PRELIMINARY NOISE STUDY

Terrace Hill TM
Residential Development

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GLOSSARY OF TERMS

Sound Pressure Level (SPL): a ratio of one sound pressure to a reference pressure (L_{ref}) of 20 µPa. Because of the dynamic range of the human ear, the ratio is calculated logarithmically by 20 log (L/L_{ref}).

A-weighted Sound Pressure Level (dBA): Some frequencies of noise are more noticeable than others. To compensate for this fact, different sound frequencies are weighted more.

Minimum Sound Level (L_{min}): Minimum SPL or the lowest SPL measured over the time interval using the A-weighted network and slow time weighting.

Maximum Sound Level (L_{max}): Maximum SPL or the highest SPL measured over the time interval the A-weighted network and slow time weighting.

Equivalent sound level (L_{eq}): the true equivalent sound level measured over the run time. Leq is the A-weighted steady sound level that contains the same total acoustical energy as the actual fluctuating sound level.

Day Night Sound Level (LDN): Representing the Day/Night sound level, this measurement is a 24 –hour average sound level where 10 dB is added to all the readings that occur between 10 pm and 7 am. This is primarily used in community noise regulations where there is a 10 dB "Penalty" for night time noise. Typically Ldn's are measured using A-weighting.

Community Noise Exposure Level (CNEL): The accumulated exposure to sound measured in a 24-hour sampling interval and artificially boosted during certain hours. For CNEL, samples taken between 7 pm and 10 pm are boosted by 5 dB; samples taken between 10 pm and 7 am are boosted by 10 dB. These additions are made to account for the increased sensitivity during the evening and nighttime hours when sound appears louder.

Octave Band: An octave band is defined as a frequency band whose upper band-edge frequency is twice the lower band frequency.

Third-Octave Band: A third-octave band is defined as a frequency band whose upper band-edge frequency is 1.26 times the lower band frequency.

Response Time (F,S,I): The response time is a standardized exponential time weighting of the input signal according to fast (F), slow (S) or impulse (I) time response relationships. Time response can be described with a time constant. The time constants for fast, slow and impulse responses are 1.0 seconds, 0.125 seconds and 0.35 milliseconds, respectively.

EXECUTIVE SUMMARY

This noise study has been completed to determine the noise impacts associated with the development of the proposed residential project. The project known as "Terrace Hill" consists of a tentative parcel map. The project design consists of 10 residential units on approximately 2.85 acres. The project site is located south of Pepper Drive along Terrace Hill Drive in the unincorporated area of the Lakeside Community Planning Area within the County of San Diego.

It was determined from the detailed analysis that the NSLU's adjacent to the roadways will comply with the County of San Diego 60 dBA CNEL exterior noise standard without mitigation measures. The first and second floor building facades will comply with the General Plan Noise Element Standard, of 60 dBA CNEL. Therefore, no interior mitigation is required.

The grading equipment will be spread out over the project site from distances near the occupied property to distances of 400-feet away. Based upon the proposed site plan, most of the combined grading operations will be more than 100-feet away from the adjacent property lines. Grading activities near the property lines will be intermittent and limited to the cutting of slopes and final pad preparation. It was determined that at average distances over 90-feet the grading activities are anticipated not to exceed the County's 75-dBA standard and would not require any mitigation measures. Since most of the time the average distance from all the equipment to the occupied properties is more than 100-feet no impacts are anticipated.

No blasting or rock crushing is anticipated during the grading operations. Therefore, no impulsive noise sources are expected and the Project will comply with Section 36.410 of the County Noise Ordinance.

1.0 INTRODUCTION

1.1 Project Description

This noise study was completed to determine the noise impacts associated with the development of the proposed Terrace Hill Residential Project. The project is located at 32° 49′ 8″ N and 116° 55′ 17″ W, south of Pepper Drive along Terrace Hill Drive. The project site is located in the unincorporated area of the Lakeside Community Planning Area in the County of San Diego. The general location of the project is shown on the Vicinity Map, Figure 1-A.

The proposed project site is currently designated as Village Residential (VR-4.3) with a density of 4.3 dwelling units per acre by the General Plan as shown on the San Diego County Land Use Designation Map (Adopted August 2011). The project will consist of 10 single-family residential lots on approximately 2.85 acres. The proposed on-site noise sensitive land uses (NSLU) located on the project site is the 10 single family homes.

1.2 Environmental Settings & Existing Conditions

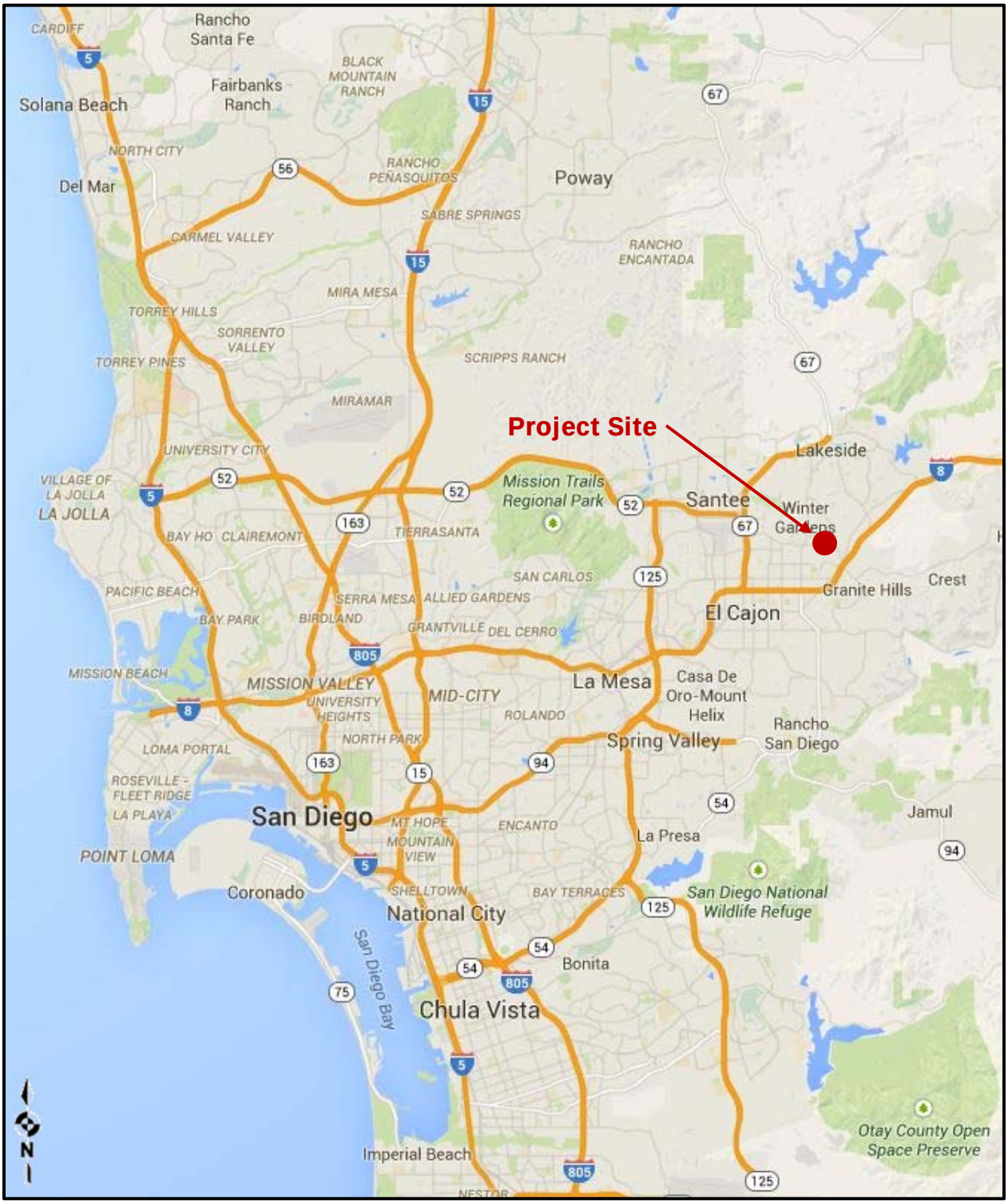
a) Settings & Locations

The existing and proposed site is designated as VR-4.3 with 4.3 dwelling units per acre. Befitting the overall setting, the project is served by one major roadway to the north, Pepper Drive via Interstate 8 and Highway 67. Adjacent to the subject property boundaries are single-family residential dwelling units. The site plan used for this analysis is shown on Figure 1-B.

b) Existing Noise Conditions

The project is located a minimum of 250-feet from Pepper Drive and situated along Terrace Hill Drive. Pepper Drive is described as a Light Collector (2.2E) in the County of San Diego's Circulation Element with an ultimate design speed limit of 40 MPH. Terrace Hill Drive is described as a Minor Collector (2.3C) in the County of San Diego's Circulation Element with an ultimate design speed limit of 25 MPH. Currently Terrace Hill Drive as reduced speeds due to the vertical and horizontal alignments and a posted speed limit of 15 MPH. Existing noise at the proposed site occurs from traffic traveling on Pepper Drive and Terrace Hill Drive.

Figure 1-A: Project Vicinity Map



Source: Google Maps, 2015

Figure 1-B: Project Site Plan

Source: REC Consultants, 2015

1.3 Methodology and Equipment

a) Noise Measuring Methodology and Procedures

To determine the existing noise environment and to assess potential noise impacts, measurements were taken at a single location on the project having a direct line of site to Terrace Hill Drive. This was done to determine the worst case existing conditions at the proposed NSLU. The noise measurements were recorded on April 4, 2015 by Ldn Consulting between approximately 8:00 a.m. and 8:15 a.m.

Noise measurements were taken using a Larson-Davis Model LxT Type 1 precision sound level meter, programmed, in "slow" mode, to record noise levels in "A" weighted form. The sound level meter and microphone were mounted on a tripod, five feet above the ground and equipped with a windscreen during all measurements. The sound level meter was calibrated before and after the monitoring using a Larson-Davis calibrator, Model CAL 150.

The noise measurement location was determined based on site access and noise impact potential to the proposed uses. Monitoring location 1 (M1) was located roughly 50-feet from the centerline of Terrace Hill Drive along the western portion of the project. The noise monitoring location is provided graphically in Figure 1-C on the following page.

The results of the noise level measurements are presented in Table 1-1. The noise measurements were monitored for a time period of 15 minutes. The ambient noise levels measured in the area of the project during the morning hour were found to be 52 dBA Leq and 90% (L90) the noise levels were 49 dBA. The existing noise levels in the project area consisted primarily of traffic along Terrace Hill Drive and Pepper Drive.

Table 1-1: Existing Noise Levels

Location	Time	One Hour Noise Levels (dBA)					
		Leq	Lmin	Lmax	L10	L50	L90
M1	8:00 a.m. – 8:15 a.m.	52.1	46.1	67.9	53.8	51.0	49.3
Source: Ldn Consulting, Inc. April 3, 2015							

Figure 1-C: Noise Measurement Location

b) Noise Modeling Software

The expected roadway noise impacts from Pepper Drive and Terrace Hill Drive was projected using Caltrans Sound32 Traffic Noise Prediction Model. Sound32 is a peak hour based traffic noise prediction model. The results of this analysis are based on the California Vehicle Noise Emission Levels (CALVENO). The Sound 32 model was calibrated in accordance with the FHWA Highway Traffic Noise Prediction Manual (Report RD-77-108) and in accordance with Caltrans Technical Noise Supplement (TeNS) Section N-5400. The critical model input parameters, which determine the projected vehicular traffic noise levels, include vehicle travel speeds, the percentages of automobiles, medium trucks and heavy trucks in the roadway volume, the site conditions ("hard" or "soft") and the peak hour traffic volume.

The peak hour traffic volumes range between 6-12% of the average daily traffic (ADT) and 10% is generally acceptable for noise modeling purposes. The required coordinate information necessary for the Sound32 traffic noise prediction model input was taken from the site plans provided by REC Consultants received March, 2015. To predict the future noise levels the preliminary site plans were used to identify the pad elevations, the roadway elevations, and the relationship between the noise source(s) and the NSLU areas.

Traffic was consolidated into a single lane located along the centerline of the roadway. For this analysis, the roadway segments were extended a minimum of 500 feet beyond the observer locations. No grade correction or calibration factor (according to Caltrans Policy TAN-02-01 dated January 17, 2002) was included as part of the Sound32 traffic noise prediction model analysis.

To evaluate the potential noise impacts on the proposed development, outdoor observers were located in NSLU areas and placed five feet above the pad elevation and near the center of the rear yard a minimum of ten feet from the top/bottom of slope. All second floor observers located fifteen feet above the proposed pad elevation at the anticipated building facades.

c) Noise Calculations and Factors

Noise is defined as unwanted or annoying sound which interferes with or disrupts normal activities. Exposure to high noise levels has been demonstrated to cause hearing loss. The individual human response to environmental noise is based on the sensitivity of that individual, the type of noise that occurs and when the noise occurs.

Sound is measured on a logarithmic scale consisting of sound pressure levels known as a decibel (dB). The sounds heard by humans typically do not consist of a single frequency

but of a broadband of frequencies having different sound pressure levels. The method for evaluating all the frequencies of the sound is to apply an A-weighting to reflect how the human ear responds to the different sound levels at different frequencies. The A-weighted sound level adequately describes the instantaneous noise whereas the equivalent sound level depicted as Leq represents a steady sound level containing the same total acoustical energy as the actual fluctuating sound level over a given time interval.

A vehicle's noise level is from a combination of the noise produced by the engine, exhaust and tires. The cumulative traffic noise levels along a roadway segment are based on three primary factors: the amount of traffic, the travel speed of the traffic, and the vehicle mix ratio or number of medium and heavy trucks. The intensity of traffic noise is increased by higher traffic volumes, greater speeds and increased number of trucks. Because mobile/traffic noise levels are calculated on a logarithmic scale, a doubling of the traffic noise or acoustical energy results in a noise level increase of 3 dBA. Therefore the doubling of the traffic volume, without changing the vehicle speeds or mix ratio, results in a noise increase of 3 dBA.

Mobile noise levels radiate in an almost oblique fashion from the source and drop off at a rate of 3 dBA for each doubling of distance under hard site conditions and at a rate of 4.5 dBA for soft site conditions. Hard site conditions consist of concrete, asphalt and hard pack dirt while soft site conditions exist in areas having slight grade changes, landscaped areas and vegetation. On the other hand, fixed/point sources radiate outward uniformly as sound travels away from the source. Their sound levels attenuate or drop off at a rate of 6 dBA for each doubling of distance.

The most effective noise reduction methods consist of controlling the noise at the source, blocking the noise transmission with barriers or relocating the receiver. Any or all of these methods may be required to reduce noise levels to an acceptable level.

2.0 NOISE SENSITIVE LAND USES (NSLU)

2.1 Guidelines for the Determination of Significance

The County's General Plan Chapter 8 Noise Element uses the Noise Compatibility Guidelines listed in Table N-1 of the General Plan Noise Element (provided below) to determine the compatibility of land use when evaluating proposed development projects. The Noise Compatibility Guidelines indicate ranges of compatibility and are intended to be flexible enough to apply to a range of projects and environments. For example, a commercial project would be evaluated differently than a residential project in a rural area or a mixed-use project in a more densely developed area of the County.

TABLE N-1: NOISE COMPATIBILITY GUIDELINES (CNEL)

Table N-1 Noise Compatibility Guidelines									
		Exterior Noise Level (CNEL)							
	Land Use Category		55	60	65	70	75	80	
A	Residential—single family residences, mobile homes, senior housing, convalescent homes								
B	Residential—multi-family residences, mixed-use (commercial/residential)								
C	Transient lodging—motels, hotels, resorts								
D*	Schools, churches, hospitals, nursing homes, child care facilities								
E*	Passive recreational parks, nature preserves, contemplative spaces, cemeteries								
F*	Active parks, golf courses, athletic fields, outdoor spectator sports, water recreation								
G*	Office\professional, government, medical\dental, commercial, retail, laboratories								
H*	Industrial, manufacturing, utilities, agriculture, mining, stables, ranching, warehouse, maintenance/repair								
	ACCEPTABLE—Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal construction, without any special noise insulation requirements.								
	CONDITIONALLY ACCEPTABLE—New construction or development should be undertaken only after a detailed noise analysis is conducted to determine if noise reduction measures are necessary to achieve acceptable levels for land use. Criteria for determining exterior and interior noise levels are listed in Table N-2, Noise Standards. If a project cannot mitigate noise to a level deemed Acceptable, the appropriate county decision-maker must determine that mitigation has been provided to the greatest extent practicable or that extraordinary circumstances exist.								
	UNACCEPTABLE—New construction or development shall not be undertaken.								

* Denotes facilities used for part of the day; therefore, an hourly standard would be used rather than CNEL (refer to Table N-2).

Note: For projects located within an Airport Influence Area of an adopted Airport Land Use Compatibility Plan (ALUCP), additional Noise Compatibility Criteria restrictions may apply as specified in the ALUCP.

A land use located in an area identified as "acceptable" indicates that standard construction methods would attenuate exterior noise to an acceptable indoor noise level and that people can carry out outdoor activities with minimal noise interference. Land uses that fall into the "conditionally acceptable" noise environment should have an acoustical study that considers the type of noise source, the sensitivity of the noise receptor, and the degree to which the noise source may interfere with sleep, speech, or other activities characteristic of the land use. For land uses indicated as "conditionally acceptable," structures must be able to attenuate the exterior noise to the indoor noise level as indicated in the Noise Standards listed in Table N-2 of the General Plan Noise Element (provided below). For land uses where the exterior noise levels fall within the "unacceptable" range, new construction generally should not be undertaken.

TABLE N-2: NOISE STANDARDS

Table N-2 Noise Standards[Note]
1. The exterior noise level (as defined in Item 3) standard for Category A shall be 60 CNEL, and the interior noise level standard for indoor habitable rooms shall be 45 CNEL.
2. The exterior noise level standard for Categories B and C shall be 65 CNEL, and the interior noise level standard for indoor habitable rooms shall be 45 CNEL.
3. The exterior noise level standard for Categories D and G shall be 65 CNEL and the interior noise level standard shall be 50 dBA L_{eq} (one hour average).
4. For single-family detached dwelling units, "exterior noise level" is defined as the noise level measured at an outdoor living area which adjoins and is on the same lot as the dwelling, and which contains at least the following minimum net lot area: *(i)* for lots less than 4,000 square feet in area, the exterior area shall include 400 square feet, *(ii)* for lots between 4,000 square feet to 10 acres in area, the exterior area shall include 10 percent of the lot area; *(iii)* for lots over 10 acres in area, the exterior area shall include 1 acre.
5. For all other residential land uses, "exterior noise level" is defined as noise measured at exterior areas which are provided for private or group usable open space purposes. "Private Usable Open Space" is defined as usable open space intended for use of occupants of one dwelling unit, normally including yards, decks, and balconies. When the noise limit for Private Usable Open Space cannot be met, then a Group Usable Open Space that meets the exterior noise level standard shall be provided. "Group Usable Open Space" is defined as usable open space intended for common use by occupants of a development, either privately owned and maintained or dedicated to a public agency, normally including swimming pools, recreation courts, patios, open landscaped areas, and greenbelts with pedestrian walkways and equestrian and bicycle trails, but not including off-street parking and loading areas or driveways.
6. For non-residential noise sensitive land uses, exterior noise level is defined as noise measured at the exterior area provided for public use.
7. For noise sensitive land uses where people normally do not sleep at night, the exterior and interior noise standard may be measured using either CNEL or the one-hour average noise level determined at the loudest hour during the period when the facility is normally occupied.
8. The exterior noise standard does not apply for land uses where no exterior use area is proposed or necessary, such as a library.
9. For Categories E and F the exterior noise level standard shall not exceed the limit defined as "Acceptable" in Table N-1 or an equivalent one-hour noise standard.

Note: Exterior Noise Level compatibility guidelines for Land Use Categories A-H are identified in Table N-1, Noise Compatibility Guidelines.

2.2 Potential Noise Impacts

It is expected that the primary source of noise impacts to the project site will occur from Pepper Drive and Terrace Hill Drive. The existing conditions were modeled to compare against the noise measurements. Section N-5440 of the Caltrans Technical Noise Supplement provides detailed procedures for calibrating the Sound32 traffic noise prediction model. Section N-5460 suggests that model results should not be adjusted when calculated and measured noise levels are within 1 dBA. Differences of 3 to 4 dBA are routinely calibrated to adjust for site conditions the Sound32 model did not account for including topographic features, soft site conditions and existing structures or barriers.

During the ambient noise measurements, traffic counts were taken to later determine the existing vehicle mix for the model calibration. Based on the results, the existing traffic noise model utilizes a vehicle mix of 91.4% Autos, 5.7% Medium Trucks, and 2.9% Heavy Trucks for Pepper Drive. No traffic was observed along Terrace Hill Drive. Table 2-1 presents the roadway parameters used in the analysis including the traffic volumes, speeds and the hourly traffic flow distribution (vehicle mix) for the existing conditions. The vehicle mix provides the hourly distribution percentages of automobile, medium trucks and heavy trucks for input into the Sound32 Model.

Table 2-1: Existing Traffic Parameters

Roadway[1]	Observed Traffic Volume	Observed Speeds (MPH)	Vehicle Mix %		
			Auto	Medium Trucks	Heavy Trucks
Pepper Drive	280	40[2]	91.4	5.7	2.9

[1] All roadway parameters were observed during the ambient noise measurement period.
[2] Traffic was observed traveling at lower speeds based on the vertical and horizontal alignment of the roadway.

The ambient measurement location was modeled in Sound32 and the comparison is provided in Table 2-2. The model is slightly under predicting the noise levels by 1 dBA using hard-site conditions and almost 6 dBA with soft site conditions. The difference could be attributed to various observed noise sources including landscaping activities and dogs barking. No calibration factor was applied to predict the first/ground floor areas and hard-site conditions were applied to the models. The existing model input parameters for calibration and output file are provided as ***Attachment A*** to this report.

Table 2-2: Model Calibration

Receptor	Location	Site Conditions /Drop-off Rate	Calibration Results (dBA)		
			Measured Noise Levels	Modeled Noise Levels	Difference
M1	Northwest portion of project site	Hard	52.1	51.1	-1.0[1]
		Soft		46.3	-5.8
[1] Hard Site Conditions were found.					

a) Potential Build Out Noise Conditions

The Buildout conditions were provided by SANDAG's Series 12 Traffic Volume Forecast. The future traffic along Pepper Drive and Terrace Hill Drive is estimated to be 11,600 ADT and 800 ADT respectively. To assess the peak hour traffic noise conditions 10% of the ADT was utilized for the roadway. Pepper Drive is considered a Light Collector with a worst case traffic speed of 40 MPH. Terrace Hill Drive is considered a Minor Collector with a worst case traffic speed of 25 MPH The future roadway parameters and inputs utilized in this analysis are provided in Table 2-3.

Table 2-3: Buildout 2030 Traffic Parameters

Roadway	Average Daily Traffic (ADT)	Peak Hour Volume[1]	Modeled Speeds (MPH)	Vehicle Mix %		
				Auto	Medium Trucks	Heavy Trucks
Pepper Drive	11,600	1,160	40	95	3	2
Terrace Hill Drive	800	80	25	95	3	2
[1] 10% of the ADT						

b) Detailed Analysis and Mitigation Measures

The Buildout analysis was modeled assuming future year traffic parameters as shown previously in Table 2-3. It was determined from the detailed analysis that the single family NSLUs will comply with the County of San Diego 60 dBA CNEL exterior noise standard without mitigation measures. This is due to a combination of the large setback of proposed lots to Pepper Drive and the modeled receptors as well as low traffic volumes along Terrace Hill Drive. The results of the specific noise modeling are provided in Table 2-4 below for the unmitigated scenario. Modeled observer locations for a representative amount of NSLU are

presented in Figure 2-A. The S32 models input and output files for the future conditions are provided in ***Attachment C***.

Table 2-4: Future Exterior Noise Levels

Receptor Number	Receptor Location (Lot #)	Receptor Elevation (Feet)[1]	Unmitigated Noise Level (dBA CNEL)[2]	Second Floor Façade Noise Levels (dBA CNEL)[3]
1	1	748	57.8	57.8
2	2	756	58.4	58.4
3	3	756	56.1	56.0
4	4	755	57.0	57.0
5	5	752	55.0	55.0
6	6	753	54.7	54.7
7	7	747	54.0	54.0
8	8	740	53.0	53.0
9	9	737	52.3	52.3
10	10	735	51.9	51.9

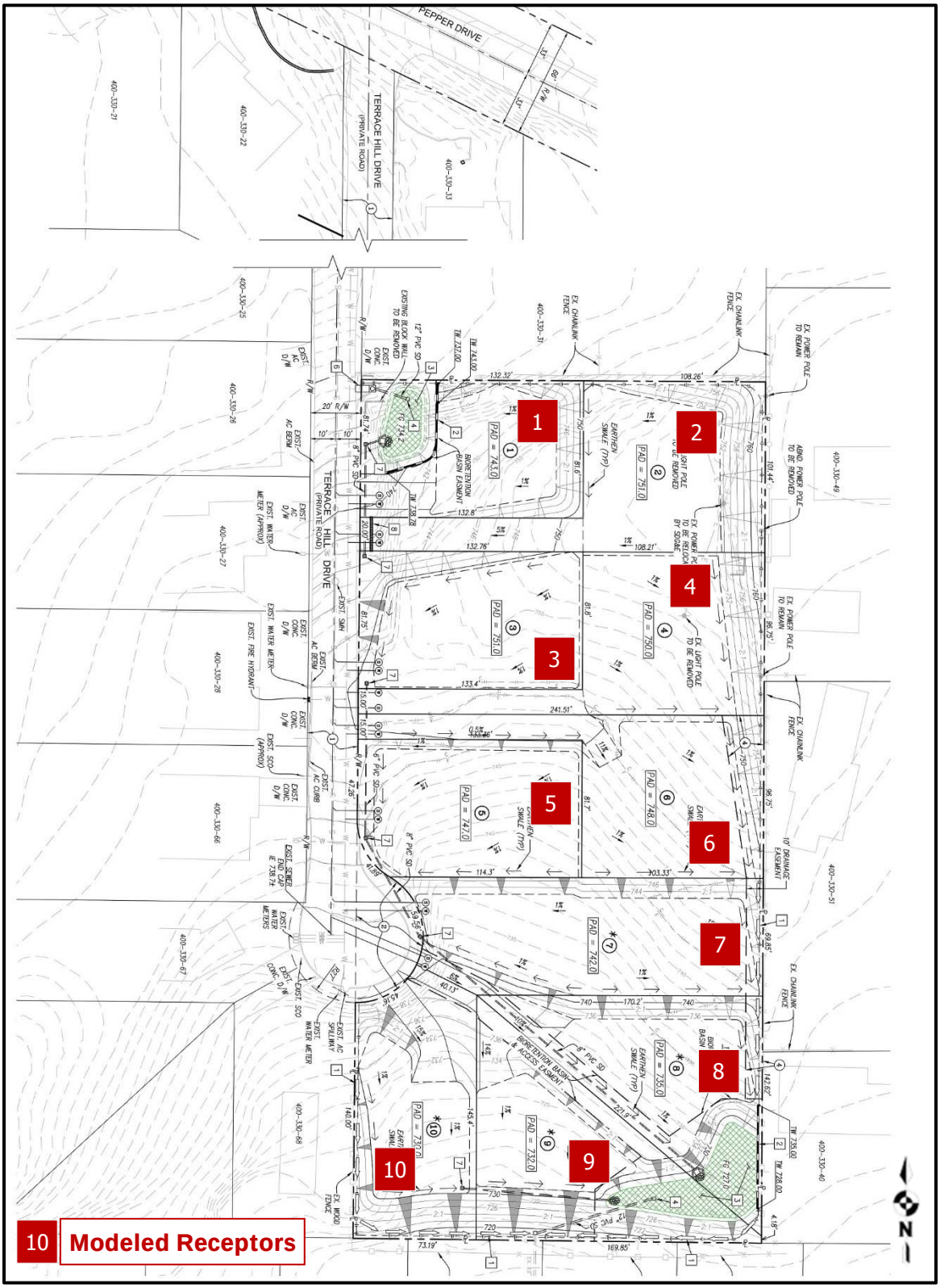
[1] Receptor Elevation is 5-feet above the Pad Elevation
[2] Exterior Mitigation required per County Guidelines if **BOLD**
[3] Interior Noise Study required per County Guidelines if ***BOLD***

Without mitigation measures, the first floor and second floor building facades of the single family dwellings will comply with the General Plan Noise Element Standard, of 60 dBA CNEL. Therefore, no interior mitigation is required.

2.3 Conclusions

It was determined from the detailed analysis that all NSLU's will comply with the County of San Diego 60 dBA CNEL exterior noise standard without mitigation measures. The first floor and second floor building facades will comply with the General Plan Noise Element Standard, of 60 dBA CNEL. No additional mitigation is required.

Figure 2-A: Modeled NSLU Receptor Locations



3.0 CONSTRUCTION ACTIVITIES

3.1 Guidelines for the Determination of Significance

Construction Noise: Noise generated by construction activities related to the project will exceed the standards listed in San Diego County Code Sections as follows.

SEC. 36.408: HOURS OF OPERATION OF CONSTRUCTION EQUIPMENT

Except for emergency work, it shall be unlawful for any person to operate or cause to be operated, construction equipment:

a. Between 7 p.m. and 7 a.m.

b. On a Sunday or a holiday. For purposes of this section, a holiday means January 1st, the last Monday in May, July 4th, the first Monday in September, December 25th and any day appointed by the President as a special national holiday or the Governor of the State as a special State holiday. A person may, however, operate construction equipment on a Sunday or holiday between the hours of 10 a.m. and 5 p.m. at the person's residence or for the purpose of constructing a residence for himself or herself, provided that the operation of construction equipment is not carried out for financial consideration or other consideration of any kind and does not violate the limitations in sections 36.409 and 36.410.

SEC. 36.409: SOUND LEVEL LIMITATIONS ON CONSTRUCTION EQUIPMENT

Except for emergency work, it shall be unlawful for any person to operate construction equipment or cause construction equipment to be operated, that exceeds an average sound level of 75 decibels for an eight-hour period, between 7 a.m. and 7 p.m., when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received.

SEC. 36.410: SOUND LEVEL LIMITATIONS ON IMPULSIVE NOISE

In addition to the general limitations on sound levels in section 36.404 and the limitations on construction equipment in section 36.409, the following additional sound level limitations shall apply:

(a) Except for emergency work or work on a public road project, no person shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in Table 36.410A (provided below), when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period, as described in subsection (c) below. The maximum sound level depends on the use being made of the occupied property. The uses in Table 36.410A are as described in the County Zoning Ordinance.

TABLE 36.410A: MAXIMUM SOUND LEVEL (IMPULSIVE) MEASURED AT OCCUPIED PROPERTY IN DECIBELS (dBA)

OCCUPIED PROPERTY USE	DECIBELS (dBA)
Residential, village zoning or civic use	82
Agricultural, commercial or industrial use	85

(b) Except for emergency work, no person working on a public road project shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in Table 36.410B, when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period, as described in subsection (c) below. The maximum sound level depends on the use being made of the occupied property. The uses in Table 36.410B are as described in the County Zoning Ordinance.

TABLE 36.410B: MAXIMUM SOUND LEVEL (IMPULSIVE) MEASURED AT OCCUPIED PROPERTY IN DECIBELS (dBA) FOR PUBLIC ROAD PROJECTS

OCCUPIED PROPERTY USE	dB(A)
Residential, village zoning or civic use	85
Agricultural, commercial or industrial use	90

(c) The minimum measurement period for any measurements conducted under this section shall be one hour. During the measurement period a measurement shall be conducted every minute from a fixed location on an occupied property. The measurements shall measure the maximum sound level during each minute of the measurement period. If the sound level caused by construction equipment or the producer of the impulsive noise exceeds the maximum sound level for any portion of any minute, it will be deemed that the maximum sound level was exceeded during that minute.

3.2 Potential Property Line Noise Impacts

a) Potential Build Out Noise Conditions

Construction noise represents a short-term impact on the ambient noise levels. Noise generated by construction equipment includes haul trucks, water trucks, graders, dozers, loaders and scrapers can reach relatively high levels. Grading activities typically represent one of the highest potential sources for noise impacts. The most effective method of controlling construction noise is through local control of construction hours and by limiting the hours of construction to normal weekday working hours.

The U.S. Environmental Protection Agency (U.S. EPA) has compiled data regarding the noise generating characteristics of specific types of construction equipment. Noise levels generated by heavy construction equipment can range from 60 dBA to in excess of 100 dBA when measured at 50 feet. However, these noise levels diminish rapidly with distance from the construction site at a rate of approximately 6 dBA per doubling of distance. For example, a noise level of 75 dBA measured at 50 feet from the noise source to the receptor would be reduced to 69 dBA at 100 feet from the source to the receptor, and reduced to 63 dBA at 200 feet from the source.

b) Potential Noise Impact Identification

Using a point-source noise prediction model, calculations of the expected construction noise impacts were completed. The essential model input data for these performance equations include the source levels of each type of equipment, relative source to receiver horizontal and vertical separations, the amount of time the equipment is operating in a given day, also referred to as the duty-cycle and any transmission loss from topography or barriers.

Based empirical data and the amount of equipment needed, worst case noise impacts from this construction equipment would occur during the grading operations. In order to determine the worst case scenario for the grading activities all the equipment was place in a common location, which is not physically possible. As can be seen in Table 3-1, even if all the equipment were placed together the cumulative grading activities noise levels would be 80.1 dBA and would attenuate 5.1 dBA at a distance of 90-feet from the point source noise and would be at or below the 75 dBA threshold.

Table 3-1: Construction Noise Levels

Construction Equipment	Quantity	Source Level @ 50-Feet (dBA)[1]	Duty Cycle (Hours/Day)	Cumulative Noise Level @ 50-Feet (dBA)
Dozer - D8	1	72	8	72.0
Tractor/Backhoe	1	74	8	74.0
Loader/Grader	1	73	8	73.0
Water Trucks	1	70	8	70.0
Paver/Blade	1	75	8	75.0
			Cumulative Levels @ 50 Feet	80.1
			Distance To Property Line (Feet)	90
			Noise Reduction Due To Distance	-5.1
			NEAREST PROPERTY LINE NOISE LEVEL	**75.0**

[1] Source: U.S. Environmental Protection Agency (U.S. EPA), 1971 and Empirical Data

The grading equipment will be spread out over the project site from distances near the occupied property to distances of 400-feet away. Based upon the proposed site plan, most of the combined grading operations will be more than 100-feet away from the adjacent property lines. Grading activities near the property lines will be intermittent and limited to the cutting of slopes and final pad preparation.

It was determined above that at average distances over 90-feet the grading activities are anticipated not to exceed the County's 75-dBA standard and would not require any mitigation measures. Since most of the time the average distance from all the equipment to the occupied properties is more than 100-feet no impacts are anticipated.

No blasting or rock crushing is anticipated during the grading operations. Therefore, no impulsive noise sources are expected and the Project is anticipated to comply with Section 36.410 of the County Noise Ordinance and no further analysis is required.

3.3 Conclusions

The grading equipment will be spread out over the project site from distances near the occupied property to distances of 400-feet away. Based upon the proposed site plan, most of the combined grading operations will be more than 100-feet away from the adjacent property lines. Grading activities near the property lines will be intermittent and limited to the cutting of slopes and final pad preparation. It was determined that at average distances over 90-feet the grading activities are anticipated not to exceed the County's 75-dBA standard and would not require any mitigation measures. Since most of the time the average distance from all the equipment to the occupied properties is more than 100-feet no impacts are anticipated.

No blasting or rock crushing is anticipated during the grading operations. Therefore, no impulsive noise sources are expected and the Project will comply with Section 36.410 of the County Noise Ordinance.

4.0 SUMMARY OF PROJECT IMPACTS, MITIGATION & CONCLUSIONS

- On-Site Noise Analysis

  It was determined from the detailed analysis that all NSLU's will comply with the County of San Diego 60 dBA CNEL exterior noise standard without mitigation measures.

  The first and second floor building facades will comply with the General Plan Noise Element Standard, of 60 dBA CNEL. Therefore, interior mitigation is not required to obtain an interior level of 45 dBA CNEL.

- Construction Noise Analysis

  The grading equipment will be spread out over the project site from distances near the occupied property to distances of 400-feet away. Based upon the proposed site plan, most of the combined grading operations will be more than 100-feet away from the adjacent property lines. Grading activities near the property lines will be intermittent and limited to the cutting of slopes and final pad preparation. It was determined that at average distances over 90-feet the grading activities are anticipated not to exceed the County's 75-dBA standard and would not require any mitigation measures. Since most of the time the average distance from all the equipment to the occupied properties is more than 100-feet no impacts are anticipated.

  No blasting or rock crushing is anticipated during the grading operations. Therefore, no impulsive noise sources are expected and the Project will comply with Section 36.410 of the County Noise Ordinance.

5.0 CERTIFICATIONS

The contents of this report represent an accurate depiction of the future acoustical environment and impacts within and surrounding the Lone Oak Ranch Residential Development. The report was prepared by Jeremy Louden; a County approved CEQA Consultant for Acoustics.

DRAFT

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Date April 14, 2015

ATTACHMENT A

MODEL CALIBRATION INPUT AND
OUTPUT FILES

Terrace Hill Calibration
T-OBSERVED ONE HOUR, 1
256 , 40 , 16 , 40 , 8 , 40
L-PEPPER, 1
N,192,1104,722.5,
N,461,972,740,
N,736,837,754,
N,821,787,754,
N,898,722,754,
R, 1 , 65 ,10
251,613,755.,M1 HARD
R, 2 , 65 ,10
251,613,755.,M2 SOFT
D, 4.5
ALL,2
C,C

SOUND32 - RELEASE 07/30/91

TITLE:
Terrace Hill Calibration

BASED ON FHWA-RD-108 AND
CALIFORNIA REFERENCE ENERGY MEAN EMISSION LEVELS

RECEIVER	LEQ
M1 HARD	51.1
M2 SOFT	46.3

ATTACHMENT B

FUTURE NOISE CONTOUR MODEL
INPUT AND OUTPUT FILES

Terrace Hill Ground Level Unmitigated
T-PEAK HOUR SANDAG 2035, 1
1102 , 40 , 35 , 40 , 24 , 40
T-PEAK HOUR SANDAG 2035, 2
76 , 25 , 3 , 25 , 2 , 25
L-PEPPER, 1
N,192,1104,722.5,
N,461,972,740,
N,736,837,754,
N,821,787,754,
N,898,722,754,
L-TERRACE HILL, 2
N,192.,1104,722.5,
N,190,897,710,
N,187,659,730,
N,186,458,749.5,
N,184,327,741.5,
R, 1 , 65 ,10
312,618,748,LOT 1
R, 2 , 65 ,10
407,627,756,LOT 2
R, 3 , 65 ,10
324,482,756,LOT 3
R, 4 , 65 ,10
406,541,755,LOT 4
R, 5 , 65 ,10
324,397,752,LOT 5
R, 6 , 65 ,10
420,372,753,LOT 6
R, 7 , 65 ,10
426,318,747,LOT 7
R, 8 , 65 ,10
427,240,740,LOT 8
R, 9 , 65 ,10
351,191,737,LOT 9
R, 10 , 65 ,10
220,180,735,LOT 10
C,C

SOUND32 - RELEASE 07/30/91

TITLE:
Terrace Hill Ground Level Unmitigated

BASED ON FHWA-RD-108 AND
CALIFORNIA REFERENCE ENERGY MEAN EMISSION LEVELS

RECEIVER	LEQ
LOT 1	57.8
LOT 2	58.4
LOT 3	56.1
LOT 4	57.0
LOT 5	55.0
LOT 6	54.7
LOT 7	54.0
LOT 8	53.0
LOT 9	52.3
LOT 10	51.9

Terrace Hill Second Level Unmitigated
T-PEAK HOUR SANDAG 2035, 1
1102 , 40 , 35 , 40 , 24 , 40
T-PEAK HOUR SANDAG 2035, 2
76 , 25 , 3 , 25 , 2 , 25
L-PEPPER, 1
N,192,1104,722.5,
N,461,972,740,
N,736,837,754,
N,821,787,754,
N,898,722,754,
L-TERRACE HILL, 2
N,192.,1104,722.5,
N,190,897,710,
N,187,659,730,
N,186,458,749.5,
N,184,327,741.5,
R, 1 , 65 ,10
312,618,758.,LOT 1
R, 2 , 65 ,10
407,627,766.,LOT 2
R, 3 , 65 ,10
324,482,766.,LOT 3
R, 4 , 65 ,10
406,541,765.,LOT 4
R, 5 , 65 ,10
324,397,762.,LOT 5
R, 6 , 65 ,10
420,372,763.,LOT 6
R, 7 , 65 ,10
426,318,757.,LOT 7
R, 8 , 65 ,10
427,240,750.,LOT 8
R, 9 , 65 ,10
351,191,747.,LOT 9
R, 10 , 65 ,10
220,180,745.,LOT 10
C,C

SOUND32 - RELEASE 07/30/91

TITLE:
Terrace Hill Second Level Unmitigated

BASED ON FHWA-RD-108 AND
CALIFORNIA REFERENCE ENERGY MEAN EMISSION LEVELS

RECEIVER	LEQ
LOT 1	57.8
LOT 2	58.4
LOT 3	56.0
LOT 4	57.0
LOT 5	55.0
LOT 6	54.7
LOT 7	54.0
LOT 8	53.0
LOT 9	52.3
LOT 10	51.9