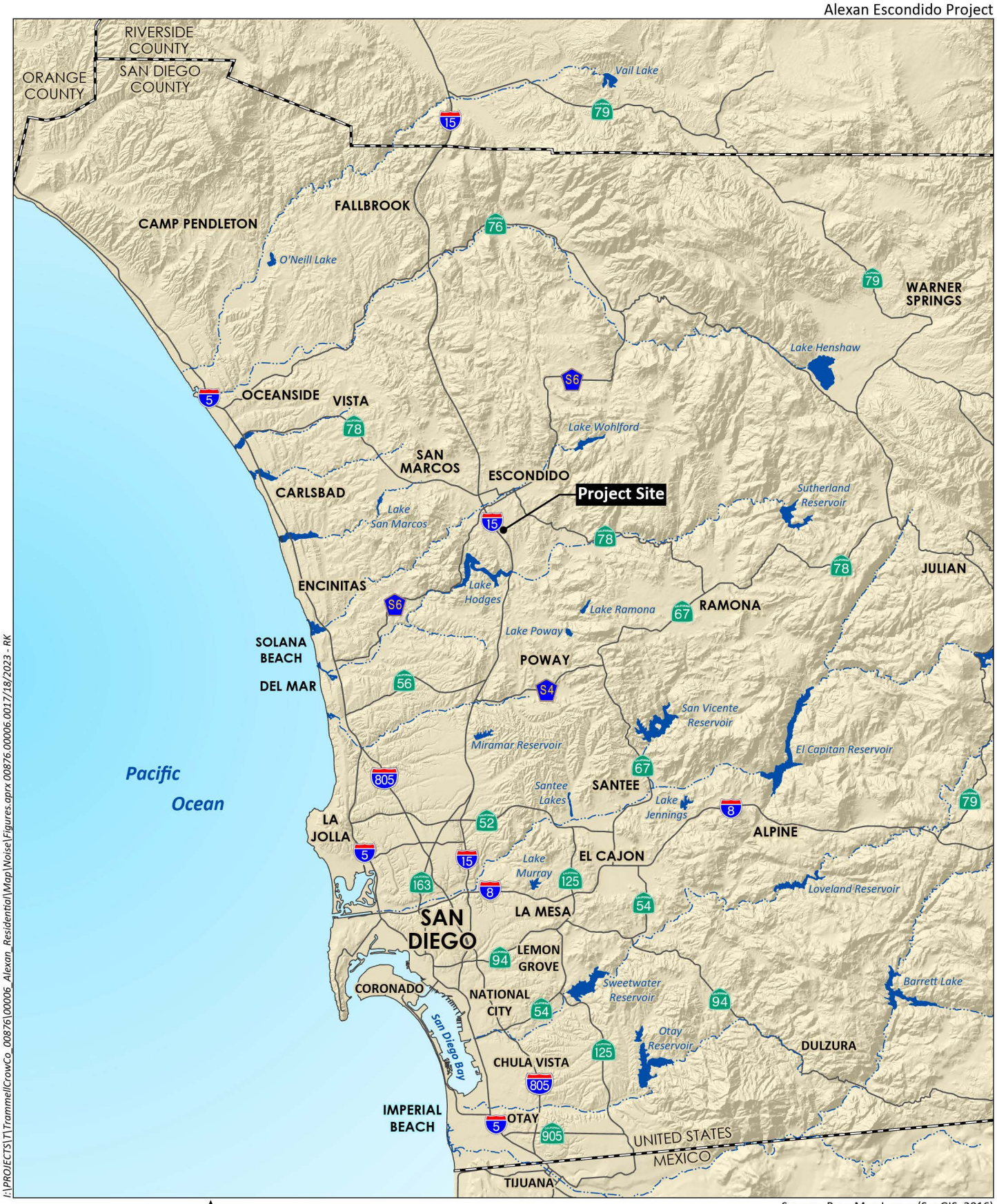
All noise level or sound level values presented herein are expressed in terms of decibels (dB), with A-weighting (dBA) to approximate the hearing sensitivity of humans. Time-averaged noise levels are expressed by the symbol L_{EQ}, with a specified duration. The CNEL is a 24-hour average, where noise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

1.3.2 Terminology

1.3.2.1 Sound, Noise, and Acoustics

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

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



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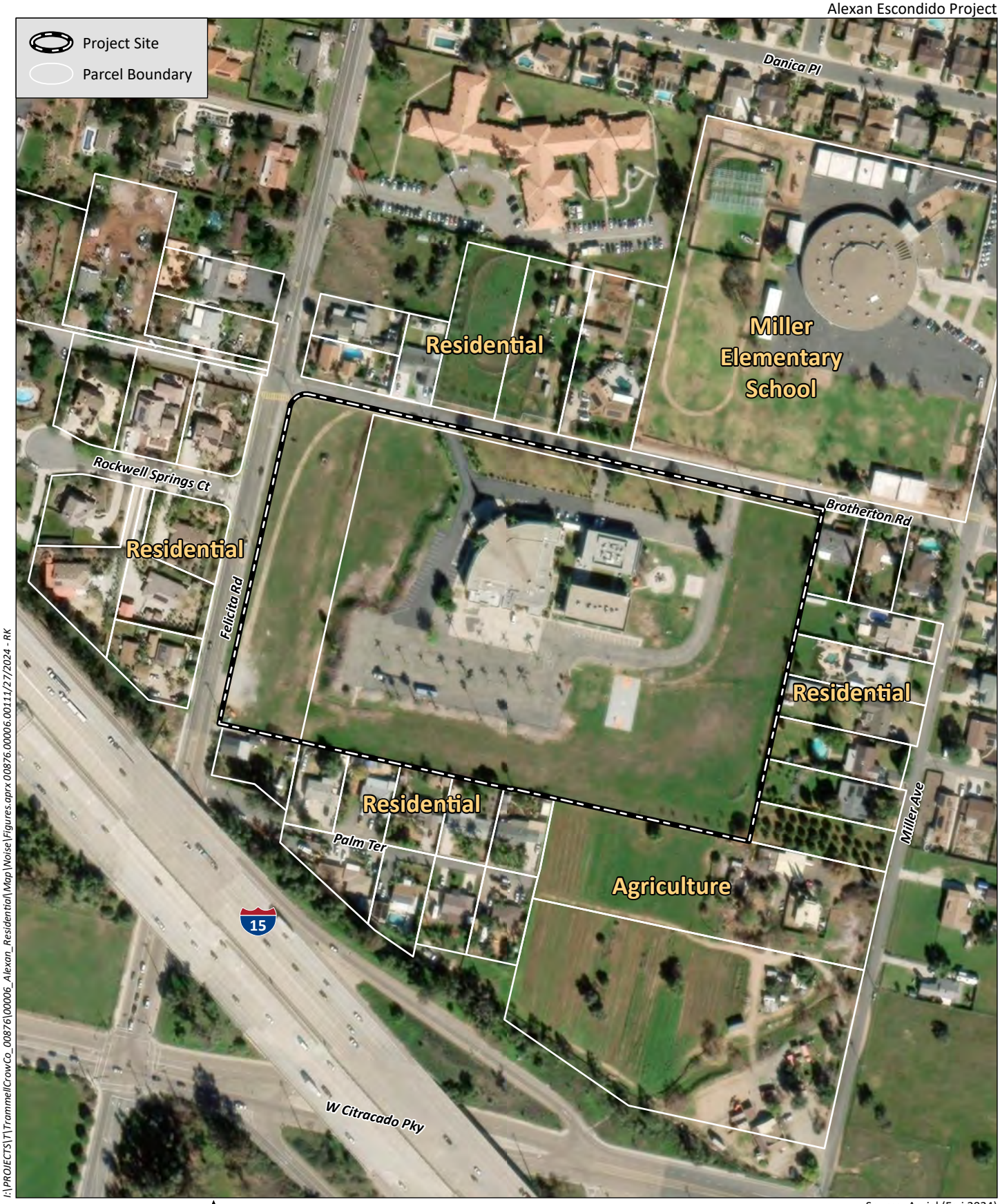
0 8 Miles

Source: Base Map Layers (SanGIS, 2016)

HELIX Environmental Planning

Regional Location

Figure 1



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0 250 Feet

Source: Aerial (Esri 2024)

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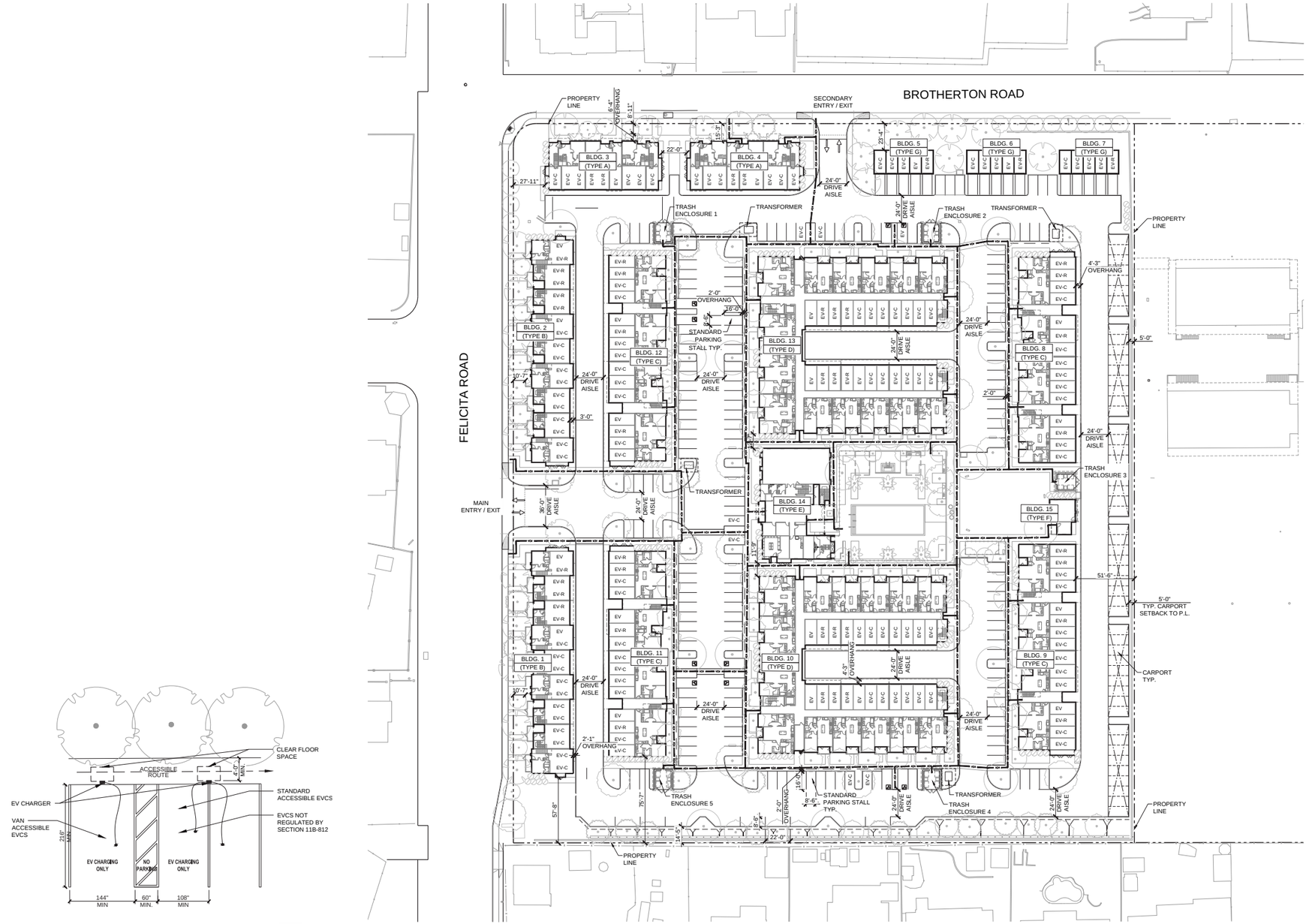
Aerial Photograph

Figure 2



SITE PLAN 1

LEGEND

— · — · —	PROPERTY LINE
▬ ▪ ▬ ▪ ▬	ADA PATH OF TRAVEL
EV-C	EV CAPABLE STALLS
EV-R	EV READY STALLS
EV	EV CHARGER STALLS

NOTE :

1. EXISTING OVER HEAD UTILITIES AND POLES TO BE UNDERGROUNDED, REFER TO CIVIL DRAWINGS.

TYP. EV. PARKING STATION 2

Source: adc 2024

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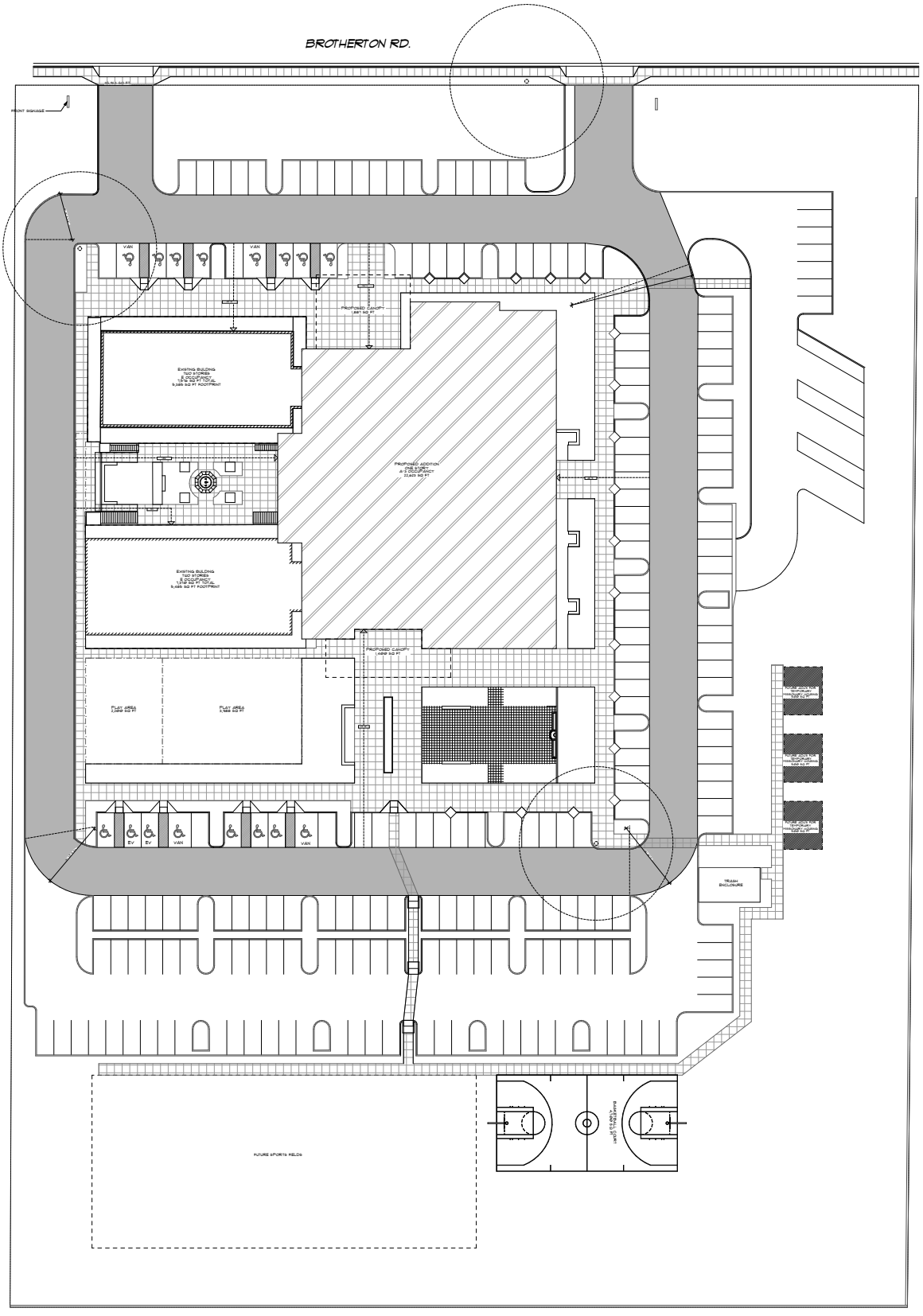
Residential Development Site Plan

Figure 3



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Source: BGW Architects 2024

HELIX Environmental Planning

Church Redevelopment Site Plan

Figure 4

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

1.3.2.2 Frequency

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

Sound Pressure Levels and Decibels

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micro-Pascals (µPa). One µPais approximately one hundred billionth (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 µPa. Because of this wide range of values, sound is rarely expressed in terms of µPa. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of dBA. The threshold of hearing for the human ear is about 0 dBA, which corresponds to 20 µPa.

1.3.2.3 Addition of Decibels

Because decibels are logarithmic units, SPL cannot be added or subtracted through standard arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3 dBA increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dBA higher than from one source under the same conditions. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dBA—rather, they would combine to produce 73 dBA. Under the decibel scale, three sources of equal loudness together produce a sound level 5 dBA louder than one source.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear can discern 1-dBA changes in sound levels, when exposed to steady, single-frequency (“pure-tone”) signals in the mid-frequency (1,000 Hz–8,000 Hz) range. In typical noisy environments, changes in noise of 1 to 2 dBA are generally not perceptible. It is widely accepted, however, that people begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5-dBA increase is generally perceived as a distinctly noticeable increase, and a 10-dBA increase is generally perceived as a doubling of loudness.

No known studies have directly correlated the ability of a healthy human ear to discern specific levels of change in traffic noise over a 24-hour period. Many ordinances, however, specify a change of 3 CNEL as the significant impact threshold. This is based on the concept of a doubling in noise energy resulting in a 3 dBA change in noise, which is the amount of change in noise necessary for the increase to be perceptible to the average healthy human ear.

1.3.3 Vibration Descriptors and Terminology

Vibration is measured in feet or inches (in). Acceleration is measured by comparing acceleration to that of the Earth's gravity, and this unit is "G." These units of acceleration or velocity are relative to time, in seconds (sec), and are noted as in/sec^2 for acceleration and in/sec for velocity. Displacement is not relative to time and is only shown as inches.

Vibration effects can be described by its peak and root mean square amplitudes. Building damage is often discussed in terms of peak velocity, or peak particle velocity (PPV). The PPV is defined as the maximum instantaneous positive or negative peak of the vibration signal. PPV is related to the stresses that are experienced by buildings; it is often used in the monitoring of blasting vibration and in discussing construction vibration. Decibels are also used to compress the range of numbers required to describe vibration. Vibration velocity level (LV) with units of vibration decibels (VdB) are commonly used in evaluating human reactions to vibrations.

1.4 NOISE-SENSITIVE AND VIBRATION-SENSITIVE LAND USES

Noise-sensitive land uses (NSLUs) are land uses that may be subject to stress and/or interference from excessive noise, including residences, hospitals, schools, hotels, resorts, libraries, sensitive wildlife habitat, or similar facilities where quiet is an important attribute of the environment. Noise receptors are individual locations that may be affected by noise. The closest NSLUs to the project site are Miller Elementary School across Brotherton Road, with outdoor recreation areas located approximately 65 feet to the north, and classroom buildings located approximately 360 feet to the north, and the single-family residential properties surrounding the project site. The nearest residences to the project site are adjacent to the east and south, 40 feet to the north across Brotherton Road, and 60 feet to the west across Felicita Road. Additionally, the project residential buildings and the school building associated with the church on the project site would be considered NSLUs.

Land uses in which ground-borne vibration could potentially interfere with operations or equipment, such as research, manufacturing, hospitals, and university research operations (Federal Transit Administration [FTA] 2018) are considered "vibration-sensitive." The degree of sensitivity depends on the specific equipment that would be affected by the ground-borne vibration. In addition, excessive levels of ground-borne vibration of either a regular or an intermittent nature can result in annoyance to land uses where people sleep, such as residences, hotels, hospitals, and dormitories. The closest vibration-sensitive uses to the project site are the single-family homes surrounding the project site described above.

1.5 REGULATORY FRAMEWORK

1.5.1 California Noise Control Act

The California Noise Control Act is a section within the California Health and Safety Code that describes excessive noise as a serious hazard to the public health and welfare and that exposure to certain levels of noise can result in physiological, psychological, and economic damage. It also finds that there is a continuous and increasing bombardment of noise in the urban, suburban, and rural areas. The California Noise Control Act declares that the State of California has a responsibility to protect the health and welfare of its citizens by the control, prevention, and abatement of noise. It is the policy of the State to provide an environment for all Californians free from noise that jeopardizes their health or welfare.

1.5.2 California Noise Insulation Standards [California's Title 24 Noise Standards, Cal. Adm. Code Title 24, Chap. 2-35]

In 1974, the California Commission on Housing and Community Development adopted noise insulation standards for multi-family residential buildings (California Code of Regulations Title 24, Part 2). Title 24 establishes standards for interior noise (attributable to outside noise sources) within habitable rooms. Where standard building materials would not ensure compliance with this requirement, additional acoustical analysis is required. Such acoustical analysis must demonstrate that the residence has been designed to limit intruding noise to an interior noise level below 45 CNEL (or L_{DN}) (California Building Standards Commission 2022).

1.5.3 City of Escondido Community Protection Element

The goal of the Community Protection Element of the City General Plan (City 2012a) is to minimize the impact of noise on the community by identifying existing and potential noise sources and providing the policies and standards needed to keep noise from reducing the quality of life in the City. The Community Protection Element establishes guidelines to evaluate the compatibility of land uses and noise exposure levels. Table 1, *City of Escondido Exterior Land Use/Noise Compatibility Guidelines*, summarizes the City's exterior land use/noise compatibility guidelines. A land use proposed in an area identified as "normally acceptable" indicates that standard construction methods would attenuate exterior noise to an acceptable indoor noise level and that people can conduct outdoor activities with minimal noise interference. Where the existing noise environment is considered "conditionally acceptable" for a given land use, development of that use should only occur after noise attenuation features are incorporated into the design. For land uses where the exterior noise level falls within the "conditionally unacceptable" range, new construction or development should generally be discouraged but may proceed following analysis and incorporation of noise insulation features. For land uses where the exterior noise levels fall within the "clearly unacceptable" range, new construction should not be undertaken.

Table 1
CITY OF ESCONDIDO EXTERIOR LAND USE/NOISE COMPATIBILITY GUIDELINES

Land Use Category	Annual CNEL (dBA)						
	55	60	65	70	75	80	
Residential Single-family, Duplex, Mobile Home							
Residential Multi-family, Residential Mixed Use							
Transient Lodging, Motels, and Hotels							
Schools, Libraries, Churches, Hospitals, and Nursing Homes							
Auditoriums, Concert Halls, Amphitheaters							
Sports Arena, Outdoor Spectator Sports							
Playgrounds, Neighborhood Parks							
Golf Courses, Riding Stables, Water Recreation, Cemeteries							

Land Use Category	Annual CNEL (dBA)						
	55	60	65	70	75	80	
Offices Buildings, Business, Commercial, and Professional							
Industrial, Manufacturing, Utilities, Agriculture							

Normally Acceptable – Specified land use is satisfactory, based upon the assumption that buildings involved are of normal conventional construction, without any special noise insulation requirements.

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 will usually suffice.

Normally Unacceptable – New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made with noise insulation features included in the design.

Clearly Unacceptable - New construction or development clearly should not be undertaken.

Source: City 2012a

The Community Protection Element also states that the exterior standard should not normally be applied to balconies or patios associated with residential uses. In addition, the impact of noise generated by proposed projects on existing land uses should be evaluated in terms of the potential for adverse community response, based on a significant increase in existing noise levels. For example, if an area is currently below the maximum normally acceptable level, an increase in noise up to the maximum should not necessarily be allowed. Projects increasing noise levels by 5 dBA or greater should be considered to generate a significant impact that requires mitigation.

The Community Protection Element also includes exterior incremental environmental noise impact standards for NSLUs, shown in Table 2, *City of Escondido Incremental Noise Impact Standards*. The allowable increase in noise levels decreases as ambient noise levels increase. In addition, the standards include separate allowable noise increases for land uses that are more noise sensitive during the day (peak hour) versus at night where people normally sleep (24-hour).

Table 2
CITY OF ESCONDIDO INCREMENTAL NOISE IMPACT STANDARDS

Residences and Building Where People Normally Sleep		Institutional Land Uses with Primarily Daytime and Evening Uses	
Existing L_{DN}[1]	Allowable Noise Increment	Existing Peak Hour L_{EQ}[2]	Allowable Noise Increment
45	8	45	12
50	5	50	9
55	3	55	6
60	2	60	5
65	1	65	3
70	1	70	3
75	0	75	1
80	0	80	0

Source: City General Plan Figure VI-14 (City 2012a)

[1] L_{DN} is a 24-hour average with an added 10 dBA weighting on the nighttime hours of 10:00 p.m. to 7:00 a.m.

[2] L_{EQ} stands for one-hour average sound level.

Noise Policy 5.5 of the Community Protection Element requires construction projects to achieve acceptable vibration levels at nearby vibration-sensitive land uses based on FTA criteria. These criteria are outlined in the Escondido General Plan Update, Downtown Specific Plan Update and Climate Action Plan Environmental Impact Report (General Plan EIR; City 2012b) and shown in Table 3, *City of Escondido Ground-borne Vibration Impact Criteria*. The General Plan EIR states that the category of infrequent events is applicable to construction activities.

Table 3
CITY OF ESCONDIDO GROUND-BORNE VIBRATION IMPACT CRITERIA

Land Use Category	Impact Criteria (VdB)		
	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where vibration would interfere with interior operations	65[4]	65[4]	65[4]
Category 2: Residences and buildings where people normally sleep	72	75	80
Category 3: Institutional land uses with primarily daytime uses	75	78	83

Source: City 2012b

1 "Frequent Events" is defined as more than 70 vibration events of the same source per day.

2 "Occasional Events" is defined as between 30 to 70 vibration events of the same source per day.

3 "Infrequent Events" is defined as fewer than 30 vibration events of the same source per day.

4 This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels.

VdB = vibration decibels

1.5.4 City of Escondido Municipal Code Chapter 17, Article 12, Noise Abatement and Control

City of Escondido Municipal Code Chapter 17, Article 12, Noise Abatement and Control, establishes prohibitions for the purpose of securing and promoting the public health, comfort, safety, peace, and quiet for its citizens. Table 4, *City of Escondido Noise Ordinance – Exterior Noise Limits*, shows the allowable noise levels at any point on or beyond the boundaries of the property on which the sound is produced, and the corresponding times of day for each zoning designation. The noise standards apply to each property or portion of the property substantially used for a particular type of land use. Where two or more dissimilar land uses occur on a single property, the more restrictive noise limits apply. Noise is measured by the one-hour average sound level known as L_{EQ}. Noise restrictions are listed in Sections 17-226 through 17-260 of the Escondido Municipal Code and include specific regulations, such as those pertaining to motor vehicles. Additional sections of the Noise Ordinance applicable to this analysis are listed below.

Table 4
CITY OF ESCONDIDO NOISE ORDINANCE – EXTERIOR NOISE LIMITS

Zone	Time	Noise Limit (dBA L_{EQ})
Residential zones	7:00 a.m. to 10:00 p.m.	50
	10:00 p.m. to 7:00 a.m.	45
Multi-residential zones	7:00 a.m. to 10:00 p.m.	55
	10:00 p.m. to 7:00 a.m.	50
Commercial zones	7:00 a.m. to 10:00 p.m.	60
	10:00 p.m. to 7:00 a.m.	55
Light industrial/Industrial park zones	Anytime	70
General industrial zones	Anytime	75

Source: Escondido Municipal Code Section 17-229, Sound Level Limits
dBA = A-weighted decibels; L_{EQ} = one-hour noise level

Section 17-229(c) (Corrections to Exterior Noise Level Limits)

Section 17-229 (c)(5) of the Noise Ordinance, Corrections to Exterior Noise Level Limits, includes the following regulations:

1) If the noise is continuous, the L_{EQ} for any hour will be represented by any lesser time period within that hour. Noise measurements of a few minutes only will thus suffice to define the noise level.

2) If the noise is intermittent, the L_{EQ} for any hour may be represented by a time period typical of the operating cycle. Measurement should be made of a representative number of noisy/quiet periods. A measurement period of not less than 15 minutes is, however, strongly recommended when dealing with intermittent noise.

3) In the event the alleged offensive noise, as judged by the enforcement officer, contains a steady, audible sound such as a whine, screech, or hum, or contains a repetitive impulsive noise such as hammering or riveting, the standard limits set forth in Table 17-229 [Table 4], shall be reduced by 10 dBA or to the ambient noise level when such noises are not occurring.

4) If the measured ambient level exceeds that permissible in subsection (a) of this section [Table 4], the allowable noise exposure standard shall be the ambient noise level. The ambient level shall be measured when the alleged noise violations source is not operating.

5) The sound level limit at a location on a boundary between two land use classifications is the limit applicable to the receiving land use; provided, however, that the one-hour average sound level limit applicable to extractive industries including, but not limited to, borrow pits and mines, shall be 75 dBA at the property line regardless of the zone where the extractive industry is actually located.

   Fixed-location public utility distribution or transmission facilities located on or adjacent to a property line shall be subject to the noise level limits of this section, measured at or beyond 6 feet from the boundary of the easement upon which the equipment is located.

Section 17-234 (Construction Equipment)

Except for emergency work, it shall be unlawful for any person, including the City of Escondido, to operate construction equipment as follows:

(a) It shall be unlawful for any person, including the City of Escondido, to operate construction equipment at any construction site, except on Monday through Friday during a week between the hours of 7:00 a.m. and 6:00 p.m. and on Saturdays between the hours of 9:00 a.m. and 5:00 p.m., and provided that the operation of such construction equipment complies with the requirements of subsection (d) of this section.

(b) It shall be unlawful for any person, including the City of Escondido, to operate construction equipment at any construction site on Sundays and on days designated by the President, Governor, or City Council as public holidays.

(c) A person may operate construction equipment at his/her residence or for the purpose of constructing or modifying a residence for himself/herself on Monday through Friday of a week between the hours of 7:00 a.m. and 6:00 p.m., and on Saturdays, Sundays, and holidays between the hours of 9:00 a.m. and 5:00 p.m.; provided that such operation of construction equipment is not carried on for profit or livelihood and complies with the requirements of subsection (d) of this section.

(d) No construction equipment or combination of equipment, regardless of age or date of acquisition, shall be operated to cause noise in excess of a one-hour average sound level limit of 75 dBA at any time, unless a variance has been obtained in advance from the City Manager.

(e) Persons engaged in construction for profit or as a business shall post signs at conspicuous places on a construction site, indicating hours of work as prescribed by this article or authorized by permit and the applicable noise level limits.

Section 17-237 (Landscape Equipment)

It shall be unlawful for any person, including the City of Escondido, to use any motorized landscape equipment, including but not limited to power blowers and vacuums, which causes a disturbing, excessive, or offensive noise as defined under Section 17-227(k) of this article.

Section 17-238 (Grading)

(a) It shall be unlawful for any person, including the City of Escondido, to do any authorized grading at any construction site, except on Mondays through Fridays during a week between the hours of 7:00 a.m. and 6:00 p.m. and, provided a variance has been obtained in advance from the City Manager, on Saturdays from 10:00 a.m. to 5:00 p.m.

(b) For this section, “grading” shall include, but not be limited to, compacting, drilling, rock crushing or splitting, bulldozing, clearing, dredging, digging, filling, and blasting.

(c) In addition, any equipment used for grading shall not be operated so as to cause noise in excess of a one-hour sound level limit of 75 dBA at any time when measured at or within the property

lines of any property which is developed and used in whole or in part for residential purposes, unless a variance has been obtained in advance from the City Manager.

Section 17-240 (General Noise Regulations)

Section 17-240 includes additional general noise regulations. This section states that it is unlawful for any person to make, continue or cause to be made or continued, any disturbing, excessive, or offensive noise which causes discomfort or annoyance to reasonable persons of normal sensitivity. Noises declared to be disturbing, excessive and offensive include stereo equipment, animal noise, and loading and unloading of vehicles that disturb neighboring receptors.

2.0 ENVIRONMENTAL SETTING

2.1 SURROUNDING LAND USES

Surrounding land uses include single-family residences to the west; single-family residences, a nursing home, and Miller Elementary School to the north; and single-family residences and agriculture uses to the south and east.

2.2 EXISTING NOISE ENVIRONMENT

The existing environment is dominated by traffic noise from the nearby I-15. Additional noise sources include traffic noise from Felicita Road, and the less travelled Brotherton Road.

2.2.1 Ambient Noise Survey

Three noise measurements were taken at the project site for the ambient noise survey, as shown on Figure 5, *Measurement and Off-Site Receiver Locations*. The first measurement (M1) was recorded in the southwestern quadrant of the project site within the existing field, pointing southwest toward I-15 and Felicita Road. The second measurement (M2) was taken in the southeast corner of the existing parking lot just east of the project site, pointing south towards I-15. A third 24-hour measurement was taken along the southeastern boundary of the existing parking lot, pointing south toward I-15.

Table 5
NOISE MEASUREMENT RESULTS

Measurement 1 – Ambient	
Date:	June 13, 2023
Conditions:	Temperature: 63°F. Wind Speed: 3 mph. 77% humidity. Partly Cloudy.
Time:	9:43 a.m. – 9:59 a.m.
Location:	At the southwestern quadrant of the project site within the existing field, approximately 150 feet from Felicita Road.
Measured Noise Level:	61.2 dBA L_{EQ}
Notes:	Noise sources: distant traffic along I-15, and traffic from Felicita Road. Brotherton Road had little to no traffic.

Measurement 2 – Ambient	
Date:	June 13, 2023
Conditions:	Temperature: 63°F. Wind Speed: 3 mph. 77% humidity. Partly Cloudy.
Time:	10:15 a.m. – 10:30 a.m.
Location:	At the southwest corner of the existing parking lot, approximately 230 feet from Felicita Road and approximately 365 feet from I-15.
Measured Noise Level:	77.8 dBA L_{EQ}
Notes:	Noise sources: Majority of noise from traffic along I-15, and traffic from Felicita Road. Noise from I-15 is more audible at this location compared to Measurement 1 due to the higher elevation and clearer line of sight to the freeway.
Measurement 3 – 24 hour	
Date:	June 13, 2023 – June 14, 2023
Time:	10:20 a.m. June 13, 2023 – 10:22 a.m. June 14, 2023
Location:	At the southeastern portion of the existing parking lot attached to a tree, approximately 600 feet from Felicita Road and approximately 700 feet from I-15.
Measured Noise Level:	74.8 dBA L_{DN}
Notes:	Noise sources: Close traffic along I-15, and traffic from Felicita Road

A traffic count was conducted at the M1 location to estimate the breakdown of heavy trucks (three or more axles), medium trucks (double tires/two axles), and automobiles along Felicita Road. The measured noise levels are shown in Table 5, *Noise Measurement Results*. Traffic counts for the timed measurement and the one-hour equivalent volume are shown in Table 6, *Recorded Traffic Volume and Vehicle Mix*.

Table 6
RECORDED TRAFFIC VOLUME AND VEHICLE MIX

Measurement	Roadway	Traffic	Autos	MT[1]	HT[2]
M2	Felicita Road	15-minute count	164	4	0
		One-hour equivalent	656	16	0
		Percent	98%	2%	0%

[1] Medium Trucks (double tires/two axles)

[2] Heavy Trucks (three or more axles)

3.0 ANALYSIS, METHODOLOGY, AND ASSUMPTIONS

3.1 METHODOLOGY

3.1.1 Ambient Noise Survey

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

- Piccolo II Integrating Sound Level Meter
- Larson Davis Model CA250 Calibrator
- Windscreen and tripod for the sound level meter

The sound level meter was field-calibrated immediately before the noise measurements to ensure accuracy. All sound level measurements conducted and presented in this report were made with a sound level meter that conforms to the American National Standards Institute (ANSI) specifications for sound level meters (ANSI SI.4-1983 R2006). All instruments were maintained with the National Institute of Standards and Technology traceable calibration per the manufacturers' standards.

3.1.2 Noise Modeling Software

Modeling of the exterior noise environment for this report was accomplished using the computer noise model Computer Aided Noise Abatement (CadnaA) version 2022. CadnaA is a model-based computer program developed by DataKustik for predicting noise impacts in a wide variety of conditions. CadnaA assists in the calculation, presentation, assessment, and mitigation of noise exposure. It allows for the input of project-related information, such as noise source data, barriers, structures, and topography to create a detailed CadnaA model, and uses the most up-to-date calculation standards to predict outdoor noise impacts. CadnaA traffic noise prediction is based on the data and methodology used in the Traffic Noise Model (TNM) released by the U.S. Department of Transportation (USDOT 2004).

Peak-hour traffic volumes are estimated based on the assumption that approximately 10 percent of average daily trips (ADT) would occur during a peak hour. The one-hour L_{EQ} noise level is calculated utilizing peak-hour traffic. Peak hour L_{EQ} can be converted to CNEL using the following equation, where $L_{EQ}(h)pk$ is the peak hour L_{EQ}, P is the peak hour volume percentage of the ADT, d and e are divisions of the daytime fraction of ADT to account for daytime and evening hours, and N is the nighttime fraction of ADT:

$$CNEL = L_{EQ}(h)pk + 10\log10\ 4.17/P + 10\log10(d + 4.77e + 10N)$$

The model-calculated one-hour L_{EQ} noise output is therefore approximately equal to the CNEL (Caltrans 2013).

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

3.2 ASSUMPTIONS

3.2.1 Construction

Construction activities would include site preparation, demolition, grading, underground utility installation, building construction, paving, and architectural coatings. Project construction on-road trips were estimated in the Air Quality and Greenhouse Gas Emissions Technical Report (HELIX 2024). Worker commute trips are anticipated to vary between approximately 6 and 217 trips per day, depending on construction activity. Approximately 40 vendor trips are anticipated per day during building construction (36 for residential construction, 4 for church construction). Vegetation hauling during site preparation would result in 1 one-way trip per day per site, demolition debris hauling would result in 7 one-way trips per day from residential construction and 4 one-way trips per day from church construction, and soil export hauling during grading would result in 30 one-way trips per day. Paving would require the import of asphalt and concrete estimated to include 42 one-way trips per day during residential development paving and 19 one-way trips per day during church development paving, assuming an uncompressed pavement thickness of six inches and tandem trailer truck loads (HELIX 2024).

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0 250 Feet

Source: Aerial (Esri 2024)

HELIX Environmental Planning

Measurement and Off-Site Receptors Locations

Figure 5

Construction would require the use of heavy off-road equipment. Construction equipment estimates for site preparation, demolition, underground utilities, and grading were based on site project information provided by the project applicant. Construction equipment estimates for building construction, architectural coating, and paving were based on default values used for modeling as part of the project's Air Quality and Greenhouse Gas Emissions Technical Report (HELIX 2024). A water truck was assumed to be used on-site, up to 4 hours per day for dust suppression during all demolition and earth-moving activities. Construction of the project residence and the church are anticipated to occur concurrently. To be conservative, project residential site and church site construction were assumed to have independent sets of off-road construction equipment. See Table 7, *Construction Phases and Equipment*, for the assumed off-road equipment by phase.

Table 7
CONSTRUCTION PHASES AND EQUIPMENT

Construction Phase	Equipment	Residential Quantity	Church Quantity
Demolition	Rubber Tired Dozer	1	1
	Tractors/Loaders/Backhoes	2	2
Site Preparation	Rubber Tired Dozer	1	1
Grading	Rubber Tired Dozer	1	1
	Grader	1	1
	Scrapers	3	3
Building Construction	Crane	1	1
	Forklifts	3	3
	Generator Set	1	1
	Tractors/Loaders/Backhoes	3	3
	Welder	1	1
Underground Utilities	Excavators	2	2
	Tractor/Loader/Backhoe	1	1
Paving	Pavers	2	2
	Paving Equipment	2	2
	Roller	2	2
Architectural Coating	Air Compressor	1	1

Source: HELIX 2024

3.2.2 Operation

Anticipated operational noise sources associated with the development of the project would primarily be associated with the use of building heating, ventilation, and air conditioning (HVAC) systems, and the addition of project-related traffic to area roadways.

3.2.2.1 Heating, Ventilation, and Air Conditioning Units

The specific HVAC systems and locations that would be installed for the project have not been identified at this stage of project design. This analysis assumes the residential building design would use one typical to larger-sized residential HVAC split system for each residence, and the HVAC condensers would be mounted on the building roofs, as shown on the project roof plans, behind 3-foot high parapets; and the church would use large commercial rooftop package systems mounted behind parapets 4 feet high. The residential HVAC systems assumed in this analysis are Carrier model 38BRC-024-34 2-ton split systems (one for each of the 258 residential units plus 18 additional systems for common areas, 276 total HVAC systems), which have a sound power level of 76 dBA (Carrier 2005). For the church, Carrier

50PG03-14 12.5-ton HVAC package systems with a sound power level of 83 dBA were assumed (Carrier 2008). Standard commercial HVAC planning assumes approximately one ton of HVAC for every 350 SF of habitable space (American Society of Heating, Refrigeration, and Air Conditioning Engineers [ASHRAE] 2012). Based on the church size (22,700 SF), six 12.5-ton HVAC systems would be required. The manufacturer's noise data for the HVAC units is provided below in Table 8, *HVAC Noise Data*.

Table 8
HVAC NOISE DATA

System	Noise Levels in Decibels[1] (dB) Measured at Octave Frequencies							Overall Noise Level in A-weighted Scale (dBA)[1]
	125 Hz	250 Hz	500 Hz	1 KHz	2 KHz	4 KHz	8 KHz	
Residential 38BRC-024-34	55.5	62.5	68.0	70.0	67.0	61.5	57.5	76.0
Church 50PG03-14	85.9	85.3	81.8	78.2	72.2	67.9	59.9	83.3

Source: Carrier 2005; Carrier 2008

[1] Sound Power Level (S_{WL})

HZ = Hertz; KHz = kilohertz

3.2.2.2 Vehicular Traffic

Traffic data and project trip generation for surrounding streets were based on volumes from the Local Mobility Analysis prepared for the project by Linscott, Law & Greenspan Engineers (LLG; 2024). In total, the project would generate 1,620 ADT. A traffic distribution of 97 percent automobiles, 2 percent medium trucks, and 1 percent heavy trucks was used in this analysis for the vehicle mix, which conservatively includes slightly higher percentages of medium and heavy trucks than what was observed during the traffic count conducted along Felicita Road during the site survey. According to Caltrans data, I-15 in the project vicinity carries approximately 8.3 percent trucks, consisting of approximately 3.5 percent medium trucks and 4.8 percent heavy trucks (Caltrans 2024). Project-generated traffic would consist almost entirely of automobiles. Table 9, *Existing and Future Traffic Volumes*, summarizes the ADT data for nearby roadways, both with and without the project.

Table 9
EXISTING AND FUTURE TRAFFIC VOLUMES

Roadway Segment	Average Daily Trips (ADT)			
	Existing Volumes	Project Volumes	Existing + Project (2025)	Cumulative + Project (2035)
Brotherton Road				
Felicita Road to Project Driveway #1	930	190	1,120	1,690
Project Driveway #1 to Miller Avenue	930	230	1,160	1,730
Miller Avenue to Alexander Drive	830	430	1,260	1,430
Alexander Drive to Centre City Parkway	2,200	0	2,200	2,200
Felicita Road				
Brotherton Road to Project Driveway #2	13,130	270	13,400	13,270
Project Driveway #2 to West Citracado Parkway	13,130	740	13,870	13,270
Gamble Lane				
I-15 SB Off-Ramp to Felicita Road	13,850	120	13,970	18,120

Roadway Segment	Average Daily Trips (ADT)			
	Existing Volumes	Project Volumes	Existing + Project (2025)	Cumulative + Project (2035)
West Citracado Parkway				
Felicita Road to I-15 SB On-Ramp	11,370	460	11,830	15,170
I-15 SB On-Ramp to I-15 NB Ramps	9,320	390	9,710	12,450
I-15 NB Ramps to Miller Avenue	6,790	270	7,060	9,050
Miller Avenue to Alexander Drive	4,640	80	4,720	4,580
Alexander Drive to Centre City Parkway	4,470	80	4,550	5,280
Miller Avenue				
West Citracado Parkway to Brotherton Road	1,610	350	1,960	2,430
Center City Parkway				
West Citracado Parkway to Brotherton Road	30,720	0	30,720	31,400

Source: LLG 2024

Traffic for the nearby I-15 freeway was provided by the San Diego Association of Government (SANDAG) Transportation Forecast Information Center (TFIC). The TFIC provides forecasted traffic information for roadways within the region. Traffic data for I-15 was based on the Forecast Year 2025 data for existing conditions, which shows the freeway carrying approximately 228,500 ADT, and Forecast Year 2035 data for cumulative and future conditions, which shows the freeway carrying approximately 236,400 ADT (SANDAG 2024). The I-15 traffic volumes include traffic for northbound, southbound, HOV lanes, and on- and off-ramp volumes from Felicita Road to Centre City Parkway.

3.3 GUIDELINES FOR THE DETERMINATION OF SIGNIFICANCE AND CONDITIONS OF APPROVAL

Implementation of the project would result in a significant adverse impact if it would exceed the following thresholds based on Appendix G of the CEQA Guidelines, as applicable to the project:

Threshold 1: *Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the Escondido General Plan or noise ordinance.*

Significant operational noise impacts would occur if the project would result in a permanent increase in ambient noise levels that would exceed the sound level limits in Escondido Municipal Code Section 17-229 (50 dBA L_{EQ} daytime, 45 dBA L_{EQ} nighttime for residential uses, see Table 4 of this report) at any point on or beyond the boundaries of the property on which the sound is produced; or if the project would result in a permanent increase in transportation noise that would exceed the allowable incremental noise increase listed in Table 2 of this report (City 2012a).

Significant construction noise impacts would occur if the project would generate construction noise that exceeds the standards listed in Escondido Municipal Code Section 17-234, Construction Equipment, and Section 17-238, Grading, both of which restrict construction noise to 75 dBA L_{EQ} (1 hour). Impacts would also occur if the project operates construction equipment outside of the allowed construction hours specified in Section 17-234, which are between 7:00 a.m. and 6:00 p.m. Monday through Friday and between 9:00 a.m. and 5:00 p.m. on Saturdays.

Threshold 2: *Generate excessive ground-borne vibration or ground-borne noise levels.*

For infrequent vibration events (defined as fewer than 30 events per day, applicable to construction activity), significant annoyance impacts would occur if the project would exceed vibration levels of 65 VdB for buildings where vibration would interfere with interior operations; 80 VdB for residences and buildings where people normally sleep; or 83 VdB for institutional land uses with primarily daytime uses (City 2012b). Significant damage impacts would occur if the project would expose buildings to vibration levels that exceed FTA thresholds, the lowest of which is 90 VdB for buildings extremely susceptible to vibration damage (FTA 2018).

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 use airport or private airstrip, expose people residing or working in the project area to excessive noise.*

A significant impact would occur if airport activity would expose the project land use to noise levels that exceed the City's noise compatibility standard provided in Table 1 for that use.

Threshold 4: *Would the project conflict with the General Plan Noise Element standards for proposed uses?*

Impacts would be significant if the project would expose new development to noise levels in excess of the Noise Compatibility Standards established in the City's Community Protection Element, provided in Table 1. For multi-family residential uses, the exterior noise compatibility standard is 65 CNEL. For school and church uses, exterior noise levels of up to 65 CNEL are "normally acceptable" and noise levels between 60 and 70 CNEL are "conditionally acceptable."

4.0 IMPACTS

4.1 ISSUE 1: INCREASE IN AMBIENT NOISE LEVELS

Would the project generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the Escondido General Plan or noise ordinance?

4.1.1 Impact Analysis

4.1.1.1 Construction Noise Generation

Construction of the project is anticipated to occur during daytime hours, in compliance with City Municipal Code Section 17-234.

The two school buildings on the project site are associated with the church and would be modified as part of the project to connect with the new church buildings. As such, these two school buildings are considered a part of the project and are not considered NSLUs for project construction impact analysis.

Off-Site Construction Traffic Noise

Impacts from construction traffic noise would be potentially significant if the addition of project-related construction traffic (truck trips and construction worker commute trips) to existing traffic on area roads

would result in an increase of more than 3 dBA (a just perceptible increase in noise in typical outdoor environments).

As discussed in Section 3.2.1, the largest number of construction heavy truck trips is anticipated to occur during paving for the residential site, which would result in 42 one-way heavy truck trips per day. This equates to approximately 5 trips per hour over an 8-hour construction workday. Five additional heavy truck trips per hour, during the AM peak hour were assumed to travel on Felicita Road, Brotherton Road, Miller Avenue, and Citracado Parkway, the potential haul routes from the project site to I-15. In addition, to be conservative, the highest number of worker commute trips (109 trips) were assumed to travel during the peak hour.

Traffic noise levels were calculated in CadnaA for the receivers shown in Figure 5. Table 10, *Off-site Construction Traffic Noise Levels*, provides the modeled existing noise level at each receptor and the corresponding noise level with existing plus project construction traffic volumes. The 2025 traffic volumes for I-15 were used to determine the existing noise levels since the project is expected to commence construction in 2025 (SANDAG 2023). As shown in Table 10, the maximum increase in noise levels would be 0.9 dBA L_{EQ}, which is not perceptible (the change from the existing noise level would be less than 3 dBA) compared to existing noise levels. In addition, noise level increases from construction trips would be temporary.

Table 10
OFF-SITE CONSTRUCTION TRAFFIC NOISE LEVELS

Receiver	Traffic Noise Exposure (L_{EQ}) – Peak Hour			Perceptible Change? (> 3 dBA)
	Existing (No Project)	Existing Plus Construction Traffic (2025)	Change from Existing	
R1	67.8	68.4	+0.6	No
R2	71.8	71.9	+0.1	No
R3	73.1	73.1	+0.0	No
R4	66.5	66.9	+0.4	No
R5	66.2	66.3	+0.1	No
R6	69.8	69.8	+0.0	No
R7	64.3	65.2	+0.9	No
R8	69.7	69.8	+0.1	No

Source CadnaA
L_{EQ} = equivalent sound level

On-Site Construction Equipment Noise

Potentially significant construction noise impacts would occur if project off-road construction equipment would generate noise that exceeds the 75 dBA L_{EQ} standard from the City Municipal Code.

Construction of the project would require demolition of the existing structures, site preparation, grading, installation of underground utilities/infrastructure, construction of new buildings, paving, and architectural coating. The magnitude of the noise generated would depend on the type of construction activity, equipment, duration of each construction phase, distance between the noise source and receiver, and any intervening structures. Construction would generate elevated noise levels that may disrupt nearby residences surrounding the project site.

Table 11, *Construction Equipment Noise Levels,* provides construction equipment noise levels for expected construction equipment at distances representative of the closest NSLUs to the project site. Construction equipment would not all operate at the same time or location and would not be in constant use during the 8-hour operating day; therefore, for noise level prediction purposes, a conservative average distance from construction activities to the nearest residences is shown in Table 10. Receivers R1, R2, and R3 are the closest off-site residential property lines to construction of the project residential development. Receivers R3, R4, and R5 are the closest off-site residential property lines to the project church construction. Other nearby residences would be located at greater distances from the project's construction activities. The receiver locations are provided in Figure 5.

Table 11
CONSTRUCTION EQUIPMENT NOISE LEVELS

Unit	Percent Operating Time	L_{MAX} at 50 feet[1] (dBA)	Resulting Noise Level at Noise-Sensitive Land Uses[2] (1-hour dBA L_{EQ})				
			R1 & R2 350 feet	R3 315 feet	R4 270 feet	R5 230 feet	R6 415 feet
Backhoe	40	78	56.7	57.6	58.9	60.3	55.2
Bulldozer	40	78	60.8	61.7	63.0	64.4	59.3
Compressor (air)	40	78	56.8	57.7	59.0	60.4	55.3
Crane	20	81	55.7	56.6	57.9	59.3	54.2
Excavator	40	81	59.8	60.7	62.1	63.5	58.3
Generator	50	81	60.7	61.6	63.0	64.4	59.2
Grader	40	85	64.1	65.0	66.4	67.8	62.6
Paver	50	77	57.3	58.2	59.6	61.0	55.8
Roller	20	80	56.1	57.0	58.4	59.8	54.6
Scraper	40	84	62.7	63.6	65.0	66.3	61.2
Flat Bed Truck	40	84	53.4	54.3	55.6	57.0	51.9
Welder/Torch	40	74	53.1	54.0	55.4	56.8	51.6

Source: RCNM (USDOT 2008)

[1] L_{MAX} values are based on representative equipment in RCNM ("Actual Measured" levels).

[2] Receiver noise levels at various distances were evaluated using RCNM.

L_{MAX} = maximum noise level; dBA = A-weighted decibel; L_{EQ} = time-averaged sound level.

R1, R2, R3 – Receivers affected by construction of the residential development.

R4, R5, R6 – Receivers affected by construction of the church.

As shown in Table 11, the project would not require equipment that would generate noise levels exceeding 75 dBA L_{EQ} (1-hour) at any of the receiver locations. Multiple construction equipment types would be in use throughout the day. A grader and a scraper could operate on the site simultaneously but would not operate near one another at a given time due to the nature of their respective operations. A grader and scraper were analyzed together due to their likelihood of being used in conjunction with one another. Table 12, *Combined Construction Noise Levels,* provides the calculated combined construction noise level generated by a grader and a scraper. As shown in Table 12, *Combined Construction Noise Levels*, noise levels at each receiver would not exceed the 75 dBA 1-Hour L_{EQ} limit.

Table 12
COMBINED CONSTRUCTION NOISE LEVELS

Construction Phase/Activity	Two Loudest Pieces of Equipment in Phase	Combined 1-hour L_{EQ} at 50 feet (dBA)	Combined Noise Level at Noise-Sensitive Land Uses (1-hour dBA L_{EQ})				
			R1 & R2 350 feet	R3 315 feet	R4 270 feet	R5 230 feet	R6 415 feet
Grading	Grader and Scraper	83.4	66.5	67.4	68.7	70.1	65.0

Source: RCNM (USDOT 2008)
dBA = A-weighted decibel; L_{EQ} = equivalent sound level.
R1, R2, R3 – Receivers affected by construction of the development.
R3, R4, R6, R6 – Receivers affected by construction of the church.

4.1.1.2 Operational Noise Generation

Operational On-site Noise Generation

The primary source of project operational noise generated on the project site would be from building HVAC systems. The combined noise of all project HVAC systems operating concurrently at night would be significant if the resulting noise would exceed the City Municipal Code standard of 45 dBA received at residential property lines.

As described in Section 3.2.2.1, the project is anticipated to include 276 Carrier model 38BRC-024-34 2-ton split system HVAC units for the residential buildings, and six Carrier 50PG03-14 12.5-ton HVAC package units for the church building, all mounted on building rooftops behind parapet walls. These units were modeled in CadnaA as described in Section 3.2.2 and the resulting noise levels were calculated at the receivers shown in Figure 5, at a height of 5 feet above the ground level to approximate human hearing. As shown in Table 13, *Off-site HVAC Noise*, the combined project HVAC systems would not result in noise levels exceeding the City's most restrictive standard of 45 dBA L_{EQ} measured at residential property lines during the nighttime hours near the project site.

Table 13
OFF-SITE HVAC NOISE

Receiver	Combined Project HVAC Noise (dBA L_{EQ})	City Nighttime Standard (dBA L_{EQ})	Exceed Standard?
R1	35.0	45	*No*
R2	36.2	45	*No*
R3	37.2	45	*No*
R4	39.9	45	*No*
R5	34.8	45	*No*
R6	38.1	45	*No*

Source: CadnaA; Standard: City Municipal Code Section 17-229
dBA = A weighted decibels; L_{EQ} = equivalent sound level

Operational Off-site Transportation Noise Generation

As noted in Section 3.2.2.2, Existing and Existing Plus Project traffic noise levels presented in this analysis are based on traffic volumes provided by LLG (2023). Refer to Table 9 for the forecasted ADT data for

existing and project-added traffic volumes. As shown in Table 9, the largest increase in project-added trips would occur on Felicita Road, between the project's driveway #2 and West Citracado Parkway, where the project would add 770 ADT to an existing traffic volume of 13,130 ADT.

Traffic noise levels were calculated in CadnaA for the receivers shown in Figure 4. As noted in Table 2, the allowable incremental increase in noise is dependent on the existing ambient noise level (Existing L_{DN}). Table 14, *Off-site Traffic Noise Levels*, provides the modeled existing noise level at each receptor and the corresponding noise level with existing plus project traffic volumes. Existing ambient noise is the calculated 2025 traffic noise level without the addition of project-related traffic.

Table 14
OFF-SITE TRAFFIC NOISE LEVELS

Receiver	Traffic Noise Exposure (L_{DN})				Exceed Allowable Increase?
	Existing (2025 – No Project)	Allowable Noise Increment[1]	Existing Plus Project (2025)	Change from Existing	
R1	68	+1	68	+0	No
R2	72	+0	72	+0	No
R3	73	+0	73	+0	No
R4	67	+1	67	+0	No
R5	66	+1	66	+0	No
R6	70	+1	70	+0	No
R7	64	+1	64	+0	No
R8	69	+1	69	+0	No

Source: CadnaA
L_{DN} = day-night average sound level
[1] Allowable noise increase over exiting ambient noise from City General Plan Figure VI-14 (City 2012).

The maximum noise increase due to the addition of project traffic to streets in the area would be 0.2 dBA at receiver R7 (on Miller Avenue). As shown in Table 14, noise levels would not increase more than the allowable noise increment.

4.1.1.3 Cumulative Operational Noise Impacts

The potential for a cumulative noise impact during operation is primarily related to traffic generation when trips generated by multiple projects combine to substantially increase noise levels. A significant cumulative traffic noise impact would occur if the project, in combination with cumulative projects, would increase traffic noise levels above the City's incremental noise thresholds listed in Table 2 at nearby NSLU receivers. The trips generated by cumulative development, in addition to assumed growth for the year 2035 in the project's traffic analysis (LLG 2023) and I-15 volumes from the TFIC 2035 data (SANDAG 2023), were used in this analysis. A comparison of existing, cumulative, and cumulative plus project traffic noise levels is provided in Table 15, *Cumulative Off-Site Traffic Noise Levels*, and compared with the City's incremental noise thresholds.

Table 15
CUMULATIVE OFF-SITE TRAFFIC NOISE LEVELS

Receiver	Traffic Noise Exposure (L_{DN})					
	Existing (2025 - No Project)	Allowable Noise Increment	Cumulative (2035 – No Project)	Cumulative (2035 – With Project)	Cumulative Change	Project Contribution to Cumulative Change
R1	68	+1	68	68	+0	+0
R2	72	+0	72	72	+0	+0
R3	73	+0	73	73	+0	+0
R4	67	+1	67	67	+0	+0
R5	66	+1	67	67	+0	+0
R6	70	+0	70	70	+0	+0
R7	64	+1	65	65	+1	+0
R8	69	+1	71	71	+2	+0

Source: CadnaA

L_{DN} = day-night average sound level

[1] Allowable noise increase over exiting ambient noise from City General Plan Figure VI-14 (City 2012).

As shown in Table 15, traffic noise levels at NSLU receivers near the project site would not increase above the allowable noise increment under cumulative conditions except for Receiver R8, on West Citricado Parkway (See Figure 5). However, the project's contribution to the cumulative increase in traffic noise levels would be negligible, as the cumulative traffic noise level would not increase with the addition of project-generated trips. Therefore, the project would not result in a cumulatively considerable increase in ambient traffic noise.

4.1.2 Significance of Impacts

The addition of project construction traffic would not result in a perceptible increase in ambient traffic noise levels. The calculated one-hour project construction equipment noise levels would be less than the City limit of 75 dBA measured at nearby NSLUs. The calculated project operational noise from on-site building HVAC systems would not exceed the City nighttime standards of 45 dBA L_{EQ} measured at nearby NSLUs. The increase in traffic noise due to the addition of project traffic to area streets would not exceed the City allowable incremental increase for residential land uses and would not be perceptible to the human ear. Therefore, the project would not result in the generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project exceeding standards established in the local general plan or noise ordinance, or applicable standards of other agencies. The impact would be less than significant.

4.1.3 Mitigation Framework

Impacts would be less than significant; therefore, no mitigation measures would be required.

4.1.4 Significance After Mitigation

The project would not result in the generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project exceeding standards established in the local general plan or noise ordinance, or applicable standards of other agencies. The impact would be less than significant.

4.2 ISSUE 2: EXCESSIVE VIBRATION

Would the project result in generation of excessive ground-borne vibration or ground-borne noise levels?

4.2.1 Impact Analysis

4.2.1.1 Construction Vibration

Potentially significant impacts would occur if construction of the project would result in vibration which would exceed 80 VdB for residences and buildings where people normally sleep or exceed the 90 VdB thresholds for potential damage to buildings extremely susceptible to vibration damage.

The equipment with the greatest potential for vibration generation during project construction would be a vibratory roller, which may be used for compaction of soil beneath building foundations and could be used within 70 feet of the closest off-site residence north of the project site. Most usage of a vibratory roller, however, would occur at distances greater than 70 feet from any single residence due to the mobile nature of its use across the project site. A vibratory roller would create approximately 0.210 inch per second PPV at a distance of 25 feet (FTA 2018). A 0.210 inch per second PPV vibration level would equal 0.045 inch per second PPV, or 81 VdB, at a distance of 70 feet[1]. This would be lower than the conservative structural damage impact threshold for buildings extremely susceptible to vibration damage of 90 VdB (0.12 inch per second PPV), but higher than the 80 VdB City's vibration impact criteria for infrequent events for Category 2 land uses (residences).

Mitigation measure NOI-1, below, would require vibratory rollers to be used in static mode within 80 feet of residences and the nearby school (the distance at which the vibration level would be below 80 VdB) or documentation that vibratory rollers selected for use on the project site would comply with the limit of 80 VdB at nearby residences, and the nearby school. With the implementation of mitigation measure NOI-2, impacts associated with a vibratory roller (and other potential equipment) would be less than significant.

4.2.1.2 Operational Vibration

Land uses that may generate substantial ground-borne operational vibrations include heavy industrial or mining operations that require the use of vibratory equipment. The project would not include equipment that would generate substantial vibration.

4.2.2 Significance of Impacts

Vibrations from the use of vibratory rollers during project construction could exceed the City standard of 80 VdB for disturbance of residents. Once operational, the project would not be a substantial source of vibration. Long-term operation of the project would not be a source of substantial ground-borne vibrations. The impact would be potentially significant.

[1] Equipment PPV = Reference PPV * $(25/D)^n$ (inches per second), where Reference PPV is PPV at 25 feet, D is distance from equipment to the receiver in feet, and n = 1.5. L_V = Reference L_V – 30*log (D/25) (VdB), where Reference L_V is L_V at 25 feet and D is distance from equipment to the receiver in feet. Formulas from FTA 2018.

4.2.3 Mitigation Framework

Mitigation measure NOI-1 would require vibratory rollers to be used in static mode (no vibrations) within 80 feet of residences, the distance at which the vibration level would not exceed 80 VdB.

Mitigation Measures

NOI-1 Vibratory Roller Usage Limits. Vibratory rollers shall be used in static mode only (no vibrations) when operating within 80 feet of an occupied residential building. The contractor shall specify vibratory roller operating mode restrictions on all demolition, grading, and construction permits.

4.2.4 Significance of Impacts After Mitigation

With the implementation of mitigation measure NOI-1, the project would not result in the generation of excessive ground-borne vibration levels. The impact would be less than significant with mitigation incorporated.

4.3 ISSUE 3: AIRPORT NOISE EXPOSURE

For a project located within 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?

4.3.1 Impact Analysis

The project site is subject to some aircraft flyover noise, although the site is not located near an airport or private airstrip. The nearest airports to the project site are the Ramona Airport, located approximately 10 miles to the southeast, and the McClellan-Palomar Airport, located approximately 12 miles to the west. Therefore, the project would not expose people working on the project site to excessive noise from aircraft or airport operations.

4.3.2 Significance of Impacts

The project would not expose people working on the project site to excessive noise from aircraft or airport operations, and the impact would be less than significant.

4.3.3 Mitigation Framework

Impacts would be less than significant; therefore, no mitigation measures would be required.

4.3.4 Significance After Mitigation

The project would not expose people working on the project site to excessive noise from aircraft or airport operations, and the impact would be less than significant.

4.4 ISSUE 4: LAND USE COMPATIBILITY

Would the project conflict with the General Plan Community Protection Element noise standards for the proposed uses?

4.4.1 Impact Analysis

4.4.1.1 Exterior Noise Levels

As noted in the Land Use section of CEQA Guidelines Appendix G, a project may result in a significant impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. The General Plan Community Protection Element includes noise and land use compatibility standards to ensure that proposed land uses are not exposed to excessive noise. Therefore, an analysis of consistency with the Community Protection Element noise exposure criteria is included in this analysis. Noise Policy 5.2 in the General Plan Community Protection Element states that outdoor activity areas within multi-family residential developments should not exceed noise levels exceeding 65 CNEL. However, the Community Protection Element notes that this standard may not be achievable in some cases, and residential construction may still proceed given feasible mitigation is installed and interior areas comply with Title 24 requirements. For school and church uses, the Community Protection Element indicates exterior noise levels of up to 65 CNEL are "normally acceptable" and noise levels between 60 and 70 CNEL are "conditionally acceptable."

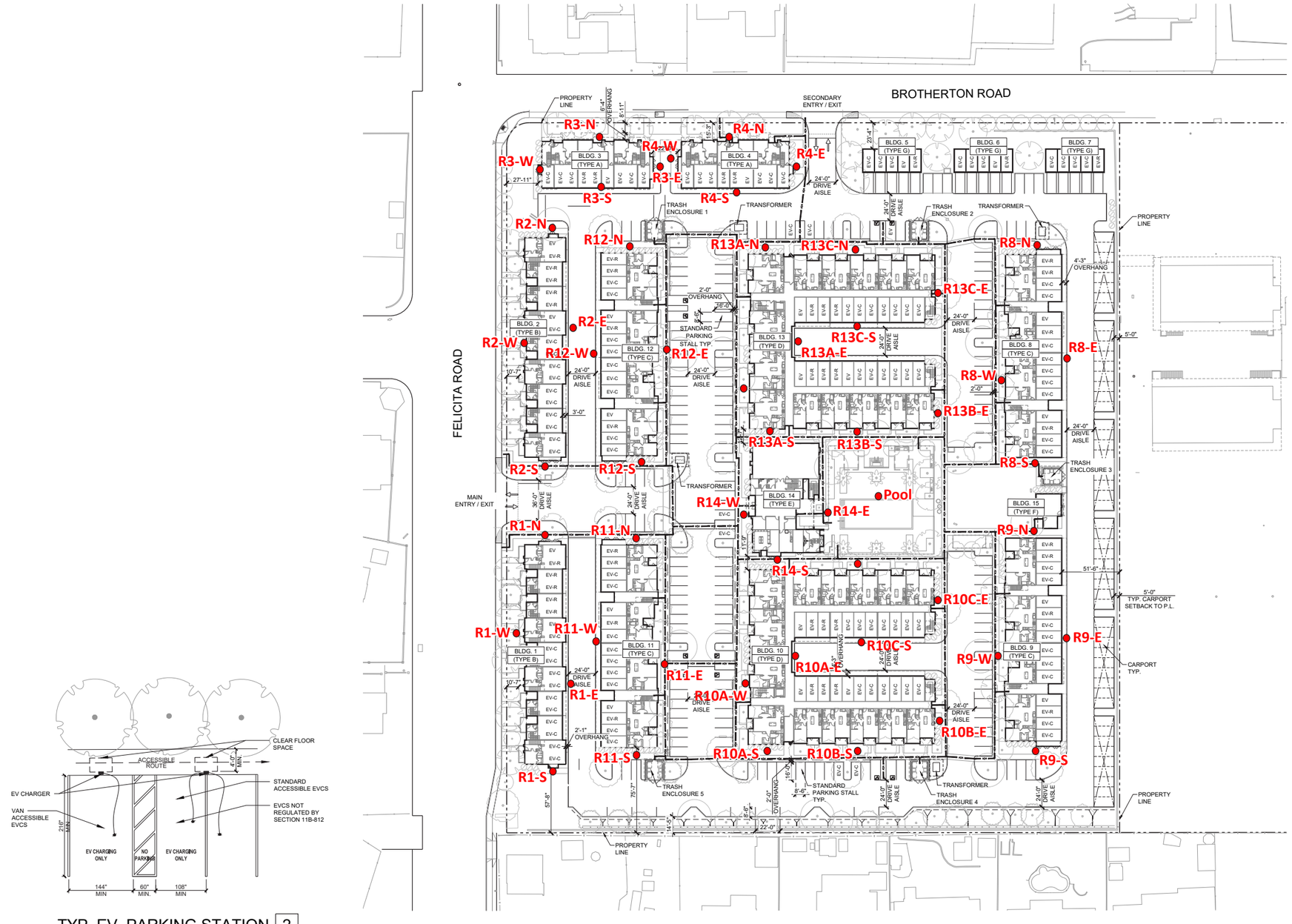
Outdoor use areas proposed by the residential development include a pool and amenity area at the center of the residential buildings. Outdoor use areas proposed by the church development include a sports field and basketball court along the southern edge of the church development area and a play area at the southern edge of the school building. Existing plus project traffic volumes during the PM peak hour along adjacent roadways (based on traffic levels provided in Table 9) and 10 percent of ADT on I-15 were modeled in CadnaA. Noise receivers at heights of five feet were placed within the proposed outdoor use areas at the locations shown in Figure 6, *On-Site Residential Receiver Locations*, and Figure 7, *On-Site Church Receiver Locations*.

Noise levels at the residential pool and amenity area were modeled to be 44.1 CNEL. As this noise level would not exceed 65 CNEL, the residential development would comply with the General Plan policy for allowable noise in outdoor use areas for new residential developments.

Within the church development, noise levels at the lawn and basketball court were modeled to be 67.3 CNEL and 67.9 CNEL, respectively. Noise levels at the play area south of the school building were modeled to be 66.8 CNEL. These noise levels are within the conditionally compatible range of noise levels for church and school land uses. As these areas would be used for recreational purposes, no further attenuation is required. The church development would comply with the General Plan compatibility standards for allowable noise in outdoor use areas for new church developments.

4.4.1.2 Interior Noise Levels

Title 24 regulations require that noise levels in habitable interior spaces for multi-family residential uses do not exceed 45 CNEL. General Plan Noise Policy 5.4 also requires noise attenuation for new noise-sensitive uses, including residences, schools, and churches, if the projected interior noise standard of 45 dBA CNEL is exceeded. Traditional architectural materials are conservatively estimated to attenuate



SITE PLAN 1

LEGEND

— · — · —	PROPERTY LINE
▬ ▬ ▬	ADA PATH OF TRAVEL
EV-C	EV CAPABLE STALLS
EV-R	EV READY STALLS
EV	EV CHARGER STALLS
●	RECEIVER LOCATION

NOTE :

1. EXISTING OVER HEAD UTILITIES AND POLES TO BE UNDERGROUNDED, REFER TO CIVIL DRAWINGS.

TYP. EV. PARKING STATION 2

Source: adc 2024

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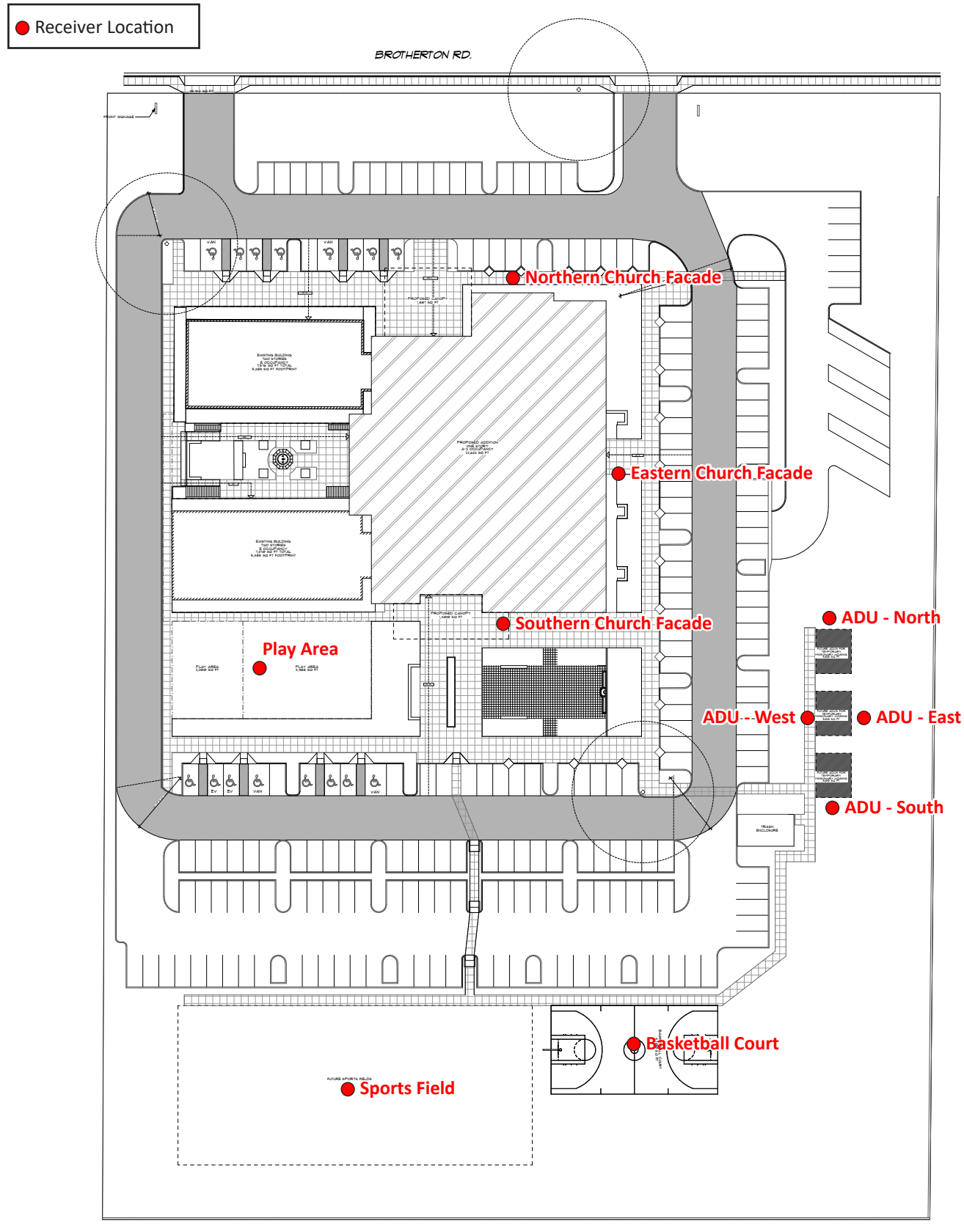
On-Site Residential Receiver Locations

Figure 6



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Source: BGW Architects 2024

HELIX Environmental Planning

On-Site Church Receiver Locations

Figure 7

noise levels by 15 CNEL; therefore, if exterior noise levels at building façades exceed 60 CNEL, interior noise levels may exceed the 45 CNEL limit, and further analysis is required.

As described in Section 3.1.2, 10 percent of ADT for future (2035) plus project traffic volumes along adjacent roadways and 10 percent of ADT on I-15 were modeled in CadnaA to calculate receiver noise levels in CNEL, based on the assumption that approximately 10 percent of ADT would occur during a peak hour. The one-hour L_{EQ} noise level is calculated utilizing peak-hour traffic. The model-calculated one-hour L_{EQ} noise output is, therefore, approximately equal to the CNEL (Caltrans 2013).

Receivers were placed at each proposed residential building façade (north, west, south, and east) at the locations shown in Figure 6 at heights of 5, 15, 25, and 35 feet, as applicable for the floors of each residential building (floors 1, 2, 3, and 4, respectively). Buildings 5, 6, and 7, as shown on the site plan, are parking structures and do not contain residences (see Figure 6). Receivers were placed at the church building and ADU façades at the locations shown on Figure 7 at heights of 5 feet. The model considered the proposed topography at the project site, the existing off-site topography, and the retaining walls on the project's northeastern corner, eastern boundary, and southern boundary.

Noise levels at the church building were estimated to be 66.2 CNEL at the southern façade facing I-15, 61.1 CNEL at the eastern façade facing Miller Avenue, and 48.1 at the northern façade facing Brotherton Road. Noise levels at the ADU façades were estimated to be 55.6 CNEL on the north, 66.6 CNEL on the south, 60.2 CNEL on the east, and 64.6 CNEL. These noise levels are within the conditionally compatible range for new church and residential land uses. The General Plan Community Protection Element requires an analysis of noise reduction requirements in this case but notes that conventional construction, with closed windows and fresh air supply systems or air conditioning, will usually suffice to attenuate interior noise. Nonetheless, interior noise levels may exceed the interior noise limit of 45 CNEL, and additional analysis would be required to confirm that the final building materials achieve interior noise levels that are compatible with the General Plan Community Protection Element noise standards.

The resulting noise levels at each receiver and floor for the residential development are provided in Table 16, *Calculated Noise Levels at Residential Building Façades*. As shown in Table 16, several building façades would be exposed to noise levels above 60 CNEL, particularly the south and west building façades that face the adjacent roadways and freeway. Therefore, interior noise levels may exceed the interior noise limit of 45 CNEL with the use of typical construction materials. Additional analysis would be required to confirm that the building materials achieve interior noise levels that are compatible with the General Plan Community Protection Element noise standards.

Table 16
CALCULATED NOISE LEVELS AT RESIDENTIAL BUILDING FAÇADES

	Floor (CNEL)					Floor (CNEL)			
Receiver	**1**	**2**	**3**	**4**	**Receiver**	**1**	**2**	**3**	**4**
R1 East	**70.3**	**70.7**	**71.0**	-	R11 East	**69.1**	**71.3**	**71.9**	**-**
R1 South	**74.2**	**76.5**	**77.2**	-	R11 South	**74.9**	**76.8**	**77.1**	**-**
R1 West	**72.0**	**72.8**	**73.4**	-	R11 West	**68.3**	**69.8**	**70.0**	-
R1 North	63.2	64.1	64.9	-	R11 North	59.4	59.6	62.0	**-**
R2 East	61.0	61.3	61.6	-	R12 East	**65.4**	**66.9**	**66.6**	-
R2 South	**67.6**	**67.8**	**68.9**	-	R12 South	**65.5**	**66.1**	**66.8**	-
R2 West	**69.2**	**69.8**	**70.4**	-	R12 West	61.8	62.0	62.2	-

R2 North	61.4	61.6	61.2	-	R12 North	53.8	53.5	54.2	-
R3 East	61.2	61.0	61.2	-	R13A East	37.6	39.4	41.1	45.9
R3 South	61.8	63.0	63.3	-	R13A South	56.6	56.5	58.2	63.7
R3 West	**67.2**	**66.9**	**67.1**	-	R13A West	**65.3**	**66.8**	**66.6**	**69.0**
R3 North	60.1	59.9	60.1	-	R13B East	61.4	**65.5**	**65.1**	**65.4**
R4 East	46.5	48.0	48.1	-	R13B South	47.7	48.0	50.5	60.2
R4 South	63.0	63.7	64.2	-	R13C East	62.3	63.7	63.2	64.6
R4 West	59.2	59.2	59.6	-	R13C South	39.8	41.7	44.3	48.8
R4 North	58.5	58.0	58.0	-	R13C North	50.5	50.9	51.6	53.5
R8 East	57.5	63.9	67.2	-	R14 East	38.5	39.2	-	-
R8 South	49.5	55.5	62.0	-	R14 South	44.9	47.0	-	-
R8 West	62.0	**65.0**	64.0	-	R14 West	**69.6**	**70.1**	-	-
R8 North	42.4	43.3	50.8	-					
R9 East	59.2	**67.6**	**67.8**	-					
R9 South	**71.8**	**74.7**	**75.0**	-					
R9 West	**67.2**	**70.1**	**70.4**	-					
R9 North	43.1	43.1	46.8	-					
R10A East	63.1	63.0	63.1	63.6					
R10A South	**76.0**	**76.1**	**76.7**	**76.9**					
R10A West	**73.5**	**73.9**	**74.1**	**74.8**					
R10B East	59.0	**69.2**	**70.0**	**70.1**					
R10**B** South	**74.2**	**75.7**	**76.0**	**76.2**					
R10C East	57.7	**68.0**	**68.6**	**68.9**					
R10C South	42.8	43.8	45.6	51.1					
R10C North	44.6	46.1	51.0	59.4					

Source: CadnaA

CNEL = Community Noise Equivalent Level; - = no building floor at this location.

Bold = potentially significant impact

4.4.2 Significance of Impacts

Noise levels in project outdoor activity areas would not exceed the City standard of 65 CNEL for residential uses or 70 CNEL for church and school uses. Interior noise levels for apartments with line of sight to I-15 or Felicita Road (east-, south-, and west-facing building façades), church building rooms on the southern and eastern edges of the church building, and ADU rooms could exceed the interior noise standard of 45 CNEL. The impact would be potentially significant.

4.4.3 Mitigation Framework

Mitigation measure NOI-2 would require an exterior-to-interior noise analysis for habitable rooms in residential units with a direct line of sight to Felicita Road or I-15. Mitigation measure NOI-3 would require an exterior-to-interior noise analysis for rooms in the church building and associated ADUs.

Mitigation Measures

NOI-2 Demonstration of Residential Interior Noise Standard Compliance. Interior noise levels for the project's proposed residential units shall be demonstrated not to exceed 45 CNEL. Once final building plan information is available, additional exterior-to-interior noise analysis shall be conducted for habitable rooms in residential units with a direct line of sight to Felicita Road or I-15.

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

Air conditioning or mechanical ventilation systems shall be installed to allow windows and doors to remain closed for extended intervals of time so that acceptable interior noise levels can be maintained. The mechanical ventilation system shall meet the criteria of the International Building Code (Chapter 12, Section 1203 of the 2022 California Building Code or the applicable Building Code at the time of building permit issuance).

NOI-3 Demonstration of Church Development Interior Noise Standard Compliance. Interior noise levels for the project's proposed church building and accessory dwelling units shall be demonstrated not to exceed 45 CNEL. Once final building plan information is available, additional exterior-to-interior noise analysis shall be conducted for rooms along the southern and eastern edges of the church building as well as for each accessory dwelling unit.

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

Air conditioning or mechanical ventilation systems shall be installed to allow windows and doors to remain closed for extended intervals of time so that acceptable interior noise levels can be maintained. The mechanical ventilation system shall meet the criteria of the International Building Code (Chapter 12, Section 1203 of the 2022 California Building Code or the applicable Building Code at the time of building permit issuance).

4.4.4 Significance After Mitigation

With the implementation of mitigation measures NOI-2 and NOI-3, the project would be compatible with the General Plan Noise Community Protection Element noise standards for siting of new NSLUs. The impact would be less than significant with mitigation incorporated.

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Appendix A

Construction Noise Modeling Outputs

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/19/2025
Case Description: Alexan Escondido Project

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
R1 + R2	Residential	75	75	75

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	350	0
Dozer	No	40		81.7	350	0
Crane	No	16		80.6	350	0
Compressor (air)	No	40		77.7	350	0
Excavator	No	40		80.7	350	0
Generator	No	50		80.6	350	0
Grader	No	40	85		350	0
Paver	No	50		77.2	350	0
Roller	No	20		80	350	0
Scraper	No	40		83.6	350	0
Flat Bed Truck	No	40		74.3	350	0
Welder / Torch	No	40		74	350	0

Results

	Calculated (dBA)	
Equipment	*Lmax	Leq
Backhoe	60.7	56.7
Dozer	64.8	60.8
Crane	63.6	55.7
Compressor (air)	60.8	56.8
Excavator	63.8	59.8
Generator	63.7	60.7
Grader	68.1	64.1
Paver	60.3	57.3
Roller	63.1	56.1
Scraper	66.7	62.7
Flat Bed Truck	57.3	53.4
Welder / Torch	57.1	53.1
Total	68.1	70.2

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
R3	Residential	75	75	75

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	315	0
Dozer	No	40		81.7	315	0
Crane	No	16		80.6	315	0
Compressor (air)	No	40		77.7	315	0
Excavator	No	40		80.7	315	0
Generator	No	50		80.6	315	0
Grader	No	40	85		315	0
Paver	No	50		77.2	315	0
Roller	No	20		80	315	0
Scraper	No	40		83.6	315	0
Flat Bed Truck	No	40		74.3	315	0
Welder / Torch	No	40		74	315	0

Results

Calculated (dBA)

Equipment	*Lmax	Leq
Backhoe	61.6	57.6
Dozer	65.7	61.7
Crane	64.6	56.6
Compressor (air)	61.7	57.7
Excavator	64.7	60.7
Generator	64.6	61.6
Grader	69	65
Paver	61.2	58.2
Roller	64	57
Scraper	67.6	63.6
Flat Bed Truck	58.3	54.3
Welder / Torch	58	54
Total	69	71.1

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
R4	Residential	75	75	75

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	270	0
Dozer	No	40		81.7	270	0
Crane	No	16		80.6	270	0
Compressor (air)	No	40		77.7	270	0
Excavator	No	40		80.7	270	0
Generator	No	50		80.6	270	0
Grader	No	40	85		270	0
Paver	No	50		77.2	270	0
Roller	No	20		80	270	0
Scraper	No	40		83.6	270	0
Flat Bed Truck	No	40		74.3	270	0
Welder / Torch	No	40		74	270	0

Results

Calculated (dBA)

Equipment		*Lmax	Leq
Backhoe		62.9	58.9
Dozer		67	63
Crane		65.9	57.9
Compressor (air)		63	59
Excavator		66.1	62.1
Generator		66	63
Grader		70.4	66.4
Paver		62.6	59.6
Roller		65.4	58.4
Scraper		68.9	65
Flat Bed Truck		59.6	55.6
Welder / Torch		59.4	55.4
	Total	70.4	72.5

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
R5	Residential	75	75	75

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	230	0
Dozer	No	40		81.7	230	0
Crane	No	16		80.6	230	0
Compressor (air)	No	40		77.7	230	0
Excavator	No	40		80.7	230	0
Generator	No	50		80.6	230	0
Grader	No	40	85		230	0
Paver	No	50		77.2	230	0
Roller	No	20		80	230	0
Scraper	No	40		83.6	230	0
Flat Bed Truck	No	40		74.3	230	0
Welder / Torch	No	40		74	230	0

Results

Calculated (dBA)

Equipment		*Lmax	Leq
Backhoe		64.3	60.3
Dozer		68.4	64.4
Crane		67.3	59.3
Compressor (air)		64.4	60.4
Excavator		67.5	63.5
Generator		67.4	64.4
Grader		71.7	67.8
Paver		64	61
Roller		66.7	59.8
Scraper		70.3	66.3
Flat Bed Truck		61	57
Welder / Torch		60.7	56.8
	Total	71.7	73.8

*Calculated Lmax is the Loudest value.

---- Receptor #5 ----

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
R6	Residential	75	75	75

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	415	0
Dozer	No	40		81.7	415	0
Crane	No	16		80.6	415	0
Compressor (air)	No	40		77.7	415	0
Excavator	No	40		80.7	415	0
Generator	No	50		80.6	415	0
Grader	No	40	85		415	0
Paver	No	50		77.2	415	0
Roller	No	20		80	415	0
Scraper	No	40		83.6	415	0
Flat Bed Truck	No	40		74.3	415	0
Welder / Torch	No	40		74	415	0

Results

Calculated (dBA)

Equipment		*Lmax	Leq
Backhoe		59.2	55.2
Dozer		63.3	59.3
Crane		62.2	54.2
Compressor (air)		59.3	55.3
Excavator		62.3	58.3
Generator		62.2	59.2
Grader		66.6	62.6
Paver		58.8	55.8
Roller		61.6	54.6
Scraper		65.2	61.2
Flat Bed Truck		55.9	51.9
Welder / Torch		55.6	51.6
	Total	66.6	68.7

*Calculated Lmax is the Loudest value.