

Del Prado Project

Acoustical Analysis Report

February 2016



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Prepared for:
Touchstone Communities
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San Diego, CA 92131

Prepared by:
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LIST OF ACRONYMS

ADT	average daily trip
ANSI	American National Standards Institute
CAD	Computer Aided (engineering and architectural) Design
CadnaA	Computer Aided Noise Abatement
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
City	City of Escondido
CG	General Commercial (CG)
CNEL	Community Noise Equivalent Level
dB	Decibel
dba	A-weighted decibels
Daytime	The period from 7:00 a.m. to 10:00 p.m.
EIR	Environmental Impact Report
Evening	The period from 7:00 p.m. to 10:00 p.m.
FTA	Federal Transit Administration
Hz	Hertz
HVAC	heating, ventilation and air conditioning
in./sec	inch per second
I-15	Interstate 15
kHz	kilohertz
L _{DN}	Day-Night Sound Level
L _{EQ}	one-hour average sound level
MCAS Miramar	Marine Corps Air Station Miramar
mPa	micro-Pascals

LIST OF ACRONYMS (cont.)

mph	miles per hour
NSLUs	noise-sensitive land uses
PD-MU	Planned Development-Mixed Use
ppv	peak particle velocity
Project	Del Prado Project
RCNM	Roadway Construction Noise Model
SDG&E	San Diego Gas & Electric
SPL	sound pressure level
STC	sound transmission control
SWL	sound power level
TIS	Traffic Impact Study
TNM	Traffic Noise Model
USDOT	U.S. Department of Transportation
VdB	Vibration decibels

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EXECUTIVE SUMMARY

This report presents an assessment of potential construction and operational noise impacts associated with the proposed Del Prado Project (project).

The project consists of 4.87 acres and is located in the City of Escondido (City) in San Diego County. The proposed project consists of the construction of 113 residential units in a 3-story row townhome design across two complexes: Del Prado North and Del Prado South.

Exterior noise levels from traffic noise would be less than significant. However, the building façade of the proposed residential units that face Brotherton Road or S. Centre City Parkway may be exposed to noise in excess of 60 CNEL, and as traditional materials would be expected to attenuate noise by 15 CNEL, interior noise levels may exceed 45 CNEL. In accordance with Title 24 standards, additional exterior-to-interior noise analysis would need to be conducted where exterior noise levels are expected to exceed 60 CNEL.

Vibration impacts from use of a vibratory roller would be potentially significant to nearby vibration-sensitive land uses (single- and multi-family residences and a preschool). As mitigation, operation of a vibratory roller or equivalent shall be avoided within 75 feet of any off-site residence or 60 feet of the preschool.

Residential and commercial heating, ventilation, and air conditioning (HVAC) noise from the condensers would not exceed allowable City limits for operational sources.

Compliance with the City's noise ordinance would limit exposure to landscaping equipment and nuisance noise to below a level of significance.

Traffic noise generated by the project would not cause significant impacts to off-site noise-sensitive land uses.

Construction of the project, including demolition and mass grading, would not cause significant noise impacts to surrounding noise-sensitive land uses.

The project would not be located within the 60 CNEL noise contours for any airport, and impacts from airport noise would be less than significant.

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1.0 INTRODUCTION

1.1 PROJECT LOCATION

The Del Prado Project (project) is located in the City of Escondido (City) in San Diego County (see Figure 1, *Regional Location*, and Figure 2, *Project Vicinity*). The project is located on a 4.87-acre site to the west of S. Centre City Parkway and to the south of Brotherton Road. The project is located approximately 0.4 mile east of Interstate 15 (I-15). Access to the project site would be provided from one private driveway off Brotherton Road and one private driveway off S. Centre City Parkway.

1.2 PROJECT DESCRIPTION

The proposed project consists of the construction of 113 residential units in a 3-story row townhome design (see Figures 3a, *Site Plan – North*, and 3b, *Site Plan – South*). The proposed project is divided into two portions, Del Prado North and Del Prado South. The lots are physically separated by a San Diego Gas & Electric (SDG&E) driveway used to access the Felicita substation. Del Prado North has an area of 3.44 acres and would consist of 81 multi-family units at a density of 24 units per acre. Del Prado South is 1.43 acres and includes 32 multi-family units at a density of 23 units per acre.

The project also includes private streets for vehicular access, parking, recreational areas, landscaped areas, storm drains, bioretention areas, and monument sculpture/signage. The project's exterior use areas include a pool and barbeque area in the central area within Del Prado North.

2.0 ENVIRONMENTAL SETTING

2.1 NOISE AND SOUND LEVEL DESCRIPTORS AND TERMINOLOGY

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

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

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

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

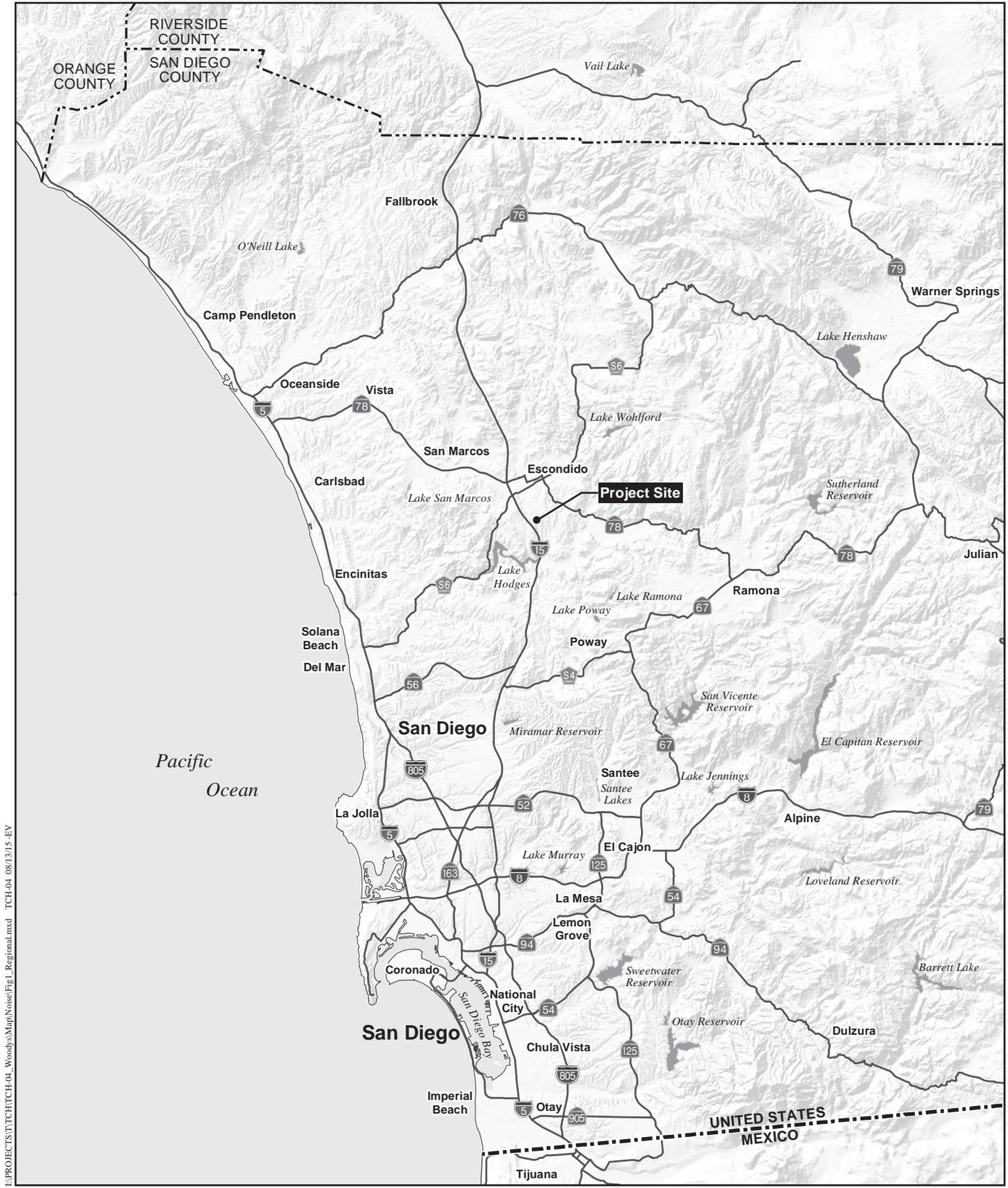
The amplitude of pressure waves generated by a sound source determines the loudness of that source. A logarithmic scale is used to describe sound pressure level (SPL) in terms of dB units. The threshold of hearing for the human ear is about 0 dB, which corresponds to 20 micro-Pascals (mPa).

Because decibels are logarithmic units, SPL cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB 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 dB higher than one source under the same conditions.

2.2 NOISE AND VIBRATION SENSITIVE LAND USES

Noise-sensitive land uses (NSLUs) are land uses that may be subject to stress and/or interference from excessive noise, such as residential dwellings, transient lodging, hospitals, educational facilities, libraries, and sensitive habitat. Industrial and commercial land uses are generally not considered sensitive to noise. NSLUs in the project area include single- and multi-residences and a preschool (Escondido KinderCare).

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] 2006) are considered “vibration-sensitive.” The degree of sensitivity depends on the specific equipment that would be affected by the ground-borne vibration. In addition, excessive levels of ground-borne vibration of either a regular or an intermittent nature can result in annoyance to residential uses. Vibration-sensitive land uses in the project area include single and multi-family residences.



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Regional Location

DEL PRADO PROJECT

Figure 1

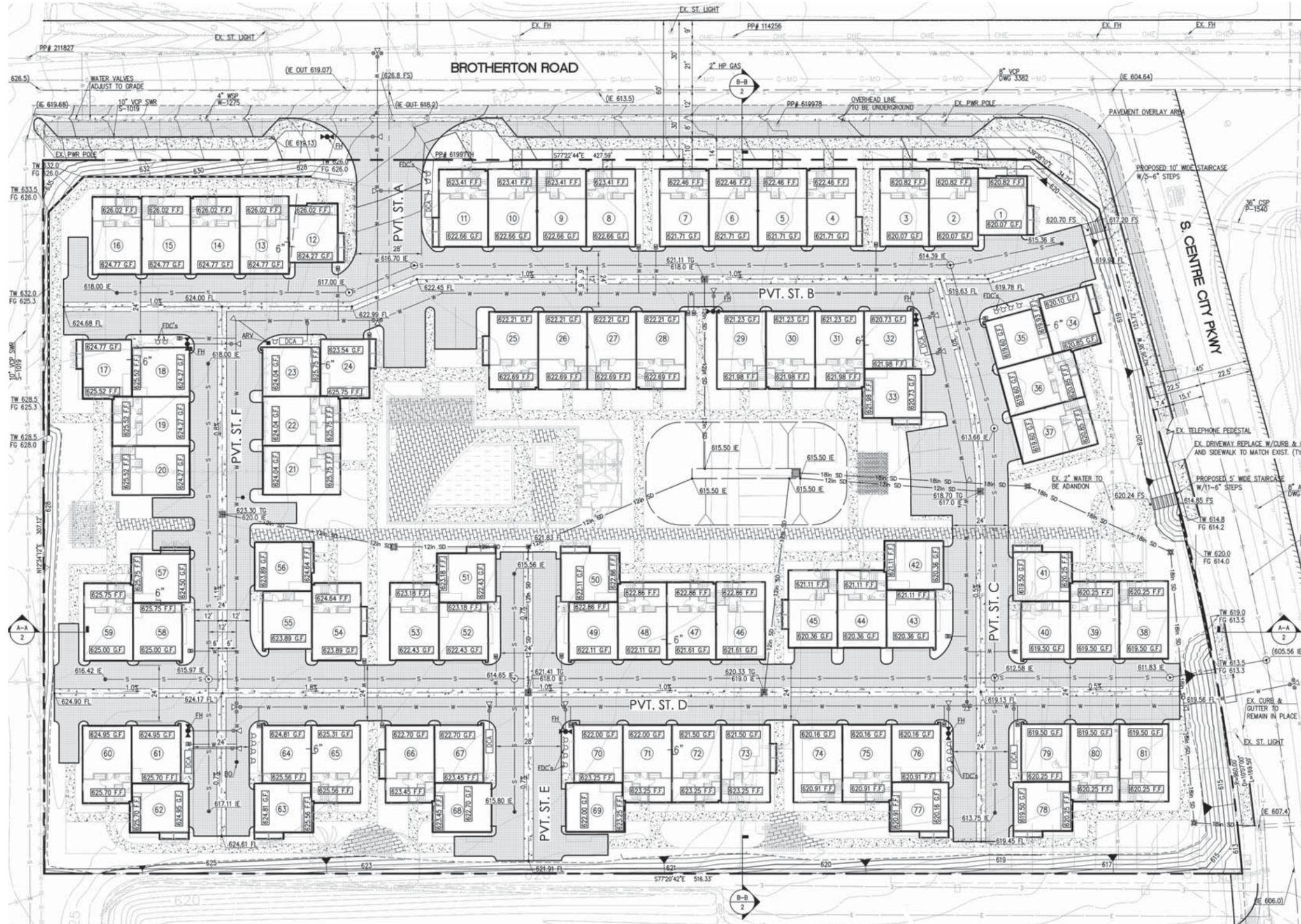


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Project Vicinity

DEL PRADO PROJECT

Figure 2

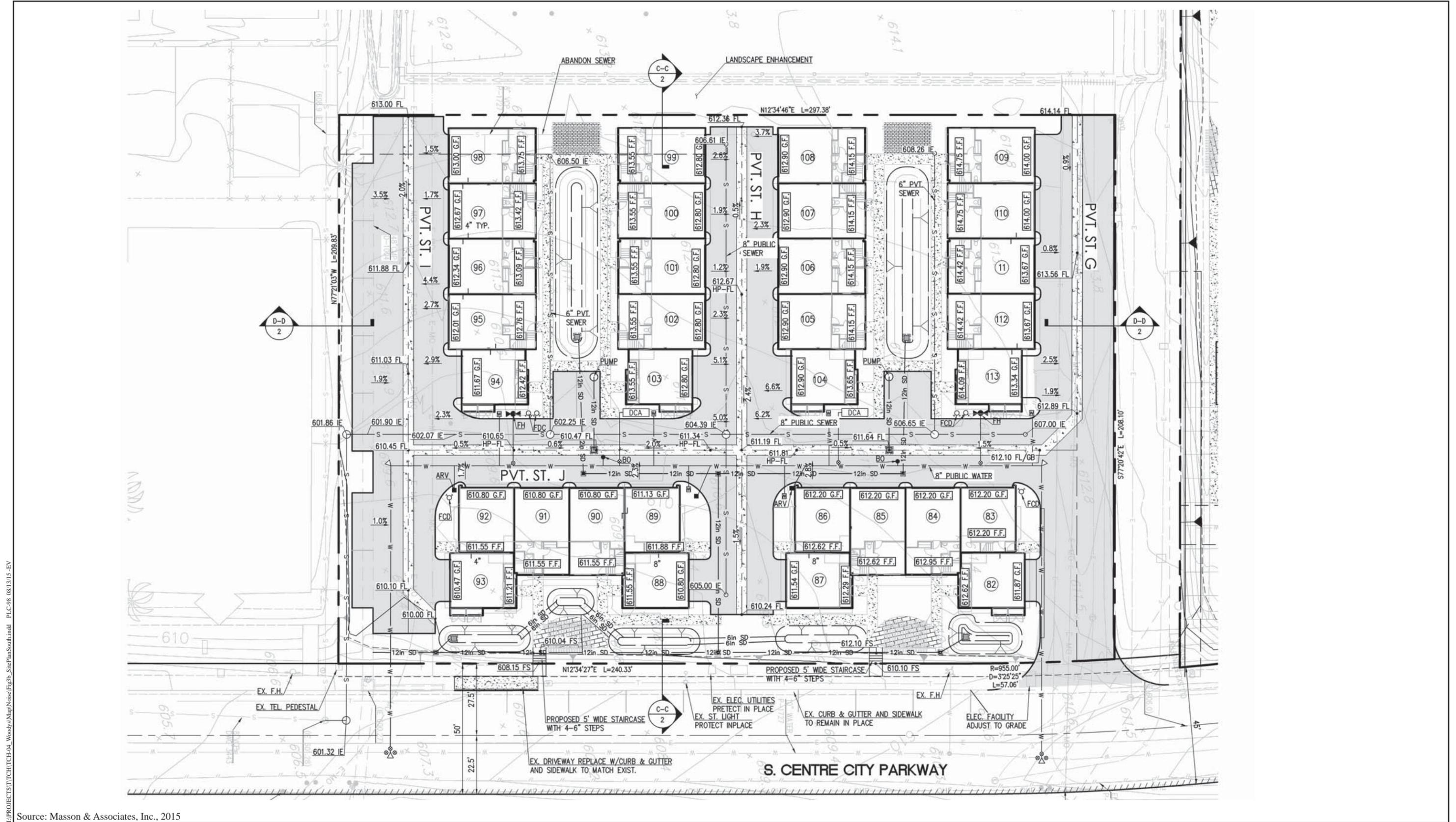


Source: Masson & Associates, Inc., 2015

Site Plan - North

DEL PRADO PROJECT

Figure 3a

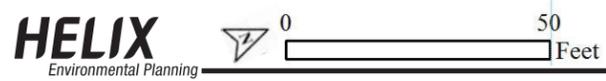


Source: Masson & Associates, Inc., 2015

Site Plan - South

DEL PRADO PROJECT

Figure 3b



2.3 REGULATORY FRAMEWORK

California Noise Insulation Standards (California Code of Regulations, Title 24)

Title 24 establishes an Interior Noise Standard of 45 dBA CNEL for multiple-unit and hotel/motel structures. Acoustical studies must be prepared for proposed multiple-unit residential and hotel/motel structures within the CNEL noise contours of 60 dBA or greater. The studies must demonstrate that the design of the building will reduce interior noise in habitable rooms to 45 dBA CNEL or lower.

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 located 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. For land uses where the exterior noise level falls within the "conditionally unacceptable" range, new construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made with noise insulation features included in the design. For land uses where the exterior noise levels fall within the "clearly unacceptable" range, new construction generally 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			Light Gray	Medium Gray	Dark Gray	Very Dark Gray
Residential Multi-family, Residential Mixed Use			Light Gray	Medium Gray	Dark Gray	Very Dark Gray
Transient Lodging, Motels, and Hotels			Light Gray	Medium Gray	Dark Gray	Very Dark Gray
Schools, Libraries, Churches, Hospitals, and Nursing Homes			Light Gray	Medium Gray	Dark Gray	Very Dark Gray
Auditoriums, Concert Halls, Amphitheatres	Light Gray	Medium Gray	Dark Gray	Very Dark Gray	Very Dark Gray	Very Dark Gray
Sports Arena, Outdoor Spectator Sports	Light Gray	Medium Gray	Dark Gray	Very Dark Gray	Very Dark Gray	Very Dark Gray
Playgrounds, Neighborhood Parks				Medium Gray	Dark Gray	Very Dark Gray
Golf Courses, Riding Stables, Water Recreation, Cemeteries					Dark Gray	Very Dark Gray
Offices Buildings, Business, Commercial, and Professional					Medium Gray	Dark Gray
Industrial, Manufacturing, Utilities, Agriculture					Light Gray	Medium Gray

	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 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 increases. In addition, the standards include separate allowable noise increases for 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}	Allowable Noise Increment	Existing Peak Hour L _{EQ} *	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 2012a

* L_{EQ} stands for one-hour average sound level.

Noise Policy 5.5 of the Community Protection Element requires that construction projects and new development ensure acceptable vibration levels at nearby NSLUs based on FTA criteria. These criteria is 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*, below. 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 Levels (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

VdB = vibration decibels

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 70 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.

City of Escondido Municipal Code (Noise Ordinance)

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 (City 2015). 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 corresponding times of day for each zoning designation. The noise standards apply to each property or portion of 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 17-230 through 17-241 of the Noise Ordinance, such as specific regulations pertaining to motor vehicles. Additional sections of the Noise Ordinance applicable to this analysis are listed below.

Zone	Time	Noise Level (dBA)
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	Anytime	70
General industrial zones	Anytime	75

Source: City of Escondido Municipal Code Section 17-229, Sound Level Limits

Section 17-229(c)(5) (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:

- a) 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.
- b) 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.

- c) 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 4, shall be reduced by 10 dB or to the ambient noise level when such noises are not occurring.
- d) If the measured ambient level exceeds that permissible in 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.
- e) 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 dB 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 six feet from the boundary of the easement upon which the equipment is located.

Section 17-234 (Construction Equipment)

Except for emergency work, the following applies to all construction equipment operating in the City:

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

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 the Noise Ordinance. Disturbing, excessive or offensive noise refers to any sound or noise exceeding the noise standards established in the Noise Ordinance (Table 4.12-5, City of Escondido Exterior Sound Limit Levels).

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 the purpose of 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 dB 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

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 disturbs neighboring receptors.

City of Escondido Municipal Code Chapter 33, Article 47, Environmental Quality Regulations

The Environmental Quality Regulations (EQRs) implement the California Environmental Quality Act (CEQA) and the CEQA Guidelines (guidelines) by applying the provisions and procedures contained in CEQA to development projects proposed within the City of Escondido. Section 33-924(a)(8)(A) and (B) pertain to noise impacts, specifically noise impacts related to the widening of Circulation Element street widening. In situations where a negative declaration is otherwise appropriate, the following incremental noise increases are generally not considered significant:

- a. Short or long-term increases, regardless of the extent, that do not result in noise increases in excess of General Plan standards.
- b. Short or long-term increases that result in a 3 dBA or less incremental increase in noise beyond the General Plan’s noise standards.

2.4 EXISTING CONDITIONS

2.4.1 Surrounding Land Uses

The area surrounding the project site consists primarily of residential land uses, including both single- and multi-family residences. A multi-family residential complex is located to the southwest of the project site; in between the site and this residential complex is an SDG&E transformer station. To the west and north (across Brotherton Road) are single-family homes. The Escondido KinderCare Learning Center (a preschool) is located to the south of the project site. Commercial land uses are east of the project site across Centre City Parkway.

2.4.2 Existing Noise Conditions

2.4.2.1 *General Site Survey*

One 15-minute traffic noise measurement was conducted during a site visit on October 29, 2014. The measurement was performed adjacent to S. Centre City Parkway along the eastern extent of the proposed project site (see Figure 4, *Receiver Locations*, for measurement locations). During the noise measurement, start and end times were recorded and vehicle counts were made for cars, medium trucks (double-tires/two axles), and heavy trucks (three or more axles) for the corresponding road segments. The measurement time was sufficiently long for a representative traffic volume to occur and the noise level (LEQ) to stabilize. The vehicle counts were then converted to one-hour equivalent volumes by applying an appropriate factor.

The measured noise level and related weather conditions are shown in Table 5, *Noise Measurements Results*. Traffic counts for the timed measurement and the one-hour equivalent volumes are shown in Table 6, *Traffic Counts Along Centre City Parkway*.

Table 5 NOISE MEASUREMENT RESULTS	
Measurement 1	
Date	October 29, 2014
Conditions	70-72 degrees Fahrenheit, no measurable wind, moderate humidity
Time	2:45 p.m. to 3:00 p.m.
Location	144 feet due west of the centerline of Centre City Parkway, 288 feet south of Brotherton Road
Measured Noise Level	63.4 dBA L _{EQ}

Roadway	Traffic	Autos	MT¹	HT²
Centre City Parkway	15-minute count	445	8	3
	One-hour Equivalent	1,780	32	12
Percent		97%	2%	1%

¹ Medium Trucks (double tires/two axles)

² Heavy Trucks (three or more axles)

3.0 METHODOLOGY AND SIGNIFICANCE CRITERIA

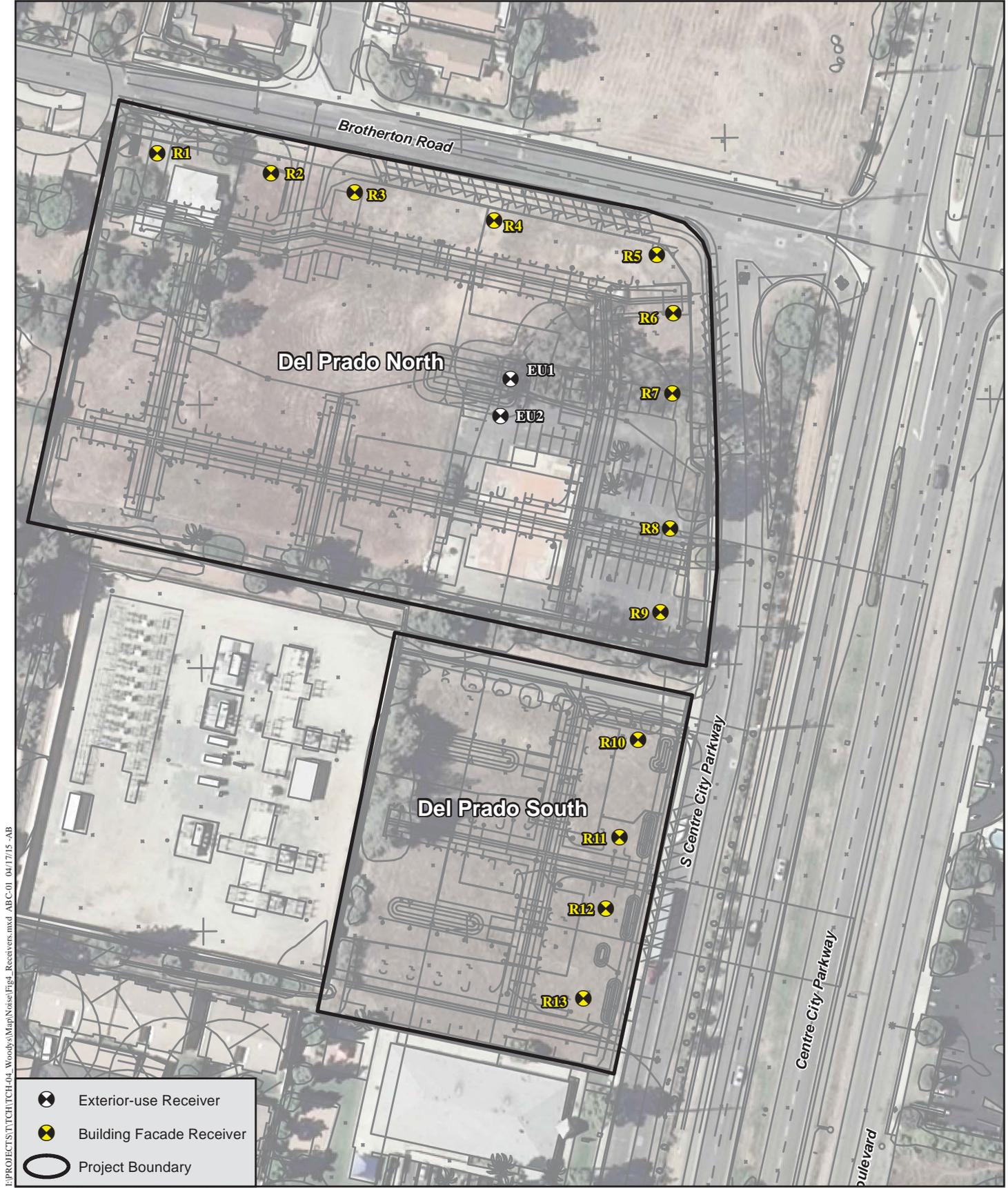
3.1 METHODOLOGY AND EQUIPMENT

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

- Larson Davis System LxT Integrating Sound Level Meters
- Larson Davis Model CA250 Calibrator
- Windscreen and tripod for the sound level meter
- Digital camera

The sound level meter was field-calibrated immediately prior to the noise measurements to ensure accuracy. All measurements were made with a meter that conforms to the American National Standards Institute (ANSI) specifications for sound level meters (ANSI SI.4-1983 R2001). All instruments were maintained with National Bureau of Standards traceable calibration per the manufacturers' standards.

Modeling of the exterior noise environment for this report was accomplished using two computer noise models: Computer Aided Noise Abatement (CadnaA) version 4.5 and Traffic Noise Model (TNM) version 2.5. CadnaA is a model-based computer program developed by DataKustik for predicting noise impacts in a wide variety of conditions. CadnaA assists in the calculation, presentation, assessment, and mitigation of noise exposure. It allows for the input of project-related information, such as noise source data, barriers, structures, and topography to create a detailed CadnaA model, and uses the most up-to-date calculation standards to predict outdoor noise impacts. CadnaA traffic noise prediction is based on the data and methodology used in the TNM. TNM was released in February 2004 by the U.S. Department of Transportation (USDOT), and calculates the daytime average hourly LEQ from three-dimensional model inputs and traffic data (California Department of Transportation [Caltrans] 2004). TNM was developed from Computer Aided Design (CAD) plans provided by the project applicant. Input variables included road alignment, elevation, lane configuration, area topography, existing and planned noise control features, projected traffic volumes, estimated truck composition percentages, and vehicle speeds.



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Receiver Locations

DEL PRADO PROJECT

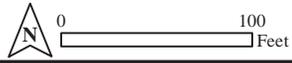


Figure 4

The one-hour L_{EQ} noise level is calculated utilizing peak-hour traffic; peak-hour traffic volumes can be estimated based on the assumption that 10 percent of the average daily traffic would occur during a peak hour. The model-calculated one-hour L_{EQ} noise output is the equivalent to the CNEL (Caltrans Technical Noise Supplement, November 2009).

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 would require heavy equipment during demolition, mass grading, utility installations, building construction and paving. Construction equipment used on site would include but not be limited to: dozers, loaders, scrapers, trenchers, compacters, forklifts, cranes, trucks, flatbeds, generators, air compressors, sprayers, nail guns, painting equipment, stucco equipment, saws, cutters, staplers, and grinders. Project construction is anticipated to occur over two years.

The most likely source of vibration during the project construction would be a vibratory roller, which may be used to achieve soil compaction as part of the foundation construction or for the project private roads.

3.2.2 Operation

The known or anticipated project site operational noise sources include residential heating, ventilation, and air conditioning (HVAC) systems and vehicular traffic.

3.2.2.1 *Residential Air Conditioners*

Specific planning data for the future HVAC systems is not available at this stage of project design; however, analysis using a typical to larger-sized residential condenser mounted on ground level pads provides a reasonable basis for analysis. The unit used in this analysis is a Carrier 38HDR060 split system condenser (see Appendix A, *Carrier 38HDR060 Split System Condenser*). The manufacturer's noise data is provided below in Table 7, *Carrier 38HDR060 Condenser Noise*. It was assumed that the project includes the installation of ground-mounted HVAC condenser units.

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	
63.0	61.5	64.0	66.5	66.0	64.5	55.5	72.0

¹ Sound Power Levels (S_{WL})

3.2.2.2 Vehicular Traffic

The Traffic Impact Study (TIS) for the project (KOA Corporation 2015) provides the existing and near term future traffic volumes for the street segments surrounding the proposed project site under four scenarios. Anticipated future traffic noise levels are based on these forecasted traffic volumes. Table 8, *Existing and Near Term Future Traffic Volumes*, shows the existing and near term future (Existing + Project, Near Term, and Near Term + Project) daily traffic volumes for the street segments in the vicinity of the project site.

Table 8 EXISTING AND NEAR TERM FUTURE TRAFFIC VOLUMES				
Roadway Segment	ADT			
	Existing	Existing + Project	Near Term Future	Near Term Future + Project
S. Centre City Parkway				
Brotherton Road to Citracado Parkway	209	639	639	1,069
Centre City Parkway				
North of Brotherton Road	23,463	23,735	24,253	24,525
Brotherton Road to Citracado Parkway	24,280	24,708	25,310	25,738
South of Citracado Parkway	24,378	24,784	25,223	25,629
Brotherton Road				
Charise Street to S. Centre City Parkway	764	1,382	2,224	2,842
S. Centre City Parkway to Centre City Parkway	838	1,266	1,868	2,296
Citracado Parkway/Gamble Lane				
S. Centre City Parkway to Centre City Parkway	4,758	5,008	5,448	5,698

Source: KOA Corporation 2015

Although the speed limit on Centre City Parkway is 65 miles per hour (mph), it was assumed to be 40 mph for modeling purposes, as the speed limit is unposted (to discourage higher speeds) so that traffic will adjust to travel at 40 mph (NBC San Diego 2010). For a conservative analysis, Centre City Parkway was also modeled at 50 mph for the on-site noise impacts. Speeds on the collector streets (Brotherton Road and S. Centre City Parkway) are assumed to be a typical residential speed limit of 25 mph. The posted speed limit on Citracado Parkway/Gamble Lane is 30 mph. Based upon site visit observations, the percentage breakdown of vehicles was assumed to be 97 percent autos, 2 percent medium trucks, and 1 percent heavy trucks. These percentages

were used for vehicle composition for modeling the existing and future conditions in the vicinity of the project.

TNM software was used to calculate the distances to noise contour lines for all four scenarios (refer to Section 4.4.2).

4.0 IMPACTS

4.1 GUIDELINES FOR THE DETERMINATION OF SIGNIFICANCE

The following thresholds are based on the City General Plan EIR and Noise Ordinance, as applicable to the project.

A significant noise impact would occur if the project would:

1. 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 uses, the noise compatibility standard is 65 CNEL.
2. For infrequent vibration events (defined as fewer than 30 events per day, applicable to construction operations), expose vibration-sensitive uses to vibration levels that exceed 65 VdB, residences and buildings where people normally sleep to 80 VdB, or institutional land uses with primarily daytime uses to 83 VdB. The FTA damage thresholds indicate that, for buildings not extremely sensitive to vibration, a damage threshold between 0.2 inch per second (in./sec) peak particle velocity (PPV) and 0.5 in./sec would apply (depending on the type of building).
3. Result in a permanent increase in ambient noise levels from operational sources that would exceed the sound level limits that exceed the noise limits in the City of Escondido Municipal Code Section 17-229, Sound Level Limits, at any point on or beyond the boundaries of the property on which the sound is produced.
 - For multi-family residential uses the exterior noise limit is 55 dBA L_{EQ} from 7:00 a.m. to 10:00 p.m. and 50 dBA L_{EQ} from 10:00 p.m. to 7:00 a.m.
 - For single-family residential uses the exterior noise limit is 50 dBA L_{EQ} from 7:00 a.m. to 10:00 p.m. and 50 dBA L_{EQ} from 10:00 p.m. to 7:00 a.m.
4. Result in a permanent increase in transportation noise that would exceed the incremental noise standards listed in Table 2.
5. Generate construction noise that exceeds the standards listed in the City of 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).
6. Expose people residing or working in the project area to noise levels from a nearby public airport or private airstrip that exceed the City's noise compatibility standard for that use.

4.2 ISSUE 1: NOISE LEVEL STANDARD COMPLIANCE FOR NEW USES

As noted in the assumptions, future traffic noise levels presented in this analysis are based on forecasted traffic volumes provided in the project TIS. Refer to Table 3-2, *Existing and Near Term Future Traffic Volumes*, for the forecasted average daily trip (ADT) data for all analyzed traffic conditions.

4.2.1 Transportation Noise

4.2.1.1 *Exterior Residential Noise Levels*

Because the highest traffic volumes were estimated under the Near Term Future + Project scenario, this scenario was used to conservatively estimate on-site exterior noise levels from traffic. Two receiver locations of exterior use areas (the swimming pool and barbeque area) were modeled at a height of 5 feet above ground level. The results of this modeling are shown in Table 9, *Future Exterior Use Area Noise Levels* and the location of these receivers can be seen in Figure 4, *Receiver Locations*.

Receiver Number	Noise Levels 40 mph on CCP (CNEL)	Noise Levels 50 mph on CCP (CNEL)	Exceed Exterior Threshold?
R1	61.4	64.1	No
R2	61.4	64.2	No

Note: Noise levels are based on traffic volumes provided in the project traffic report (KOA Corporation 2015) for the Near Term Future + Project condition. CCP = Centre City Parkway.

No exterior use areas would exceed City thresholds. It should also be noted that modeling conservatively did not account for the noise attenuation that would be provided from the proposed buildings that would be located between these areas and the roadway; therefore actual noise levels at the exterior use areas would likely be 5 dBA-10 dBA lower. Therefore, impacts associated with exterior residential noise levels are less than significant.

4.2.1.2 *Interior Residential Noise Levels*

Traditional architectural materials are normally able to reduce exterior-to-interior noise by up to 15 dBA. Thirteen second-story building façade receivers for the proposed on-site residential units were modeled at a height of 15 feet above ground level (10 feet for the second story height plus a 5 foot height for the receiver). As seen in Table 10, *Future Building Façade Noise Levels*, building façade noise levels may exceed 60 CNEL at the proposed residences facing Brotherton

Road or S. Centre City Parkway. Therefore, interior noise levels are likely to exceed the Title 24 interior noise standard of 45 CNEL, resulting in a potentially significant impact.

Receiver Number	Noise Levels 40 mph on CCP (CNEL)	Noise Levels 50 mph on CCP (CNEL)	Exceed Interior Threshold?
R1	57.8	60.0	Yes
R2	58.6	60.6	Yes
R3	59.2	61.3	Yes
R4	60.5	62.8	Yes
R5	63.1	65.7	Yes
R6	63.6	66.3	Yes
R7	64.1	66.9	Yes
R8	64.7	67.6	Yes
R9	65.0	67.8	Yes
R10	65.0	67.8	Yes
R11	65.0	67.9	Yes
R12	65.0	67.9	Yes
R13	64.9	67.7	Yes

Note: Noise levels are based on traffic volumes provided in the project traffic report (KOA Corporation 2015) for the Near Term Future + Project condition. CCP = Centre City Parkway.

4.2.2 Mitigation Measures

To ensure that interior noise levels are within acceptable noise levels, the following mitigation measure is required:

MM-Noi-1 Interior Noise Attenuation. Interior noise levels for the proposed residences shall not exceed 45 CNEL. Once specific building plan information is available, additional exterior-to-interior noise analysis shall be conducted for the proposed residences that face Brotherton Road or S. Centre City Parkway where exterior noise levels are expected to exceed 60 CNEL to demonstrate that interior levels do not exceed 45 CNEL. 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. The analysis shall also assume a “windows closed” condition and that vehicles on Centre City Parkway are traveling at 50 mph. With this specific building plan information, the analysis shall determine the predicted interior noise levels at the planned on-site buildings. 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. Standard measures such as glazing with Sound Transmission Control (STC) ratings from a STC 22 to STC 60, as well as walls with appropriate STC ratings (34 to 60), should be considered.

Appropriate means of air circulation and provision of fresh air would be provided to allow windows to remain closed for extended intervals of time so that acceptable interior noise levels can be maintained. The mechanical ventilation system would meet the criteria of the International Building Code (Chapter 12, Section 1203.3 of the 2001 California Building Code).

4.2.3 Significance of Impacts After Mitigation

With the implementation of MM-Noi-1, potential interior noise impacts to on-site NSLUs would be required to reduce interior noise levels to 45 CNEL or below, thus reducing the impact to a less-than-significant level.

4.3 ISSUE 2: EXCESSIVE GROUND-BORNE VIBRATION

4.3.1 Impact Analysis

4.3.1.1 *Construction Vibration*

In accordance with the City's Noise Ordinance, construction only would occur during the daytime and would not disturb sleep. However, residences may be occupied during daytime construction and construction may result in a nuisance to daily activities. Per FTA vibration levels provided in the General Plan EIR, an impact would occur if construction would generate vibration levels greater than 80 VdB at the nearest residence or 83 VdB at the preschool. Residences are located within 25 feet of possible construction activities in the northwestern area of Del Prado North and within 50 feet in the southwestern corner of Del Prado South. The preschool is located within 25 feet of possible construction activities at Del Prado South.

A vibratory roller would be expected to create the highest vibration levels during fill compaction. Table 4.12-9 of the City General Plan EIR provides vibration source levels for common construction equipment, which lists a vibratory roller as generating approximately 94 VdB at 25 feet. Using the vibration formula¹ provided in that table, a roller would generate approximately 80 VdB at 75 feet and 83 VdB at 60 feet. Therefore, if a vibratory roller would be operated within 75 feet of nearby residences or within 60 feet of the preschool, impacts would be potentially significant. It should be noted that provided that a vibratory roller is operated at a distance further than 25 feet, PPV would not exceed 0.2 in./sec, and building damage would not be expected to occur.

¹ VdB = VdB (VdB at 25 feet) – 30log(distance/25)

4.3.1.2 *Operation Vibration*

The proposed residential uses do not include equipment that would generate substantial vibration. Therefore, operational vibration impacts are less than significant.

4.3.2 **Mitigation Measures**

To ensure that construction vibration levels do not exceed 80 VdB at nearby residences or 83 VdB at the preschool, the following mitigation measure is required:

MM-Noi-2 Vibration-generating Construction Equipment Limit. The construction contractor shall not operate a vibratory roller, or equipment with the potential to result in an equivalent level of vibration, that results in a level that exceeds 80 VdB at off-site residences or 83 VdB at the preschool. Operation of a vibratory roller or equivalent shall be avoided within 75 feet of any off-site residence or 60 feet of the preschool.

4.3.3 **Significance of Impacts After Mitigation**

With the implementation of MM-Noi-2, potential vibration impacts to nearby NSLUs would be reduced to less than significant levels.

4.4 **ISSUE 3: PERMANENT INCREASE IN AMBIENT NOISE LEVELS**

The anticipated primary project operational noise sources include the HVAC systems, nuisance noise, and vehicular traffic. Potential impacts from these sources are discussed below.

4.4.1 **Heating, Ventilation, and Air Conditioning Systems**

As mentioned in Section 3.2.2, modeling assumed that the air conditioning condenser would be a Carrier 38HDR060 split system. This unit typically generates a noise level of 56 dBA at a distance of 7 feet. Based on the site plan, the closest project building to the nearest NSLU property line would be the building in the northwest corner of Del Prado North. At this lot, the building pad is set back an approximate distance of 20 feet from the adjacent single-family residential property line. Assuming that an HVAC system is centered on the ground to the north of the building pad, the minimum distance that the HVAC unit would be to the property line would be 30 feet. At this distance, the condenser would generate a noise level of 43 dBA, which does not exceed the City's nighttime allowable hourly limit of 45 dBA for single-family residential; therefore, impacts would be less than significant.

4.4.2 **Landscape Equipment and Nuisance Noise**

General residential noise sources such as landscape equipment and other intermittent or neighborhood noise such as amplified music or barking dogs (often characterized as nuisance noise) are regulated by the limits within Sections 17-237 and 17-240 of the noise ordinance. Nuisance noise is difficult to control due to the variety of noise sources and intermittent nature of the impact. Compliance with the noise ordinance would limit exposure to nuisance noise and impacts would be less than significant.

4.4.3 Off-site Transportation Noise

TNM software was used to calculate the noise contour distances for off-site roadway segments in the project vicinity for the following scenarios: Existing, Existing + Project, Near Term, and Near Term + Project. The off-site roadway modeling represents a conservative analysis that does not take into account topography or attenuation provided by existing structures. The results of this analysis for the CNEL at the nearest NSLU to the roadway segment are shown below in Table 11, *Off-site Traffic Noise Levels (Existing + Project)*, and Table 12, *Off-site Traffic Noise Levels (Near Term Future + Project)*. Additional analysis for the 70, 65, and 60 CNEL distances are provided in Appendix B, *Existing and Near Term Future Traffic Noise Levels*.

A significant direct impact would occur if buildings where people normally sleep and institutional land uses with primarily daytime and evening uses are exposed to noise level increases in excess of allowable increments as listed in Table 2. As seen in Table 11, the project does not increase any of the noise levels above the allowable increase. Therefore, exterior off-site direct transportation noise impacts under the Existing + Project scenario would be less than significant.

Table 11 OFF-SITE TRAFFIC NOISE LEVELS (EXISTING + PROJECT)						
Roadway Segment	Distance to Nearest NSLU (feet)	CNEL				
		Existing	Existing + Project	Change from Existing	Allowable Increase¹	Impact
S. Centre City Parkway						
Brotherton Road to Citracado Parkway	50	47.2	49.3	2.1	12 ²	No
Centre City Parkway						
North of Brotherton Road	100	62.8	62.8	0	2	No
Brotherton Road to Citracado Parkway	150	59.1	59.2	0.1	6 ²	No
South of Citracado Parkway	100	62.9	63.0	0.1	2	No
Brotherton Road						
Charise Street to S Centre City Parkway	50	50.2	52.1	1.9	5	No
S. Centre City Parkway to Centre City Parkway	50	50.4	51.8	1.4	5	No
Citracado Parkway/Gamble Lane						
S. Centre City Parkway to Centre City Parkway	275	44.4	44.4	0	8	No

¹ See Table 2.

² Nearest NSLU is a preschool, which is an institutional land use per Table 2.

Table 12 shows the results of the off-site roadway noise analysis under the Near Term Future scenario. As shown on Table 12, no segments are identified as having a significant exterior impact according to this standard. Therefore, traffic-related off-site exterior noise impacts under the Near Term Future + Project scenario are less than significant.

Table 12 OFF-SITE TRAFFIC NOISE LEVELS (NEAR TERM FUTURE + PROJECT)						
Roadway Segment	Distance to Nearest NSLU (feet)	CNEL				Impact
		Buildout	Buildout + Project	Change from Buildout	Allowable Increase¹	
S. Centre City Parkway						
Brotherton Road to Citracado Parkway	50	49.3	51.1	1.8	12 ²	No
Centre City Parkway						
North of Brotherton Road	100	62.9	63	0.1	2	No
Brotherton Road to Citracado Parkway	150	59.3	59.4	0.1	6 ²	No
South of Citracado Parkway	100	63.1	63.2	0.1	2	No
Brotherton Road						
Charise Street to S Centre City Parkway	50	54.2	55.5	1.2	5	No
S. Centre City Parkway to Centre City Parkway	50	53.7	54.4	0.7	5	No
Citracado Parkway/Gamble Lane						
S. Centre City Parkway to Centre City Parkway	275	44.7	45.1	0.4	8	No

¹ See Table 2.

² Nearest NSLU is a preschool, which is an institutional land use per Table-2.

4.4.4 Mitigation Measures

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

4.4.5 Significance of Impacts After Mitigation

Impacts would be less than significant without mitigation.

4.5 ISSUE 4: TEMPORARY INCREASE IN AMBIENT NOISE LEVELS

4.5.1 Construction Noise

Construction of the project would generate elevated noise levels that may disrupt nearby noise sensitive receptors, including nearby residents and a preschool. The magnitude of the impact

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 noise impact analysis includes demolition and grading, which are typically significantly louder than other activities and have the greatest potential to create impacts to off-site NSLUs. Demolition would involve the use of a front-end loader to demolish the existing building and a dump truck to load the demolished material. Grading involves the ripping of materials using a dozer and excavator. Table 13, *Construction Equipment Noise Levels*, provides the 50-foot distance noise level for these pieces of equipment as modeled in RCNM.

Equipment	% Operating Time	dBA L_{EQ} (1 hour) @ 50 feet	L_{MAX} @ 50 feet
Front End Loader	40	79.9	80.7
Dump Truck	40	72.5	76.5
Dozer	40	77.7	81.7
Excavator	40	76.7	80.7

Source: RCNM

As a reasonable worst-case scenario, a front end loader and dump truck were assumed to be operating at the same time during demolition. It was assumed that the front end loader would be operating at a distance of 60 feet from the property line of the nearest off-site residence (the nearest residences to the proposed demolition are adjacent to the western portion of the Del Prado North site). The dump truck would be operating to the east of the building to be demolished, at approximately 110 feet from the property line. Based on these assumptions, the highest impact level for a front end loader and a dump truck at the adjacent single-family residences to the west would be 74.2 dBA L_{EQ} (1 hour).

During rough grading, a dozer and an excavator may be working on site at the same time, but would not be working in close proximity to one another due to the nature of their respective operations. Therefore, a dozer and an excavator were modeled for construction noise impacts in isolation. The equipment would be moving across the site during the course of a day; however, a reasonable average distance to the nearest off-site residence and pre-school was assumed to be 100 feet. Based on these assumptions, the highest impact level at the single-family residences to the west and the preschool to the south would be 71.7 dBA L_{EQ} (1 hour) for a dozer and 70.7 dBA L_{EQ} (1-hour) for an excavator. See Appendix C, *Construction Noise Model Outputs*, for model outputs.

Given that construction noise levels from demolition and rough grading would not exceed the City's noise limits of 75 dBA L_{EQ} (1 hour), impacts from construction noise would be less than significant.

4.5.2 Mitigation Measures

Because impacts related to Issue 4 would be less than significant, no mitigation is required.

4.5.3 Significance of Impacts After Mitigation

Impacts would be less than significant without mitigation.

4.6 ISSUE 5: AIRPORT NOISE LEVELS

4.6.1 Public and Private Airports

As noted in the General Plan EIR, the two nearest public airports to the City are the McClellan-Palomar Airport and Ramona Airport. Additionally, portions of the City are subject to periodic flyovers from Marine Corps Air Station (MCAS) Miramar. However, the entire City is outside of the 60 CNEL noise contours for these airports. The project site is not within 2 miles of any private airstrip. Therefore impacts associated with airports and airstrips are less than significant.

4.6.2 Mitigation Measures

Because impacts related to Issue 5 would be less than significant, no mitigation is required.

4.6.3 Significance of Impacts After Mitigation

Impacts would be less than significant without mitigation.

5.0 LIST OF PREPARERS

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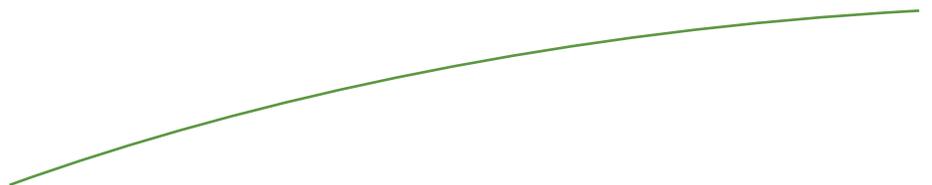
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Appendix A

CARRIER 38HDR060 SPLIT SYSTEM
CONDENSER



ELECTRICAL DATA

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

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

FLA – Full Load Amps

HACR – Heating, Air Conditioning, Refrigeration

LRA – Locked Rotor Amps

NEC – National Electrical Code

RLA – Rated Load Amps (compressor)

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

38HDR

SOUND LEVEL

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

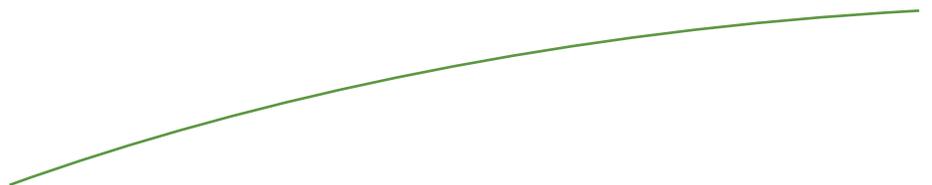
CHARGING SUBCOOLING (TXV-TYPE EXPANSION DEVICE)

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



Appendix B

EXISTING AND NEAR TERM FUTURE
TRAFFIC NOISE LEVELS



**Appendix B
Existing and Future Traffic Noise Levels**

Table B-1 EXISTING AND FUTURE TRAFFIC NOISE LEVELS																	
Roadway/Segment	Distance to Nearest NSLU (feet)	Existing Conditions				Existing + Project				Existing + Cumulative				Existing + Project + Cumulative			
		CNEL @ nearest NSLU	70 CNEL (ft.)	65 CNEL (ft.)	60 CNEL (ft.)	CNEL @ nearest NSLU	70 CNEL (ft.)	65 CNEL (ft.)	60 CNEL (ft.)	CNEL @ nearest NSLU	70 CNEL (ft.)	65 CNEL (ft.)	60 CNEL (ft.)	CNEL @ nearest NSLU	70 CNEL (ft.)	65 CNEL (ft.)	60 CNEL (ft.)
South Centre City Parkway																	
Brotherton Road to Citracado Parkway	50	47.2	IRW	IRW	IRW	49.3	IRW	IRW	IRW	49.3	IRW	IRW	IRW	51.1	IRW	IRW	IRW
Centre City Parkway																	
North of Brotherton Road	100	62.8	45	80	135	62.8	45	80	135	62.9	46	81	137	63	47	81	137
Brotherton Road to Citracado Parkway	150	59.1	47	82	136	59.2	47	81	139	59.3	48	82	140	59.4	48	82	140
South of Citracado Parkway	100	62.9	47	82	136	63	45	80	139	63.1	48	82	140	63.2	48	82	140
Brotherton Road																	
Charise Street to S Centre City Parkway	50	50.2	IRW	IRW	IRW	52.1	IRW	IRW	IRW	54.2	IRW	IRW	14	55.5	IRW	IRW	17
South Centre City Parkway to Centre City Parkway	50	50.4	IRW	IRW	IRW	51.8	IRW	IRW	IRW	53.7	IRW	IRW	12	54.4	IRW	IRW	14
Citracado Parkway/Gamble Lane																	
From South Center City Parkway to Centre City Parkway	275	44.4	IRW	13	45	44.5	IRW	14	46	44.7	IRW	15	48	45.1	IRW	16	50

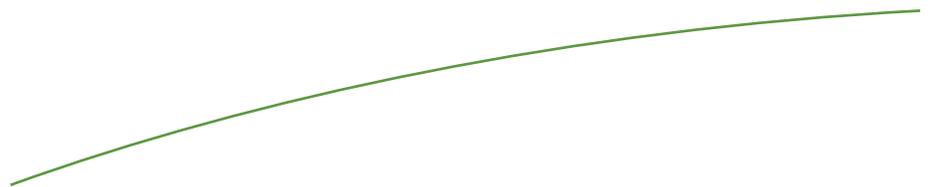
IRW = In road right-of-way

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Appendix C

CONSTRUCTION NOISE MODELING OUTPUTS



Roadway Construction Noise Model (RCNM),Version 1.1

Report date: #####

Case Descr TCH-04

---- Receptor #1 ----

Baselines (dBA)

Descriptor	Land Use	Daytime	Evening	Night
SF Resident	Residential	75	75	75

Equipment

Description	Impact	Device	Usage(%)	Spec	Actual	Receptor	Estimated
				Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Dump Truck	No		40		76.5	110	0
Front End Loader	No		40		79.1	60	0

Results

Calculated (dBA)

Equipment	*Lmax	Leq
Dump Truck	69.6	65.6
Front End Loader	77.5	73.5
Total	77.5	74.2

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date 8/12/2015

Case Descr TCH-04

---- Receptor #2 ----

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

		Equipment				
		Spec	Actual	Receptor	Estimated	
Description	Impact Device	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)	
Dozer	No	40	81.7	100	0	

Results

Calculated (dBA)

		*Lmax	Leq
Equipment	Dozer	75.6	71.7
	Total	75.6	71.7

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date 8/12/2015

Case Descr TCH-04

---- Receptor #2 ----

		Baselines (dBA)		
Descriptor	Land Use	Daytime	Evening	Night
Residential	Residential	75	75	75

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Excavator	No	40	85		100	0

Results

Calculated (dBA)

Equipment	*Lmax	Leq
Excavator	79	75
Total	79	75

*Calculated Lmax is the Loudest value.

