NOISE ASSESSMENT

TM 21225 (Steeve)
Residential Development
County of San Diego CA

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ATTACHMENTS

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.

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 "TPM 21225 (Steeve)" proposes a subdivision that will create 4 single family lots on approximately 4.6 acres (APN 234-120-66). Access would be provided by Bear Valley Parkway and Birch Avenue. The project is located east of Bear Valley Parkway and south of Birch Avenue in the unincorporated area of the North County Metro Community Planning Area in San Diego County.

- On-Site Noise Analysis

The 75 dBA CNEL contours are all located within the right-of-way (ROW) along the road edges. The worst-case first floor 60 dBA CNEL contour extends approximately 240-feet along Bear Valley Parkway. The second floor unshielded 60 dBA CNEL contour extends 420-feet from Bear Valley Parkway. Figure 2-A provides the location of the future first and second floor 75 dBA CNEL and 60 dBA CNEL noise contours for the proposed project layout. The noise contours provided in Figure 2-A show that noise sensitive land use (NSLU) areas will not exceed the County of San Diego 60 dBA CNEL exterior noise standard. Therefore, the proposed lots will meet the 60 dBA CNEL standard at more than the 10% minimum lot area. Based on the findings, no additional exterior noise analysis is required for the proposed project and no mitigation measures that are required. Additionally, Lots 1 and 2 were found to be above the 60 dBA CNEL at the proposed building facades.

Therefore, an interior noise assessment is required to mitigate the exterior noise levels to an interior level of 45 dBA CNEL. This report should be conducted prior to the issuance of building permits and would finalize the noise requirements based upon precise grading plans and actual building design specifications. This is to ensure that interior noise levels for the proposed residential structures comply with the interior noise level requirement of 45 dBA pursuant to the County Noise Element. It should be noted; interior noise levels of 45 dBA CNEL can be obtained with conventional building construction methods by providing a window condition requiring a means of mechanical ventilation (e.g. air conditioning) and providing upgraded windows at all affected lots.

The Project does not create a direct impact of more than 3 dBA CNEL on any roadway segment and no cumulative noise increase of 3 dBA CNEL or more was found. Therefore, the proposed Project's direct and cumulative contributions to off-site roadway noise increases will not cause any significant impacts to any existing or future noise sensitive land uses.

- Off-Site Noise Analysis

The Project does not create a direct impact of more than 3 dBA CNEL on any roadway segment

and no cumulative noise increase of 3 dBA CNEL or more was found. Therefore, the proposed Project's direct and cumulative contributions to off-site roadway noise increases will not cause any significant impacts to any existing or future noise sensitive land uses.

- Construction Noise Analysis

The grading equipment will be spread out over the project site from distances near the occupied property to distances of 300-feet or more away. Based upon the proposed site plan the majority of the grading operations will occur more than 100-feet from the northern and western property lines. At distances of more than 90-feet the grading activities are anticipated not to exceed the County's 75-dBA standard and no mitigation measures are required.

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 TPM 21225 Residential Project. The project is located at 33° 07′ 3″ N and 117° 02′ 55″ W, East of Bear Valley Parkway and south of Birch Avenue in the unincorporated area of the North County Metro Community Planning Area in San Diego County. The general location of the project is shown on the Vicinity Map, Figure 1-A.

The proposed project is approximately 4.6 acres. The recently adopted County of San Diego General Plan Update Land Use designation for this site is SR-1 (Semi-Rural Residential: 1 unit per 1, 2, or 4 gross acres). The project proposes to build 4 single-family residential DU. The site plan for the proposed project used for this analysis is shown on Figure 1-B.

1.2 Environmental Settings & Existing Conditions

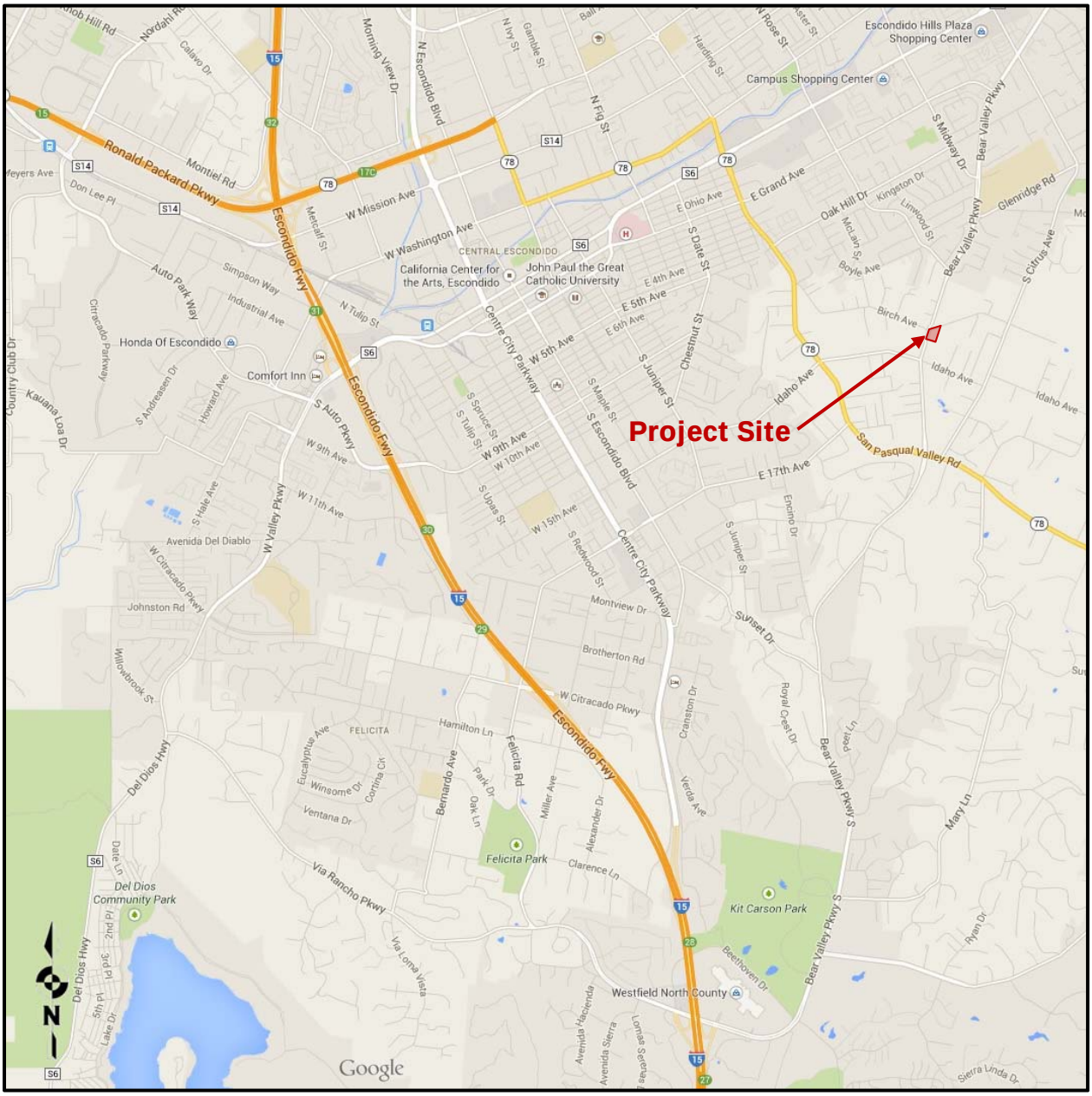
a) Settings & Locations

Access to the site would be taken from Bear Valley Parkway and Birch Avenue. The community is served by two major roadways connecting the area to the City of Escondido to the northwest and the Pauma Valley area to the north. Existing land uses surrounding the site are primarily, residential and open space areas.

b) Existing Noise Conditions

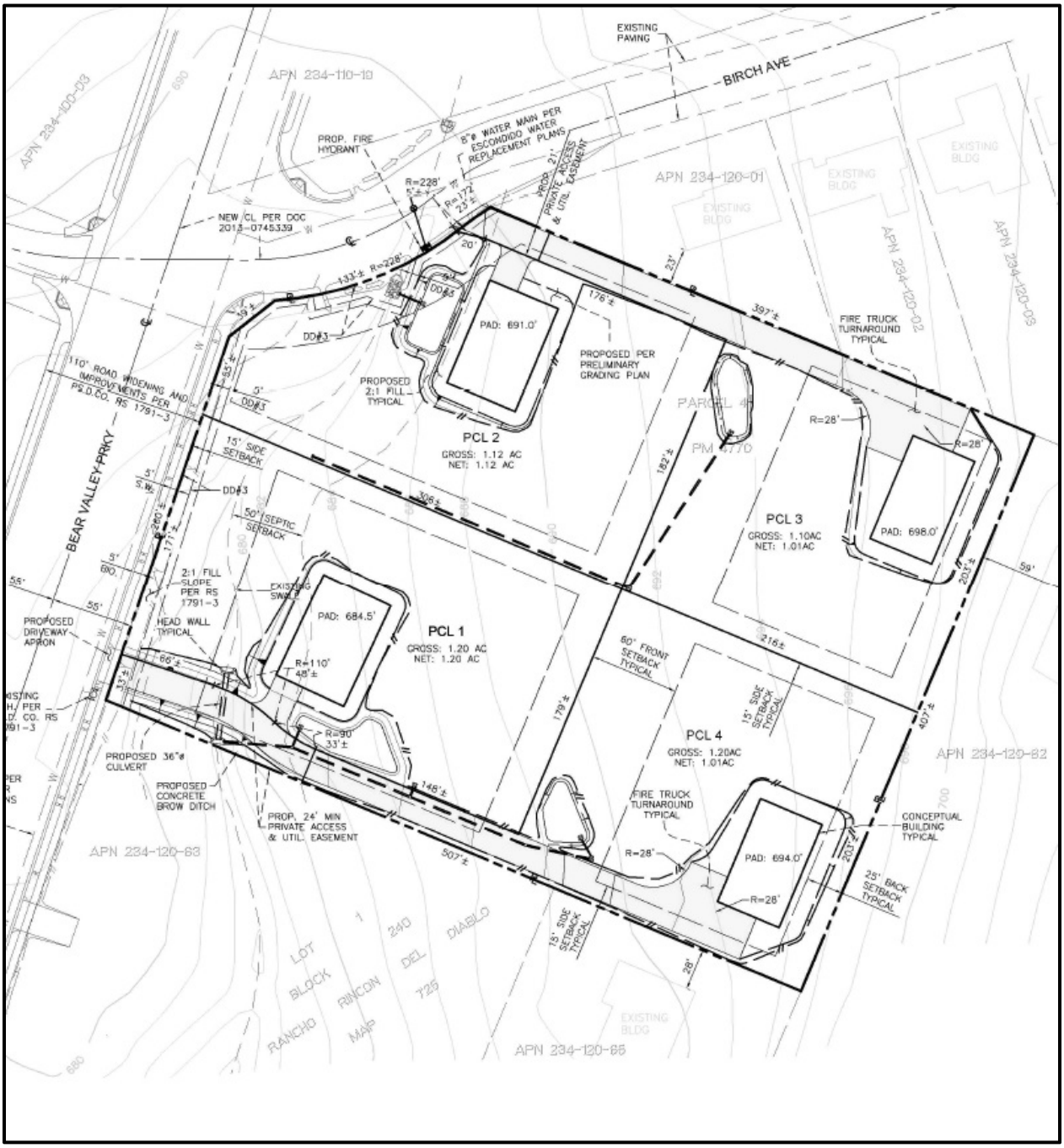
The project is located adjacent to Bear Valley Parkway described as a Major Road (4.1A) in the vicinity of the site in the County of San Diego's Circulation Element. Existing noise occurs mainly from traffic traveling along Bear Valley Parkway.

Figure 1-A: Project Vicinity Map



Source: Google Maps, 10/15

Figure 1-B: Proposed Project Site Layout



Source: Bill Yen & Associates, 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 two locations on the project having a view of Bear Valley Parkway. The noise measurements were recorded on September 27, 2015 by Ldn Consulting between approximately 10:15 a.m. and 10:40 a.m.

Noise measurements were taken using two Larson-Davis Spark 706 Type 2 meters. Both meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were mounted on a tripod, five feet above the ground and equipped with a windscreen during all measurements. The meters were calibrated with a Larson-Davis Model CAL 150.

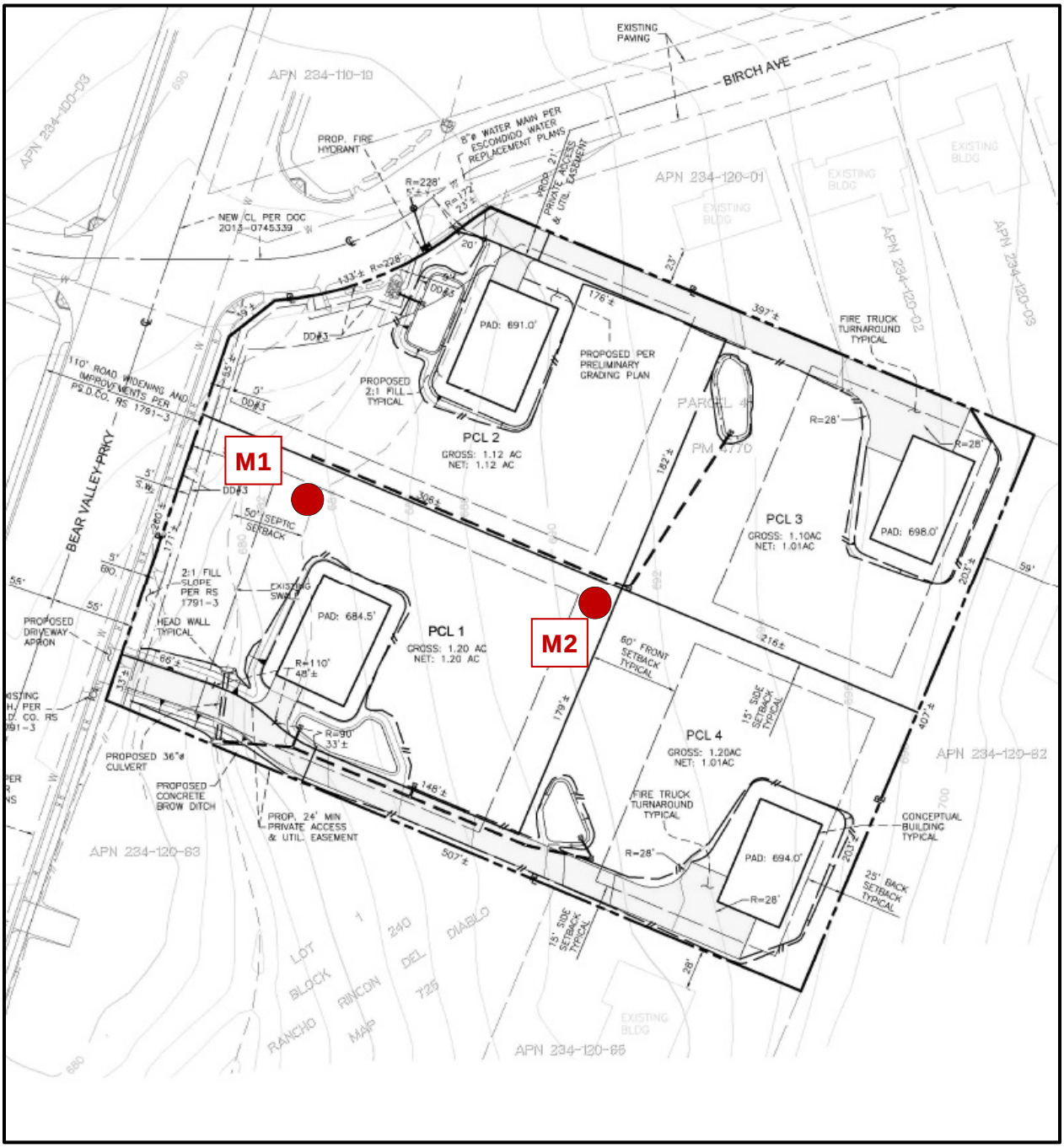
The noise measurement locations were determined based on site access and noise impact potential to the proposed residences. Monitoring location 1 (M1) was located along Bear Valley Parkway approximately 150 feet from the centerline and monitoring location 2 (M2) was set back at a distance of 350 feet from Bear Valley Parkway. The noise monitoring locations are 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 roughly 20 minutes. The ambient Leq noise levels measured on the project site during the morning were found to be between 60 and 63 dBA Leq. The existing noise levels in the project area consisted primarily of traffic along Bear Valley Parkway.

Table 1-1: Existing Noise Levels

Location	Time	One Hour Noise Levels (dBA)					
		Leq	Lmin	Lmax	L10	L50	L90
M1	10:15–10:40 a.m.	50.7	46.0	61.4	52.2	49.6	47.9
M2	10:15–10:40 a.m.	47.1	39.8	63.2	48.5	44.5	42.0
Source: Ldn Consulting, Inc. September 27, 2015							

Figure 1-C: Noise Measurement Locations



b) Noise Modeling Software

The expected roadway noise levels from Bear Valley Parkway 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 preliminary site plans provided by Bill Yen & Associates received September, 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 each roadway. Longer roadway segments were subdivided into a series of adjoining segments for analysis. 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 were 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.

The Community Noise Equivalent Level (CNEL) is the 24 hour A-weighted average for sound, with corrections for evening and nighttime hours. The corrections require an addition of 5 decibels to sound levels in the evening hours between 7 p.m. and 10 p.m. and an addition of 10 decibels to sound levels at nighttime hours between 10 p.m. and 7 a.m. These additions are made to account for the increased sensitivity during the evening and nighttime hours when sound appears louder.

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 potential noise impacts to the project site will occur from traffic noise along Bear Valley Parkway. To determine the future noise environment and impact potentials the Sound32 model first needs to be calibrated using the ambient noise measurements results. The existing conditions were modeled to compare against the noise measurements described in Section 1.3.a of this report. Section N-5440 of the Caltrans Technical Noise Supplement provides detailed procedures for calibrating the Sound32 traffic noise prediction model. The comparison is made to ensure that predicted traffic noise levels accurately reflect the actual measured noise levels. Section N-5460 suggests that model calibration should not be performed 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 aforementioned ambient noise measurements, traffic counts were taken to determine the existing vehicle mix for the model calibration. Based on the results, the existing traffic noise model utilizes a vehicle mix of 95.5% Autos, 3.0% Medium Trucks and 1.5% Heavy Trucks along Bear Valley Parkway. Table 2-1 presents the roadway parameters used in the analysis including the calculated hourly traffic volumes, vehicle speeds and the 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
Bear Valley Parkway	201	40	95.5	3.0	1.5
[1] All roadway parameters were observed during the ambient noise measurement period.					

The ambient measurement location was modeled in Sound32 to compare with the noise monitoring locations presented previously in Table 1-1. The modeled existing noise level comparison is provided in Table 2-2 below. The model is over predicting the noise levels by roughly 5 dBA using hard-site conditions under predicting the noise levels by 1 dBA using soft-site conditions. This slight under prediction near the center of the site is due to variations in the vehicular speeds and topographic changes.

Table 2-2: Noise Model Calibration

Receptor	Location	Site Conditions	Calibration Results (dBA)		
			Measured Noise Levels	Modeled Noise Levels	Difference
M1		Hard	50.7	55.8	+5.1
		Soft		50.7	0.0
M2	Along Bear Valley Parkway	Hard	47.1	52.8	+5.7
		Soft		46.0	-1.1
Model is within 1 dBA and no calibration is needed.					

Therefore, the roadways were modeled using soft site conditions for the future noise environment and no calibration factor was applied to predict the first/ground floor areas. Second floor areas were modeled using hard site conditions based upon Caltrans Protocol. The existing model input parameters for calibration and output file are provided as ***Attachment A*** to this report.

a) Potential Build Out Noise Conditions

The Buildout scenario includes the future year 2050 traffic volume forecasts provided by the County's General Plan Update. The future traffic along Bear Valley Parkway near the project site is estimated to be 12,400 ADT. The future roadway parameters and inputs utilized in this analysis are provided in Table 2-3. To assess the peak hour traffic noise conditions for both roadways, 10% of the ADT was utilized and the observed vehicle mix was also utilized.

Table 2-3: Buildout 2030 Traffic Parameters

Roadway	Average Daily Traffic (ADT)	Peak Hour Volume[1]	Modeled Speeds (MPH)	Vehicle Mix %[2]		
				Auto	Medium Trucks	Heavy Trucks
Bear Valley Parkway	12,400	1,240	55	95	3	2
[1] 10% of the ADT. [2] Conservative vehicle mix.						

Bear Valley Parkway is considered a Major Road based on the County of San Diego Department of Public Works Public Road Standards with a designed traffic speed of 55 MPH. To determine the worst case future noise levels a speed limit of 55 MPH along Bear Valley

Parkway was used. The future traffic noise model also utilizes a conservative vehicle mix of 95% Autos, 3% Medium Trucks and 2% Heavy Trucks along both roadways.

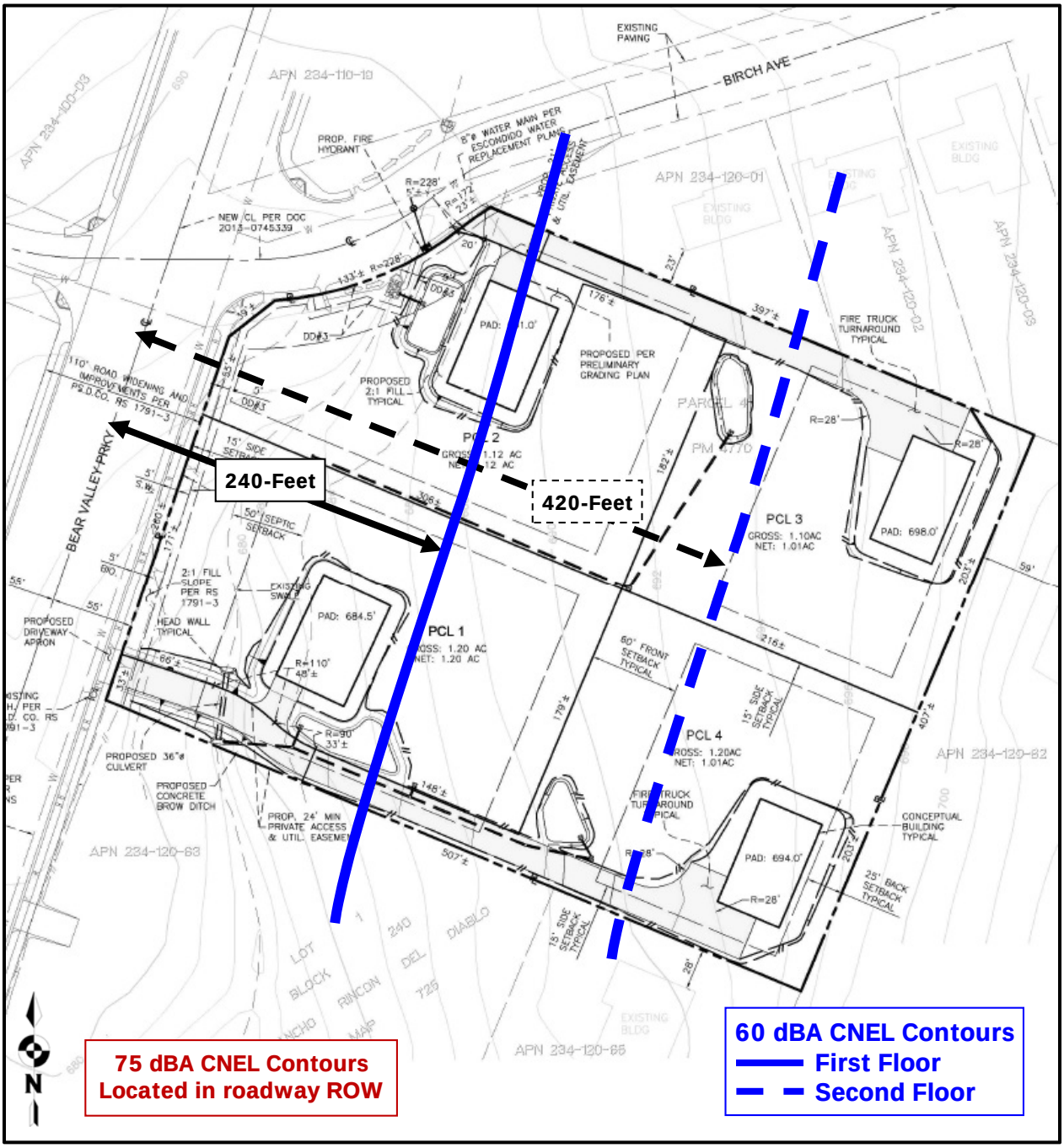
b) Potential Noise Impact Identification

Noise contours are lines that when drawn from a noise source indicate a continuous or equivalent level of noise exposure. Noise contour lines are generally used as a planning tool to assess potential impacts and the need for additional analysis. The noise contour lines that may affect the project site were developed for the unshielded future Buildout conditions. No barriers or structures were included as part of the noise contour analysis. The Sound32 traffic noise prediction model was used to calculate the noise contours perpendicular to the roadways. No natural topography or road edges were incorporated in the contour model to determine the worst-case future noise levels. The model input parameters and results for the first and second noise contours are provided in ***Attachment B***.

The 75 dBA CNEL contours are all located within the right-of-way (ROW) along the road edges. The worst-case first floor 60 dBA CNEL contour extends approximately 240-feet along Bear Valley Parkway. The second floor unshielded 60 dBA CNEL contour extends 420-feet from Bear Valley Parkway. Figure 2-A provides the location of the future first and second floor 75 dBA CNEL and 60 dBA CNEL noise contours for the proposed project layout. The noise contours provided in Figure 2-A show that noise sensitive land use (NSLU) areas will not exceed the County of San Diego 60 dBA CNEL exterior noise standard. Therefore, the proposed lots will meet the 60 dBA CNEL standard at more than the 10% minimum lot area. Based on the findings, no additional exterior noise analysis is required for the proposed project and no mitigation measures that are required. Additionally, Lots 1 and 2 were found to be above the 60 dBA CNEL at the proposed building facades.

Therefore, an interior noise assessment is required to mitigate the exterior noise levels to an interior level of 45 dBA CNEL. This report should be conducted prior to the issuance of building permits and would finalize the noise requirements based upon precise grading plans and actual building design specifications. This is to ensure that interior noise levels for the proposed residential structures comply with the interior noise level requirement of 45 dBA pursuant to the County Noise Element. It should be noted; interior noise levels of 45 dBA CNEL can be obtained with conventional building construction methods by providing a window condition requiring a means of mechanical ventilation (e.g. air conditioning) and providing upgraded windows at all affected lots.

Figure 2-A: Future Noise Contour Locations



2.3 Off-site Noise Impacts

To determine if direct or cumulative off-site noise level increases associated with the development of the proposed project would create noise impacts. The traffic volumes for the existing conditions were compared with the traffic volume increase of existing plus the proposed project. The project is estimated to only generate 48 daily trips (12 per lot) with a peak hour volume of 4 trips. The existing average daily traffic (ADT) volumes on the area roadways are more than several thousand ADT. Typically it requires a project to double (or add 100%) the traffic volumes to have a direct impact of 3 dBA CNEL or be a major contributor to the cumulative traffic volumes. The project will add less than a 5% increase to the exiting roadway volumes and no direct or cumulative impacts are anticipated.

2.4 Conclusions

The 75 dBA CNEL contours are all located within the right-of-way (ROW) along the road edges. The worst-case first floor 60 dBA CNEL contour extends approximately 240-feet along Bear Valley Parkway. The second floor unshielded 60 dBA CNEL contour extends 420-feet from Bear Valley Parkway. Figure 2-A provides the location of the future first and second floor 75 dBA CNEL and 60 dBA CNEL noise contours for the proposed project layout. The noise contours provided in Figure 2-A show that noise sensitive land use (NSLU) areas will not exceed the County of San Diego 60 dBA CNEL exterior noise standard. Therefore, the proposed lots will meet the 60 dBA CNEL standard at more than the 10% minimum lot area. Based on the findings, no additional exterior noise analysis is required for the proposed project and no mitigation measures that are required. Additionally, Lots 1 and 2 were found to be above the 60 dBA CNEL at the proposed building facades.

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The Project does not create a direct impact of more than 3 dBA CNEL on any roadway segment and no cumulative noise increase of 3 dBA CNEL or more was found. Therefore, the proposed Project's direct and cumulative contributions to off-site roadway noise increases will not cause any significant impacts to any existing or future noise sensitive land uses.

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

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.

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.

The single family units may be developed on a lot-by-lot basis, which may result in some lots undergoing building construction simultaneously but all grading activities and internal roadways will be graded prior to the occupancy of any proposed Lots. According to the project applicant, a total of two dozers, a loader/tractor, a water truck and an excavator will be required during grading activities to complete the proposed grading operations. The anticipated equipment will be spread out over the site working in different areas for 1-4 weeks and then relocating to a different portion of the site as needed. For example: a single water truck and a single dozer may be utilized near the project boundary while the other equipment is working on the opposite side of the site. The list of equipment and the associated noise levels utilized in this analysis are shown in Table 3-1. The worst case anticipated construction noise levels during construction are characterized below.

Table 3-1: Reference Noise Levels for Construction

Construction Phase	Construction Equipment	Quantity	Source Level @ 50 Feet (dBA)[1]
Grading and Base Operations	Dozer - D8	1	72
	Tractor/Backhoe	1	74
	Loader/Grader	1	73
	Water Trucks	1	70
	Scraper	2	75
[1] Source: EPA 1971 and Empirical Data			

Existing residential uses are located to the north and west of the site as can be seen in Table 3-2, if all the equipment was operating in the same location, which is not physically possible, at an average distance of over 100-feet from the nearest property line the point source noise attenuation from these construction activities is -5.1 dBA. This would result in an anticipated worst case eight-hour average combined noise level of less than 75 dBA at the property line. Given this and the spatial separation of the equipment, the noise levels will comply with the County of San Diego's 75 dBA standard at all Project property lines.

Table 3-2: Grading Operation 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
Scraper	2	75	8	78.0
			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				

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

If all the equipment was working in the same area, at an average distance of over 100-feet the point source noise attenuation from the site preparation activities and the nearest property line is -5.1 dBA. This would result in an anticipated worst case eight-hour average combined noise level of less than 75 dBA at the property line. Given this and the spatial separation of the equipment over the site, the noise levels from the grading are anticipated to comply with the County of San Diego's 75 dBA standard per Section 36.409 of the Noise Ordinance at all Project property lines.

No blasting or rock crushing is anticipated. 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

  The 75 dBA CNEL contours are all located within the right-of-way (ROW) along the road edges. The worst-case first floor 60 dBA CNEL contour extends approximately 240-feet along Bear Valley Parkway. The second floor unshielded 60 dBA CNEL contour extends 420-feet from Bear Valley Parkway. Figure 2-A provides the location of the future first and second floor 75 dBA CNEL and 60 dBA CNEL noise contours for the proposed project layout. The noise contours provided in Figure 2-A show that noise sensitive land use (NSLU) areas will not exceed the County of San Diego 60 dBA CNEL exterior noise standard. Therefore, the proposed lots will meet the 60 dBA CNEL standard at more than the 10% minimum lot area. Based on the findings, no additional exterior noise analysis is required for the proposed project and no mitigation measures that are required. Additionally, Lots 1 and 2 were found to be above the 60 dBA CNEL at the proposed building facades.

  Therefore, an interior noise assessment is required to mitigate the exterior noise levels to an interior level of 45 dBA CNEL. This report should be conducted prior to the issuance of building permits and would finalize the noise requirements based upon precise grading plans and actual building design specifications. This is to ensure that interior noise levels for the proposed residential structures comply with the interior noise level requirement of 45 dBA pursuant to the County Noise Element. It should be noted; interior noise levels of 45 dBA CNEL can be obtained with conventional building construction methods by providing a window condition requiring a means of mechanical ventilation (e.g. air conditioning) and providing upgraded windows at all affected lots.

- Off-Site Noise Analysis

  The Project does not create a direct impact of more than 3 dBA CNEL on any roadway segment and no cumulative noise increase of 3 dBA CNEL or more was found. Therefore, the proposed Project's direct and cumulative contributions to off-site roadway noise increases will not cause any significant impacts to any existing or future noise sensitive land uses.

- Construction Noise Analysis

  If all the equipment was working in the same area, at an average distance of over 100-feet the point source noise attenuation from the site preparation activities and the nearest property line is -5.1 dBA. This would result in an anticipated worst case eight-hour average combined noise level of less than 75 dBA at the property line. Given this and the spatial separation of the equipment over the site, the noise levels from the grading are anticipated to comply with the County of San Diego's 75 dBA standard per Section 36.409 of the Noise

Ordinance at all Project property lines.

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 TPM 21225 residential development. The report was prepared by Jeremy Louden; a County approved CEQA Consultant for Acoustics.

Jeremy Louden, Principal
Ldn Consulting, Inc.
760-473-1253
jlouden@ldnconsulting.net

Date October 18, 2015

ATTACHMENT A

MODEL CALIBRATION INPUT AND OUTPUT FILES

STEEVE - Existing Conditions
T-PEAK HOUR TRAFFIC CONDITIONS, 1
192 , 40 , 6 , 40 , 3 , 40
L-BEAR VALLEY, 1
N,471,568,680,
N,537,765,680,
N,784,1502,692,
N,858,1731,697,
R, 1 , 65 ,10
790,1074,689.,m1
R, 2 , 65 ,10
994,1027,697.,m2
R, 3 , 65 ,10
790,1074,689.,m1soft
R, 4 , 65 ,10
994,1027,697.,m2soft
D, 4.5
ALL,3,4
C,C

SOUND32 - RELEASE 07/30/91

TITLE:
STEEVE - Existing Conditions

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

RECEIVER	LEQ
m1	55.8
m2	50.7
m1soft	52.8
m2soft	46.0

ATTACHMENT B

FUTURE NOISE CONTOUR MODEL INPUT AND OUTPUT FILES

STEEVE - GROUND LEVEL CONTOURS
T-PEAK HOUR TRAFFIC CONDITIONS, 1
 1178 , 55 , 37 , 55 , 25 , 55
L-BEAR VALLEY, 1
N,471,568,680,
N,537,765,680,
N,784,1502,692,
N,858,1731,697,
B-PROP WALL, 1 , 2 , 0 ,0
690.,977,685,685,
668.,984,685,685,
721.,1146,685,685,
738.,1198,686,686,
769.,1222,687,687,
815.,1230,688,688,
857.,1247,690,690,
894.,1271,690,690,
909.,1265,690,690,
R, 1 , 65 ,10
676,944,685.,
R, 2 , 65 ,10
708,1041,686.5,
R, 3 , 65 ,10
741,1138,688.,
R, 4 , 65 ,10
773,1234,690.,
R, 5 , 65 ,10
805,1331,694.,
R, 6 , 65 ,10
745,915,685.,
R, 7 , 65 ,10
778,1012,686.,
R, 8 , 65 ,10
810,1108,689.,
R, 9 , 65 ,10
842,1205,689.,
R, 10 , 65 ,10
875,1302,694.,
R, 11 , 65 ,10
814,886,687.,
R, 12 , 65 ,10
847,983,690.,
R, 13 , 65 ,10
879,1079,692.,
R, 14 , 65 ,10
912,1176,696.,
R, 15 , 65 ,10
944,1273,695.5,
R, 16 , 65 ,10
884,857,690.,
R, 17 , 65 ,10
916,954,693.,
R, 18 , 65 ,10
949,1050,695.,
R, 19 , 65 ,10
981,1147,696.,
R, 20 , 65 ,10
1014,1244,697.,
R, 21 , 65 ,10
953,828,693.,
R, 22 , 65 ,10
986,925,695.,
R, 23 , 65 ,10
1018,1021,697.,
R, 24 , 65 ,10
1050,1118,698.,
R, 25 , 65 ,10
1083,1215,699.,
R, 26 , 65 ,10
1023,799,695.,
R, 27 , 65 ,10
1055,896,697.,
R, 28 , 65 ,10
1087,992,699.,
R, 29 , 65 ,10
1120,1089,700.,

R, 30 , 65 ,10
1152,1186,701.,
R, 31 , 65 ,10
1092,770,698.,
R, 32 , 65 ,10
1124,867,699.,
R, 33 , 65 ,10
1157,963,701.,
R, 34 , 65 ,10
1189,1060,703.,
R, 35 , 65 ,10
1222,1157,703.,
R, 36 , 65 ,10
1161,741,704.,
R, 37 , 65 ,10
1194,838,704.,
R, 38 , 65 ,10
1226,934,705.,
R, 39 , 65 ,10
1259,1031,707.,
R, 40 , 65 ,10
1291,1128,706.,
D, 4.5
ALL,ALL
C,C

SOUND32 - RELEASE 07/30/91

TITLE:
STEEVE - GROUND LEVEL CONTOURS

REC	REC ID	DNL	PEOPLE	LEQ(CAL)
1	R-1	65.	10.	68.3
2	R-2	65.	10.	65.7
3	R-3	65.	10.	67.9
4	R-4	65.	10.	68.4
5	R-5	65.	10.	68.5
6	R-6	65.	10.	63.2
7	R-7	65.	10.	62.4
8	R-8	65.	10.	62.6
9	R-9	65.	10.	62.1
10	R-10	65.	10.	63.6
11	R-11	65.	10.	60.4
12	R-12	65.	10.	60.3
13	R-13	65.	10.	60.3
14	R-14	65.	10.	60.5
15	R-15	65.	10.	60.6
16	R-16	65.	10.	58.3
17	R-17	65.	10.	58.3
18	R-18	65.	10.	58.3
19	R-19	65.	10.	58.4
20	R-20	65.	10.	58.3
21	R-21	65.	10.	56.5
22	R-22	65.	10.	56.6
23	R-23	65.	10.	56.6
24	R-24	65.	10.	56.6
25	R-25	65.	10.	56.6
26	R-26	65.	10.	55.0
27	R-27	65.	10.	55.1
28	R-28	65.	10.	55.2
29	R-29	65.	10.	55.2
30	R-30	65.	10.	55.0
31	R-31	65.	10.	53.6
32	R-32	65.	10.	53.8
33	R-33	65.	10.	53.8
34	R-34	65.	10.	53.8
35	R-35	65.	10.	53.7
36	R-36	65.	10.	52.4
37	R-37	65.	10.	52.6
38	R-38	65.	10.	52.6
39	R-39	65.	10.	52.6
40	R-40	65.	10.	52.5

STEEVE - SECOND LEVEL CONTOURS
T-PEAK HOUR TRAFFIC CONDITIONS, 1
 1178 , 55 , 37 , 55 , 25 , 55
L-BEAR VALLEY, 1
N,471,568,680,
N,537,765,680,
N,784,1502,692,
N,858,1731,697,
B-PROP WALL, 1 , 2 , 0 ,0
690.,977,685,685,
668.,984,685,685,
721.,1146,685,685,
738.,1198,686,686,
769.,1222,687,687,
815.,1230,688,688,
857.,1247,690,690,
894.,1271,690,690,
909.,1265,690,690,
R, 1 , 65 ,10
676,944,695.,
R, 2 , 65 ,10
708,1041,696.5,
R, 3 , 65 ,10
741,1138,698.,
R, 4 , 65 ,10
773,1234,700.,
R, 5 , 65 ,10
805,1331,704.,
R, 6 , 65 ,10
745,915,695.,
R, 7 , 65 ,10
778,1012,696.,
R, 8 , 65 ,10
810,1108,699.,
R, 9 , 65 ,10
842,1205,699.,
R, 10 , 65 ,10
875,1302,704.,
R, 11 , 65 ,10
814,886,697.,
R, 12 , 65 ,10
847,983,700.,
R, 13 , 65 ,10
879,1079,702.,
R, 14 , 65 ,10
912,1176,706.,
R, 15 , 65 ,10
944,1273,705.5,
R, 16 , 65 ,10
884,857,700.,
R, 17 , 65 ,10
916,954,703.,
R, 18 , 65 ,10
949,1050,705.,
R, 19 , 65 ,10
981,1147,706.,
R, 20 , 65 ,10
1014,1244,707.,
R, 21 , 65 ,10
953,828,703.,
R, 22 , 65 ,10
986,925,705.,
R, 23 , 65 ,10
1018,1021,707.,
R, 24 , 65 ,10
1050,1118,708.,
R, 25 , 65 ,10
1083,1215,709.,
R, 26 , 65 ,10
1023,799,705.,
R, 27 , 65 ,10
1055,896,707.,
R, 28 , 65 ,10
1087,992,709.,
R, 29 , 65 ,10
1120,1089,710.,

R, 30 , 65 ,10
1152,1186,711.,
R, 31 , 65 ,10
1092,770,708.,
R, 32 , 65 ,10
1124,867,709.,
R, 33 , 65 ,10
1157,963,711.,
R, 34 , 65 ,10
1189,1060,713.,
R, 35 , 65 ,10
1222,1157,713.,
R, 36 , 65 ,10
1161,741,714.,
R, 37 , 65 ,10
1194,838,714.,
R, 38 , 65 ,10
1226,934,715.,
R, 39 , 65 ,10
1259,1031,717.,
R, 40 , 65 ,10
1291,1128,716.,
C,C

SOUND32 - RELEASE 07/30/91

TITLE:
STEEVE - SECOND LEVEL CONTOURS

REC	REC ID	DNL	PEOPLE	LEQ(CAL)
1	R-1	65.	10.	70.1
2	R-2	65.	10.	70.2
3	R-3	65.	10.	70.2
4	R-4	65.	10.	70.2
5	R-5	65.	10.	70.1
6	R-6	65.	10.	65.8
7	R-7	65.	10.	65.5
8	R-8	65.	10.	66.7
9	R-9	65.	10.	66.7
10	R-10	65.	10.	66.6
11	R-11	65.	10.	63.5
12	R-12	65.	10.	63.5
13	R-13	65.	10.	64.5
14	R-14	65.	10.	64.5
15	R-15	65.	10.	64.4
16	R-16	65.	10.	61.7
17	R-17	65.	10.	61.9
18	R-18	65.	10.	62.8
19	R-19	65.	10.	62.8
20	R-20	65.	10.	62.2
21	R-21	65.	10.	60.2
22	R-22	65.	10.	60.3
23	R-23	65.	10.	60.6
24	R-24	65.	10.	60.6
25	R-25	65.	10.	60.7
26	R-26	65.	10.	59.0
27	R-27	65.	10.	59.1
28	R-28	65.	10.	59.2
29	R-29	65.	10.	59.3
30	R-30	65.	10.	59.4
31	R-31	65.	10.	57.9
32	R-32	65.	10.	58.0
33	R-33	65.	10.	58.2
34	R-34	65.	10.	58.2
35	R-35	65.	10.	58.2
36	R-36	65.	10.	57.0
37	R-37	65.	10.	57.2
38	R-38	65.	10.	57.2
39	R-39	65.	10.	57.3
40	R-40	65.	10.	57.2