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Acoustical and Environmental Consulting Services

Acoustical Analysis Report for Slope Street Subdivision

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1.0 Executive Summary

The proposed project, Slope Street Subdivision, consists of the demolition of existing structures and the subdivision and development of a 2.46-acre lot to contain 11 single-family residences. The project site is located at 9463 Slope Street in the City of Santee, California.

Operational noise impacts from the project site are expected to be limited to small HVAC unit operation. Calculations show that noise impacts from HVAC units are not expected to cause a significant increase in ambient noise levels.

Calculations show that noise from temporary construction activities will not exceed generally accepted construction noise limits at surrounding sensitive receptors. Construction is prohibited between the hours of 7 p.m. and 7 a.m. and on Sundays or legal holidays. Standard construction noise control methods, including adhering to permissible hours of operation, maintaining equipment in proper operating condition, and placing staging areas at furthest locations from noise sensitive receptors, shall also be employed as much as feasible to reduce noise impacts to surrounding sensitive receptors and ensure that construction impacts remain less than significant at off-site receivers. Additionally, if any piece of equipment that will be used on site for more than 10 days is specified as having a manufacturer noise level exceeding 85 dBA L_{MAX} at 50 feet from equipment (or if insufficient evidence exists to prove otherwise), a notice must be provided to all property owners and residents within 300 feet of the site no later than 10 days before the start of construction. The notice must be approved by the City and describe the project, the expected duration, and provide a point of contact to resolve noise complaints.

As construction vibration is not anticipated to cause damage to off-site buildings and will only approach the threshold of "severe" vibration for a short period of time when work is performed on the western portion of the site, it is the opinion of the undersigned that temporary construction vibration impacts would not be "excessive" and therefore are less than significant.

The project site is located within the 60-65 CNEL contour of Gillespie Field. According to the Gillespie Field ALUCP, single-family residential uses are considered to be conditionally compatible in areas with noise levels up to 65 CNEL, in that the building structure must be capable of attenuating noise levels at the interior of the residence to 45 CNEL or less. As current exterior building construction is generally expected to achieve 15 decibels of exterior-to-interior noise attenuation with windows opened, buildings with noise exposure exceeding 60 CNEL may be subject to interior noise levels exceeding 45 CNEL with windows opened without appropriate design features implemented. The following condition of approval is required:

> *Prior to the issuance of building permits, an exterior-to-interior analysis shall be performed for residences on the project site to identify building features necessary for the attenuation of interior noise levels from aircraft and traffic noise to be 45 CNEL or less. Where windows must be closed to comply, mechanical ventilation that offers appropriate fresh air exchanges without relying on an open window must be provided. This study shall be required for obtaining a certificate of occupancy but shall be performed prior to the issuance of building permits to establish any specific measures necessary to achieve compliant interior noise levels prior to building construction.*

With implementation of the condition of approval detailed above, the project will achieve compliance with the acoustical requirements of the ALUCP.

2.0 Introduction

This acoustical analysis report is submitted to provide an assessment of noise impacts in relation to the noise questions presented in the California Environmental Quality Act (CEQA). Its primary purpose is to assess noise impacts from temporary project-related noise sources, such as construction noise. This analysis will determine if project design features are necessary and feasible to bring noise levels into compliance with the applicable noise limits of the City of Santee and/or to reduce noise impacts to be less than significant.

All noise level or sound level values presented herein are expressed in terms of decibels, with A-weighting to approximate the hearing sensitivity of humans. Time-averaged noise levels are expressed by the symbol L_{EQ}, for a specified duration. The Community Noise Equivalent Level (CNEL) is a calculated 24-hour weighted average, where sound levels during evening hours of 7 p.m. to 10 p.m. have an added 5 dB weighting, and sound levels during nighttime hours of 10 p.m. to 7 a.m. have an added 10 dB weighting. This is similar to the Day-Night sound level, DNL, 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 A-weighted decibels. As DNL and CNEL are generally found to be within approximately 0.5 dB or less of one another, they are considered equivalent for purposes of this analysis. These metrics are used to express noise levels for both measurement and municipal regulations, for land use guidelines, and for enforcement of noise ordinances.

Sound pressure is the actual noise experienced by a human or registered by a sound level instrument. When sound pressure is used to describe a noise source, the distance from the noise source must be specified in order to provide complete information. Sound power, on the other hand, is a specialized analytical metric used to provide information without the distance requirement, but it may be used to calculate the sound pressure at any desired distance.

Most people describe changes in sound levels along the following lines: (a) a 3 dB sound level change is barely perceptible, (b) a 5 dB sound level change is quite noticeable, whereas (c) a change of 10 dB is described as being dramatic, or about one-half or twice as loud. A 3 dB increase in sound level also represents a doubling of sound energy and is generally considered to be the threshold for significance in terms of increases in sound levels.

2.1 Project Description

The proposed project, Slope Street Subdivision, consists of the demolition of existing structures and the subdivision and development of a 2.46-acre lot to contain 11 single-family residences with attached garages. The lots will range in size from 6,000 square feet to 15,500 square feet, and residences will be approximately 1,800 square feet each. Additional information is provided in the project plans, included as Appendix A.

2.2 Project Location

The project site is located at 9463 Slope Street in the City of Santee, California. The Assessor's Parcel Number (APN) for the property is 384-232-03-00. The project site is surrounded by existing residential uses to the north (across Slope Street), west, and south (across Weld Boulevard). The site to the east is occupied by existing commercial uses.

2.3 Applicable Noise Regulations

This acoustical analysis report is submitted to provide an assessment of noise impacts in relation to the noise questions presented in CEQA. The City of Santee Municipal Code does not contain noise limits for operational

noise sources that may be present on the project site but includes general design restrictions for HVAC equipment in Section 5.04.040, General Noise Regulations. The Municipal Code also does not contain property line temporary construction noise limits; however, Section 5.04.090 states that construction is prohibited between the hours of 7 p.m. and 7 a.m. and on Sundays or legal holidays. Additionally, this section states that "Construction equipment with a manufacturer's noise rating of 85 dBA L_{MAX} or greater, may only operate at a specific location for 10 consecutive workdays. If work involving such equipment will involve more than 10 consecutive workdays, a notice must be provided to all property owners and residents within 300 feet of the site no later than 10 days before the start of construction. The notice must be approved by the City and describe the project, the expected duration, and provide a point of contact to resolve noise complaints." Although not specified in the Code, it is assumed that the measurement of 85 dBA L_{MAX} would apply at 50 feet from construction equipment, as 50 feet is the industry standard for noise measurements of construction equipment.

The project would be subject to the noise requirements of the Gillespie Field Airport Land Use Compatibility Plan (ALUCP). According to the ALUCP, single-family residential uses are considered to be conditionally compatible in areas with noise levels up to 65 CNEL, in that the building structure must be capable of attenuating noise levels at the interior of the residence to 45 CNEL or less. The California Building Code similarly contains a provision requiring interior noise levels of 45 CNEL or less in habitable space.

Please refer to Appendix B for pertinent sections of the City of Santee Municipal Code, the Gillespie Field ALUCP, and the State of California Building Code.

3.0 Environmental Setting

3.1 Existing Noise Environment

3.1.1 Aircraft Noise Exposure

The primary source of noise at the project site is aircraft overflight from Gillespie Field. According to existing noise contours found within the Gillespie Field ALUCP, the project site is located within the 60-65 CNEL airport noise contours. Based on the site's location in relation to the contours, the worst-case aircraft noise impact is estimated to be approximately 64 CNEL. Please refer to Figure 1 for a graphical representation of future aircraft noise contours. No other noise source is considered significant.

3.1.2 Traffic Noise Exposure

Although not included in the CEQA checklist, traffic noise from Weld Boulevard is also expected to be present at the project site. According to SANDAG Transportation Forecast Information Center ABM2+/2021 RP (activity-based regional transportation model), this roadway carries approximately 8,200 Average Daily Trips (ADT) as of the year 2016 (see reference). In order to roughly estimate traffic noise contribution at the site, noise impacts were performed using the HUD DNL Calculator (see reference) considering this traffic volume and an estimated vehicle mix of 2% medium trucks and 1% heavy trucks. The traffic noise level was found to be approximately 61 DNL at the worst-case building location (nearest to Weld Boulevard), without considering shielding that would be received from intervening topography between the site and the roadway. As detailed in Section 2.0, DNL can generally be considered equivalent to CNEL based on the minimal difference between the two values. Although aircraft noise exposure will be the primary source of environmental noise at the project site, traffic noise exposure is expected to contribute to the overall noise environment.

3.1.3 Measured Noise Level

An on-site inspection and a long-term noise measurement were made beginning the evening of Tuesday, February 23, 2021 through Thursday, February 25, 2021. The noise monitor was placed at the west property line of the project site, approximately 290 feet south of the Slope Street centerline. The microphone was placed at approximately four feet above the existing grade. The measured hourly average noise levels are shown in Table 1, and the noise measurement location is shown graphically in Figure 2.

Table 1. Long-Term Measured Noise Levels on Site

Date	Time	Hourly Average Noise Level (dBA L_{EQ})
February 23, 2021	6 p.m. – 7 p.m.	54.4
	7 p.m. – 8 p.m.	56.9
	8 p.m. – 9 p.m.	54.5
	9 p.m. – 10 p.m.	53.8
	10 p.m. – 11 p.m.	51.3
	11 p.m. – 12 a.m.	50.6
February 24, 2021	12 a.m. – 1 a.m.	50.3
	1 a.m. – 2 a.m.	49.1
	2 a.m. – 3 a.m.	49.6
	3 a.m. – 4 a.m.	53.4
	4 a.m. – 5 a.m.	54.5
	5 a.m. – 6 a.m.	57.8
	6 a.m. – 7 a.m.	59.9
	7 a.m. – 8 a.m.	60.9
	8 a.m. – 9 a.m.	63.5
	9 a.m. – 10 a.m.	59.5
	10 a.m. – 11 a.m.	59.2
	11 a.m. – 12 p.m.	59.2
	12 p.m. – 1 p.m.	53.2
	1 p.m. – 2 p.m.	58.2
	2 p.m. – 3 p.m.	60.2
	3 p.m. – 4 p.m.	58.7
	4 p.m. – 5 p.m.	59.8
	5 p.m. – 6 p.m.	55.7
	6 p.m. – 7 p.m.	55.1
	7 p.m. – 8 p.m.	54.9
	8 p.m. – 9 p.m.	52.7
	9 p.m. – 10 p.m.	56.0
	10 p.m. – 11 p.m.	57.6
	11 p.m. – 12 a.m.	47.4

Table 1. Long-Term Measured Noise Levels on Site		
Date	**Time**	**Hourly Average Noise Level (dBA L_{EQ})**
February 25, 2021	12 a.m. – 1 a.m.	45.4
	1 a.m. – 2 a.m.	42.0
	2 a.m. – 3 a.m.	39.5
	3 a.m. – 4 a.m.	39.9
	4 a.m. – 5 a.m.	42.8
	5 a.m. – 6 a.m.	50.1
	6 a.m. – 7 a.m.	54.8
	7 a.m. – 8 a.m.	58.6
	8 a.m. – 9 a.m.	59.7

The minimum measured noise level during the measurement period was 39.5 dBA between the hours of 2 a.m. and 3 a.m. on February 25, 2021. The maximum measured noise level was 63.5 dBA between 8 a.m. and 9 a.m. on February 24, 2021. The average nighttime noise level was found to be 54.6 dBA between the hours of 10 p.m. on February 23 and 7 a.m. on February 24. The average nighttime noise level was found to be 51.0 dBA between the hours of 10 p.m. on February 24 and 7 a.m. on February 25.

3.2 Future Noise Environment

The future noise environment in the vicinity of the project site will be primarily a result of the same ambient noise sources, as well as the noise generated by the proposed uses at the project site.

3.2.1 Future Aircraft Noise Exposure

Future aircraft noise is not expected to change significantly, as the site will continue to be exposed to approximately 64 CNEL from aircraft operations. Future aircraft noise contours are shown in Figure 1.

3.2.2 Future Traffic Noise Exposure

SANDAG traffic predictions show that the future (year 2050) traffic volume of Weld Boulevard is expected to remain at 8,200 ADT. Therefore, no change is anticipated between the worst-case current noise projection and that which would be expected for the future noise environment.

3.2.3 Permanent Project-Related Noise Sources

The primary source of noise on the proposed project site is likely to be HVAC units serving the residences on site. The units are anticipated to be at or around 3-ton capacity and are expected to have an approximate sound power level of 74 dBA. This noise level has been used to perform a rough analysis of potential noise impacts at off-site properties, as detailed in Section 5.0.

3.2.4 Temporary Construction Equipment

According to the project proponent and professional experience, on-site construction activities are expected to take approximately one year and will consist of the following stages: grading/demolition (three months), underground utilities and paving (three months), and building construction (six months). No rock crushing or other impact construction equipment is anticipated to be used on site. Please refer to Table 2 for anticipated

on-site construction equipment during each stage of activity with noise levels and duty cycles for each piece of equipment. Construction equipment noise levels were provided by the UK Department for Environment, Food and Rural Affairs (DEFRA), and duty cycle information was taken from the Federal Highway Administration (FHWA) (see references). Although FHWA offers noise levels of construction equipment, professional experience and observations of construction activity by Eilar Associates, Inc. suggest that the noise levels given by DEFRA are more representative of equipment noise levels that would be generated at smaller scale construction sites such as the proposed project.

Table 2. Anticipated Construction Activity and Equipment Noise Levels

Equipment	Duty Cycle (%)[1]	Average Noise Level at 50 feet (dBA)[2]	Activity Stage(s)
Dozer	40	75	Grading/Demolition, Utilities
Front Loader	40	72	Grading/Demolition, Utilities
Excavator	40	75	Grading/Demolition, Utilities
Dump Truck	40	72	Grading/Demolition
Paver	50	71	Paving
Roller	20	71	Paving
Forklift[3]	40	74	Building Construction
Skip Loader	40	64	Building Construction

[1]Duty cycle information was provided by the Federal Highway Administration.
[2]Unless otherwise noted, noise level information was provided by UK Department for Environment, Food and Rural Affairs.
[3]Eilar Associates, Inc. noise measurements performed at the 91 Freeway/Green River project site near Corona, California, on March 25, 2010.

Equipment noise levels shown above were incorporated into the temporary construction noise impact analysis as shown in Section 5.0.

4.0 Methodology and Equipment

4.1 Methodology

4.1.1 CadnaA Noise Modeling Software

Modeling of the outdoor noise environment is accomplished using CadnaA Version 2021, which is a model-based computer program developed by DataKustik for predicting noise impacts in a wide variety of conditions. CadnaA (Computer Aided Noise Abatement) assists in the calculation, presentation, assessment, and alleviation of noise exposure. It allows for the input of project information such as noise source data, barriers, structures, and topography to create a detailed model and uses the most up-to-date calculation standards to predict outdoor noise impacts. Noise standards used by CadnaA that are particularly relevant to this analysis include ISO 9613 (Attenuation of sound during propagation outdoors). CadnaA provides results that are in line with basic acoustical calculations for distance attenuation and barrier insertion loss.

4.1.2 Formulas and Calculations

Decibel Addition

To determine the combined logarithmic noise level of two known noise source levels, the values are converted to the base values, added together, and then converted back to the final logarithmic value, using the following formula:

$$L_C = 10\log(10^{L1/10} + 10^{L2/10} + 10^{LN/10})$$

where L_C = the combined noise level (dB), and
L_N = the individual noise sources (dB).

To approximate this equation, please refer to Table 3. This procedure is also valid when used successively for each added noise source beyond the first two. The reverse procedure can be used to estimate the contribution of one source when the contribution of another concurrent source is known and the combined noise level is known. These methods can be used for L_{EQ} or other metrics (such as L_{DN} or CNEL), as long as the same metric is used for all components.

Table 3. Sound Level Addition for Two Noise Sources

Difference	Add to Higher Value
0-1 dB	3 dB
2-3 dB	2 dB
4-9 dB	1 dB
10 or more dB	0 dB

Attenuation Due to Distance

Attenuation due to distance is calculated by the equation:

$$SPL_2 = SPL_1 - 20\log(\frac{D_2}{D_1})$$

where SPL_1 = Known sound pressure level at known distance,
SPL_2 = Calculated sound pressure level at distance,
D_1 = Distance from source to location of known sound pressure level, and
D_2 = Distance from source to location of calculated sound pressure level.

This is identical to the more commonly used reference of 6 dB reduction for every doubling of distance. This equation does not take into account reduction in noise due to atmospheric absorption.

Sound Power to Sound Pressure

To convert sound power levels to sound pressure levels, the following formula is used:

$$SPL = SWL - 20\log(D) - 0.5$$

where: SPL= Calculated sound pressure level at distance, and
D = Distance from source to location of calculated sound pressure level.

Construction Vibration Calculations

The construction vibration assessment contained herein is evaluated using calculations of peak particle velocity (PPV). PPV at receivers is calculated as follows:

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

where PPV_{equip} is the peak particle velocity (in inches per second) of the equipment, adjusted for distance, PPV_{ref} is the reference vibration level (in inches per second) at a distance of 25 feet from the equipment, and D is the distance from the equipment to the receiver.

4.2 Measurement Equipment

Some or all of the following equipment was used at the site to measure existing noise levels:

- Soft dB Model Piccolo II Type 2 Sound Level Meter, Serial # P0220043008
- Larson Davis Model CAL150 Type 2 Calibrator, Serial # 5954

The sound level meter was field-calibrated immediately prior to the noise measurement and checked afterward to ensure accuracy. All sound level measurements conducted and presented in this report, in accordance with the regulations, were made with a sound level meter that conforms to the American National Standards Institute specifications for sound level meters (ANSI S1.4). All instruments are maintained with National Bureau of Standards traceable calibration, per the manufacturers' standards.

5.0 Noise Impacts

Noise impacts from the project site are summarized below and classified per the noise portion of the CEQA Environmental Checklist form. This list summarizes conclusions made within the report and classifies the level of significance as: Potentially Significant Impact, Less than Significant with Mitigation Incorporated, Less than Significant Impact, or No Impact. Italics are used to denote language from the CEQA Environmental Checklist form.

XII. NOISE—Would the project result in:

a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Less Than Significant Impact. Operational noise impacts are not expected to generate a substantial permanent increase in ambient noise levels in the vicinity of the project site, as permanent project-related noise impacts would be limited to the operation of small HVAC units servicing each residence on the site. Considering a typical 3-ton unit with a sound power level of 74 dBA, the worst-case noise exposure would potentially result at the west property line, where a unit placed at the rear of a residence would be approximately 22 feet away from the property line. The noise impact in this location would be approximately 47 dBA with a single unit operating continuously. When combined with the minimum nighttime ambient noise level of 51 dBA measured on site, using the principles of decibel addition, the cumulative ambient noise level would increase by approximately 1 dB. As this increase in noise levels falls below the 3 dB threshold of significance, the impact of permanent project-related noise sources would be less than significant. As per Section 5.04.040, General Noise Regulations, of the City of Santee Municipal Code, all HVAC equipment is subject to the setback and screening requirements of the Municipal Code. Section 13.10.050, Special Development Criteria, states that air conditioning equipment "may project into required yards a maximum distance of two feet, provided such features shall be at least three feet from a property line. Equipment must be screened with materials and colors that blend with the building design." These design restrictions should be considered at the project site to further ensure adequate noise protection for surrounding properties.

Temporary noise impacts would consist of construction activity on the site. According to the City of Santee Municipal Code, Section 5.04.090, construction activity is prohibited between the hours of 7 p.m. and 7 a.m. and on Sundays or legal holidays. During permissible hours of operation, there is no average noise level limit at off-site property lines. A generally accepted construction noise limit, and that employed by the County of San Diego and the City of San Diego, is an average noise level of 75 dBA at any occupied residential property line.

Construction information detailed in Section 3.2.4 has been input into a CadnaA noise model to assess noise impacts at off-site residential receivers. Please refer to Table 2 for anticipated on-site construction equipment during each stage of activity, construction equipment noise levels, and duty cycles for each piece of equipment. Construction noise levels were calculated at property lines of surrounding sensitive receptors to the north and west. Any other potentially noise-sensitive receivers are located at a greater distance from construction activity and would be exposed to lesser noise impacts due to distance attenuation and shielding provided by intervening structures.

In order to evaluate construction noise impacts as grading and utility work is performed on different areas of the site, the site was divided into four quadrants consisting of three lots each on the two west quadrants and the northeast quadrant, and two lots in the southeast quadrant. For grading and utilities, construction noise sources were evaluated in the northwest quadrant to evaluate worst-case noise impacts to the surrounding sensitive receptors to the north and west as equipment moves around this area. Activity in any other quadrant would have similar or lesser noise impacts at surrounding receivers such that results of this analysis would be considered representative of construction noise exposure. Paving noise impacts were evaluated considering equipment moving around the proposed street area in the center of the site, while building construction noise sources were evaluated assuming construction equipment located at the center of Lot 11, which would also show worst-case noise impacts at properties to the north and west. In all stages, noise calculations consider typical duty cycles of equipment to account for periods of activity and inactivity on the site. Noise levels for each stage of construction are shown in Table 4. Detailed calculations can be found in Appendix C, and graphical representations of construction noise source and receiver locations are provided as Figures 3 through 5.

Table 4. Temporary Construction Noise Levels at Surrounding Property Lines				
Activity Stage	**Equipment**	**Receiver**	**Noise Limit (dBA L_{EQ})**	**Average Construction Noise Level (dBA L_{EQ})**
Grading/ Utilities	Dozer, Dump Truck, Excavator, Loader	R1 (North)	75	67
		R2 (West)	75	75
Paving	Paver, Roller	R1 (North)	75	58
		R2 (West)	75	61
Building Construction	Forklift x 2, Skip Loader	R1 (North)	75	66
		R2 (West)	75	75

As shown above, construction noise levels are expected to meet the generally accepted construction noise limit of 75 dBA at all sensitive receptors with equipment in worst-case locations. These calculations are considered to be a conservative estimate of noise impacts, as they consider simultaneous equipment operation in locations nearest to sensitive property lines. Noise impacts over the course of the construction of the site are not expected to exceed these average levels that are generally considered acceptable for temporary noise impacts, and therefore, the temporary increase in ambient noise levels at off-site receivers is not considered substantial. This noise impact is considered to be less than significant.

In addition to adherence to the requirements of Section 5.04.090, which provides specific times and days during which construction equipment may operate, the following "good practice" measures will be followed as a courtesy to residential neighbors:

1. Staging areas should be placed as far as possible from sensitive receptors. Ideally, staging areas would be located near the southeast corner of the site.

2. Place stationary equipment in locations that will have a lesser noise impact on nearby sensitive receptors.

3. Turn off equipment when not in use.

4. Limit the use of enunciators or public address systems, except for emergency notifications.

5. Equipment used in construction should be maintained in proper operating condition, and all loads should be properly secured to prevent rattling and banging.

6. Schedule work to avoid simultaneous construction activities that both generate high noise levels.

7. Use equipment with effective mufflers.

8. Minimize the use of backup alarms.

With construction operating hours limited to those permitted by the City of Santee in Section 5.04.090 of the Municipal Code and adherence to the general good practice construction noise control techniques described herein, temporary construction noise impacts are expected to be less than significant at off-site receivers.

It should be noted that the analysis detailed above has been performed using average noise levels generated by the proposed construction equipment as described by the project proponent. L_{MAX} data provided for similar equipment is outdated and shows significantly higher noise levels, as pieces of equipment measured are now over 40 years old and likely unusable due to current emissions standards. For this reason, compliance with the 85 dBA L_{MAX} provision within the City of Santee Municipal Code could not be determined. It is recommended that, prior to construction, the contractor requests actual manufacturer noise data for the specific pieces of equipment to be used on site to confirm whether maximum noise levels would exceed the threshold of 85 dBA L_{MAX} at 50 feet. If so, or if data is unavailable to justify that noise impacts would fall below this threshold, and assuming such equipment would be in use for more than 10 consecutive workdays, a notice must be provided to all property owners and residents within 300 feet of the site no later than 10 days before the start of construction. The notice must be approved by the City and describe the project, the expected duration, and provide a point of contact to resolve noise complaints.

b) Generation of excessive groundborne vibration or groundborne noise levels?

Less Than Significant Impact. The proposed grading phase of construction is expected to generate the highest vibration levels of the three stages, as it includes the use of a large bulldozer. According to the Federal Transit Administration Transit Noise and Vibration Assessment Manual (see reference), a large bulldozer generates a peak particle velocity (PPV) of approximately 0.089 inches/second at a distance of 25 feet from equipment. The evaluation of an impact's significance can be determined by reviewing both the likelihood of annoyance to individuals as well as the potential for damage to existing structures. According to the Caltrans Transportation and Construction Vibration Guidance Manual (see reference), the appropriate threshold for damage to modern residential structures is a PPV of 0.5 inches/second. Annoyance is assessed based on levels of perception, with a PPV of 0.01 being considered "barely perceptible," 0.04 inches/second as "distinctly perceptible," 0.1 inches/second as "strongly perceptible," and 0.4 inches/second as "severe."

It is estimated that the nearest location a bulldozer would operate to occupied residences would be approximately 20 feet from the nearest residential structure to the west. At this distance, the PPV would be approximately 0.124 inches/second. This level of vibration falls below the building damage PPV criteria of 0.5 inches/second. The impact falls between the "strongly perceptible" and "severe" PPV criteria for annoyance; however, vibration would be reduced to "distinctly perceptible" levels by the time the bulldozer is located at a distance of 45 feet from receivers, and "barely perceptible" at 100 feet from receivers. As construction vibration is not anticipated to cause damage to off-site buildings and will only approach the threshold of "severe" vibration for a short period of time when work is performed on the western portion of the project site, it is the opinion of the undersigned that temporary construction vibration impacts would not be "excessive" and therefore are less than significant. Please refer to Appendix D for additional information.

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

Less Than Significant. The proposed project is located within the Gillespie Field noise contours and is expected to be exposed to approximately 64 CNEL. According to the Gillespie Field ALUCP (see reference), single-family residential uses are considered to be conditionally compatible in areas with noise levels up to 65 CNEL, in that the building structure must be capable of attenuating noise levels at the interior of the residence to 45 CNEL or less. The California Building Code similarly contains a provision requiring interior noise levels of 45 CNEL or less in habitable space. According to a study performed by the U.S. EPA (see reference), current exterior building construction is generally expected to achieve at least 15 decibels of exterior-to-interior noise attenuation, with windows opened. Therefore, buildings with noise exposure exceeding 60 CNEL may be subject to interior noise levels exceeding 45 CNEL with windows opened. Although not explicitly specified

by CEQA and although aircraft noise would be the dominant source of environmental noise at the project site, traffic noise should also be included in this interior noise analysis as it would also be subject to meeting the interior noise requirements of the California Building Code. The following condition of approval is therefore required:

> *Prior to the issuance of building permits, an exterior-to-interior analysis shall be performed for residences on the project site to identify building features necessary for the attenuation of interior noise levels from aircraft and traffic noise to be 45 CNEL or less. Where windows must be closed to comply, mechanical ventilation that offers appropriate fresh air exchanges without relying on an open window must be provided. This study shall be required for obtaining a certificate of occupancy but shall be performed prior to the issuance of building permits to establish any specific measures necessary to achieve compliant interior noise levels prior to building construction.*

With implementation of the condition of approval detailed above, the project will achieve compliance with the acoustical requirements of the ALUCP, and thus this impact would be considered less than significant.

The project site may also experience some noise impacts from the adjacent industrial properties to the east; however, aircraft noise would still be expected to be the dominant source of average daily noise at the project site. Control of noise impacts generated at the industrial properties to the east would be the responsibility of the users of the industrial properties themselves, which are located within the jurisdiction of the City of El Cajon and therefore must adhere to noise regulations and limits defined within the City of El Cajon Municipal Code.

6.0 Conclusion

Operational noise impacts from the project site are expected to be limited to small HVAC unit operation. Calculations show that noise impacts from HVAC units are not expected to cause a significant increase in ambient noise levels.

Calculations show that noise from temporary construction activities will not exceed generally accepted construction noise limits at surrounding sensitive receptors. Construction is prohibited between the hours of 7 p.m. and 7 a.m. and on Sundays or legal holidays. Standard construction noise control methods, including adhering to permissible hours of operation, maintaining equipment in proper operating condition, and placing staging areas at furthest locations from noise sensitive receptors, shall also be employed as much as feasible to reduce noise impacts to surrounding sensitive receptors and ensure that construction impacts remain less than significant at off-site receivers. Additionally, if any piece of equipment that will be used on site for more than 10 days is specified as having a noise level exceeding 85 dBA L_{MAX} at 50 feet (or if insufficient evidence exists to prove otherwise), a notice must be provided to all property owners and residents within 300 feet of the site no later than 10 days before the start of construction. The notice must be approved by the City and describe the project, the expected duration, and provide a point of contact to resolve noise complaints.

As construction vibration is not anticipated to cause damage to off-site buildings and will only approach the threshold of "severe" vibration for a short period of time when work is performed on the western portion of the site, it is the opinion of the undersigned that temporary construction vibration impacts would not be "excessive" and therefore are less than significant.

The project site is located within the 60-65 CNEL contour of Gillespie Field. According to the Gillespie Field ALUCP, single-family residential uses are considered to be conditionally compatible in areas with noise levels up to 65 CNEL, in that the building structure must be capable of attenuating noise levels at the interior of the residence to 45 CNEL or less. As current exterior building construction is generally expected to achieve 15 decibels of exterior-to-interior noise attenuation with windows opened, buildings with noise exposure

exceeding 60 CNEL may be subject to interior noise levels exceeding 45 CNEL with windows opened without appropriate design features implemented. The following condition of approval is required:

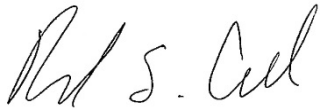
> *Prior to the issuance of building permits, an exterior-to-interior analysis shall be performed for residences on the project site to identify building features necessary for the attenuation of interior noise levels from aircraft and traffic noise to be 45 CNEL or less. Where windows must be closed to comply, mechanical ventilation that offers appropriate fresh air exchanges without relying on an open window must be provided. This study shall be required for obtaining a certificate of occupancy but shall be performed prior to the issuance of building permits to establish any specific measures necessary to achieve compliant interior noise levels prior to building construction.*

With implementation of the condition of approval detailed above, the project will achieve compliance with the acoustical requirements of the ALUCP.

7.0 Certification

All recommendations for noise control are based on the best information available at the time our consulting services are provided. However, as there are many factors involved in sound and impact transmission, and Eilar Associates has no control over the construction, workmanship, or materials, Eilar Associates is specifically not liable for final results of any recommendations or implementation of the recommendations.

The findings and recommendations of this acoustical analysis report are based on the information available and are a true and factual analysis of the potential acoustical issues associated with the Slope Street Subdivision project, to be located at 9463 Slope Street in the City of Santee, California. This report was prepared by Rachael Cowell and Amy Hool.



Rachael S. Cowell, INCE
Acoustical Consultant

Amy Hool, INCE
President/CEO

8.0 References

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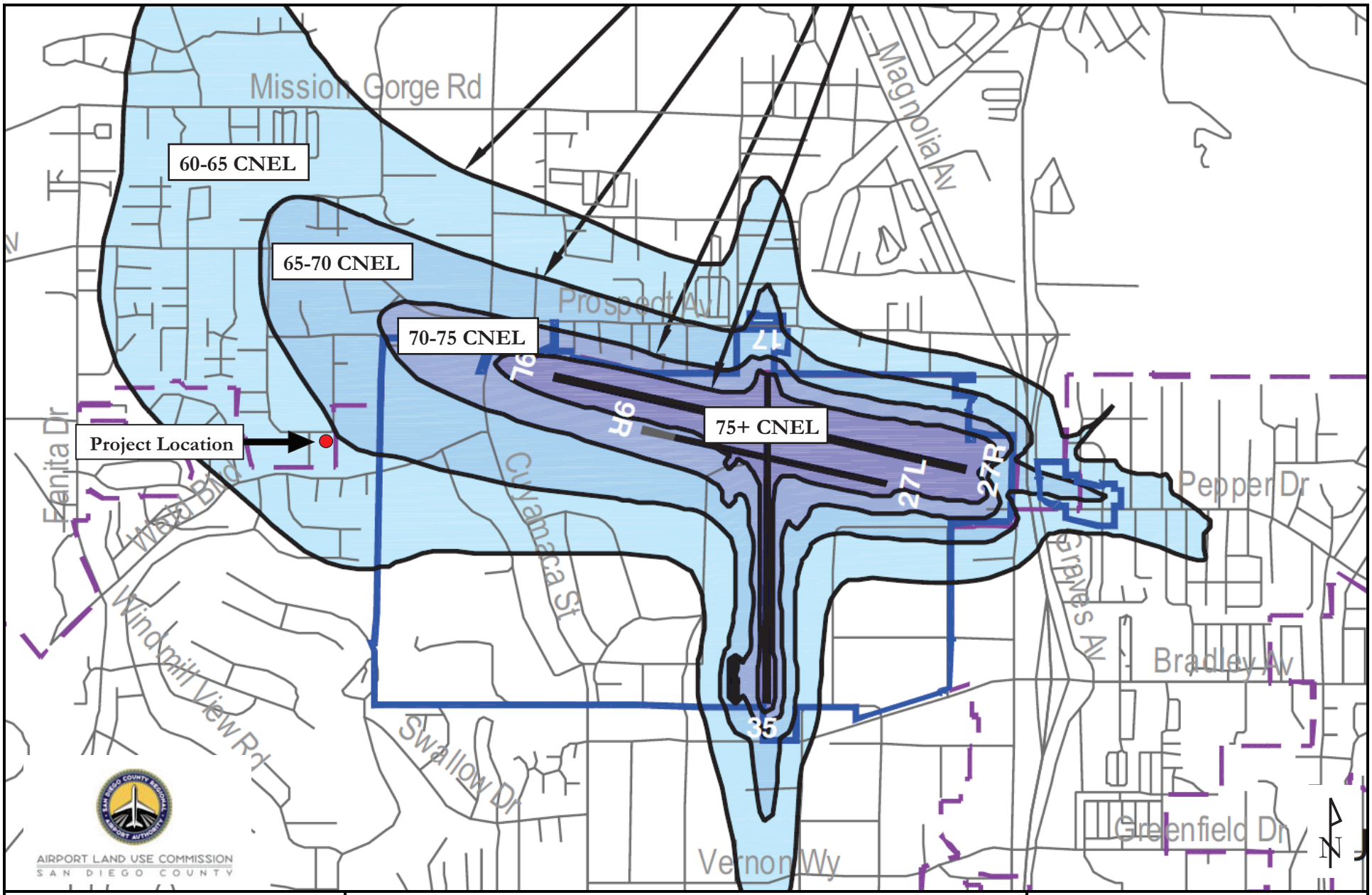
Figures



Eilar Associates, Inc.
210 South Juniper Street, Suite 100
Escondido, California 92025
760-738-5570

Gillespie Field Noise Contours Showing Project Location
Job # S210202

Figure 1

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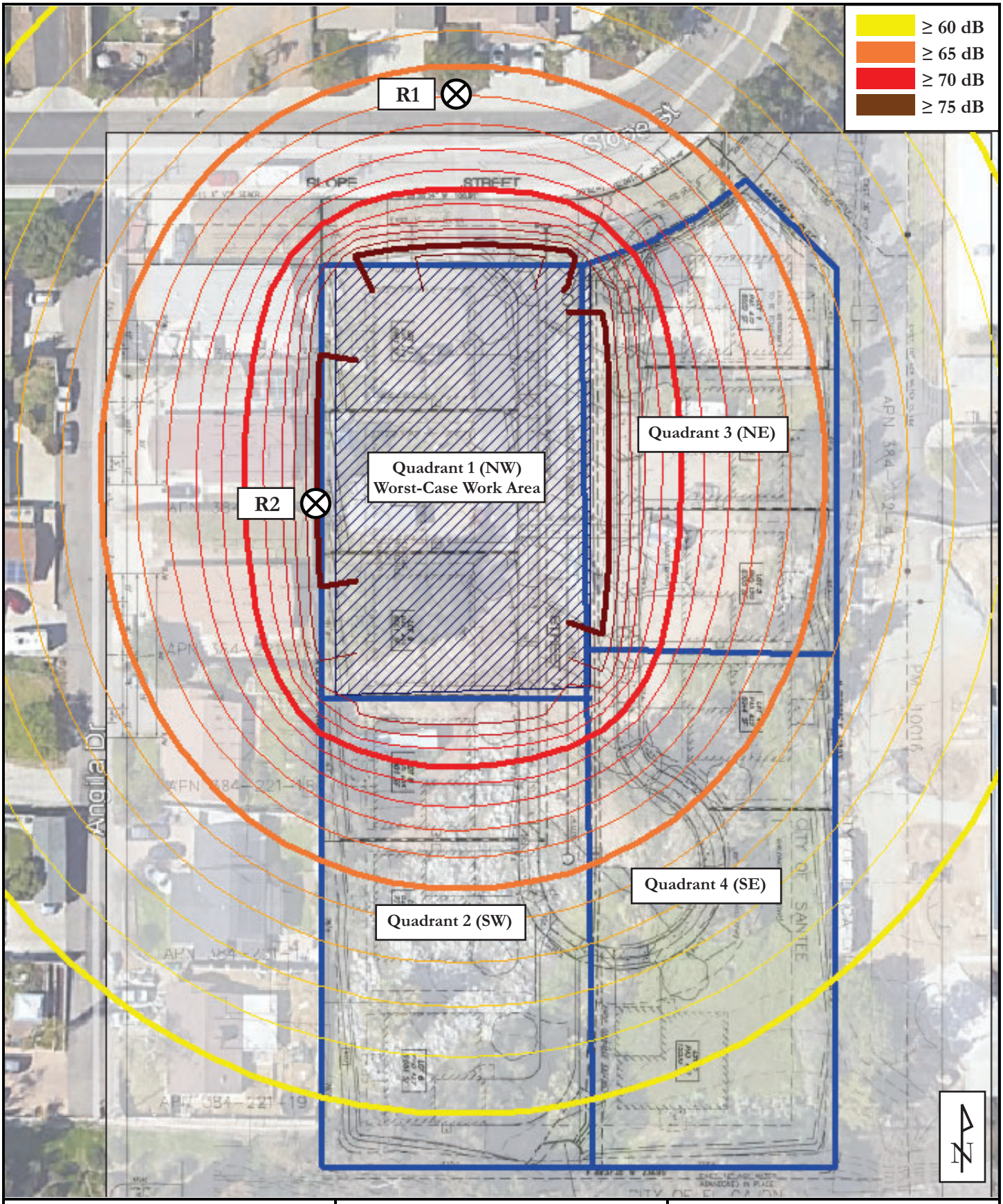
210 South Juniper Street, Suite 100
Escondido, California 92025
760-738-5570

Satellite Aerial Photograph Showing Noise Measurement Location
Job # S210202

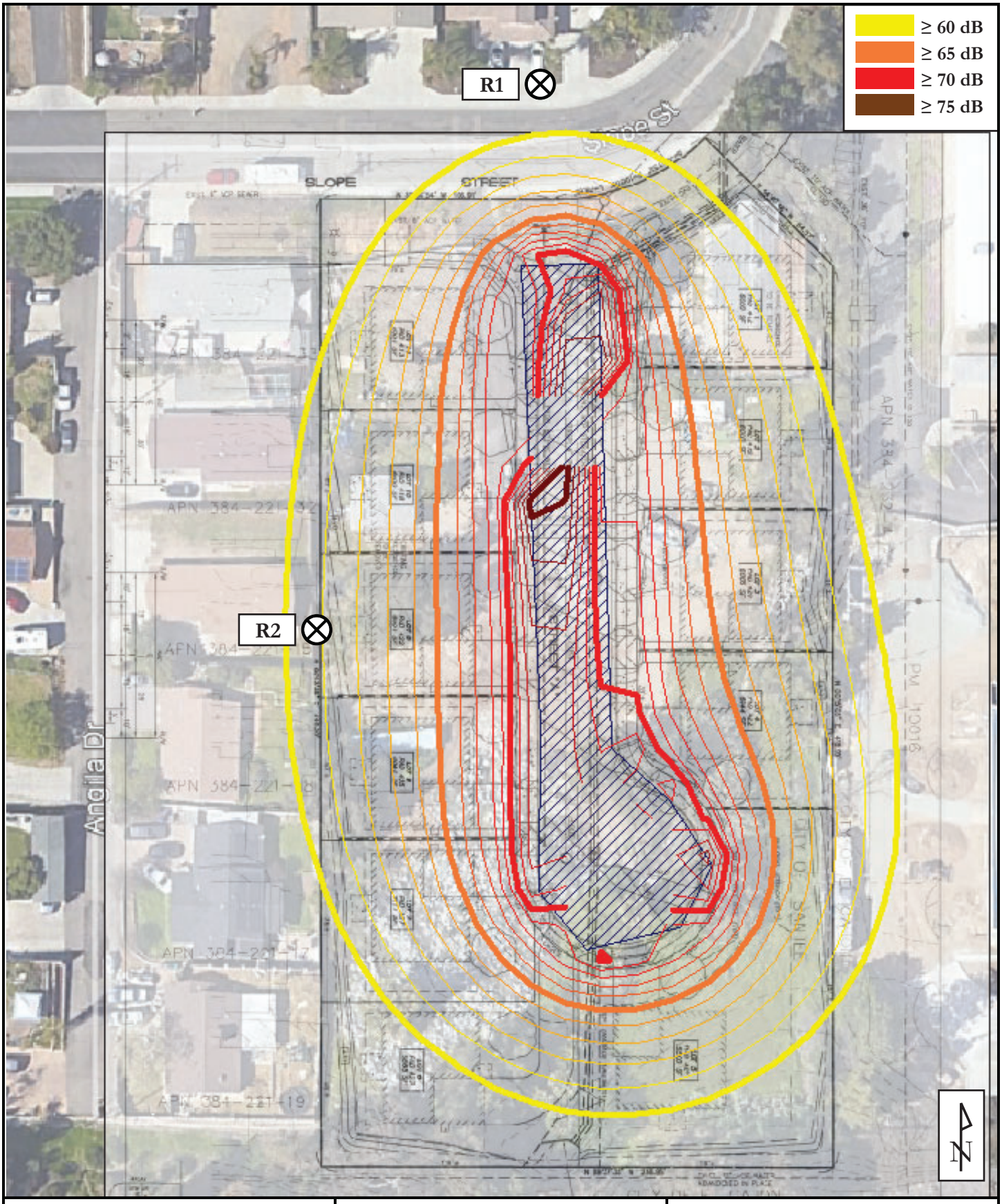
Figure 2



Eilar Associates, Inc.
210 South Juniper Street, Suite 100
Escondido, California 92025
760-738-5570

Site Plan Showing Construction Equipment Noise Contours and Receiver Locations - Grading/Utilities
Job # S210202

Figure 3



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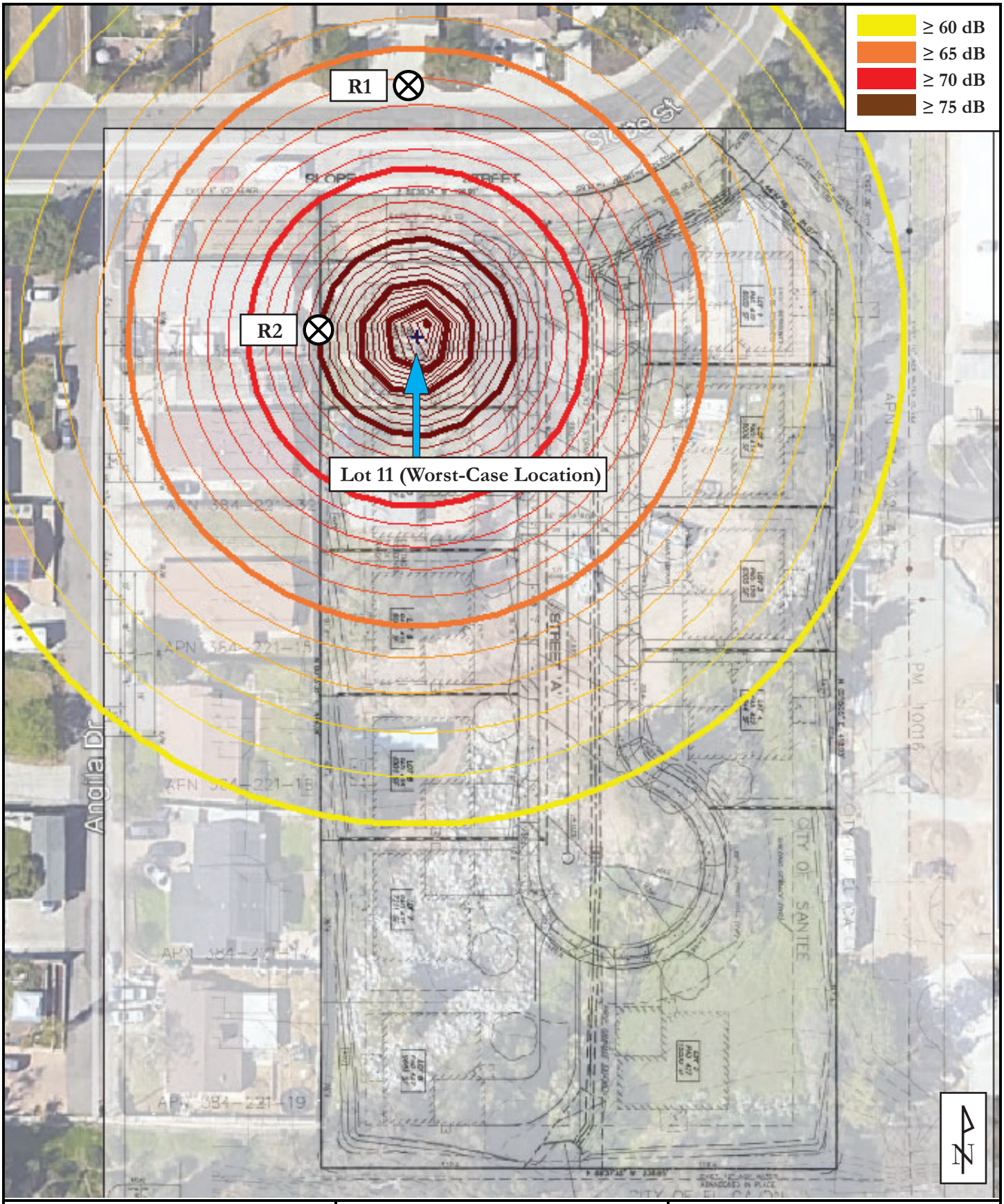
760-738-5570

Site Plan Showing Construction Equipment Noise Contours and Receiver Locations - Paving
Job # S210202

Figure 4



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Site Plan Showing Construction Equipment Noise Contours and Receiver Locations - Building Construction
Job # S210202

Figure 5

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Appendix A
Project Plans

PRELIMINARY GRADING PLAN - SLOPE STREET SUBDIVISION

OWNER/ APPLICANT:

HAMANN FAMILY TRUST
1000 PIONEER WAY
EL CAJON, CA 92020
(619) 441-1463

1. LEGAL DESCRIPTION:
   PORTION OF TRACT B OF GODBOLD'S SUBDIVISION, IN THE CITY OF SANTEE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 2303, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, FEBUARY 21, 1946.
2. ASSESSOR'S PARCEL NUMBER 384-232-03
3. TOTAL NUMBER OF LOTS PROPOSED 11 SINGLE FAMILY LOTS
4. TOTAL GROSS/NET ACREAGE = 2.46 ACRES
5. EXISTING ZONING R-2 (6,000 SF MIN.)
6. PROPOSED ZONING NO CHANGE
7. EXISTING ZONING OF ADJACENT PROPERTIES IS R-2
8. LAND USE DESIGNATION SINGLE FAMILY RESIDENTIAL
9. PRESENT USE OF PROPERTY IS SINGLE FAMILY RESIDENCE
10. PROPOSED USE OF PROPERTY IS AN 11 LOT SUBDIVISION.
11. FIRE PROTECTION: SANTEE FIRE PROTECTION DISTRICT
12. SEWER & WATER: PADRE DAM MUNICIPAL WATER DISTRICT
13. HIGH SCHOOL: GROSSMONT UNION HIGH SCHOOL DISTRICT
14. ELEMENTARY SCHOOL: SANTEE ELEMENTARY SCHOOL DISTRICT
15. STREET LIGHTING: CITY OF SANTEE

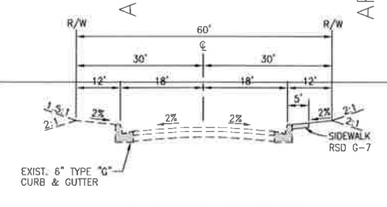
EARTHWORK QUANTITIES

EXCAVATION	3100 CY
EMBANKMENT	3100 CY
EXPORT	0 CY

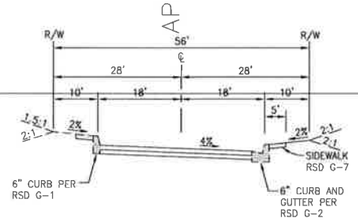
IMPERVIOUS SURFACES				
LOT	BLDG	D/W	PATIO	TOTAL
1	2196	416	272	2884
2	2196	416	180	2792
3	2196	416	180	2792
4	2196	416	272	2884
5	2196	419	180	2795
6	2196	1676	180	4052
7	2196	417	180	2793
8	2196	417	180	2793
9	2196	417	180	2793
10	2196	417	180	2793
11	2196	417	180	2793
RD A				18559
SLOPE				1022
TOTAL				51745

N

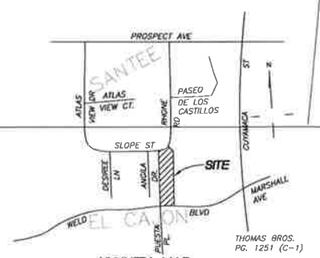
20 0 20 40 60
GRAPHIC SCALE 1" = 20'



SECTION : SLOPE STREET
NO SCALE



SECTION : STREET "A"
NO SCALE



VICINITY MAP
NO SCALE

Eilar Associates, Inc.
Acoustical and Environmental Consulting Services

Appendix B

Applicable Noise Regulations

5.04.090 Construction equipment.

A. Prohibitions. Except for emergency work or work that has been expressly approved by the City, it is unlawful for any person to operate any single or combination of powered construction equipment at any construction site, as follows:

1. It is unlawful for any person to operate any single or combination of powered construction equipment at any construction site on Mondays through Saturdays except between the hours of 7:00 a.m. and 7:00 p.m., unless expressly approved by the Director of Development Services.

2. It is unlawful for any person to operate any single or combination of powered construction equipment at any construction site on Sundays or City recognized holidays unless expressly approved by the Director of Development Services.

3. No construction equipment is permitted to be started, idled, moved or operated at any location before 7:00 a.m. or after 7:00 p.m. on Mondays through Saturdays and all times on Sundays and holidays, described in subsection (A)(2) of this section. Specific exemptions may be authorized by the Director of Development Services.

4. Construction equipment with a manufacturer's noise rating of 85 $dBAL_{MAX}$ or greater, may only operate at a specific location for 10 consecutive workdays. If work involving such equipment will involve more than 10 consecutive workdays, a notice must be provided to all property owners and residents within 300 feet of the site no later than 10 days before the start of construction. The notice must be approved by the City and describe the project, the expected duration, and provide a point of contact to resolve noise complaints. (Ord. 558 § 3, 2019)

Santee, California Municipal Code

Title 5 HEALTH AND SAFETY

Chapter 5.04 NOISE ABATEMENT AND CONTROL

5.04.040 General noise regulations.

A. General Prohibitions. It is unlawful for any person to make, continue, or cause to be made or continued, within the limits of the City, any disturbing, excessive or offensive noise which causes discomfort or annoyance to reasonable persons of normal sensitivity residing in the area. The characteristics and conditions which should be considered in determining whether a violation of the provisions of this section exists, include, but are not limited to, the following:

1. The level of the noise;
2. Whether the nature of the noise is usual or unusual;
3. Whether the origin of the noise is natural or unnatural;
4. The level of the background noise;
5. The proximity of the noise to sleeping facilities;
6. The nature and zoning of the area within which the noise emanates;
7. The density of the inhabitation of the area within which the noise emanates;
8. The time of day or night the noise occurs;
9. The duration of the noise;
10. Whether the noise is recurrent, intermittent, or constant; and
11. Whether the noise is produced by a commercial or noncommercial activity.

B. Disturbing, Excessive or Offensive Noises. The following acts, among others, are declared to be disturbing, excessive and offensive noises in violation of this section:

1. Horns, Signaling Devices or Similar Devices. Violations for disturbing, excessive or offensive noises associated with the use or operation of horns, signaling device or similar devices, on automobiles, motorcycles, or any other vehicle, except as provided elsewhere in this code, will be prosecuted under applicable provisions of the California Vehicle Code.

2. Radio, Television, Music, Sound Amplifiers, and Similar Devices.

   a. Uses Restricted. No person is permitted to play, use, operate, or allow to be played, used or operated, any radio, musical instrument, television, loudspeaker, bullhorn, amplifier, public address system, musical instrument, or other machine or device that produces sound in such manner that disturbs the peace, quiet and comfort of persons of normal sensitivity in the area.

   b. Prima Facie Violations. The operation of any device in subsection (B)(2)(a) between the hours of 10:00 p.m. and 7:00 a.m., in such a manner as to be louder than the average conversational level at a distance of 50 feet from the building, structure or vehicle in which it is located, measured vertically or horizontally, is prima facie evidence of a violation of this section.

   c. The limitations imposed in this section do not apply between the hours of 7:00 a.m. and 10:00 p.m. to a person participating in: (i) a public assembly; or (ii) a parade, athletic event, or outdoor special event; provided that a permit has been issued for the parade, athletic event or outdoor special event, if required, and the person is in compliance with the permit.

d. The limitations imposed in this section do not apply to emergency signal devices as described in Section 5.04.100 of this code.

3. Disturbing or raucous yelling, shouting, hooting, whistling or singing on the public streets, between the hours of 10:00 p.m. and 7:00 a.m. or at any time or place so as to annoy or disturb the quiet, comfort or repose of neighboring residents or persons of normal sensitivity within the area for whatever reason, is prohibited. This provision may not be construed to prohibit the selling by outcry of merchandise, food and beverages at sporting events, parades, fairs, celebrations, festivals, circuses, carnivals and other similar special events for public entertainment.

4. Heating and Air Conditioning Equipment and Generators.

a. It is unlawful for any person to operate or allow the operation of any generator, air conditioning, refrigeration or heating equipment in such manner as to create a noise disturbance on the premises of any other occupied property, or if a condominium, apartment house, duplex, or attached business, within any adjoining unit.

b. All generators, heating, air conditioning, or refrigeration equipment are subject to the setback and screening requirements in this code.

5. Pool Heaters, Pumps and Filtering Equipment.

a. It is unlawful for any person to operate or allow the operation of any pool heater, pump or filtering equipment in such manner as to create a noise disturbance on the premises of any other occupied property, or if a condominium, apartment house, duplex, or attached business, within any adjoining unit.

b. All pool heater, pumps and filtering equipment are subject to the setback and screening requirements listed in this code.

6. Animals and Fowl. It is unlawful to keep, maintain, or allow to be kept or maintained on any premises any animal or fowl that causes annoyance or discomfort to persons of normal sensitivity adjacent to the owner's property by any frequent or continuous noise; provided, however, that this section does not apply to occasional noises emanating from legally operated dog and cat hospitals, humane societies, pounds, farm and/or agricultural facilities, or areas where keeping of animals or fowl are permitted.

7. Schools, Courts, Churches, Hospitals. It is unlawful to create any noise that disrupts the workings of any of the following institutions while they are in use and if there are signs indicating the presence of such institution:

a. School, institution of learning (except recreational areas of schools), church, court or library;

b. A hospital, rest home, or long-term medical or mental health care facility. (Ord. 558 § 3, 2019)

Contact:

City Clerk: 619-258-4100 ext. 114

13.10.050 Special development criteria.

The special development criteria set forth in this section are intended to provide minimum standards for residential development.

A. Attached and Detached Residential Accessory Structures.

1. Attached and detached residential accessory structures which require a building permit (including, but not limited to, unenclosed patio covers, cabanas, garages, carports, and storage buildings) may encroach in a required interior side yard or rear yard, except as required in Table 13.10.040A, subject to the following limitations:

a. Height. The maximum height for accessory structures is 16 feet (one story).

b. Rear Yard Setback. Attached and detached residential accessory structures or additions may be located four feet from the rear property line, excluding eave overhang.

c. Side Yard Setback. Attached or detached residential accessory structures may be located four feet from the side interior property line, excluding eave overhang. Attached and detached residential accessory structures may not encroach into required exterior side yard setbacks.

d. Front Yard and Corner Side Yard. No detached residential accessory structure shall be placed in front of the main structure.

e. Size. The maximum allowable gross floor area for all detached residential accessory structures in conjunction with an existing single-family residence shall not exceed 50% of the living area of the primary residence. A 400-square-foot detached garage is permitted in all cases if a garage does not currently exist on site.

f. Additional Standards for Accessory Structures. The following items may be allowed in an accessory structure, such as a garage, workshop, cabana, or similar structure, with recording of a City-approved deed restriction:

i. Wet bar/kitchen.

ii. Wash basin (sink and drain).

iii. Bathroom.

2. Sea cargo containers are prohibited.

B. Projections into Yards.

1. Eaves, roof projections, awnings, and similar architectural features may project into required yards a maximum distance of two feet, provided such appendages are supported only at, or behind, the building setback line.

2. Fireplace chimneys, bay windows, balconies, fire escapes, exterior stairs and landings and similar architectural features and equipment for pools and air conditioning may project into required yards a maximum distance of two feet, provided such features shall be at least three feet from a property line. Equipment must be screened with materials and colors that blend with the building design.

3. Uncovered decks, platforms, uncovered porches, and landing places which do not extend above the first floor level of the main building and are not at any point more than 32 inches above grade, may project into any front or corner side yard a maximum distance of 10 feet, and project into any rear or interior side yard up to the property line. Where not extending above the first floor level but where greater than 32 inches above grade, must be at least five feet from all side property lines and 10 feet from the rear and front property lines.

4. Projections Over a Slope. If a structure is constructed such that it projects over a slope, and the structure is visible from a public street, the underside of the structure shall either be enclosed or landscaping shall be provided to screen the structure from public view to the satisfaction of the Director.

5. Two-story additions may encroach a maximum of five feet into the required rear yard setback if the Director determines that the encroachment is necessary for a continuation and extension of the architectural design, style, and function of the structure.

C. Projections Above Height Limits. Except as provided for in Chapter 13.34, flues, chimneys, antennas, elevators, other mechanical equipment, utility, and mechanical features may exceed the height limit of the base district in Table 13.10.040A by no more than 15 feet, provided such feature shall not be used for habitable space and appropriate screening is provided as determined by the Director. Architectural appurtenances to churches and other religious institutions involving a steeple, or cross combination thereof, and clock towers, may exceed the maximum height of the base district if it is determined through the development review permit or conditional use permit process that architectural compatibility and appropriate building scale are achieved and maintained.

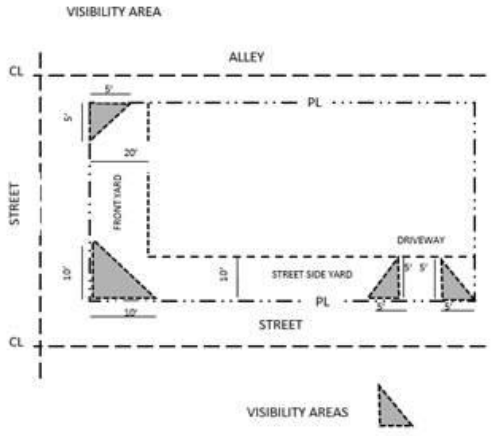
D. Variable Front Yard Provisions. Front setbacks required by the base district may be averaged on the interior lots within a new single-family detached or detached condominium subdivision. Additions to single-family homes in established residential subdivisions shall be allowed to build to the pre-established front yard setback of the subdivision without the need for a variance.

E. Fences, Walls and Hedges. The following provisions regarding fences, walls and hedges shall apply to all residential districts.

1. Fences, walls, hedges, or similar view obstructing structures or plant growth that reduce visibility and the safe ingress and egress of vehicles or pedestrians shall not exceed a height of three and one-half feet in the front yard. A combination of solid and open fences (e.g., wrought iron, chain link, Plexiglas) not exceeding six feet in height may be located in a required front yard or visibility clearance area, provided such fences are constructed with at least 90% of the top two and one-half feet of their vertical surface open, and nonview-obscuring.

2. Fences or walls, not exceeding six feet in height, may be located in a required exterior side yard, rear, or interior side yard. Walls required by the City for noise mitigation may be up to eight feet in height and may be located within the exterior side yard setback or rear setback adjacent to a street. The noise wall shall be designed such that it does not reduce visibility and the safe ingress and egress of vehicles or pedestrians.

3. A visibility clearance area shall be required on lots adjacent to an alley, driveway or street in which nothing shall be erected, placed, planted or allowed to grow exceeding three and one-half feet in height. Such area shall consist of a triangular area bounded by the alley, driveway, or street right-of-way lines of such lots and a line joining points along said alley, driveway, or street lines from the point of intersection as shown in the Visibility Area diagram below.



4. Outdoor recreation court fences not exceeding 12 feet in height shall be located five feet from any rear or side property lines, except when adjacent to outdoor recreation courts on adjacent properties.

5. Barbed wire, concertina wire, or similar security devices are not allowed in residential zones.

6. Walls constructed next to a mobility element street shall be constructed with decorative materials to the satisfaction of the Director. Anti-graffiti surfaces shall be provided pursuant to Chapter 7.16.

F. Swimming Pools, Spas and Recreational Courts.

1. Swimming pools, spas, tennis courts, basketball courts, or similar paved outdoor recreational courts, shall not be located in any required front yard, and shall be located no closer than three feet from any rear, side or corner side property line.

2. Outdoor lighting poles and fixtures are permitted not to exceed 12 feet in height. Any such lighting shall be designed to project light downward and shall not create glare on adjacent properties.

G. Mobile Home Parks. For mobile home park development provisions, refer to Chapter 13.22.

H. Use of Required Yards.

1. Street Yards. Except as otherwise permitted, a street yard shall be used only for landscaping, pedestrian walkways, driveways, or off-street parking.

2. Rear and Interior Side Yards. Except as otherwise permitted, these yards shall be used only for landscaping, pedestrian walkways, driveways, off-street parking or loading, recreational activities or similar accessory activities.

I. Lights. All public parking areas shall be adequately lighted. All lighting shall be designed and adjusted to reflect light away from any road or street, and away from any adjoining premises. All lights and illuminated signs shall be shielded or directed so as to not cause glare on adjacent properties or to motorists. (Ord. 599 § 2, 2022; Ord. 591 § 2, 2021; Ord. 566 § 3, 2019)

Contact:

City Clerk: 619-258-4100 ext. 114

Table III-1

Noise Compatibility Criteria

Land Use Category [1]	Exterior Noise Exposure (dB *CNEL*			
Note: Multiple categories may apply to a project	60–65	65–70	70–75	75-80
Agricultural and Animal-Related				
horse stables; livestock breeding or farming	A	A	A	
nature preserves; wildlife preserves				
interactive nature exhibits	A			
zoos	A	A		
agriculture (except residences and livestock); greenhouses; fishing				A
Recreational				
children-oriented neighborhood parks; playgrounds	A			
campgrounds; recreational vehicle/motor home parks				
community parks; regional parks; golf courses; tennis courts; athletic fields; outdoor spectator sports; fairgrounds; water recreation facilities		A		
recreation buildings; gymnasiums; club houses; athletic clubs; dance studios		50	50	
Public				
outdoor amphitheaters	A			
children's schools (K-12); day care centers (>14 children)	45			
libraries	45			
auditoriums; concert halls; indoor arenas; places of worship	45	45		
adult schools; colleges; universities [2]	45	45		
prisons; reformatories		50		
public safety facilities (e.g., police, fire stations)		50	50	
cemeteries; cemetery chapels; mortuaries		45 A	45 A	
Residential, Lodging, and Care				
residential (including single-family, multi-family, and mobile homes); family day care homes (≤14 children)	45			
extended-stay hotels; retirement homes; assisted living; hospitals; nursing homes; intermediate care facilities	45			
hotels; motels; other transient lodging [3]	45	45	45	
Commercial and Industrial				
office buildings; office areas of industrial facilities; medical clinics; clinical laboratories; radio, television, recording studios		50	50	
retail sales; eating/drinking establishments; movie theaters; personal services		50	50 B	
wholesale sales; warehouses; mini/other indoor storage			50 C	

Table III-1 Continued

Noise Compatibility Criteria

Land Use Category [1]	Exterior Noise Exposure (dB *CNEL*			
Note: Multiple categories may apply to a project	60–65	65–70	70–75	75-80
industrial; manufacturing; research & development; auto, marine, other sales & repair services; car washes; gas stations; trucking, transportation terminals			50 C	
extractive industry; utilities; road, rail rights-of-way; outdoor storage; public works yards;automobile parking; automobile dismantling; solid waste facilities				50 C
animal shelters/kennels	50	50	50	

Land Use	Acceptability	Interpretation/Comments
	Compatible	*Indoor Uses:* Standard construction methods will sufficiently attenuate exterior noise to an acceptable indoor community noise equivalent level (*CNEL*) *Outdoor Uses:* Activities associated with the land use may be carried out with essentially no interference from aircraft noise
45 50	*Conditional* [4]	*Indoor Uses:* Building structure must be capable of attenuating exterior noise to the indoor *CNEL* indicated by the number; standard construction methods will normally suffice *Outdoor Uses:* *CNEL* is acceptable for outdoor activities, although some noise interference may occur.
A B C	*Conditional* [4]	*Indoor or Outdoor Uses:* A Caution should be exercised with regard to noise-sensitive outdoor uses; these uses are likely to be disrupted by aircraft noise events; acceptability is dependent upon characteristics of the specific use [5] B Outdoor dining or gathering places incompatible above 70 dB *CNEL* C Sound attenuation must be provided for associated office, retail, and other noise-sensitive indoor spaces sufficient to reduce exterior noise to an interior maximum of 50 dB *CNEL*
	Incompatible	Use is not compatible under any circumstances.

Notes:

1 Land uses not specifically listed shall be evaluated, as determined by the *ALUC*, using the criteria for similar uses.

2 Applies only to classrooms, offices, and related indoor uses. Laboratory facilities, gymnasiums, outdoor athletic facilities, and other uses to be evaluated as indicated for those land use categories.

3 Lodging intended for stays by an individual person of no more than 25 days consecutively and no more than 90 days total per year; facilities for longer stays are in the extended- stay hotel category.

4 An *avigation easement* is required for any project situated on a property lying within the projected 65 dB *CNEL* noise contour. See Policy 2.11.5 and Policy 3.3.3(d).

5 Noise-sensitive land uses are ones for which the associated primary activities, whether indoor or outdoor, are susceptible to disruption by loud noise events. The most common types of noise-sensitive land uses include, but are not limited to, the following: residential, hospitals, nursing facilities, intermediate care facilities, educational facilities, libraries, museums, places of worship, child-care facilities, and certain types of passive recreational parks and open space.

Source: San Diego County Regional Airport Authority, October 2009.

Prepared by: Ricondo & Associates, Inc., January 2010.

Section 1206 Sound Transmission

1206.1 Scope

This section shall apply to common interior walls, partitions and floor/ceiling assemblies between adjacent *dwelling units* and *sleeping units* or between *dwelling units* and *sleeping units* and adjacent public areas such as halls, *corridors*, *stairways* or *service areas*.

1206.2 Airborne sound

Walls, partitions and floor-ceiling assemblies separating *dwelling units* and *sleeping units* from each other or from public or service areas shall have a sound transmission class of not less than 50, or not less than 45 if field tested, for airborne noise where tested in accordance with ASTM E90. Alternatively, the sound transmission class of walls, partitions and floor-ceiling assemblies shall be established by engineering analysis based on a comparison of walls, partitions and floor-ceiling assemblies having sound transmission class ratings as determined by the test procedures set forth in ASTM E90. Penetrations or openings in construction assemblies for piping; electrical devices; recessed cabinets; bathtubs; soffits; or heating, ventilating or exhaust ducts shall be sealed, lined, insulated or otherwise treated to maintain the required ratings. This requirement shall not apply to entrance doors; however, such doors shall be tight fitting to the frame and sill.

1206.2.1 Masonry

The sound transmission class of concrete masonry and clay masonry assemblies shall be calculated in accordance with TMS 0302 or determined through testing in accordance with ASTM E90.

1206.3 Structure-borne sound

Floor-ceiling assemblies between *dwelling units* and *sleeping units* or between a *dwelling unit* or *sleeping unit* and a public or service area within the structure shall have an impact insulation class rating of not less than 50, or not less than 45 if field tested, where tested in accordance with ASTM E492. Alternatively, the impact insulation class of floor-ceiling assemblies shall be established by engineering analysis based on a comparison of floor-ceiling assemblies having impact insulation class ratings as determined by the test procedures in ASTM E492.

Exception: Impact sound insulation is not required for floor-ceiling assemblies over nonhabitable rooms or spaces not designed to be occupied, such as garages, mechanical rooms or storage areas.

1206.4 Allowable interior noise levels

Interior noise levels attributable to exterior sources shall not exceed 45 dB in any habitable room. The noise metric shall be either the day-night average sound level (Ldn) or the community noise equivalent level (CNEL), consistent with the noise element of the local general plan.

1206.5 Acoustical control

[BSC-CG] See *California Green Building Standards Code*, Chapter 5, Division 5.5 for additional sound transmission requirements.

Eilar Associates, Inc.
Acoustical and Environmental Consulting Services

Appendix C

CadnaA Analysis Data and Results

Eilar Associates, Inc.
210 South Juniper Street, Suite 100
Escondido, California 92025-4230
Phone: (760) 738-5570

Date: 18 Mar 2021

Calculation Configuration

Configuration	
Parameter	Value
General	
Country	(user defined)
Max. Error (dB)	0.00
Max. Search Radius (#(Unit,LEN))	2000.00
Min. Dist Src to Rcvr	0.00
Partition	
Raster Factor	0.50
Max. Length of Section (#(Unit,LEN))	1000.00
Min. Length of Section (#(Unit,LEN))	1.00
Min. Length of Section (%)	0.00
Proj. Line Sources	On
Proj. Area Sources	On
Ref. Time	
Reference Time Day (min)	960.00
Reference Time Night (min)	480.00
Daytime Penalty (dB)	0.00
Recr. Time Penalty (dB)	6.00
Night-time Penalty (dB)	10.00
DTM	
Standard Height (m)	0.00
Model of Terrain	Triangulation
Reflection	
max. Order of Reflection	0
Search Radius Src	100.00
Search Radius Rcvr	100.00
Max. Distance Source - Rcvr	1000.00 1000.00
Min. Distance Rvcr - Reflector	1.00 1.00
Min. Distance Source - Reflector	0.10
Industrial (ISO 9613)	
Lateral Diffraction	some Obj
Obst. within Area Src do not shield	On
Screening	Excl. Ground Att. over Barrier
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	3.0 20.0 0.0
Temperature (#(Unit,TEMP))	10
rel. Humidity (%)	70
Ground Absorption G	0.60
Wind Speed for Dir. (#(Unit,SPEED))	3.0
Roads (TNM)	
Railways (Schall 03 (1990))	
Strictly acc. to Schall 03 / Schall-Transrapid	
Aircraft (???)	

Configuration	
Parameter	Value
Strictly acc. to AzB	

Receivers

Name	M.	ID	Level Lr		Limit. Value		Land Use			Height		Coordinates		
			Day	Night	Day	Night	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)				(m)		(m)	(m)	(m)
North		R1	65.9	-80.2	75.5	0.0				1.52	r	209.45	197.93	1.52
West		R2	75.0	-80.2	75.5	0.0				1.52	r	189.74	140.17	1.52

Area Sources

Name	M.	ID	Result. PWL			Result. PWL"			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Moving Pt. Src		
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night				Number		
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(min)	(min)	(min)	(dB)	(Hz)		Day	Evening	Night
Dozer			110.0	10.0	10.0	76.6	-23.4	-23.4	PWL-Pt	L1		0.0	0.0	0.0				24.00	0.00	0.00	0.0		(none)	1.0	0.0	0.0
Loader			106.5	6.5	6.5	73.1	-26.9	-26.9	PWL-Pt	L2		0.0	0.0	0.0				24.00	0.00	0.00	0.0		(none)	1.0	0.0	0.0
Excavator			110.0	10.0	10.0	76.6	-23.4	-23.4	PWL-Pt	L3		0.0	0.0	0.0				24.00	0.00	0.00	0.0		(none)	1.0	0.0	0.0
Dump Truck			107.1	7.1	7.1	73.7	-26.3	-26.3	PWL-Pt	L4		0.0	0.0	0.0				24.00	0.00	0.00	0.0		(none)	1.0	0.0	0.0

Geometry - Area Sources

Name	Height				Coordinates			
	Begin		End		x	y	z	Ground
	(m)		(m)		(m)	(m)	(m)	(m)
Dozer	1.52	r			192.05	173.77	1.52	0.00
					192.22	112.85	1.52	0.00
					228.22	113.80	1.52	0.00
					228.32	174.17	1.52	0.00
Loader	1.52	r			192.05	173.77	1.52	0.00
					192.22	112.85	1.52	0.00
					228.22	113.80	1.52	0.00
					228.32	174.17	1.52	0.00
Excavator	1.52	r			192.05	173.77	1.52	0.00
					192.22	112.85	1.52	0.00
					228.22	113.80	1.52	0.00
					228.32	174.17	1.52	0.00
Dump Truck	1.52	r			192.05	173.77	1.52	0.00
					192.22	112.85	1.52	0.00
					228.22	113.80	1.52	0.00
					228.32	174.17	1.52	0.00

Sound Level Spectra

Name	ID	Type	1/3 Oktave Spectrum (dB)											Source
			Weight.	63	125	250	500	1000	2000	4000	8000	A	lin	
Dozer	L1	Lw (c)		106.0	110.0	108.0	108.0	105.0	102.0	96.0	88.0	110.0	115.0	Defra
Front Loader	L2	Lw (c)		113.0	113.0	102.0	104.0	100.0	98.0	97.0	89.0	106.5	116.6	Defra
Excavator	L3	Lw (c)		116.0	109.0	108.0	108.0	104.0	102.0	99.0	94.0	110.0	118.2	Defra
Dump Truck	L4	Lw (c)		108.0	108.0	107.0	103.0	102.0	100.0	95.0	85.0	107.1	113.5	Defra
Paver	L5	Lw (c)		109.0	108.0	103.0	103.0	102.0	100.0	93.0	87.0	106.6	113.2	Defra
Roller	L6	Lw (c)		121.0	113.0	104.0	103.0	101.0	96.0	90.0	85.0	106.0	121.8	Defra
Forklift	L7	Lw (c)		94.7	102.2	102.6	103.9	104.2	102.8	98.2	91.5	108.8	110.7	91/Green River
Skip Loader	L8	Lw (c)		105.0	97.0	95.0	95.0	94.0	91.0	90.0	81.0	98.8	106.8	Defra

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Date: 18 Mar 2021

Calculation Configuration

Configuration	
Parameter	Value
General	
Country	(user defined)
Max. Error (dB)	0.00
Max. Search Radius (#(Unit,LEN))	2000.00
Min. Dist Src to Rcvr	0.00
Partition	
Raster Factor	0.50
Max. Length of Section (#(Unit,LEN))	1000.00
Min. Length of Section (#(Unit,LEN))	1.00
Min. Length of Section (%)	0.00
Proj. Line Sources	On
Proj. Area Sources	On
Ref. Time	
Reference Time Day (min)	960.00
Reference Time Night (min)	480.00
Daytime Penalty (dB)	0.00
Recr. Time Penalty (dB)	6.00
Night-time Penalty (dB)	10.00
DTM	
Standard Height (m)	0.00
Model of Terrain	Triangulation
Reflection	
max. Order of Reflection	0
Search Radius Src	100.00
Search Radius Rcvr	100.00
Max. Distance Source - Rcvr	1000.00 1000.00
Min. Distance Rvcr - Reflector	1.00 1.00
Min. Distance Source - Reflector	0.10
Industrial (ISO 9613)	
Lateral Diffraction	some Obj
Obst. within Area Src do not shield	On
Screening	Excl. Ground Att. over Barrier
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	3.0 20.0 0.0
Temperature (#(Unit,TEMP))	10
rel. Humidity (%)	70
Ground Absorption G	0.60
Wind Speed for Dir. (#(Unit,SPEED))	3.0
Roads (TNM)	
Railways (Schall 03 (1990))	
Strictly acc. to Schall 03 / Schall-Transrapid	
Aircraft (???)	

Configuration	
Parameter	Value
Strictly acc. to AzB	

Receivers

Name	M.	ID	Level Lr		Limit. Value		Land Use			Height		Coordinates		
			Day	Night	Day	Night	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)				(m)		(m)	(m)	(m)
North		R1	58.2	-80.2	75.5	0.0				1.52	r	221.42	199.19	1.52
West		R2	60.9	-80.2	75.5	0.0				1.52	r	189.85	122.12	1.52

Area Sources

Name	M.	ID	Result. PWL			Result. PWL"			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Moving Pt. Src		
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night				Number		
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(min)	(min)	(min)	(dB)	(Hz)		Day	Evening	Night
Paver			106.6	6.6	6.6	75.7	-24.3	-24.3	PWL-Pt	L5		0.0	0.0	0.0				30.00	0.00	0.00	0.0		(none)	1.0	0.0	0.0
Roller			106.0	6.0	6.0	75.2	-24.8	-24.8	PWL-Pt	L6		0.0	0.0	0.0				12.00	0.00	0.00	0.0		(none)	1.0	0.0	0.0

Geometry - Area Sources

Name	Height				Coordinates			
	Begin		End		x	y	z	Ground
	(m)		(m)		(m)	(m)	(m)	(m)
Paver	1.52	r			218.65	173.61	1.52	0.00
					229.49	173.74	1.52	0.00
					231.38	105.07	1.52	0.00
					239.57	97.72	1.52	0.00
					245.66	88.48	1.52	0.00
					241.04	79.66	1.52	0.00
					227.81	76.51	1.52	0.00
					221.09	84.70	1.52	0.00
					221.30	108.22	1.52	0.00
Roller	1.52	r			218.65	173.61	1.52	0.00
					229.49	173.74	1.52	0.00
					231.38	105.07	1.52	0.00
					239.57	97.72	1.52	0.00
					245.66	88.48	1.52	0.00
					241.04	79.66	1.52	0.00
					227.81	76.51	1.52	0.00
					221.09	84.70	1.52	0.00
					221.30	108.22	1.52	0.00

Sound Level Spectra

Name	ID	Type	1/3 Oktave Spectrum (dB)											Source
			Weight.	63	125	250	500	1000	2000	4000	8000	A	lin	
Dozer	L1	Lw (c)		106.0	110.0	108.0	108.0	105.0	102.0	96.0	88.0	110.0	115.0	Defra
Front Loader	L2	Lw (c)		113.0	113.0	102.0	104.0	100.0	98.0	97.0	89.0	106.5	116.6	Defra
Excavator	L3	Lw (c)		116.0	109.0	108.0	108.0	104.0	102.0	99.0	94.0	110.0	118.2	Defra
Dump Truck	L4	Lw (c)		108.0	108.0	107.0	103.0	102.0	100.0	95.0	85.0	107.1	113.5	Defra
Paver	L5	Lw (c)		109.0	108.0	103.0	103.0	102.0	100.0	93.0	87.0	106.6	113.2	Defra
Roller	L6	Lw (c)		121.0	113.0	104.0	103.0	101.0	96.0	90.0	85.0	106.0	121.8	Defra
Forklift	L7	Lw (c)		94.7	102.2	102.6	103.9	104.2	102.8	98.2	91.5	108.8	110.7	91/Green River
Skip Loader	L8	Lw (c)		105.0	97.0	95.0	95.0	94.0	91.0	90.0	81.0	98.8	106.8	Defra

Eilar Associates, Inc.
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Phone: (760) 738-5570

Date: 18 Mar 2021

Calculation Configuration

Configuration	
Parameter	Value
General	
Country	(user defined)
Max. Error (dB)	0.00
Max. Search Radius (#(Unit,LEN))	2000.00
Min. Dist Src to Rcvr	0.00
Partition	
Raster Factor	0.50
Max. Length of Section (#(Unit,LEN))	1000.00
Min. Length of Section (#(Unit,LEN))	1.00
Min. Length of Section (%)	0.00
Proj. Line Sources	On
Proj. Area Sources	On
Ref. Time	
Reference Time Day (min)	960.00
Reference Time Night (min)	480.00
Daytime Penalty (dB)	0.00
Recr. Time Penalty (dB)	6.00
Night-time Penalty (dB)	10.00
DTM	
Standard Height (m)	0.00
Model of Terrain	Triangulation
Reflection	
max. Order of Reflection	0
Search Radius Src	100.00
Search Radius Rcvr	100.00
Max. Distance Source - Rcvr	1000.00 1000.00
Min. Distance Rvcr - Reflector	1.00 1.00
Min. Distance Source - Reflector	0.10
Industrial (ISO 9613)	
Lateral Diffraction	some Obj
Obst. within Area Src do not shield	On
Screening	Excl. Ground Att. over Barrier
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	3.0 20.0 0.0
Temperature (#(Unit,TEMP))	10
rel. Humidity (%)	70
Ground Absorption G	0.60
Wind Speed for Dir. (#(Unit,SPEED))	3.0
Roads (TNM)	
Railways (Schall 03 (1990))	
Strictly acc. to Schall 03 / Schall-Transrapid	
Aircraft (???)	

Configuration	
Parameter	Value
Strictly acc. to AzB	

Receivers

Name	M.	ID	Level Lr		Limit. Value		Land Use			Height		Coordinates		
			Day	Night	Day	Night	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)				(m)		(m)	(m)	(m)
North		R1	66.2	-80.2	75.5	0.0				1.52	r	202.31	198.56	1.52
West		R2	75.0	-80.2	75.5	0.0				1.52	r	189.85	163.91	1.52

Point Sources

Name	M.	ID	Result. PWL			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night						X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(min)	(min)	(min)	(dB)	(Hz)		(m)		(m)	(m)	(m)
Forklift		S_1	108.8	108.8	108.8	Lw	L7		0.0	0.0	0.0				24.00	0.00	0.00	0.0		(none)	1.52	r	203.58	162.98	1.52
Forklift		S_2	108.8	108.8	108.8	Lw	L7		0.0	0.0	0.0				24.00	0.00	0.00	0.0		(none)	1.52	r	203.66	162.86	1.52
Skip Loader		S_3	98.8	98.8	98.8	Lw	L8		0.0	0.0	0.0				24.00	0.00	0.00	0.0		(none)	1.52	r	203.66	163.07	1.52

Sound Level Spectra

Name	ID	Type	1/3 Oktave Spectrum (dB)											Source
			Weight.	63	125	250	500	1000	2000	4000	8000	A	lin	
Dozer	L1	Lw (c)		106.0	110.0	108.0	108.0	105.0	102.0	96.0	88.0	110.0	115.0	Defra
Front Loader	L2	Lw (c)		113.0	113.0	102.0	104.0	100.0	98.0	97.0	89.0	106.5	116.6	Defra
Excavator	L3	Lw (c)		116.0	109.0	108.0	108.0	104.0	102.0	99.0	94.0	110.0	118.2	Defra
Dump Truck	L4	Lw (c)		108.0	108.0	107.0	103.0	102.0	100.0	95.0	85.0	107.1	113.5	Defra
Paver	L5	Lw (c)		109.0	108.0	103.0	103.0	102.0	100.0	93.0	87.0	106.6	113.2	Defra
Roller	L6	Lw (c)		121.0	113.0	104.0	103.0	101.0	96.0	90.0	85.0	106.0	121.8	Defra
Forklift	L7	Lw (c)		94.7	102.2	102.6	103.9	104.2	102.8	98.2	91.5	108.8	110.7	91/Green River
Skip Loader	L8	Lw (c)		105.0	97.0	95.0	95.0	94.0	91.0	90.0	81.0	98.8	106.8	Defra

Eilar Associates, Inc.
Acoustical and Environmental Consulting Services

Appendix D

Construction Vibration Calculations

Construction Vibration Calculation

Job: Slope St Sub
Job #: S210202
Date: 3/16/2021
Source 1: Large Bulldozer
Receiver: West

Vibration Source

Vibration Level (PPV, in/sec) 0.089 at 25 feet

Path Calculation

Source to Receiver Direct Path Distance: **20** feet

Vibration Level (PPV, in/sec) **0.124** at 20 feet

Path Calculation

Source to Receiver Direct Path Distance: **45** feet

Vibration Level (PPV, in/sec) **0.037** at 45 feet

Path Calculation

Source to Receiver Direct Path Distance: **100** feet

Vibration Level (PPV, in/sec) **0.011** at 100 feet